Programme: MCA/MSc (Computer Science)

CourseCode	Title	Schemeof Examination				Hrs/Week			Credits
		Duration (hrs)	IA	UE	Total Marks	L	T	P	
MC-144	Principles of Programming&ProblemSolving usingC	3	40	60	100	5	0	0	4

Objective:

The objectiveofthecourse istodeveloplogical abilityandbasicprogrammingskillsinstudents topavethewayforproblemsolving.

Unit-I

ProblemSolving:Introduction,Steps inProblemSolving,ProblemSolving Techniques(Trial& Error,BrainStorming,Divide&Conquer),FlowchartsandAlgorithms (Definition, Symbols&Characteristics),SimpleExamplesofFlowcharts andAlgorithms(RealLifeExamples),Concept ofProgrammingLanguages,Categoriesof Languages.

Unit-II

IntroductiontoC-Language: History,Features,Structure&LifeCycleofaC-ProgramData typesandsizes,Variables,Constants,Keywords,Storage Classes, Operators(Unary, Arithmetic, logical,Bitwise,Assignment, Ternary),Expressions, Controlstatements(if-else,switch,break, continue,goto),Loops(for,while,do-while).

Unit-III

Arrays, Functions &Sorting: Arrays (Linear and Multi-dimensional); String handling; Functions(built-inand userdefined),declaration,definition,andfunction call,parameterpassing andreturntypes,Recursion,Sorting:BubbleSort,InsertionSortandSelectionSort.

Unit-IV

StructuresandUnion: Declaration,Accessingstructureandunionelements,difference,Array ofstructures,Nestedstructures,passing ArraysandStructurestofunctions;Pointers,Array of pointers,CallbyValueandCallbyReference.

Unit-V

FileHandling: IntroductiontofilehandlinginC,FileAccess Modes,Textvs.BinaryFiles,File I/OOperations,andErrorHandlinginFiles,FormattedInput/output,andRandomAccessto Files,Reading&WritingFileRecordswithSorting,SearchingandMerging Operations, CommandLineArguments.

COURSEOUTCOMES:

Onthesuccessfulcompletionofthecourse,studentswillbeableto

CO1. Define problem,outlinesolution,developthealgorithmandtestthealgorithmfor correctness.Acquireknowledgeaboutthebasicconceptofwritingaprogram.

CO3. Understandthe roleofconstants,variables,identifiers,operators,typeconversionandwhy differentconstructsareavailableforiteration,suchas"for"loops,"do...while"loops.

CO5.Identifythedifferencebetweeniterationandrecursionintermsof Cprogramming.

CO6. Understandthe applicationofArrays(Linear&Multi-dimensional),Strings,Functions, Pointers,RecursiveFunctions.

CO7. DevelopCprogramsfordifferentsortingtechniques(BubbleSort,InsertionSortand SelectionSort).

CO8. Understandroleof Functionsinvolvingthe ideaofmodularity,Userdefineddatatypes likeStructuresandUnion,Pointers,Arrayofpointers,CallbyValueandCallbyReference.

CO9. DevelopCprogramsforFileManagement

NoteforPaperSetting:

Thequestion paperwillbedivided intotwosections.**SectionA**willinclude 10compulsory objective-cum-short answertypequestionsfromeachunit,eachcarrying1mark.**SectionB**will haveten(10)longanswerquestions,twofromeachunit.Thestudentwillhavetoattemptone(01) questionfromeachunit.Eachquestionwillcarry 10marks.

TextBooks:

1. **Balagurusamy**.**E(2005)**,"ProgramminginANSIC",**TMH,NewDelhi**.
2. **KanetkarY (2004)**,"LetUsC",**BPB,NewDelhi.**

References:

1.**Mulish**,**C(2004)**,"TheSpiritofC",**JaicoPublications,NewDelhi**.
2.**Keringhan,B.W&Ritche,D.M(2005)**,"C Programminglanguage",**PHINewDelhi.**
3.**Schildt,H(2004)**,"ACompleteReferenceinC",**TMH**,**NewDelhi**.
4.**Shrivastav(2002)**,"CinDepth",**BPB,NewDelhi**.
5.**Gottfried(2004)**,"ProgrammingwithC",**SchaumSeries,TMH,NewDelhi**.

Course Code	Title	Scheme of Examination				Hrs/Week			Credits
		Duration (hrs)	IA	UE	Total Marks	L	T	P	
MC-171	Lab 1: PC Software	3	50	50	100	0	0	6	4

COURSE OUTCOMES:

CO1. Student will able to understand the basic concepts of computers and Disk Operating System. Students will able to perform different DOS commands.

CO2. Students will able to identify different windows components and change settings (display, set screen savers, date and time, appearance, etc.). Students will practice handling mouse and typing on keyboard.

CO3. Students will be able to understand and practice different word processing options and use them in day to day office related work (letter typing, creating project reports, notices, etc).

CO4. Student will understand and practice MS-Excel and able to use it in creating results, analyzing data, etc. students will able to create presentations having animations.

CO5. Student will understand the concept of Internet and use browser to explore internet, create Email account, compose, attach files and send Emails.

Programme: MCA/MSc (Computer Science)

CourseCode	Title	Schemeof Examination				Hrs/Week			Credits
		Duration (hrs)	IA	UE	Total Marks	L	T	P	
MC-172	Lab2:C Programming	3	40	60	100	5	0	0	4

COURSEOUTCOMES:

Onthesuccessfulcompletionof thecourse,studentswillbeableto

CO1: Designalgorithmsforthe givenproblemspecifications.

CO2: WriteCprogramsforthedesignedalgorithmspecification.

CO3: WriteCprogramstoimplementArrays(Linear&Multi-dimensional),Strings,Functions, Pointers,RecursiveFunctions.

CO4:WriteCprogramstoimplementusingFunctions,UserdefineddatatypeslikeStructures andUnion,Pointers,Arrayofpointers,CallbyValue andCallbyReference.

CO5 WriteCprogramsforFileManagement

Programme: MCA/MSc (Computer Science)

CourseCode	Title	Schemeof Examination				Hrs/Week			Credits
		Duration (hrs)	IA	UE	Total Marks	L	T	P	
MC-241	Software Engineering	3	40	60	100	5	0	0	4

Objective:

Thispaperaimstohelpstudentstocomprehend theroleandscopeofsoftwareengineeringand equipthemwiththeabilitytoapplySoftwareEngineeringpractices.

UnitI

BasicConceptsof SystemAnalysisandDesign: SystemConcept,Characteristicsand Elements ofSystem,TypesofSystem,SystemDevelopment Life Cycle,RoleofSystemAnalyst, InformationGatheringTechniques,FeasibilityStudy,FeasibilityConsiderations, Feasibility Report.
IntroductiontoSoftwareEngineering: SoftwareMyths,SoftwareCharacteristics,Software EngineeringChallenges(Scale,QualityProductivity,ConsistencyandRepeatability,Change).

UnitII

SoftwareProcessManagement:CharacteristicsofSoftwareProcess,IntroductiontoSoftware ProcessModels:Waterfallmodel,Prototyping model,Iterativemodel,SpiralModel; Planning:CostEstimation,UncertaintiesinCostEstimation,COCOMO ModelforCost Estimation; Project Scheduling: Average Duration Estimation, Project Scheduling and milestones;IntroductiontoStaffing.

UnitIII

SystemAnalysis: IntroductiontoSoftwareRequirementAnalysisandSpecification,Software Requirements:NeedforSRS,RequirementProcess,ProblemAnalysis:Analysis Issues,Informal Approach, StructuredAnalysis(DataFlowModeling), ObjectOrientedModeling,Prototyping, RequirementSpecification(Characteristics,Components),Metrics(Size&Quality).

UnitIV

Software Design-I: Function Oriented Design:DesignPrinciples (Problem Partitioningand Hierarchy, Abstraction, Modularity, Top-Down and Bottom-UpApproaches),Module level Concepts(CouplingandCohesion), DesignNotations&Specifications (StructuredCharts, Specification),StructuredDesignMethodology.

UnitV

Software Design-II: Object Oriented Design: OO Analysis and OO Design, Concepts of OOAD:Encapsulation,Abstraction,InheritanceandPolymorphism. DesignConcepts.Design Notations&Specifications,DesignMethodology: DynamicModeling,FunctionalModeling, DefiningInternalClassesandOperations.

Introduction to Software Testing: Testing Fundamentals: Error, Fault and Failure, Test Oracles, Test Cases and Criteria, Psychologyof Testing. Test Strategies for Conventional Softwaretesting(UnitTesting,IntegrationTesting)

COURSEOUTCOMES:

CO1: ThisunitexplainsbasicconceptsofSystemAnalysisandDesignandatthesametime introducesSoftwareEngineering alongwithitschallenges.Thestudentshallbeacquaintedwith thedifference,similaritiesandrelationamongthe twosubjects.

CO2: Thestudentshallbeabletoknowvarioussoftwareprocessmodelsandthescenarios during whichthesemodelssuitthebest.Thestudentwouldalsobeabletoperform Software ProjectCostEstimation,ProjectSchedulingandProjectStaffing.

CO 3: The goal of this unit is to acquaint the student to design and develop Software RequirementSpecificationDocumentandvarioustechniquesofProblemanalysis.

CO4: TheStudents willbeabletoknowvariousconceptsofFunctionorientedapproach of SystemDesignalong withModule levelconceptsandnotationsandchartsthatareusedfor developingafunctionorienteddesign.

CO5: ThisunitenablesthestudenttodevelopObjectOriented Software Designandnotations andchartsthatareusedfordevelopingthesame.ThisunitalsointroducesvariousSoftware Test TechniquesthatareusedfortestingthenewlysoftwareS.

NoteforPaperSetting:

Thequestion paperwillbedivided intotwosections.**SectionA**willinclude 10compulsory objective-cum-short answertypequestionsfromeachunit,eachcarrying1mark.**SectionB**will haveten(10)longanswerquestions,twofromeachunit.Thestudentwillhavetoattemptone(01) questionfromeachunit.Eachquestionwillcarry10marks.

Textbooks:

1.**Pressman,RS(2006),"**SoftwareEngineering–APractitioner'sApproach",Sixthedition, **TMH.**
2.**Jalote,P(2005),**"AnIntegratedApproachtoSoftwareEngineering",3Rd Edition,**Narosa Publication.**

References:

1. **SCHAUM'SOutlines(2005),**"SoftwareEngineering",**TMH**.
2. **Sommmerville(2000)**,"SoftwareEngineering",**AddisonWesley**.

Course Code	Title	Scheme of Examination				Hrs/Week			Credits
		Duration (hrs)	IA	UE	Total Marks	L	T	P	
MC-243	**Data & File Structures using C++**	**3**	**40**	**60**	**100**	**6**	**0**	**0**	**4**

Objective:

The objective of the course is to introduce implementation, evaluation and analysis of the fundamental data structures for representing and manipulating data. The implementation of the same is carried out using C++.

Unit-I

Introduction to Data Structure: Concept, Basic Terminology, Elementary Data Structures, Abstract Data Type, Arrays & its representation, Operations on Arrays, Sparse Arrays, Pointers, Linked List (Singly, Double & Circular), Operations on Linked List (Traversing, Insertion, Deletion etc.), Introduction to Garbage Collection.

Unit-II

Stacks and Queues: Basic Concept, implementation, Applications: Recursion (Fibonacci Series, Factorial & Tower of Hanoi problem), Polish Expressions and their Compilations (Infix, Prefix, Postfix), Queues and their implementation, De-Queues, Priority Queues.

Unit III

Trees: Concept, Binary Trees, Tree Traversal Techniques (Preorder, Post order, In order), Complete Binary Trees, Binary Search Tree & Operations on Binary Search Tree (Searching, Insertion & Deletion), Height Balance and Concept of AVL Trees and purpose of B-Trees.

Unit IV

Graphs: Concept, Directed Graphs, Graph Representation (Adjacency Matrix and Linked Representation), Dijkstra's shortest Path Algorithm, Graph Traversal Techniques (Breadth First Search & Depth First Search).

Searching and Sorting: Linear & Binary Search, Merge Sort, Heap Sort, Quick sort.

Unit-V

Files: Basic terminology Attributes of a File, Classification of Files.

File Organizations: Sequential File Organization, Relative File Organization, Indexed Sequential File Organization (Primary, Clustering and Secondary).

Hashing: Basic concept, Hash Table, Hash Function.

Course Outcome

On the successful completion of the course, students will be able to:

CO1. Understand the concept of Data Structure, Abstract Data Type, Arrays & its representation, Operations on Arrays, Sparse Arrays, Pointers, Linked List (Singly, Double & Circular), Operations on Linked List (Traversing, Insertion, Deletion etc.).

CO2. Implement a solution for a given Search problem (Linear Search and Binary Search).

CO3. For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computation complexity.

CO4. Write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.

CO5. Implement Graph search and traversal algorithms and determine the time and computation complexity.

CO6. Write C++ programs for File Management

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will include 10 compulsory objective-cum-short answer type questions from each unit, each carrying 1 mark. **Section B** will have ten (10) long answer questions, two from each unit. The student will have to attempt one (01) question from each unit. Each question will carry 10 marks.

Text Books:

1. **Baluja G. S**., "Data Structures Through C++", **Dhanpat Rai & Co.**
2. **Seymour Lipschutz**(SCHAUM'S ouTlines), "DATA STRUCTURES", **Tata McGraw Hill, 2006.**

References:

1. **R. Kruse,** "Data Structures & Program Design in C", **Pearson Education, 2004.**
2. **Dr. PrabhakarGupta,VineetAgarwal, Manish Varshney, "** Data Structure Using 'C', **FIREWALL MEDIA ,2007**
3. **Tanenbaum**, "Data Structures Using "'C" & "C++"", 2nd Ed. **PHI Publication,2005.**

Course Code	Title	Scheme of Examination				Hrs/Week			Credits
		Duration (hrs)	IA	UE	Total Marks	L	T	P	
MC-272	**Lab 4: Data and File Structures using C++**	3	50	50	100	0	0	6	4

Course Outcomes

On the successful completion of the course, students will be able to:

CO1: Write C++ programs to implement linear data structures : Stack and Queue using arrays and linked list in an application context.

CO2: Implement Non linear data structures: Graph, Trees, Hash table in an application context.

CO3: Implement specific sort algorithms in application context.

CO4: Write C++ programs to implement Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort.

CO5: Write C++ Programs to Implement Graph search and traversal algorithms.

CourseCode	Title	Schemeof Examination				Hrs/Week			Credits
		Duration (hrs)	IA	UE	Total Marks	L	T	P	
MC-343	Relational Database Management System	3	40	60	100	5	0	0	4

Objective:

Theaimof thecourseis to introducestudentsto thefundamentalconceptsnecessaryfor designing, using and implementing database systems. It emphasizes relational database modeling&designandthelanguages andfacilitiesprovidedbytherelationaldatabase managementsystems.

Unit-I

DatabaseSystemConcepts&Architecture: Concept,Characteristicsofdatabase,Database systemVsfilesystem,IntroductiontoDBMS,Advantages,Disadvantages ofDBMS,Database users. DatabaseSystemConcept&Architecture:Concept,schemasandinstances,DBMSarchitecture &dataindependence,Components ofDBMS,DatabaseLanguages&Interfaces,Centralized&Client/ServerArchitecturesofDBMSs.

Unit-II

Data models:DatamodelingusingER-Approach(Concept,ER-Notations,Entities,Entitytypes, Attributes,Attributetypes,RelationshipsKeysconcept).

Conventional Data Models &Systems: Network data model concept, Hierarchical model concept.

RelationalDataModel:Concept, Relational modelConstraints (EntityIntegrity, Referential Integrity, Key Constraints, Domain Constraints), Codd's Rules, Relational Algebra (FundamentalOperations).

Unit-III

RelationalDatabaseDesign&Normalization:ConceptofFunctionaldependencies(Fully, partial,Transitive),Normalizationofrelationaldatabase,ClosureofAttributeSet,Canonical Cover,Normforms(1NF,2NF,3NF,BCNF,4NF),Joindependencies.

Unit-IV

Concurrency: Concept,Transactionstates,Transactionproperties(ACIDTest),Serializability, Recoverability.
ConcurrencyControl&RecoveryTechniques:Concurrencycontrolconcept,Concurrencycontrol techniques,Locking(concept,types),Timestampordering,Granularityofdataitems,Deadlock &itsResolution.
RecoveryConcepts,RecoveryTechniques(Logbased,Shadowpaging,Checkpoint)
IntroductiontoDatabaseSecurity.
IntroductiontoObjectOriented&MultimediaDatabases.

Unit-V

PL/SQL:Introduction,Concept, CharacteristicsofSQL,Advantages ofSQL,Datadefinitionin SQL,literals,Operators,SpecifyingConstraintsinSQL,DatamanipulationinSQL,Views& Queries,Insert,Update&DeleteOperations,Creatingusers,Grant andrevokeobjectprivileges.
IntroductiontoPL/SQL:variable,constants,datatypes,Pl/SQLblockstructure,Conditionand iterativecontrolstatements,Conceptofcursors&trigger.

COURSEOUTCOMES:

CO1:Distinguish database systemsfromfilesystemsbyenumeratingthefeatures providedby databasesystemsanddescribe eachinbothfunction andbenefit.Thestudentshallalsobe abletodefinetheterminology, features,classifications,andcharacteristicsembodiedin databasesystems.

CO2: Model an application's data requirements using conceptual modeling tools like ER diagrams anddesigndatabaseschemasbasedontheconceptualmodelandalso demonstrateanunderstanding oftherelationaldatamodelanDalsoFormulate,using relationalalgebra,solutionstoabroadrangeofqueryproblems.

CO3:Demonstrateanunderstanding ofnormalizationtheoryandapplysuchknowledgetothe normalizationofadatabase.Thestudentsshallknowwhy normalizationandwhatroleit playsinthedatabasedesignprocess andalsoitsvariousnormalforms1NF,2NF,3NF, BCNF,and4NF.

CO4:DeterminetheAcidproperties(Atomicity,Consistency,IsolationandDurability)ofa given Transactionandalsoexplorethevariouslockingprotocolsanddatabase backup and recoverymechanismssoastoimplementthesameintherealworld.

CO5:writevariousDDL/DML/DCLSQLcommandstoinsert/update/deletedata,and querydata inarelationalDBMS.Studentsshallsolveabroadrangeofquery anddataupdate problems.

NoteforPaperSetting:

Thequestion paperwillbedivided intotwosections.**SectionA**willinclude 10compulsory objective-cum-short answertypequestionsfromeachunit,eachcarrying1mark.**SectionB**will haveten(10)longanswerquestions,twofromeachunit.Thestudentwillhavetoattemptone(01) questionfromeachunit.Eachquestionwillcarry10marks.

TextBooks:

1.**Elmarsi,Navathe,SB(2004)**,"FundamentalsofdatabaseSystems", **PearsonEducation**.
2.**Silbebschatz,A.Korth,H,F.Sudarshan,S(2006)**,"DatabaseSystemConcepts",**TMH.**

References:

1.**Date,CJ(2005)**,"AnIntroductiontoDatabaseSystems",**AddisonWesley**.
2.**Desai,BC(2002)**,"AnintroductiontodatabaseSystems",**GalgotiaPublications**.
3.**Leon(2004)**,"DatabaseManagementSystems",**VikasPublications.**
*4.***BayrossI.**,"CommercialApplicationDevelopmentusingOracleDeveloper2000",**BPB.**

Programme: MCA/MSc (Computer Science)

CourseCode	Title	Schemeof Examination				Hrs/Week			Credits
		Duration (hrs)	IA	UE	Total Marks	L	T	P	
MC-344	Java Programming	3	40	60	100	5	0	0	4

Objective:

Thiscourseacquaintsstudentswithobjectorientedprogramming conceptsandotheradvanced featuresandtheirimplementationin Javalanguage.

Unit-I
Introduction: AnoverviewtoJava,Comparisonwithotherlanguages(C&C++),Javaand Internet,FeaturesofJava,IntroductiontoJavaVirtualmachine,ObjectOrientedProgramming Concepts:Abstraction,Encapsulation,InheritanceandPolymorphism.**Da tatypes:**Integers,Floatingpoint,CharactertypeandBoolean.
Variables:Assignment,Initialization,type conversion&Casting.
Operators:Arithmetic,Assignment,Modulus,Relational,Booleanand Bitwise.

Unit-II
Arrays: Concept,SingleandMultidimensionalarrays.
Controlstatements: Conditionalstatements,IterationStatements andJumpStatements.
Classes&Methods: ClassFundamentals,DeclaringObjects,CreatingMethods,Constructors, CommandLineArguments&ArgumentPassing.Staticvariablesandmethods.

Unit-III
Inheritance:Basics Of Inheritance, Super Class, Member Access, Creating a Multilevel Hierarchy,MethodOverriding,DynamicMethodDispatch&AbstractClass.
Packages&Interfaces:DefiningandImportingPackages,UnderstandingClasspath,Access Protection,Definingand ImplementingInterfaces.
ExceptionHandling:FundamentalsofExceptions,ExceptionTypes,UsingTryandCatch, ThrowingExceptions,Built-InExceptionsinJava,UserDefinedExceptions.

Unit-IV
MultithreadedProgramming:JavaThreadModel,Creating&WorkingwithThreads,Thread Priorities,IntroductiontoSynchronizationandDeadLocks.
StringHandling:StringConstructor,StringOperations, CharacterExtraction,StringSearching &Comparison,StringBufferClass,StringBufferV/sStringClass.
LangPackage:SimpleTypeWrappers,Runtime&IntroductionToMemoryManagement.

Unit-V
I/OStreams:StreamClasses,Reading&WritingtoConsole,Accessingfiles&Directories, FileInputandOutputStream,ByteArrayInput&OutputStream.

Applets: Overview, Life cycle of an Applet, HTMLtag, Parameter Passing, Applet vs. Applications.

COURSEOUTCOMES:

CO1.Studentswillbeabletounderstandthefeaturesofjavaandhowdoesworkwithdata types,variablesandoperatorsinJavaVirtualMachine(JVM)Environment.

CO2.StudentsshallbeabletoworkwithArrays,UseofControlStatementsandFundamentals ofClass&Objects.

CO3. Students will be to implement the features of Inheritance, Packages, Interfaces and ExceptionHandlinginJavaprogramming.

CO4. Studentsshalltbeabletoprogramwithmultithreadingprogrammingstyle,LangPackage andHandlingofStringsinJava.

CO5. StudentsshallbeabletoprogramwithInputOutput(I/O)Streamsanddevelopmentof Applets.

NoteforPaperSetting:

Thequestion paperwillbedivided intotwosections.**SectionA**willinclude 10compulsory objective-cum-short answertypequestionsfromeachunit,eachcarrying1mark.**SectionB**will haveten(10)longanswerquestions,twofromeachunit.Thestudentwillhavetoattemptone(01) questionfromeachunit.Eachquestionwillcarry10marks.

TextBooks:

1.**Schildt,H(2004),**"TheCompleteReferenceJava-2",SixthEdition,**TMH.**

References:

1.**Dietel&Dietel(2006),**"Java:HowtoProgramJava2",SixthEdition, **PearsonEducation.**
2.**Horstmann&Cornell (2006),**"Java2 Vol-1&Vol-2", SevenIndian Reprint,**Pearson Education.**

CourseCode	Title	Schemeof Examination				Hrs/Week			Credits
		Duration (hrs)	IA	UE	Total Marks	L	T	P	
MC-442	DotNet Technologies usingC#	3	40	60	100	5	0	0	4

Objective:
The course isdesignedtointroducestudentstotheconcept the.Netframework.The course shall coverVisualC#.Netas wellasADO.Net.Emphasisofthecourseisonenhancingprogramming skillsofstudentsfordevelopingprojects.

Unit-I
.NetFrameworkandIDE:Introduction To.NetFramework,.NetArchitecture,Advantages of DotNetFrame Work,Common Language Runtime, MSILAndJIT,ClassLibrary,Integrated **Development Environment(IDE)**:IDEComponents, WindowsFormsandBasicControls, WindowsFormsAndEvents,MessageBox,BasicControlslikeCommand Buttons,TextBox, ListBox,RadioButtons,Labels,LinkLabels,ComboBox,BuildingSmallApplications.

Unit-II
C#Basics:C#Literals,Variables&DataTypes,OperatorsandExpressions.
Workingwith Events and Event Driven programming.Conditional Logic, Looping Logic, BranchingLogic.
ClassesandObjects:Introduction,Methods:ArgumentPassing,PassingObjectsand Lists. Constructors,constructoroverloading.
Inheritance: introduction Single and Multiple, Polymorphism- Method Overloading and OperatorOverloading.

Unit-III
Interfaces:Introduction,DefininganInterface,ExtendinganInterface, ImplementingInterfaces, Interfacesand Inheritance,AbstractClassandInterfaces.
DelegatesandEvents:Introduction, Delegates,DelegateDeclaration,DelegateMethods, DelegateInstantiation,DelegateInvocation, Using Delegates.ArrayLists,Hash Tablesand Dictionaries.

Unit-IV
ManipulatingStrings:Introduction,CreatingStrings,StringMethods,InsertingStringsUsing System,ComparingStrings,FindingSubstrings,MutableStrings,andArraysofStrings. Generics,Genericcollectionclasses.
ErrorandExceptionHandling: Introduction,TypesofErrors,Exceptions,SyntaxofException HandlingCode,MultipleCatchStatements.WorkingwithDate andTime.

Threading:Applicationswithmultiplethreads,ManipulatingThreads,CreatingThreadswith Threadpool.

Unit-V

DataBaseConnectivity:ArchitectureofADO.Net,WorkingwithADO.Net, DataAccess withADO.Net,UsingDatabases,ServerExplorer,DataAdapterandDatasets,
Datacontrols:DataGrid,DataBinding,and CreatingNewData Connectionin Code.Managing dataandrelationship:XMLschemas,PopulatingaDataset,PersistingDatasetChanges,windows forms,viewing.Netdata.Reportingin.Net

COURSEOUTCOMES:

CO1. Student will able to understand the concept of .NET Framework and its architecture.Studentwillable todevelopsmallapplicationusingcontrolspresentin Visual Studio.

CO2.Studentwillbeabletounderstand thebasicconceptsofC#programminglanguageand implementOOPsconceptsinC#.

CO3. Studentswillbeabletounderstand andimplementtheconceptofeventhandling usingdelegatesinC#.

CO4. Studentwillbefamiliarizingwiththeconceptof Stringmanipulations, Generics andthreading inC#.Studentwillalsoabletohandleexceptionsgeneratedbydifferent errors**.**

CO5. Studentwillabletoworkwithdifferentdatabases, retrieve,manipulateandviewdatain differentdatacontrolsusingADO.Net.

NoteforPaperSetting:

Thequestion paperwillbedivided intotwosections.**SectionA**willinclude 10compulsory objective-cum-short answertypequestionsfromeachunit,eachcarrying1mark.**SectionB**will haveten(10)longanswerquestions,twofromeachunit.Thestudentwillhavetoattemptone(01) questionfromeachunit.Eachquestionwillcarry10marks.

TextBooks:

1. **Platt,DS (2005),**"IntroducingMicrosoft.Net",**MicrosoftPress,PHI.**
2. **Simonet.al(2005),**"C#forBegineers",**WroxPublications.**
3. **Simonet.al(2005),**"ProfessionalC#",**WroxPublications.**

References:

1. **Schildt,H(2005),**"TheCompleteReferenceC#",**TMH.**

Programme: MCA/MSc (Computer Science)

CourseCode	Title	Schemeof Examination				Hrs/Week			Credits
		Duration (hrs)	IA	UE	Total Marks	L	T	P	
MC-443	MinorProject	3	50	150	200	5	0	0	8

Objective :

Theaimistheminorprojectistoprepare students bygivingthemafeelofhowtheprojectis done.Theprojectwillbeassignedatthestartofthefourthsemesterandwillbeevaluatedby boththeconcernedInternalteacher&ExternalExaminer.

CourseOutcomes.

CO1. Thestudentswill becarryingouttheprojectwithinthedepartment.

CO2. Thestudentswillbe ableto learnandhaveafeelonhands-onProject inwhichhewillbe madebasedonhis/herunderstandingontheAnalysisanddesignoftheproblem.

CO3. ThisexercisewillhelpthestudenttobereadyfortheMajorProjectin6thSemesterof MCAProgramme.

Programme: MCA

CourseCode	Title	Schemeof Examination				Hrs/Week			Credits
		Duration (hrs)	IA	UE	Total Marks	L	T	P	
MC-542	Artificial Intelligence	3	40	60	100	5	0	0	4

Objective:

The objectiveofthecourse istointroducestudentstothebasicconcept ofArtificialIntelligence. Thecourseisappropriate both,forstudentsofcomputerscience&engineeringwhowishto acquiregeneralunderstandingofArtificialIntelligenceaswellasforstudentspreparingfor moreadvancedcoursesandresearchinArtificialIntelligence.

Unit-I

Introduction to Artificial Intelligence: Foundation and History of Artificial Intelligence, Agents,typesofAgents,IntelligentAgents,StructureofIntelligenceAgents;Knowledge Based Agent,Environmentsanditstypes,RelationshipbetweenEnvironmentandAgent.

Unit-II

Knowledge Acquisition and Representation: Introduction to Knowledge Acquisition; IntroductiontoKnowledgerepresentation,Hypothesis, KnowledgeLevels,Knowledge Classification,Knowledge RepresentationSchemas; Logic Based, Procedural, Network and StructuralRepresentations.

Unit-III

LISP Programming: Introduction to LISP, Syntax and Numeric Functions, Basic List ManipulationFunctionsinLISP,Functions,PredicateandConditionals,Input,OutputandLocal Variables,Iterationand Recursion.

Unit-IV

SearchingandProblemSolving: SearchinginProblemSolving,ProblemSolvingAgents; Uninformed SearchStrategies,BreadthFirstSearch,IterativeDeepening Search,Bidirectional Search,InformedSearchStrategies;ActionandPathCosts,HeuristicFunctions,GreedyBest FirstSearch,A*Search,IDA*Search.

Unit-V

MachineLearningandNeuralNetworks: IntroductiontoMachineLearning,Comparisonof Traditional andMachinelearningAlgorithms,ApplicationsofMachine learning,Introductionto LearningRules (Supervised,Unsupervised,ReinforcementLearning). IntroductiontoBiological NeuralNetwork,Comparison ofANNwithBiologicalNeuralNetwork,NeuronModeland Architecture:Single-InputNeuron,Transferfunctions,Multiple-input Neuron,ALayerof

Neurons,MultipleLayerofNeurons,RecurrentNeuralNetwork,PerceptronwithtwoInputcase, ApplicationsofArtificial NeuralNetworks.

COURSEOUTCOMES:

CO1. Understandbasicconceptsof Artificialintelligence,earlydevelopmentsinthisfield,basic knowledgerepresentation,problemsolving,andlearningmethodsofArtificial Intelligence.

CO2. Understand theapplicability,strengths,andweaknessesofthebasicknowledge representation, problemsolving,andlearningmethodsinsolving particularproblems,game playingasproblemsolving.

CO3. WriteProgramsinLISP.

CO4. Implement asearchproblemasastatespace,andhowdifferenttypesofsearchalgorithms worklikestatespacesearch,heuristicsearch,GreedyBestFirstSearch,A*Search,IDA* Search.

CO5. UnderstandingtheconceptsofMachineLearningandNeuralNetworks,Applicationsof Machinelearning.

CO6. Understandingthe conceptof BiologicalNeuralNetwork,NeuronModelandArchitecture, andApplicationsofArtificialNeuralNetworks.

NoteforPaperSetting:

Thequestion paperwillbedivided intotwosections.**SectionA**willinclude 10compulsory objective-cum-shortanswertypequestionsfromeachunit,eachcarrying1mark.**SectionB**will haveten(10)longanswerquestions,twofromeachunit.Thestudentwillhavetoattemptone(01) questionfromeachunit.Eachquestionwillcarry10marks.

TextBooks:

1.**Russel,SandNorvig,P(2006)**,"ArtificialIntelligence,AModernApproach",**PHI**.

References:

1.**Night,R(2005)**,"IntroductiontoArtificialIntelligence",**TMH.**
2.**Patterson,DW(2005)**,"IntroductiontoArtificialIntelligenceandExpertSystems", Indian Reprint,**PHI**.
3.**MartinT.Hagan,HowardB.Demuth,MarkBeale,OrlandoDeJesús(2014),**"Neural Networkdesign",2ndEdition,**ChinaMachinePress.**
4.**TomMitchell(1997),"**MachineLearning",1st Edition,**McGraw-Hill**.

Programme: MCA

CourseCode	Title	Schemeof Examination				Hrs/Week			Credits
		Duration (hrs)	IA	UE	Total Marks	L	T	P	
MC-543	Web Technologies	3	40	60	100	5	0	0	4

Objective

Thecourseisdesignedtoacquaintthestudents thebasicconceptsaboutWWW,italsoaims atimpartingbasicskillsofcreating,modifyingandhandlingwebpagesand webportalsand itsdeployment.

Unit-I

IntroductiontoInternet:Domain&HostNames,DNSserver,IntroductiontoWWW,roleof WebServerandWebBrowser,introduction toHTTPprotocol,HTTPRequeststructure,HTTP ResponseStructure.HTTPRequestMethods(Get &Post),introduction toIIS,configuringIIS. DeployingawebApplication.

Unit-II

IntroductiontoHTMLandCSS:HTMLtags,Formattingtext,Controllingfonts,Tables, Addingpictures,addinglinks,creatingformsworking withtextboxes,radiobuttons,check boxes,dropdownmenu,submitbuttonsettingupframes, creating webpages,PageNavigationin HTML,introductiontoCSSanditsproperties

Unit-III

IntroductiontoASP.NET: Architecture,ApplicationDomain, Lifecycle ofaWebForm. StandardControlsinASP.NET :(TextBox,Button,Label,ImageControl,DropDownList, Check Box Control), Navigation control (Tree view Control, Menu Control), Validation Controls,LoginControls,HTMLcontrolsinASP.NET.

Unit-IV

ASP.Net Objects: Request Object, Response Object, Cookies,Working with OLEDBConnection Class,OLEDBCommand Class,OLEDBTransactionClass, OLEDBDataAdapterClass,DataSetClass. ConnectingwithSQLserverDatabase.ManipulatingDatainSQLServerDatabase,Retrieving DatafromSQLServerDatabase.

Unit-V

WorkingwithData: DataBoundControls(ListControl,IterativeControls,ViewControls), Working DataControls.StateManagementinAsp.NET(HiddenField,ViewState,Cookies, Query Strings, Session Application). Introduction to AJAX. Reporting in ASP.NET. IntroductiontoMVCframework.

COURSEOUTCOMES:

CO1. StudentwillabletounderstandtheconceptofDNSServerandHTTPRequestand ResponseHeaderformats.Studentswillableto configureIISanddeployingawebapplication.

CO2. Studentwillbeabletounderstandthebasicprinciplesofwebdesigninganddesignweb pagesusingHTMLand CascadingStylesheets.

CO3. StudentswillbeabletounderstandASP.NETarchitecture.Foragivendomainstudents willabletocreateinteractivewebapplicationsandimplementvalidationandauthentication usingASP.Netcontrols.

CO4. Studentwillabletounderstandtheconcept ofRequest andResponseobjectsinASP.NET. Studentwillabletoworkwithdifferentdatabases,retrieveandmanipulatedatausingADO.Net.

CO5. StudentwillabletobuildsmallAJAXapplicationsandimplementstatemanagementin webapplications.

NoteforPaperSetting:

Thequestion paperwillbedivided intotwosections.**SectionA**willinclude 10compulsory objective-cum-short answertypequestionsfromeachunit,eachcarrying1mark.**SectionB**will haveten(10)longanswerquestions,twofromeachunit.Thestudentwillhavetoattemptone(01) questionfromeachunit.Eachquestionwillcarry10marks.

TextBooks:

1.**Deitel&Deitel,**"Internet&WWWHOWtoProgram,"3rdEdition,2005,**PHI**.
2.**DinoEsposito,"**ProgrammingMicrosoftASP.NET4",1stEdition,2011,**DreamtechPress.**

References:

1.**KogentLearningSolutionsInc(2009), "**BlackBookASP.NET3.5",BeginnersEdition, **DreamtechPress.**
2.**ImarSpaanjaars,"**BeginningASP.NET4:inC#andVB",**WROXpublication.**

Programme: MCA

Course Code	CourseTitle (CoreCourses)	Credits	Schemeof Examination			
			Duration	Marks		
			Hours	IA	UE	Total
MC-641	MajorProject	24	--	200	400	**600**

Thecomponentsandbifurcationofmarksofthecoursecode MC-641 in Semester VI shall be as follows:

Components	**IA**	**UE**
ProjectWork	-	100
Presentation	100	150
VivaVoce	100	150
Total	**200**	**400**

IA–InternalAssessment
UE–UniversityExamination

COURSEOUTCOMES:

CO1:Studentswillhavehands ofexperienceofsystemdevelopmentlifecycle.

CO2: Thestudents willlearn to applythetechnologieslearntduring thecoursein reallifeprojects.

CO3: Studentswilllearn toworkin reallifeprojectdevelopmentenvironmentsinvolving deadlinesand teamwork.

CO4:Studentswilllearn topickup and applyupcoming technologiesinprojectdevelopmentnot covered during thecourse.

Course Title: Management process and Organizational Behavior	**Total Marks:100**
Course Code: MBA 111	**University Examination:60**
Duration of Examination: 03 Hours **Credit:04**	**Sessional Assessment:40**

Objective: The objective of this course is to help students understand the conceptual framework of management and organizational behavior.

Unit I

Nature and Evolution of Management:

Meaning and definition of Management, Emergence of Management Thought – Classical, Neo-Classical, and Modern Theories.**Functions of Management: Planning**- concept, significance, types; **Organizing**-concept & principles; **Staffing, Directing, Coordinating. Control–** Process and Techniques. Roles, Skills and Responsibilities of Managers. Comparative Management – Japanese, American and Indian practices.

Unit II

Introduction to Organizational Behavior:

Definition , Nature and Scope of OB ; Theoretical Foundation for Organizational Behavior; Disciplines contributing to the field of OB. Challenges and opportunities for OB- Responding to Globalization ,Managing Workforce Diversity , Coping with "Temporariness" , Helping Employees Balance Work–Life Conflicts ,Improving Ethical Behavior. **Models of OB**-.Autocratic model, Custodial model, Supportive model, collegial model and System model.

Unit III

Individual Differences and Work Behavior:

Personality- Concept, Theories, major personality attributes influencing O.B, Values, Attitudes, and Job satisfaction. Johari Window and Transnational Analysis.**Perception**- Factors influencing perception, Attribution theory, applications in organization. **Learning**-Meaning, Types and Process.Theories of learning – Implications for performance and satisfaction.**Motivation**- Theories of Motivation – Implications for performance and satisfaction in organizations.

Unit IV

Understanding and Managing Group Process:

Characteristics of work group, work group behavior and productivity. Teams in the Modern work place. Group decision making.**Leadership**- Defining leadership, Leading Vs Managing, Leadership Theories, Leadership styles, developing leadership skills, Leadership in Cross-cultural environment - Evaluating Leaders- Women, and Corporate leadership. Challenges to the leadership construct. Power and politics- Sources and implications. **Conflict and Negotiation** – Meaning, Types, Process, and Importance

Unit V

Organizational Culture:

Meaning and importance, creating a sustainable culture, Global Implications. **Organizational change**- Change agents, Resistance to Change, Approaches to Manage Organizational Change. **Work stress and Its Management**- Individual and Organizational factors of stress, consequences of stress on individual and organization, Management of stress.

Learning Outcomes: On successful completion of the course, the student will be able to:

CO1: Explain the management evolution and understand the process of management's four functions: Planning, Organizing, Staffing and Controlling.

CO2: Analyze the behavior of individuals in the workplace as influenced by personality, values, perceptions, learning and motivations.

CO3: Outline the elements of group behavior including group dynamics, communication, leadership, politics, conflict and negotiation.

CO4: Explain how organizational change and culture affect working relationship within organizations.

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will be compulsory and will contain 10 very short answer type or objective type questions, two questions from each unit which elicit answers in not more than 20 words. Each question will carry 1 mark. **Section B**will contain 10 long answer type questions, two from each Unit. The candidate will be required to answer 5 questions one from each Unit. Each question carries 10 marks

Suggested Readings

1. Gupta & Joshi,*Organizational Behavi*our, Kalyani Publishers, 9/e, 2014
2. John W Newstrom, *Organizational Behavior: Human Behavior at Work*, TMH,13/e, 2013
3. Kavitha Singh, *OrganisationalBehaviour*, Pearson, 2011.
4. Koontz, Weihrich&Aryasri, *Principles of Management*, 10/e, TMH, New Delhi, 2015
5. Luthans, Fred, *OrganisationalBehaviour*, 12/e, McGraw Hill, 2010
6. Stephen P. Robbins, Timothy A. Judge, *Organizational Behavior*, 16/e, Pearson , 2016

Course Title: Accounting for Managers **Total Marks:100**

Course Code: MBA 112 **University Examination:60**

Duration of Examination: 03 Hours **Sessional Assessment:40**

Credit:04

Leanings objectives : The main aim of this course is to encourage students to acquire knowledge and skill relating to application of management accounting concepts and techniques and thus develop in them the ability to collect, analyse and communicate financial and non financial information to assist management in decision making process. Upon successful completation of this course, students will be able to demonstrate the application of rational economic decision making and prepare them for career in accounting, Private –industry, Govt and Banking and Financial sectors.

UNIT I: Introduction to Management Accounting: Concept, need, importance and scope of Management Accounting, Branches of accounting, Relationship between Financial accounting, Cost accounting and Management accounting, Role of management accounting in managerial decisions, Meaning, objectives, and functions of Financial Statements. Generally Accepted Accounting Principles; (GAAPs) Users of accounting information, Concept and need of Accounting Standards, Accounting Standards and IFRS, Ind -AS

UNIT II: Preparation of Financial Statements.

Double Entry Systems of Accounting, Journalizing of transactions, ledger Posting and Preparation of TrialBalance, Preparation of Companies' Financial Statements as the per Revised Schedule VI. **Depreciation**, Straight Line method, Written down Value Method. (Case Study).

UNIT III: Analysis of Financial Statements

Tools Of Analysis: Common Size Statement, Comparative Statements, Trend Analysis, and Ratio Analysis of Financial Statements, Methods of analysis; Meaning, objectives and purpose of ratio analysis, Advantage and limitations of ratio analysis. Types of ratios; Solvency, Profitability, Activity and Liquidity Ratios. Goodwill; Meaning, need and objectives of goodwill. Methods of valuation of goodwill (Average Profit Method and Super profit method) (Case Study)

UNIT IV: Statement of Cash Flow:

Cash flow statement: meaning, aims and objectives of cash flow statement, utility of cash flow statement: preparation of adjusted profit and loss account, preparation of cash flow statement.

Valuation of shares; meaning, objectives and methods of valuation of shares Intrinsic value method. Earning capacity, Yield method, and Fair value method.

UNIT V: Budget, Budgeting and Budgetary Control:

Concepts, objectives and types of budgets, fixed and flexible budgets, preparation of cash budget, sales budget, production budget and zero base budgeting, Distinction between Budgeting and Standard Costing. Marginal costing concept, distinction between marginal costing and absorption costing, breakeven point, contribution, profit volume ratio and margin of safety analysis. Decisions making: Make or buy decisions, dropping a product, Exploring new market, introducing new product, product mix decisions.

Course outcomes

CO 1: To understand the relationship between financial accounting, cost accounting, management accounting and it's importance for managers in decision-making process and to comprehend the basic philosophy of various accounting principles involved in the processing and presentation of Accounting information.

CO 2: To bring about the thorough understanding of preparation of financial statements of business entities as per the best industry practices along with the main methods of charging depreciation on fixed & tangible assets.

CO 3: To demonstrate knowledge in making analysis of various quantitative variables of financial statements by establishing their relationships between them and to analyse financial data to support business decisions strategies, including valuation goodwill.

CO 4: To be able to make distinction between the various inflows and outflows of cash which will help them to make investment and financial decisions after making critical analysis of operation of business including valuation of shares of various companies

CO 5: To be able to demonstrate progressive learning in the elements of managerial decision-making through the ideas and practices of budgeting, marginal costing techniques, standard costing, and variance analysis to take various strategic decisions on pricing, capacity, product mix, make or buy or dropping a product etc.

Note for Paper Setters

The Question paper shall have two sections. Section A will be compulsory and will contain 10 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), each carrying 1 mark. Section B will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

Suggested Readings

1. Ahmed N; , Iqbal J, Saima Accounting for Managers (2018) New Delhi Publishers, New Delhi 110059.
2. Ahmed, N;, Sharma A ;, *Corporate Accounting* (2013Ane Books Pvt. Ltd. Darya Ganj New Delhi 110002

3. Ahmed, N; Iqbal J, and Saima (2018) Financial Accounting; New Delhi Publishers, New Delhi 110059
4. Horngren, Charles (1994),Principles of Financial and Management Accounting, Englewood Cliffs, New Jersey, Prentice Hall Inc.,
5. Hawkins Robert Anthony (1995), Accounting Text and Cases, Richard D. Irwin London.
6. Maheshwari S.K, Maheshwari S. N Mittal (2005), Cost Accounting , Mahavir Book Depot New Delhi.
7. Gupta S. K and Sharma S. K (2009), Management Accounting, Kalyani Publication.
8. Bhattacharya S K and Johndearden (1987), Accounting for Management, Vikas Publication 8th Edition.

Course Title: Quantitative Techniques for Managerial Decisions **Total Marks:100**

Course Code: MBA 113 **University Examination:60**

Duration of Examination: 03 Hours **Sessional Assessment:40**

Objectives: To provide strong understanding of statistical concepts and their applications to students and to train them in interpreting and using data output in managerial decision making through the use of Microsoft Excel Packages & other statistical tools.

Unit I

Descriptive Statistics: Mean Median and Mode, Range, Absolute mean Deviation, Variance, Standard Deviation, Coefficient of variance and Skewness.

Correlation Analysis: Concept, types & methods of studying coefficient of correlation: Scatter diagram method, Karl Pearson's coefficient & Spearman's Rank correlation coefficient method; coefficient of correlation & probable error. Coefficient of determination.

Unit II

Simple Regression: Basic concepts and assumptions, Estimation using regression line, Method of least squares, Standard error of estimation, multiple regression.

Analysis of Variance: Basic concepts, Calculating variance among sample means and within samples, F-tests, ANOVA one way and two ways.

Unit III

Sampling and Sampling Plan: non-random and random sampling & Sampling distributions, sample size and standard error. **Estimation:** point and interval estimates, confidence intervals, interval estimates of mean.

Hypothesis Testing: One Sample: types of hypothesis, significance level, type I and Type II errors, one and two tailed tests, hypothesis testing of mean (under conditions of known and unknown variance). **Chi Square:** chi-square as test of independence and test of goodness of fit, chi-square and inference of population variances.

Unit IV

Probability: Concept & types of probability. **Probability Distributions**: Binomial (Case Study) distribution& Poisson distribution, Normal distribution (Characteristics & area under normal curve). **Linear Programming Problem:** Introduction to Linear Programming, Formation of LPP, Graphical Method.

Unit V

Transportation Problems: Introduction, Minimization and Maximization Transportation (Case Study) Problems.

Assignment Problems: Introduction, Hungarian Method, Variations of the Assignment Problem.

Simulation: Introduction, Concept and Application; Basics of Monte-Carlo Approach.

Course Outcomes: After completion of the Course the student will be able to:

CO1: Find the measures of central tendency & Dispersion of any data.

CO2: Calculate & interpret the correlation coefficient for qualitative as well as quantitative data and will be able Understand the casual relationship between the variable and will be able to find the

Regression coefficients

CO4: To find the significance of difference between the means of more than two samples

through the technique of ANOVA will acquire knowledge about Non-Parametric tests

Such as Chi Square and their relevance

CO5: To decide about the use of various sampling techniques and will have knowledge about

the Probability distributions, hypothesis & hypothesis testing. The student will also be able to solve the linear programming Problem graphically and will have the knowledge to find the optimal solution to transportation, Assignment & Simulation Problem

Note for Paper Setters

The Question paper shall have two sections. **Section A** will be compulsory and will contain 1 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), each carrying 1 mark. **Section B** will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

Suggested Readings

1. Sharma J K (2011), Business Statistics 2nd Ed., Pearson Education
2. Levin Richard I, David S. Rubin (2011), Statistics for Management, 8th Ed., Prentice Hall of India
3. David R Anderson, Dennis J Sweeney and Thomas A Williams (2011), Statistics for Business and Economics, 11th Ed., Cengage Learning India Private Limited, New Delhi.
4. Sharma J K, Operations Research(2009), Theory and Applications, 4th Edition, Macmillan New Delhi.
5. Kapoor, V.K. Operations Research: Techniques for Management, Sultan Chand & Sons
6. Wayne L. Winstor, Operations Research (2011), Applications and Algorithms, 4th Edition (5th Indian Reprint 2010), Cengage Learning India Private Limited, New Delhi.

Course Title: Marketing Management **Total Marks:100**

Course Code: MBA 115 **University Examination:60**

Duration of Examination: 03 Hours **Sessional Assessment:40**

Credit: 04

Objective: The objective of this course is to familiarize students with the basic concepts and techniques of marketing management which will enable them to analyze and solve marketing problems in complex business environment.

Course Outcome:*After completing this course students will be able to:*

1. Analyze the nature of marketing, marketing challenges, tasks and several marketing strategies.
2. Get admittance about types of external and internal environment affecting marketing.
3. Predict how marketing research takes places in marketing management and maintaining customer value?
4. Become familiar with market segmentation, positioning and differentiation strategies.
5. Identify various diversified factors related to product and services mix.

UNIT I

Marketing: Introduction and importance of marketing, Scope of marketing, goods marketed, demand states in marketing, types of markets, Challenges in marketing management, philosophies in marketing, shifts in marketing management, marketing management tasks, customer value and marketing, Marketing strategies and strategic planning, nature and contents of a marketing plan.

UNIT II

Marketing Environment: Nature and characteristics of marketing environment, major environmental sectors (Economic, socio-cultural, natural, political and legal, technological etc.), marketing information system and components of marketing information system, marketing intelligence system, megatrends shaping the consumer landscape, global forces affecting marketing environment.

UNIT III

Marketing Research System: Marketing Research System: Introduction and process of marketing research, features of a good marketing research, Marketing profitability analysis, customer value and determinants of a customer delivered value, cultivating customer relationships and their management, customer equity, analyzing customer databases and database marketing.

UNIT IV

Identifying market segments and targets: types of market segmentation, bases for segmenting markets, process of market segmentation, effective segmentation criteria, evaluating and selecting market segments, positioning: process and types of positioning, Selecting POPs and PODs, differentiation strategies, conditions for achieving differentiation, risks and benefits associated with differentiation.

UNIT V

Product and services mix: Characteristics and elements, product and services classification, pricing strategies and types, initiating and responding to price changes, process for setting a pricing policy, new product development process and strategies, distribution and types of distribution channels, promotion tools for products and services, Vertical and Horizontal marketing systems.

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will be compulsory and will contain 10 very short answer type or objective type questions, two questions from each unit which elicit answers in not more than 20 words. Each question will carry 1 mark. **Section B**will contain 10 long answer type questions, two from each Unit. The candidate will be required to answer 5 questions one from each Unit. Each question carries 10 marks

Suggested Readings

1. David Jobber (2009), *Foundations of Marketing*, 4th edition, Tata McGraw Hill, New Delhi.
2. Donald Lehmann &RusellWiner (2005), *Analysis for Marketing Planning*, 6thedition, Tata McGraw Hill, New Delhi.
3. Kotler P, & Keller, K (2009),*Marketing Management*, Prentice Hall,5th edition, New Delhi 2009.
4. Kotler Philip, Kevin Keller, A. Koshy and M. Jha (2011), *Marketing Management in South Asian Perspective*, 13th edition, Pearson Education, New Delhi.
5. Ramaswamy&Namakumari (2011), *Marketing Management*,4th edition, McMillan, New Delhi.

Course Title: Managerial Economics **Total Marks:100**

Course Code: MBA 114 **University Examination:60**

Duration of Examination: 03 Hours **Sessional Assessment:40**

Objective: The objective of this course is to acquaint the students with concepts and techniques used in micro-economic theory and enable them to apply these in business decision making.

Unit I

Introduction to Managerial Economics: introduction, definition, nature, scope and significance of managerial economics. Managerial economist's role and responsibility, uses of managerial economics. Basic economic tools in managerial economics–Opportunity cost principle, discounting principle and Equi- marginal principle.

Unit II

Demand and Supply Analysis: theory, demand function, the law of demand (Case Study)

, individual and market demand, determinants of demand, elasticity of demand-price, income and cross, methods of its measurement, meaning and determinants' of supply, the law of supply, indifference curve approach, properties of indifference curve, application of indifference curve and uses of indifference curve, demand forecasting.

Unit III

Cost Analysis: production and cost analysis, production function, the Iso-quant, the law of diminishing returns, economies of scale, classification of costs, average cost and marginal cost relationships, long-run and short-run cost functions.

Unit IV

Market Structures: market structures, price determination under perfect competition (features, equilibrium of the firm, price and output determination), price determination under monopoly (features, monopoly vs. perfect competition). Price determination under monopolistic competition, Price determination under oligopoly. Price discrimination- Meaning and degree of price discrimination.

Unit V

Macroeconomic Analysis: introduction and importance of macroeconomic. National income, different concepts of national income and its measurement, economic indicators (per capita income, physical quality of life index, human development index and quality of life index) business cycle–features, phases & causes of business cycle, inflation–meaning, types, causes and consequences of inflation.

Course outcomes:

After completion of this course students will able to

1. Understand concept of Managerial economics.
2. To gain concept of demand, supply and cost analysis
3. Contrast the decision-making process across industries characterized by pure competition, monopolies, and oligopolies.
4. Illustrate common pricing strategies in different market structure.
5. To understand different macroeconomic variables.

Note for Paper Setters

The Question paper shall have two sections. Section A will be compulsory and will contain 10 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), each carrying 1 mark. Section B will contain 10 long answer type questions, two from each Unit, the candidates will be required to answer one question from each Unit, each question carrying 10 marks

Suggested Readings

1. Dornbusch, Fisher and Startz (2002), Macroeconomics Tata McGraw Hill.
2. Frank and Bernanke, Economics (2007), Tata McGraw Hill.
3. Peterson and Lewis (2005), Managerial Economics, Prentice Hall of India.
4. Samuelsson and Nordhaus (20050, Economics, Tata McGraw Hill.
5. Thomas and Maurice (2005), Managerial Economics, Tata McGraw Hill.

Course Title: Human Resource Management **Total Marks:100**

Course Code: MBA 116 **University Examination:60**

Duration of Examination: 03 Hours **Sessional Assessment:40**

Credit: 04

Learning Objectives: The objective of the course is to acquaint the students with personnel functions, decisions and problems in the total setting of business organization.

Unit I

Introduction to Human Resource Management: Evolution of human resource management,differentiation between personnel management and human resource development, definition of human resource management, scope and functions of human resource management, composition of the HR department, qualification and role of HR/Personnel manager in an organization.

Unit II

Human Resource Planning: Objective, process, levels and benefits of human resource planning, job analysis, techniques of job analysis, job description and job specification, recruitment and selection, training and its methods, executive development: process and techniques of executive development programmes.

Unit III

Compensation Management: Pay Commission, compensation to public and private sector, grading system, principles of wage determination, methods of wage payments, job evaluation and its methods, **Performance Appraisal:** Performance appraisal process, methods of performance appraisal, traditional and modern methods.

Unit IV

Industrial Relations: Parties to industries relations, causes for poor industrial relations, suggestions to improve industrial relations, industrial disputes: causes of industrial disputes, prevention and settlement of industrial disputes, Trade unions**:**(Case Study) principles of trade unions, trade union function, worker's participation in management in India.

Unit V

Employee Welfare Service and Security: Labour welfare agencies of labour welfare in India, types of labour welfare services, statutory provisions concerning employee welfare, Social security: Employee's State Insurance Act, 1948, Employees Provident Fund Act, 1952, Payment of Gratuity

Act, 1972, Quality of work life (QWL**)**:(Case Study) scope of QWL and techniques for improving quality work life.

Course Outcomes

CO 1: To understand the concept of human resource management, functions, scope, composition and role of HR manager in and organization.

CO 2: To bring about the thorough understanding of human resource planning, and training and development programme.

CO 3: To demonstrate knowledge in compensation management and performance appraisal.

CO 4: To be able to demonstrate progressive learning in the industrial relations and worker's participation in management.

CO 5: To bring about the thorough understanding of employee welfare services and quality of work life.

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will be compulsory and will contain 10 very short answer type or objective type questions, two questions from each unit which elicit answers in not more than 20 words. Each question will carry 1 mark. **Section B**will contain 10 long answer type questions, two from each Unit. The candidate will be required to answer 5 questions one from each Unit. Each question carries 10 marks

Suggested Readings

1. Gary Dessler (2011),*Human Resource Management*, Pearson Education, New Delhi.
2. Monoppa&Saiyadain (2001),*Personnel Management*, 2nd edition, Tata McGraw Hill, New Delhi.
3. MirzaSaiyadain (2005),*Human Resource Management*, Tata McGraw Hill, New Delhi.

Course Title: International Business **Total Marks:100**

Course Code: MBA 221 **University Examination:70**

Examination Duration: 03 Hours **Sessional Assessment:30**

Credit:04

Objective: The purpose of this paper is to enable the students learn nature, scope and structure of International Business, and understand the influence of various environmental factors on international Business operations.

Unit I:

Introduction to International Business: Importance, nature and scope of International business; Modes of entry into International Business; Internationalization process and managerial implications; Multinational Corporations and their involvement in International Business: Issues in foreign investments, technology transfer, pricing and regulations; International collaborative arrangements and strategic alliances.

Unit II:

International Business Environment: Economic, Political, Cultural and Legal environments in International Business. Framework for analyzing international business environment. Global Trading and Investment Environment: World trade in goods and services – Major trends and developments; World trade and protectionism – Tariff and non-tariff barriers; Foreign investments-Pattern, Structure and effects

Unit III:

Balance of Payment Account: Concept and significance of balance of payments account; Current and capital account components and accounting system; Balance of payment deficits and Correction policies.

Unit IV:

International Economic Institutions and Agreements: WTO, WTO and Developing Countries, IMF, World Bank, UNCTAD. Regional Economic Groupings in Practice: Levels of Regional Economic Integration; Regionalism vs. Multilateralism; Important Regional Economic Groupings in the World. Regional Economic Groupings in Practice: Levels of Regional Economic Integration; Regionalism vs. Multilateralism; Important Regional Economic Groupings in the World.

Unit V:

Contemporary Issues in International Business: Labour and Environmental Issues. Management of diversity in MNCs; concept & Practices. International Advertising; concept and practices. Indian Companies going global; challenges & opportunities.

Couse outcomes:

1. To understand Internationalization process and managerial implications.
2. To understand Framework for analyzing international business environment.
3. To understand the importance and Implications of BOP.
4. To understand Economic integration and Global trade Organizations.
5. To gain an insight into the contemporary issues in International Business.

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will be compulsory and will contain 10 very short answer type or objective type questions, two questions from each unit which elicit answers in not more than 20 words. Each question will carry 1 mark. **Section B**will contain 10 long answer type questions, two from each Unit. The candidate will be required to answer 5 questions one from each Unit. Each question carries 10 marks

Suggested Readings

1. Agarwal Raj,*International Trade* (Excel, 1st Ed.) Hill C.W. - International Business(TMH, 5th Ed.) Daniels - International Business, Pearson, 1st Ed..
2. Bennet, Roger, *International Business*, Financial Times, Pitman Publishing, London.
3. Bhalla V.K.,*International Business Environment*, Anmol.
4. Bhattacharya, B., *Going International*: Response Strategies of the Indian Sector, Wheeler ,Publishing, New Delhi.
5. Black J,*International Business Environment*, Prentice Hall.
6. Hise, R. T., &Kolari, J. W. (2008),*Foreign fluctuations, Marketing Management*
7. Philip R. Cateora John L. Graham (2009),*International Marketing*, Tata McGraw-Hill Co. Ltd..
8. Porter, M. E. (1998),*Clusters and the new economics of competition*, Harvard Business Review, 76(6), 77-90. 13 pages
9. Weirich, T. R., &Harrast, S. A. (2011),*The next great fed crackdown, Strategic Finance,*

Course Title: Financial Management **Total Marks:100**

Course Code: MBA- 222 **University Examination:60**

Examination Duration: 03 Hours **Sessional Assessment:40**

Objective: This course aims at helping students to understand the conceptual framework of financial management and its applications under various environmental constraints.

Unit I

Financial Management: Meaning, nature and scope of financial management, financial goal- profit vs. wealth maximization. Finance functions: investment, financing and dividend decisions. Time value of money: compounding and discounting technique.

Unit II

Working Capital: Concepts of working capital, types of working capital, various approaches to working capital management, factors affecting working capital requirement. Working Capital Management **--** Management of cash, inventory (Case Study) and receivables. Working Capital Financing--Sources of short term financing, role of commercial banks in providing working capital; commercial papers; factoring and other tools of working capital management.

Unit III

Cost of Capital: Meaning and significance of cost of capital; (Case Study) calculation of cost of debt, preference capital, equity capital and retained earnings; weighted cost of capital. Concepts of leverage operating and financial leverage.

Unit IV

Capital Budgeting: Nature of investment decisions; investment criteria- Net present value, internal rate of return, profitability index, payback period, Accounting rate of return, NPV and IRR comparison, capital rationing, risk analysis in capital budgeting

Unit V

Capital structure: Concept and approaches of capital structure decisions; Net income approach, Net operating income approach, Traditional and M.M. Hypothesis. Determinants of capital structure. Dividend Decisions-Issues in dividend decisions, relevance and irrelevance theories of dividend, Walter model, Gorden's model, M-M hypothesis, forms of dividend, factors affecting dividend decision.

Course outcomes:

After completion of this course students will able to:

1. Understand deep concept of finance and Management
2. To understand working capital Management.
3. They able to understand capital, concepts and types.
4. Full aware about capital budgeting techniques
5. They understand capital structure and dividend policy

Note for Paper Setters

The Question paper shall have two sections. Section A will be compulsory and will contain 10 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), each carrying 1 mark. Section B will contain 10 long answer type questions, two from each Unit, the candidates will be required to answer one question from each Unit, each question carrying 10 marks

Suggested Readings

1. Chandra Prsanna (2010), Financial Management, Tata Mc Graw Hill, Delhi,
2. Hampton John (2010), Financial Decision Making, Prentice Hall, Delhi.
3. Pandey I.M. (2010), Vikas Publishing House, Delhi.
4. Van Horne James C (2001), Financial Management Policy, Prentice Hall, Delhi.
5. Van Horne, J.C. and J.M. Wachowicz Jr. (2011), Fundamentals of Financial Management, Prentice Hall, Delhi.
6. Khan M Y, Jain P.K. (2011), Financial Management, Tata Mc Graw Hill, Delhi.
7. Bhattarcharya Hrisikhas (2003), Working Capital Management-Strategies and Techniques, Prentice Hall, New Delhi.
8. Block Stanley B Geoffery A Hilt (2010), Foundations of Financial Management, Richard D., Irwin, Homewood.
9. Gupta S.K. and Sharma R.K. (2011), Financial Management, Kalyani Publishers, New Delhi.
10. Archer Stephen H. Choate G. Marc Recette George (2010), Financial Management, John Wiley, New York.

Pinches George (2005), Essentials of Financial Management, Harper and Row, New

Course Title: Strategic Management **Total Marks:100**
Course Code: MBA 331 **University Examination:60**
Examination Duration: 03 Hours **Sessional Assessment:40**

Objective: The aim of this course is to integrate knowledge gained from different functional areas of management and create awareness regarding the role and responsibilities of top management at each strategic level.

Unit I

Introduction to Business policy and Strategic Management: Evolution, nature and objectives of business policy, overview of strategic management, concept of strategy, levels at which strategy operates, strategic and conventional decision making, school of thought on strategy formation, process of strategic management, strategists and their role in strategic management.

Unit II

Strategic Intent: Hierarchy of strategic intent, strategic intent, vision, mission, business definition, goals and objectives; SWOT analysis(Case Study) Environmental appraisal, characteristics of environment, environmental sectors and environmental scanning techniques; Organizational appraisal: developmental framework, organizational capabilities and appraisal techniques.

Unit III

Strategy: Corporate level strategies, business level strategies and international strategies; (Case Study Red ocean and Blue ocean strategies, Strategic alternatives and choice: process of strategic analysis and choice, corporate level strategic analysis, business level strategic analysis, subjective factors in strategic analysis and choice, contingency strategies in business, strategic plan and strategic plan document.

Unit IV

Strategic Implementation: Interrelationship among formulation and implementation of strategy, different aspects of strategy implementation, strategy implementation pyramid, project implementation, procedural implementation, resource allocation and means of resource allocation, structural implementation, organizational systems and behavioral implementation.

Unit V

Functional Implementation: Plans and policies, integration of plans and policies; operational implementation; strategic evaluation: process of strategic evaluation, participants and barriers in evaluation; strategic control: types of strategic control; operational control; evaluation techniques for strategic evaluation and control.

Course Outcome: ***After completing this course students will be able to:***

1. Get familiar with nature, objectives and process of business policy and strategic management.
2. Know about elements of strategic intent, environmental and organizational appraisal.
3. Get admittance about several types of corporate and business strategies and strategic choice.
4. Become familiar with implementation progressions and recent developments of strategies.
5. Identify how strategic evaluation and control techniques are implemented?

Note for Paper Setters

The Question paper shall have two sections. Section A will be compulsory and will contain 1 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks),

eachcarrying 1 mark.Section B will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

Suggested Readings

1. Kazmi (2005), Business Policy and Strategic Management, 2nd edition, Tata McGraw Hill, New Delhi.
2. Aaker, D A (2007), Developing Business Strategies, 1984, New York: John Wiley and Sons.
3. Ansoff, H I (2009), Understanding and Managing Strategic Change, 1982, Amsterdam: North Holland.
4. C.W.L Hill and G. R. Jones (2010), Strategic Management Theory, Houghton Mifflin, New Delhi.
5. Schendel D and C Hofer (2009), Strategic Management,1979, Boston: Little Brown.

Course Title: Security Analysis **Total Marks:100**
Course Code: MBA F1 **University Examination:60**
Examination Duration: 03 Hours **Sessional Assessment:40**

Course objective: The aim of the course is to train students in conducting qualitative and quantitative analysis of a company, valuing financial securities, and analyzing investment attractiveness of various types of securities

Unit I

Investment Fundamentals: Risk/Return Analysis-required rate of return, determinants of required rate of return, factors that affect required rate of return. Measures of Risk-standard deviation, covariance, correlation. Relationship between Risk and Return-security market line (SML), capital assets pricing model (CAPM) and required rate of return.
Market Indicators-price-weighted, market-value weighted, unweighted and style indexes Trading-types of orders-market order, limit orders, short-selling, margin trading.

Unit II

Security Valuation (Approaches to Valuation): Efficient Market Hypotheses-need of efficient markets, alternative market hypotheses, weak, semi-strong, and strong forms of markets, implications of efficient markets.efficent market and fundamental analysis, efficient market and technical analysis,efficient market and portfolio management.Top-down model: overview of three--step valuation process. Economic analysis-economic cycles, leading and trailing economic indicators, economic variables and stock prices. (Case Study)

Unit III

Security Valuation (Company Analysis): Competitive strategies, focusing a strategy, growth company and growth stocks, cyclical, counter-cyclical, and defensive stocks, speculative stocks, value *vs.* growth investing. Industry analysis-industry life cycle, competition analysis, impact of structural economic changes on industry, trading mechanism. **(**Case Study)

Unit IV

Securities Valuation: Equity Securities-Dividend Discount Model (DDM)-appropriateness of DDM, calculation of intrinsic value using single period, multiple period, constant growth, and multi-growth stage models. Valuation of non-dividend paying companies-Overview of Free Cash Flow to Firm (FCFF) & Free Cash Flow to Equity (FCFE) Models. Fixed-Income Securities: Fundamentals of bonds, types of bonds, Bond valuation: PV models, Yield models, computing bond yields.

Unit V

Securities Valuation: Residual Income (Economic Value Added) Model: Calculation of EVA, comparison with MVA, appropriateness of EVA model, calculation of intrinsic value of a common stock security using EVA model. P/E Model-- Computation of leading and trailing EPS, calculation of intrinsic value using P/E ratio. Technical Analysis-assumptions, advantages of technical analysis, tools of technical analysis contrary opinion approach, confidence index, follow the smart money managers.

Course Outcome

1. Students will understand the characteristics of different financial assets such as money market instruments, bonds, and stocks, and how to buy and sell these assets in stock market.
2. Students will understand the characteristics of efficient market and gain knowledge of the various strategies followed by investment practitioners.
3. The course also provides in-depth knowledge to the students to study the behavior of various investors in capital market and trade accordingly during different market trends.
4. To stimulate the thought process among the students about various investment avenues and how to select appropriate for investment purpose and hence encourage them to read any financial newspaper daily and present/seek views on the subject/article of their interest.
5. The course also ensures that students learn how to measure risk and return for various investment alternatives.

Note for Paper Setters

The Question paper shall have two sections. Section A will be compulsory and will contain 10 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), each carrying 1 mark. Section B will contain 10 long answer type questions, two from each Unit, the candidates will be required to answer one question from each Unit, each question carrying 10 marks

Suggested Readings

1. Reilly, Frank K. and Brown, Keith C (2006), Investment Analysis & Portfolio Management, 8th edition, OH, USA: Thomson South Western.

2. Stowe, John D., Robinson, Thomas R., Pinto, Jerald E., and McLeavey, Dennis W. (2002), Analysis of Equity Investments: Valuation, Virginia, USA: CFA Institute.
3. Bodie, Z., Kane A., Marcus, A., and Mohanty, P. (2006), Investments, 6th edition, New Delhi, Tata McGraw Hill.
4. Financial Markets: A Beginners' Module Work Book, National Stock Exchange of India.
5. Securities Market (Basic) Module Work Book, National Stock Exchange of India 2007.

Course Title: International Finance **Total Marks:100**
Course Code: MBAF2 **University Examination:60**
Examination Duration: 03 Hours **Sessional Assessment:40**

Objective: The objective of this course is to provide students a conceptual framework within which the key financial decisions of multinational firms can be analyzed.

Unit I

Importance of International Finance: Nature and scope of International financial management, the determination of exchange rates, the international monetary system, international financial markets, changing structure of international financial market,(Case Study) International financial market instruments.

Unit II

The Foreign Exchange Market: Major participants in foreign exchange market, the foreign exchange market in India, purchasing power parity, interest rate parity, Currency forecasting Relevance and irrelevance approach of forecasting, Techniques of forecasting (Technical, Fundamental, Market based and Mixed forecasting).

Unit III

Forwards and Futures Contracts: Difference between forwards and future contracts, Currency futures, currency options, types of currency options, factors affecting currency options, Buyers gain in Call and Put options, Interest rate swap and variants of interest rate swap, currency swap: Basic features and forms of currency swap.

Unit IV

Foreign Exchange Risk and Exposure Measurement: Nature, relevance and types of exposure, methods of managing exposures, Hedging and management techniques for transaction, real operating and translation exposure, evaluation and management of political risk, risk management following nationalization

Unit V

International Portfolio Investment: Concept of optimal portfolio, measurement of risk and return, benefits and problem in international portfolio investment, financing of international trade, International project appraisal, international working capital management: policy and problems, steps in management of cash, management of inventory and receivables.(Case Study)

Course Outcome: After Completion of the course the student will be able:

CO1: To understand the basic concept International Financial Markets & Exchange rates.

CO2: To understand & Utilize the Concept of purchasing power parity, Interest rate parity and foreign exchange forecasting

CO3: To understand the basic concepts and application derivative contracts in International Financial markets

CO4: To apply the various measures for management of transaction, translation & economic Exposure in case of international financial transactions

CO5: To explain the concept of optimal portfolio, International Project appraisals and international Working capital Management

Note for Paper Setters

The Question paper shall have two sections. Section A will be compulsory and will contain 1 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), eachcarrying 1 mark.Section B will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

Suggested Readings

1. Sharan V (2000), International Financial Management, Tata McGraw Hill
2. Abdullah, Faud A (1987), Financial Management for Multinational Firms, Prentice Hall.
3. Shapiro, Alan, C (1995), Multinational Financial Management, 4th edition, Prentice Hall, New Delhi.
4. Levi, Maurice, D (1990), International Finance, 2nd edition, McGraw Hill.

Course Title: Social Banking and Microfinance **Total Marks:100**

Course Code: MBA F3 **University Examination:60**

Examination Duration: 03 Hours **SessionalAssessment:40**

Objective: The objective of this paper is to make students familiar with the practices of social banking and prospects of microfinance in today's business world.

Unit I

Social Banking: Introduction and scope of social banking, Challenges and opportunities for social banking, Social banking customer and its characteristics, Lewad bank scheme, Service Area approach, Priority sector lendings, Kissan Credit Card and Farmers Club.(Case Study)

Unit II

Commercial Banks: Concept, Types and Role of commercial banks in economic development, Principles of lending, Short-Medium-and-Long term loans, Financial Inclusion-Concept, Role of FI, Opportunities& Challenges.

Unit III

Microfinance: Meaning and nature of microfinance, Microfinance goals, Operationalization of microfinance goals, various products offered under microfinance umbrella, Microcredit: Forms and Principles, Impact of microcredit scheme on poor, Self Help Groups(Case Study) and Women Empowerment.

Unit IV

Microfinance Institutions: Introduction to microfinance institutions, role of microfinance institutions in poverty reduction, Analysis of various microfinance institutions (SEWA: Self-Help Women's Association, Regional Rural banks), Sustainable Microfinance, Strategic Planning for microfinance capacity building.

Unit V

NABARD: Functions and Role of NABARD in Microfinance, Development and Promotional functions of NABARD, Functions and Role of RBI in promoting Microfinance and Rural Development.

Course Outcome: After Completion of the course the student will be able:

CO1: To explain the concept of social banking & its related concepts

CO2: to explain the objectives, functions & role of commercial banks in promoting Microfinancing

CO3: to explain the concept of Microfinance, its objectives & related concepts

CO4: to understand the functions, organization & objectives of Micro financing institutions

CO5: To understand the objectives & functions of NABARD & RBI in promoting Micro financing in India

Note for Paper Setters

The Question paper shall have two sections. Section A will be compulsory and will contain 1 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), eachcarrying 1 mark.Section B will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

Suggested Readings

1. Microfinance: Perspectives & Operations, Macmilan, IIBF.
2. AturiNageswaraRao(2010), Rural Credit &Microfinance,ICFAI.
3. Debadutta K. Panada(2010), Understanding Microfinance, Wiley India Private Ltd..
4. L M Bhole(2010), Indian Financial System, VikasPublications.
5. Shashi K. Gupta (2008), Financial Institutions &Markets, Kalyani Publishers.
6. SB Deodhar(2008), Indian Financial System.
7. Ajay Tankha(2012), Banking of Self Help Groups.

Course Title: Indian Financial System **Total Marks:100**

Course Code: MBA F4 **University Examination:60**

Examination Duration: 03 Hours **SessionalAssessment:40**

Objective: This course aims at providing students with understanding of the structure, organization

and working of financial markets and institutions in India.

Unit I

Financial System: Introduction, nature and role of financial system, financial markets, financial system and economic development, evolution and developing of banking in India, present structure of Indian financial system and financial sector reforms since 1991.

Unit II

Central Banking in India SEBI: Management structure, functions and role of RBI Monetary policy aims and objective, Quantitative and qualitative instruments of monetary control in Indian and recent monetary policy of the country. SEBI function and role. Mutual Funds, SEBI guidelines for mutual funds. (Case Study)

Unit III

Commercial Banks: Meaning, structure and functions, operational and promotional activities, principal of bank management: Liquidity; profitability and solvency Narsimham Committee reports, concepts of credit creation, e-banking and e-trading (Case Study) and changing role of commercial banks in modern era.

Unit IV

Development Banking: Concept, objectives, and functions of development banks, operational and promotional activities of development banks, IFCI, ICICI, IDBI, IRBI, SIDBI, state development banks, state financial corporations and changing role of development banks in India.

Unit V

Cooperative Banking: Present structure of rural banking, organization structure, management and functions of cooperative banking, its weaknesses and suggestions for reforms, co-operative banking reforms since 1991, Organization structure, management and functions of RRB's.

Course outcomes:

After completion of this course students will able to:

1. Understand concept of Indian Financial System
2. To understand role of central banking in India.
3. To understand role of commercial banks in India
4. To understand role of Development banks in India
5. To understand role of cooperative banking in India.

Note for Paper Setters

The Question paper shall have two sections. Section A will be compulsory and will contain 10 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), each carrying 1 mark. Section B will contain 10 long answer type questions, two from each Unit, the candidates will be required to answer one question from each Unit, each question carrying 10 marks

Suggested Readings

1. Avdhani (2006), Investment and Securities Markets in India, Himalaya Publications, Delhi.
2. Averbach, Robert D (2009), Money, Banking and Financial Markets, Macmillan, London.
3. Bhole, L.M. (2010), Financial Markets and Institutions, Tata McGraw Hill, Delhi.
4. Ghosh, D (2009), Banking Policy in India, Allied Publications, Delhi.
5. Giddy, I.H (2009), Global Financial Markets, A.I.T.B.S., Delhi.
6. Khan, M. Y. (2007), Indian Financial System, Tata McGraw Hill, Delhi.

7. Reserve Bank of India, Various Reports - 2009, RBI Publication, Mumbai.
8. Srivastava R.M. (2007), Management of Indian Financial Institution, Himalaya Publishing House, Mumbai.
9. Varshney, P.N (2005), Indian Financial System, Sultan Chand & Sons, New Delhi.
10. Verma J. C. (2009), Guide to Mutual Funds and Investment Portfolio, Bharat Publishing House, New Delhi.

Course Title: Project Management **Total Marks:100**
Course Code: MBA F5 **University Examination:60**
Examination Duration: 03 Hours **SessionalAssessment:40**

Objective: The Course is designed to develop in students an understanding of the structure and role of project management in business.

Unit I
Framework of Project Management: project concept, classification , project ideas: screening of ideas in regard to various steps such as corporate appraisal, monitoring the environment, importance of project management, forms of project organization, project management today—an integrative approach, project life cycle, project formulation checklist (SWOT list), project management and the future outline.
Unit II
Feasibility Studies: phases from project planning to project control: pre--investment, investment and operational phase, cost of capital, time value system (TVS) and time value of money, project feasibility studies, opportunity studies, general and specific studies, pre--feasibility studies, functional or support studies, feasibility study: components of project feasibility study.
Unit III
Financial Analysis & Appraisal: Cost of Project, Means of Financing, Cost of Production, Working Capital Requirement & its Financing, Estimates of Net Cash Accruals over a period.
Project Risk Analysis: NPV, Benefit-Cost Ratio, IRR, Payback Period, ARR, Investment Appraisal - Indian & International Practices.

Unit IV
Social Cost Benefit Analysis: Rationale, UNIDO & L.M. approach, Project Organization, Project Scheduling, Network Techniques for Project Management, Network Models, PERT & CPM.
Unit V
Project Team Management: Building high-performance project teams, Managing virtual project teams, Project control process, Performance measurement and evaluation, Project quality, Planning, Quality assurance, Quality audit, Project closure and Post completion audit. (Case Study
Note for Paper Setters
The Question paper shall have two sections. Section A will be compulsory and will contain 1 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), eachcarrying 1 mark.Section B will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

Course outcomes:

CO1: Manage the scope, cost, timing, and quality of the project, at all times focused on
project success as defined by project stakeholders.

CO2: Align the project to the organization's strategic plans and business justification throughout its lifecycle.

CO3: dentify project goals, constraints, deliverables, performance criteria, control needs, and resource requirements in consultation with stakeholders.

CO 4 Implement project management knowledge, processes, lifecycle and the embodied
concepts, tools and techniques in order to achieve project success.

CO5: Adapt projects in response to issues that arise internally and externally.

Suggested Readings

1. Slack, Nigel, Chambers, Stuart, Harland and Johnston, A.J. (2007), Operations Management, 2nd edition, USA, PITMAN
2. Stucken, L.C. (2005), The Implementation of Project Management: The Professional's Handbook, USA, Addison-Wesley.
3. Burke, R. (2004), Project Management-Planning & Control Techniques, 7th edition, New Delhi, Wiley.
4. Meredith J.R. and Mantel S.J. (2005), Project Management-AManagerial Approach,6th edition, New Delhi, Wiley.
5. Chandra, Prasanna. (2009), Project Management-Planning, Analysis, Selection, Implementation and Review, 7th edition, New Delhi, Tata McGraw Hill.

Course Title: Advertising and Sales Promotion **Total Marks:100**

Course Code MBA M1 **University Examination:60**

Examination Duration: 03 Hours **Sessional Assessment:40**

Learning Objective: The objective of the course is to develop basic understanding in the advertising and sales promotion process and its role in stimulating sales.

Unit I

Advertising Management and Planning: Major institutions involved in the field of advertising management, importance of advertising, classification and types of advertising, the promotional mix, elements of the promotional mix, developing an advertising campaign, stages in advertising campaign.

Unit II

Advertising Budgeting: Defining Advertising Goals for Measured Advertising Results (DAGMAR),(Case Study) characteristics of objectives, Budgeting Approaches: Top-Down Budgeting, Bottom-Up Budgeting approaches to budget setting, factors influencing sales.

Unit III

Creative Strategy: Planning and Implementation: Advertising creativity, importance of creativity in advertising, creative strategy development, modern advertising appeals: informational/rational

appeals, advertising execution, modern ways of advertising execution, and creative tactics for television.

Unit IV

Media Planning and Strategy: An overview of media planning, media plan development, market analysis for developing media plan, developing and implementing media strategies, major advertising media, advertising on Internet.

Unit V

Sales Promotion and Promotion Effectiveness: The scope and role of sales promotion, consumer oriented sales promotion, techniques to conquer sales promotion; trade oriented sales promotion: objective of trade oriented sales promotion, and techniques of trade oriented sales promotion, measuring the effectiveness of the promotion program.(Case Study)

Course Outcomes

CO 1: To understand the concept of advertising management and planning.

CO 2: To demondtrate knowledge in making advertising budgeting.

CO 3: To be able to progressive learning of creative strategy.

CO 4: To demondtrate knowledgein making media planning and strategy.

CO 5: To understand the relationship between sales promotion and promotion effctiveness.

Note for Paper Setters

The Question paper shall have two sections. Section A will be compulsory and will contain 1 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), eachcarrying 1 mark.Section B will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

Suggested Readings

1. David A. Aaker& John Myers (2008), Advertising Management, 5th edition, Prentice Hall of India, New Delhi.
2. George. E. Belch and Michael A. Belch, (2008),Advertising and Promotion: An Integrated Marketing Communications Perspective, 8th edition, Tata McGraw-Hill Publishing Company Limited, New Delhi.
3. Guinn, Allen, Semenik (2009), Advertising and Integrated Brand Promotion, 6th edition, Thomson, South-Western.
4. Ogilvy, David (2012) Confession of an Advertising Man, Atheneum, New York.
5. Tom Ducan (2004), Advertising and IMC, 2nd edition, Tata McGraw Hill.
6. Guinn, Allen, Semenik (2009), Advertising and Integrated Brand Promotion, 6th edition, Thomson, South-Western.
7. Ogilvy, David (2012), Confession of an Advertising Man, Atheneum, New York.

Tom Ducan (2004), Advertising and IMC, 2nd edition, Tata McGraw Hill

Course Title: Consumer Behavior and Marketing

Strategy **Total Marks:100**

Course Code MBA M2 **University Examination:60**

Examination Duration: 03 Hours

SessionaAssessment:40

Objective:

The objective of this course is to familiarize students with the wide range of consumer behaviors and implementation of successful marketing actions related marketing Management.

Unit I

A perspective on Consumer behavior:

Introduction to consumer behavior and marketing strategy, Approaches to consumer behavior, uses of consumer behavior research, consumer behavior role in marketing strategy. A framework for consumer analysis- elements for consumer analysis, levels of consumer analysis, wheel of consumer analysis.

Unit II

Affect And Cognition and Marketing Strategy: Introduction to affect and cognition. Consumer's products knowledge and involvement, Means-end chains of knowledge, the ZMET Approach to consumer. Attention and comprehension, factors influencing Attention and comprehension. Attitudes and intentions, attitude models, consumer decision making.

Unit III

Behavior and marketing strategy: Introduction to behavior, model of overt consumer behavior, conditioning and learning process, Classical conditioning and operant conditioning, vicarious learning, factors influencing modling, analyzing consumer behaviour.

Unit IV

The environment and marketing strategy: Introduction to the environment, Cultural and cross-cultural influences, marketing implications,subculture and social class, reference groups, family and family life cycle. (Case Study)

Unit V

Consumer Analysis and Marketing Strategy: Market segmentation and product positioning-segmentation and product positioning bases, consumer behaviour and product strategy, consumer behaviour and promotion strategy, consumer behaviour and pricing strategy, consumer behavior Electronic commerce and channel strategy. (Case Study)

Course outcomes:

Upon successful completion, students will have the knowledge and skills to:

Co1: Introduction to Consumer behavior includes approaches, uses, and framework of consumer Analysis.

Co2: Understand the affectand cognition portion of wheels of consumer analysis.

Co3: Explore Behavior part of Consumer behaviorand marketing strategy.

Co4: Understanding the environmental aspect of consumer behavior and marketing strategy

Co5: Consumer Analysis and Marketing Strategy.

Note for Paper Setters

The Question paper shall have two sections. Section A will be compulsory and will contain 1 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), eachcarrying 1 mark.Section B will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

Suggested Readings

1. B. L. Loudon, A.J. Della Bitta (1989), Consumer Behaviour, Concepts and Applications (4 edition), McGraw Hill.
2. John F Sherry, Jr. (1995), Contemporary Marketing and Consumer Behaviour: An Anthropological Source Book, Sage Publications Inc., Thousand Oaks.
3. L.G. Schiffman, L.L. Kanuk (1998), Consumer Behaviour (6 edition), PHI EEE.
4. Patrica A Adler, Peter Adler (2001), Sociological Odyssey: Contemporary Readings in sociology, Wadsworth Belmont.

Course Title: Service Marketing Management **Total Marks:100**

Course Code MBA M3 **University Examination:60**

Examination Duration: 03 Hours **Sessional Assessment:40**

Objective: The course acquaints students with concepts, tools and techniques of service marketing in context with value creation.

Unit I

Service Marketing: Concept of service marketing, meaning and nature of services growing importance of services sector; classification of services and marketing implications; characteristics of services; classification of services; high contact and low contact services, nature of service act; services marketing management process.

Unit II

Consumer Behaviour: Consumer decision making in services, customer expectations and perceptions; defining and measuring service quality and customer satisfaction, SERQUAL model, house of quality, gaps model- core strategies to address service quality gaps; service recovery; customer behavior in service encounters- types of service encounters; moment of truth, purchase process for services, meaning and components of service expectations, zone of tolerance; new service development (Case Study).

Unit III

Segmentation and Marketing Mix: Service positioning- service market positioning strategy, positioning maps. services design and development; service blueprinting; service process; services distribution management; managing the integrated services communication mix; physical evidence and services cape; managing service personnel; employee and customer role in service delivery. , bases and criteria for market segmentation.

Unit IV

Pricing and Demand Management: Pricing for services, cost based pricing, competition based and value based pricing, ethics and pricing policies, revenue management in services, service demand management: service productivity and fluctuations in demand, understanding pattern and determinants of demand waiting lines, waiting line management.

Unit V

Service Feedback and Recovery: Introductory account of customer feedback and service recovery, customer complaining behavior, customer response and service failures, customer response and service recovery, service recovery and customer loyalty,(Case Study) service recovery paradox, components of service recovery system.

Course Outcome:

1. To foster understanding of service marketing concepts among students.
2. To make students understand various models of consumer behavior
3. To understand concepts of market segmentation and its types.
4. To understand pricing strategies with respect to demand
5. To understand the importance of customer feedback in service marketing

Note for Paper Setting

The Question paper shall have two sections. Section A will be compulsory and will contain 1 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), each carrying 1 mark. Section B will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

Suggested Readings

1. Zeithaml V. A. ,Bitner M. J. and Pandit, A. (2008), Services Marketing, 5th Edition, Tata McGraw Hill Publishing Co. Ltd. New Delhi.
2. Lovelock C. H., Wirtz, J. and Chaterjee, J. (2010), Service Marketing: People, Technology, Strategy, 6th Edition, Pearson Education.
3. NeRao K Rama Mohana (2007), Service Marketing, Pearson education
4. Gosney, John W. and Thomas P. Boehm (2009), Customer Relationship Essentials, Prentice Hall, New Delhi.
5. Payne Adrian(2004),The Essence of Services Marketing, Prentice Hall, New Delhi.

Course Title: Rural Marketing **Total Marks:100**
Course Code MBA M4 **University Examination:60**
Examination Duration: 03 Hours **Sessional Assessment:40**

Objective: The objective of this course is to expose the students to the Agriculture and Rural Marketing environment and make them understand the emerging challenges and the upcoming global economic scenario.

UnitI

Rural Marketing: Concept & scope of rural market, Size and nature of rural markets, phase evolution of rural marketing, Rural markets Characteristics, Environmental factors effecting rural markets, classification, rural Marketing opportunities & challenges, rural marketing in India.

UnitII

Rural Consumer Behaviour: Rural Consumer Vs Urban Consumers, needs and wants of rural consumer, factors influences rural consumer, brand beliefs of rural consumer, Relevance of Marketing mix for rural market (Case Study)/Consumers. Problems in rural market.

UnitIII

Segmentation: Targeting &positioning for rural market, benefits of rural market, tools of rural market segmentation, Market forces, components of different Product Strategies, Pricing Strategies, Promotional Strategies for Rural consumers.

UnitIV

Understanding Agricultural Markets: Nature & scope, Objectives of Agriculture Marketing, Challenges in Agriculture Marketing, Agriculture Marketing & its Economic importance, Agricultural Produces and their market.

UnitV

Export potential for agri-products: Agricultural export zones (AEZ), Innovative distribution channels, ITC E-choupal, Godrej Adhar, HUL Shakti, cold chains organized procurement and warehousing, glamourize rural markets. (Case Study)

COURSE OUTCOMES

CO1: To get students familiar with concepts related to Rural Marketing, classification, opportunities & challenges.
CO2: To make students get acquainted Rural Consumer Behaviour and Marketing mix for rural market.
CO3: To make students recognize Segmentation, Targeting &positioning for rural market.
CO4: To divulge students regarding Agriculture Marketing & its Economic importance, Agricultural Produces and their market etc.
CO5: To make students get acknowledged with Export potential for Agri-products.

Note for Paper Setters

The Question paper shall have two sections. Section A will be compulsory and will contain 1 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), eachcarrying 1 mark.Section B will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

Suggested Readings

1. Badi&Badi (2009), Rural Marketing, Himalayan Publications,New Delhi.
2. Mamoria, C.B. &Badri Vishal (2009), Agriculture problems in India, Himalayan Publications.
3. Arora R.C. (2009), Integrated Rural Development, S. Chand Publications, New Delhi.
4. Rajgopal (2008), Managing Rural Business, Sage Publications.
5. Rural Marketing - Challenges and Opportunities, Dr. H.C.Purohit, 2006
6. Rural Marketing New Dimension, R. C.Rajendra Kumar, 2006
7. Rural Marketing - Text and Cases, U.C.Mathur,2008

Course Title: Distribution Management **Total Marks:100**
Course Code:MBA M5 **University Examination:60**
Examination Duration: 03 Hours **Sessional Assessment:40**

Learning Objectives: The course aims to impart skills and knowledge needed to manage sales force and distribution function so as to gain competitive advantage. As a successful marketer, the sales and distribution function needs to be properly managed which incorporates understanding of various concepts, which the course aims to provide to the student participants.

Unit I:Introduction to Sales Management: The Sales Management Function – Scope and Importance; Personal Selling Process and Approaches; The Evolving Face of Personal Selling; Sales Organization Structure; Sales Forecasting; Sales Territory Design.

Unit II: Sales Force Management: Sales Force Job Analysis and Description; Recruiting and Selecting Sales Personnel; Training Sales Personnel; Motivating the Sales Force; Sales Force Compensation; Evaluating Sales Performance; Ethical and Legal Issues in Sales Management

Unit III: Distribution Planning and Control: Role and Function of Intermediaries; Selection and Motivation of Intermediaries; Distribution Analysis; Control and Management; Channel Dynamics – Vertical Marketing Systems; Horizontal Marketing Systems; Multichannel Marketing Systems; Channel Conflict and Management.

Unit IV: Distribution System and Logistics: Physical Distribution System – Decision Areas; Different Modes of Transport in India; Their Characteristics;

Unit V: Logistics Introduction – Functional Areas of Logistics; Logistics Integration for Customer Satisfaction; Distribution Costs; Control and Customer Service; Supply Chain Management (SCM); Integration of Sales and Distribution Strategy; Case Studies.

Course Outcomes

CO 1: To understand the concept of sales management and it's importance.

CO 2: To bring about the thorough understanding of sales force management and ethical and legal issues in sales management.

CO 3: To demonstrate knowledge in making distribution planning and control and channel conflict and management.

CO 4: To understand the relationship between distribution and logistics for managers in decision making areas.

CO 5: To be able to demonstrate progressive learning in functional areas of logistics, and integration of sales and distribution strategy.

Note for Paper Setters

The Question paper shall have two sections. Section A will be compulsory and will contain 1 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), eachcarrying 1 mark.Section B will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

Suggested Readings :

1. Still, R. R. & Cundiff, E. W., Govoni, N. A. P. (2003). Sales Management. Prentice Hall of India, Delhi.
2. Coughlan A.T., Anderson E., Stern L.W and Ansary A.E. (2001), Marketing Channels, Pearson Education.
3.Stanton, William J. etc. (2001). Management of Sales Force. Irwin, Chicago.
4 Spiro, R. (2004), Management of a Sales Force, 11th Edition, Pearson Education.

Course Title: Strategic Human Resource Management **Total Marks:100**

Course Code: MBA H1 **University Examination:60**

Examination Duration: 03 Hours **SessionalAssessment:40**

Objective: The course deals with the interaction between strategy and human resources, as approached from a general managerial perspective.

Unit I

An Investment perspective of Human Resources:HR investment considerations, investment in training and development, investment practices for improved retention, investment in job secure work force and non traditional investment approaches. The human Resources Environment--technology and organizational structure, workers values and attitudinal trends, management trends, trends in utilization of human resources and international developments.

Unit II

The Human Resource legal Environment: equal employment opportunity (EEO), compensation, employee relation, labour relation and collective bargaining, emerging issues and strategic impact of legal environment. Strategy Formulation-- importance of HR to strategy, theoretical foundation, international strategy, HR contribution to strategy, strategy driven role behavior and practices, strategic HR activity typology, classifying HR types, network organization and strategy, organizational learning, integration of strategy and HR planning and the HR managers and strategic planning.

Unit III

Human Resource Planning:overview of HR planning, the strategic role of HR planning, managerial issues in planning, selecting forecasting techniques, forecasting the supply of human resources and forecasting the demand for human resources.--Strategy Implementation, workforce utilization and employment practices,efficient utilization of human resources, dealing with employee shortages, selection of employees, dealing with employee's surpluses and special implementation challenges.

Unit IV

Strategy Implementation: Reward and Development Systems-- strategically oriented performance measurement systems, strategically oriented compensation systems and employee development and performance, impact of human resource practices: individual high--performance practices, limitation of individual practices, evolution of practices, systems of high--performance practices, individual best practices Vs system of practices and universal practices Vs contingency perspectives.

Unit V

Human Resources Evaluation:overview of evaluation, approaches to evaluation, evaluating strategic contribution of traditional areas and evaluating strategic contribution in emerging areas.

Course outcome

1. To understand HR investment considerations for investment in training and development.
2. To understand the Legal framework of HR Environment in Global prospective.
3. To get an insight of HR planning and the Strategic Impact of HRP in Human Resource Management.
4. To discuss strategically oriented performance measurement systems and their outcomes for enhance productivity.
5. To evaluate strategic contribution of HRM in traditional areas and in emerging areas.

Note for Paper Setters

The Question paper shall have two sections. Section A will be compulsory and will contain 1 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), eachcarrying 1 mark.Section B will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

Suggested Readings

1. William P. Anthony, Pamela L. Perreve& K. Michael, Kacimar(2001), Strategic Human Resource Management, The Dryden Press.
2. Charles and Greer (2001), Strategic Human Resource Management, Pearson Education.
3. Srinivas R. Kandula(2005), Strategic Human Resource Development, Prentice Hall of India Pvt.Ltd..
4. K. Aswathapa (2008),International Human Resource Management, Tata McGraw Hill Publishing Co..
5. Peter J. Dowling Denice E Wetch, Randall S. Schuler (2007),International Human Resource Management,Thomson South-Western Publishers.

Course Title: Organizational Change and Development

Total Marks:100

Course Code MBA H2

University Examination:60

Examination Duration: 03 Hours

Sessional Assessment:40

Objective: The objective of this course is to familiarize students with issues relating to the processes of organizational change and development and would make them aware of various interventions and applied behavioral tools and techniques of OD.

Unit I

Organizational Change: Concept, nature, need, forces of change, change process, levels of change, Types of change, steps in change management, change Agents, Issues in Change Management, Organization Transformation, Culture change, Resistance to Change, (Case Study) Managing Resistance to Change.

Unit II

Managing Change through OD: Concept and nature, Growth and Relevance of OD, values Assumptions and Beliefs in OD, its Implications, Foundations of OD , the OD practitioner, Issues in Consultant–Client Relationship, OD Program, Managing the OD process, Action Research as a process and an approach for OD.

Unit III

Team Interventions: classification of OD interventions, factors effecting choice of OD intervention,Team Interventions: Process Consultation, Gestalt Approach, Role Analysis Technique, Role Negotiation Technique, Responsibility Charting, Force Field Analysis, Inter group and Third Party Peace-Making, Organization Mirroring.

Unit IV

Comprehensive and Structural Interventions: Confrontation Meeting, Real Time Strategic Change, Stream Analysis, Survey Feedback, Grid OD, Structural Interventions: Work Redesign, MBO, Quality Circles, Parallel Learning Structures, Total Quality Management. (Case Study)

Unit V

Power and Politics:T-groups ,Behavioral Modeling ,Role Efficacy LAB(REL), Ethical standards in organizational development, concept of Power and Politics in Organizations, nature of Organization Development in relation to Power and Politics, Fundamental Strengths of OD, Future directions in OD.

Learning Outcomes: On successful completion of the course, the student will be able to:

CO1: Gain a general understanding of organization change and development concepts.

CO2: Understand and analyze different approaches to managing organizational change.

CO3: Critically evaluate, in an organizational development framework, the theoretical and Practical links between development models, interventions which can be used in Organizations in change and transition.

CO4: Discuss relevance of power and politics with organization development and future trends impacting upon organizational change initiatives

Note for Paper Setters

The Question paper shall have two sections. Section A will be compulsory and will contain 1 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), eachcarrying 1 mark.Section B will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

Suggested Readings

1. Cummings and Worley (2012), Organizational Development and Change, Thomson publications.
2. French, W.L. & Bell, Jr.C.H. (2009), Organizational Development, 5th edition, Prentice Hall of India, New Delhi.
3. Ramnarayayan SRao T.V and Kuldeep Singh (2011), Organizations Development, Response Books.

Course Title: Industrial Relation and Labour Laws **Total Marks:100**

Course Code MBA H3 **University Examination:60**

Examination Duration: 03 Hours **Sessional Assessment:40**

Objective: The objective of this course is to make students aware of labour andindustry based problems, understanding of industrial conflicts, essentials of industrial relations and labour laws in India and other industrially advanced countries.

Unit I

Industrial Relations: Concept, Features, Scope, Constraints, Dimensions, Objectives, Functions, Principles of an Effective Industrial Relation, components of industrial relation, factors effecting industrial relations, need for an effective industrial relation, Dunlop system Model of Industrial Relations,(Case Study) Human Relation Approach of industrial Relation, Importance of Good Industrial Relations, Industrial Policy Resolution.

Unit II

Industrial Disputes: Introduction, Essentials of Industrial Disputes, Causes of Industrial Disputes, Classification of Industrial disputes, Measures of Industrial disputes, Strikes, Types of strikes, prevention of strike, Lockouts, Preventive and settlement machinery for handling industrial disputes, Statutory Measures and Voluntary Measures, Industrial discipline, Types, Features and Principles.

Unit III

Collective Bargaining: Concept, Significance and pre--requisites, Features of Collective Bargaining, Types of Collective Bargaining, Process of Collective Bargaining, Models of Collective Bargaining, Principles of Collective Bargaining, Status of Collective Bargaining in India, factors responsible for slow progress of Collective Bargaining in India and recent trends in Collective Bargaining.(Case Study)

Unit IV

Worker's Participation in Management and Trade Unions: Introduction, Forms, Levels and Stages of Participation, participative Schemes in some Industrially Advanced Countries-an overview, Various Schemes of Participation, working and Effectiveness of the participative schemes in India, Importance , Structure, Functions and Problems of TU, functions of TU in USA and UK.

Unit V

Labour Legislations: Industrial Dispute Act 1947, Trade Union Act1926, The Industrial Employment Employees (Standing Orders) Act, 1946, Payment of Wages Act1948,Payment of Bonus Act1965, Employees State Insurance Act 1948, Workmen's Compensation Act 1923, ESMA 1981, Provisions relating to Health, Safety Working Conditions and Welfare amenities under Factories Act 1948.

Course Outcomes:

On successful completion of course, students will be able to:

CO1 Demonstrate descriptive knowledge of the field of industrial relations.
CO2 Apply the essential concepts of industrial relations and their interrelationship at the personal, organizational and national levels.
CO3 Explain the concept and provisions of formal institutions likes trade union and its functions for solving various problems of employees.
CO4 Understand the concept and importance of collective bargaining for negotiation purposes between aggrieved parties in industries.
CO5 Acquire knowledge about various laws related with labour, welfare, health and safety and importance of different schemes of worker's participation for joint decision making in India and other advanced countries.

Suggested Readings

1. Chabra T. N and R. K. Suri (2009), Industrial Relations-Concepts and Issues.
2. Dunlop John T (2009), Industrial System.
3. Monnapa Arun (2012), Industrial Relations.
4. Memoria C.B Memoria and Gankar (2011), Dynamics of Industrial Relations, Himalaya Publishing House.
5. Sahni NKPunam Aggarwal (2011), Industrial Relations and Labour Laws, Kalyani Publishers.
6. Srivastava SC (2009), Industrial Relations and Labour Laws.

Course Title: Human Resource Development	**Total Marks:100**
Course Code MBA H4	**University Examination:60**
Examination Duration: 03 Hours	**Sessional Assessment:40**

Objective: It is an attempt to create a conceptual background required to take activities in order to facilitate and manage Human resource development functions in an organization effectively.

Unit I

HRD Overview: Meaning and characteristics of HRD, Need for HRD, HRD philosophy, HRD sub systems, objectives of HRD, HRD policies and action plans, HRD and Management functions, Role of chief executives in HRD.(Case Study)

Unit II

Employee Behavior: Model of employee Behavior, Categories of employee Behavior and factors influencing employee Behavior. Concept of learning, the basic learning principles, Types of learning curves, learning strategies and styles.

Unit III

HRD Mechanisms: Performance appraisal, potential appraisal and development, feedback and performance coaching, career planning, training, organizational Development/system development, rewards and QWL, Human resource information. The contribution of HRD mechanisms to HRD goals, HRD as a Integrated system, Principles in HRD system Designing. HRD matrix.

Unit IV

Strategies and instruments for HRD implementation: HRD mechanisms, process,(Case Study) outcomes and organizational effectiveness, mapping HRD practice-profile, HRD climate survey, HRD competencies checklist, training effectiveness test, performance, planning and development test, leadership style test, integrated HRD systems intervention strategies.

Unit V

HRD in the New Economic Environment: Role of HRD in the liberalized economy, new environment, corporate strategy and HRD agenda, HRD and TQM, technological change and HRD, HRD for blue collar workers in the new context, HRD in select organization.(Case Study)

Note for Paper Setting

The Question paper shall have two sections. Section A will be compulsory and will contain 1 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), each carrying 1 mark. Section B will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

Suggested Readings

1. Anil K, Abraham, S. J. ,Verma KK.(1990), Alternative Approaches and Strategies of HRD, National HRD network, Rawat Publications.
2. Maheshwari B. L., Dharni, P. Sinha(1991), Management of Change through HRD, National HRD Network, Tata McGraw Hill.
3. Pareek U Rao T. V (1981), Designing and Managing Human Resource System, Oxford and IBH Publication.
4. Pareek U,, Lynton R. P(1990), Training for development, Vistar Publication, New Delhi.
5. Rao, T. V (1990), HRD Missionary, Tata McGraw Hill.
6. Snell, S, Bohlander, G. (2007), Human Resource Management, Cengage Learning New Delhi

Course Outcome:

After teaching the syllabus, the students shall be able to understand and comprehend

1. The working of HRD Systems and their importance in organizations.
2. Theories of learning and their application in practical field.
3. HRD Mechanisms and related concepts.
4. Use of HRD principles and their implementation
5. HRD and its relevance to technology.

Course Code: MBA H5 **University Examination:60**
Duration of Examination: 03 Hours **Sessional Assessment:40**

Objective: The purpose of this course is to develop among students an awareness of the ethical issues and environment aspects related to business

Unit I

Business Ethics: Nature, objectives, scope, need for business ethics, Relationship between Business and Ethics: Unitarian view of ethics, Separatist view of ethics and Integration view of ethics, ethical theories: meta ethics, normative ethics and applied ethics, ethical dilemmas at work place and their resolution, Work Ethics, importance, Values; Nature, Types and Importance, values across cultures.

Unit II

Management of Ethics: Corporate Codes--Development and Implementation of Corporate Codes, Corporate Governance,(Case Study) Importance, the current context of corporate governance Theories of corporate governance, Models of Corporate Governance, types of directors, types of Board Structures, board styles, Ethical Issues in Global Business.

Unit III

Business Environment: Meaning, nature and significance of Business Environment, Types of Business Environment, Factors Affecting Business Environment, Components of Environment: Economic, Political, Natural, Social, Demographic and Technological, Need to scan the Business Environment and Techniques of Scanning the Business Environment, Review of global economy, privatization; modes, reasons and problems.

Unit IV

Business and Society:

Social Responsibility of business: meaning, nature and Importance, Responsibilities towards different Sections, Social Audit(Case Study): objectives, methods and obstacles, disclosures in business, consumer rights, UN guidelines for consumer protection, consumerism in India, features of Consumer Protection Act ,contract act and companies act, Industrial development in India, Industrial sickness in India, Industrial Disputes, preventive measures for disputes.

Unit V

Politico Legal Environment and Economic Environment: Features of Indian economy, Main features of Economic Planning with respect to business, Planning in India, Industrial policy, small scale industries, competition policy and competition Act 2002, GATT and WTO; Agreements and Implications, Main provisions of SICA, Money Market in India, structure of Capital Market in India.

Course Outcomes:

On successful completion of this course, students will be able to:

CO1. Recognize important ethical issues that arise in various business contexts and professional practice.
CO2. Explain the concept of corporate governance and why governance is important for corporations as well as for society at large.
CO3. Understand the concept, significance and changing dimensions of Business Environment and identify various types of Business Environment and tools for scanning the Environment.

CO4. Understand the responsibilities of business toward different stakeholders while decision making.

CO5. Gain insights on laws, role of economic systems, government policies, public sector, economic reforms and its impact on business.

Suggested Readings

1. Paul Justin (2010), Business Environment, 3rd edition, Tata McGraw Hill Education Pvt. Ltd.
2. Upadhyay A.K (2010), Business Environment, 2nd edition ,Asian Books Pvt. Ltd.
3. Bhatia , S.K (2010),Management by Values, Excel Books Pvt. Ltd.

Course Title: Entrepreneurship Development **Total Marks:100**
Course Code: MBA 441 **University Examination:60**
Examination Duration: 03 Hours **Sessional Assessment:40**

Objective: The aim of this course is to enrich students with entrepreneurial styles and challenges in the present business scenario.

Unit I

Entrepreneurship: New concept of entrepreneur, characteristics of entrepreneur, entrepreneurial skills, expectation, functions of entrepreneurs, classification of entrepreneurs: according to the types of business, technology, motivation and stages of development, imitating, fabian entrepreneurs, constraints for the growth of entrepreneurial culture.

Unit II

Entrepreneurship Development: Entrepreneurial competencies, developing entrepreneurial competencies, role of entrepreneur, the success of entrepreneurship, entrepreneurship environment, Developmentprogramme: assistance programme for small scale units, institutional frame work, role of SSI sector in the economy. (Case Study)

Unit III

Entrepreneurship Training: Significance of entrepreneurship training, designing entrepreneurship training programme, methods of training, institutions in aid of entrepreneurship development, Management Development Institute (MDI), National Institute for Entrepreneurship and Small Business Development (NIESBUD), and Entrepreneurship Development Institute of India (EDII).

Unit IV

Project Report and Ownership Structures: Identification of business opportunity, preparation of feasibility report, financial evaluation, technical evaluation, project formulation, specimen project report. Ownership Structures**:** proprietorship, partnership, company, cooperatives.

Unit V

Sources of Finance to Entrepreneur: Types of finance, Small Industries Development Bank of India, Industrial Development Bank of India, State Financial Corporation, State Industrial Development Corporation, Women Entrepreneurship(Case Study: Traits of a successful woman entrepreneur, how to develop women entrepreneurs, Problems faced by woman entrepreneurs in India, successful women entrepreneurs in India.

Course Outcomes

CO 1: To bring about the throughunderstanding of entrepreneurship and constraints for the growth of entrepreneurial culture.

CO 2: To demondtrate knowledge in entrepreneurship development.

CO 3: To understand the concept of entrepreneushiptaining and various entrepreneurship training institutes in India.

CO 4: To be able to demontrate progressive learning in the project report and ownership structures.

CO 5: To bring about the thorough understanding of source of finance to entrepreneurs.

Note for Paper Setters

The Question paper shall have two sections. Section A will be compulsory and will contain 1 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), eachcarrying 1 mark.Section B will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

Suggested Readings

1. Clifford, M. Baumback& Joseph, R. Mancuso (2001), Entrepreneurship and Venture Management, Prentice Hall.
2. Dan, Steinhoff and John Burgess (1993), Small Business Management Fundamantals, McGraw Hill.
3. Donald, L Sexton and Raymaond W. Smilor (1990), The Art and Science of Entrepreneurship, Ballinger, Publishing House.
4. Peter, F. Drucker (2012), Innovation and Entrepreneurship, 2nd edition, Heinemann.
5. Ram. K. Vepa (2007), How to Succeed in Small Scale Industry, Vikas Publication House, New Delhi.
6. Saini Singh Jasmer (2009), Entrepreneurship Development, 1st edition, Deep and Deep Publication Private Limited, New Delhi.

Course Title: Management Information System **Total Marks:100**

Course Code: MBA 442 **University Examination:60**

Examination Duration: 03 Hours **Sessional Assessment:40**

Objective: To develop in students an understanding of the structure and role of Information and its integration in business.

Course Outcome: ***After completing this course students will be able to:***

6. Get familiar with nature, objectives, approaches, classification and process of Management Information System.
7. Know about elements of decision making in MIS, development of MIS and MIS tools.
8. Get admittance about several types of information system planning and implementation of MIS.
9. Become familiar with several types of information systems and issues related to security and control in MIS.
10. Know about MIS databases, SQL basic commands, DDL and DML procedures.

Unit I

Management Information System: Introduction to MIS, Meaning & Objectives of MIS, Nature& Approaches to MIS, Requirements for MIS, Significance & Role of MIS, Problems & Solutions in implementing MIS from Indian scenario, Benefits & Limitations of MIS, Concepts of System, Characteristics of System, Evolution of Information System, Types of Systems.

Fundamentals of Information: Concepts of Information, Characteristics of Information, Value of Information, Sources of Information, Types of Information, Dimensions of Information, Level of Management & their information requirements, Approaches to Information System, Components of Information System, Classification and Characteristics of Information Systems(TPS, PCS, ECS, MIS, DSS, EIS, ES, KMS, SIS, BIS and OAS).

Unit II

Decision Making and MIS: Introduction to Decision Making Process & Manager Roles,Classification of managerial Decisions, Models for Decision Making Process (Rational Model,Implicit Favorite Model and Emerging Model.(Case Study)

Development of MIS: Two phase model for selecting IS Tools, Tools for MIS Development(Traditional tools & Automated tools).

Unit III

Information System Planning: Nolan's Model, Concept of PIECES Model, Principles for IS Development, Concept of System Development Life Cycle (SDLC).(Case Study)

Implementation of MIS: Methods of Implementing MIS, Implementation steps of MIS,Structure for evaluation of MIS, Maintenance of MIS, Problems related to maintenance of MIS and measures to overcome these problems.

Unit IV

Information Systems for Business Operations: Sub-systems, Components and working of Marketing Information System, Production Information System, HR Information System, Financial & Accounting Information System, R&D Information System.

Control and Security Issues: Challenges for securing computer systems, Types of computer security breaches, Security controls, Audit in information systems, Cyber Laws & IT Act 2000,Ethical foundations, Ethical & Societal dimensions of Information Technology.

Unit V

Introduction to Database Concepts: Database Management System (DBMS) and their Components, Relational Database Management System (RDBMS), Concept of Entity &Relationships in Databases.**Managing Database:** Basics of Normalization concept, Basics of SQL, Working with DDL and DML commands in SQL.

Note for Paper Setters

The Question paper shall have two sections. Section A will be compulsory and will contain 1 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), each carrying 1 mark. Section B will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

Suggested Readings

1. Effy Oz (2011), Management Information Systems, Cengage Learning India Private Limited New Delhi.
2. Stair Ralp& Reynolds George (2009), Principles of Information Systems; A Managerial Approach, Cengage Learning India Private Limited New Delhi.
3. JaiswalMahadeo&Mital Monika (2007), Management Information Systems, Oxford University Press New Delhi.

Course Title: Portfolio Management **Total Marks:100**
Course Code: MBA F7 **University Examination:60**
Examination Duration: 03 Hours **SessionalAssessment:40**

Course objective: To provide students strong conceptual foundation in portfolio management and train them for constructing customized portfolios suited for individual and institutional investors.

Unit I

Introduction to Portfolio Management: Portfolio theory, risk and risk aversion, Markowitz portfolio theory. Measures of Portfolio Risk-expected return of a portfolio variance and standard deviation of a two-asset portfolio, correlation and risk-return tradeoff of a two-asset portfolio, Efficient Frontier-efficient frontier and investor utility, combining risk-free and risky assets, market portfolio as the optimal risky portfolio.

Unit II

Portfolio Management Process: Individual Investor Life Cycle-life cycle net worth and investment strategies, life cycle and investment goals. Portfolio Management Process-policy statement, investment strategy, portfolio construction, and monitoring, importance of asset allocation in portfolio management, role of portfolio managers in efficient markets. (Case Study)

Unit III

Investment Policy Statement: Role of investment policy statement in portfolio management, elements of policy statement, investment objectives (risk tolerance and return objectives, ability to take risk vs. willingness to take risk), investment constraints (liquidity needs, time horizon, tax concerns, and unique needs and preferences).

Unit IV

Equity Portfolio Management Strategies: Passive vs Active Management-passive management constructing index portfolios, tracking error, methods of index portfolio investing. Active Management-fundamental and technical strategies, value vs. growth investing. Asset Allocation Strategies: integrated, strategic, tactical, and insured allocation strategies. Use of Derivatives in Portfolio Management: modifying systematic and unsystematic portfolio risks with derivatives, restructuring portfolio with forwards, protecting portfolio value with put options and equity collars. (Case Study)

Unit V

Evaluation of Portfolio Performance: Composite Portfolio Performance Measures-peer-group comparison, Treynor measure, Sharpe measure, Jensen measure, information ratio measure, application of portfolio performance measures, factors that affect performance measures, measuring timing skills. Reporting Investment Performance-time-weighted and rupee-weighted returns, comparing the composite performance measure.

Course Outcome

1. The subject is aimed at providing insight to the various analytical techniques used in evaluation of the various investment opportunities and creation/construction of Portfolio.
2. The course also provides of application of various models in portfolio management and then comparing performance of managed Portfolio with market portfolio.
3. Students will understand the benefit of diversification of holding a portfolio of assets, and the importance played by the market portfolio.
4. Students will know how to apply different valuation models/strategies and derivative securities in order to hedge the unsystematic risk in the portfolio.
5. To evaluate fixed income and variable securities and how to create the best combination of both types of securities in order to derive efficient portfolio for risk adjusted returns.

Note for Paper Setters

The Question paper shall have two sections. Section A will be compulsory and will contain 10 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), each carrying 1 mark. Section B will contain 10 long answer type questions, two from each Unit, the candidates will be required to answer one question from each Unit, each question carrying 10 marks

Suggested Readings

1. Bodie, Z., Kane A., Marcus, A., and Mohanty, P. (2006), Investments, 6th edition, Tata McGraw Hill, New Delhi.
2. Reilly, Frank K. and Brown, Keith C. (2006), Investment Analysis & Portfolio Management, 8th edition, OH, USA, Thomson South Western.
3. Maggin, John L., Tuttle, Donald L., McLeavy, Dennis W., and Pinto, Gerald E. Managing Investment Portfolios: A Dynamic Process, 3rd Edition, Virginia, USA: CFA Institute.

Course Title: Financial Derivatives **Total Marks:100**
Course Code: MBA F8 **University Examination:60**
Examination Duration: 03 Hours **SessionalAssessment:40**

Objective: Through this course students are expected to gain comprehensive understanding of and ability to value derivatives and use them in financial/investment management.

Unit I

Introduction to Derivatives: Concept, types of financial derivatives, Participants involved in a derivative Market, functions of derivative markets, price discovery, risk management, arbitrage and derivative pricing, structure and evolution of derivative markets in India.

Unit II

Forward & Future Contracts: Nature and structure of forward contracts. Pay offs from forwards contract, Forward prices & spot prices. Risks of Forwards- default risk, and credit risk.

Future Contract: Types of future stock, Index, interest rate, and currency futures, Future Payoffs: Payoffs for buyer & seller of futures, relationship between futures prices and spot prices, Mechanics of future trading: role of clearing house; daily settlement & margins, price limits, delivery and cash settlement, Pricing and valuation of futures before and after marking to the market (Practicals), Forward vs future contracts. (Case Study)

Unit III

Characteristics of Options: Types: call & put options. Index & stock options. Option Pricing; pay off values, effect of difference in exercise value and time to maturity on option price, option positions; Short & long positions for Call & Put options, Pricing Models- discrete option pricing-binomial model (one period only), continuous option pricing-Black-Scholes-Merton model.

Unit IV

Trading strategies involving options: Trading strategies involving Single option & a stock, (Case Study). Spreads; Bull spread, bear spread, butterfly spread, calendar spread, collars, straddle, Strips & straps, Strangles, Concept of future options. Concept of Weather, energy & insurance derivatives.

Unit V

Characteristics of Swap Contracts: Types of Swap contracts: currency Swap, interest rate swap, and equity swap, credit risk at various stages of swap life. Pricing and Valuation: computation of the market value of different types of interest rate and currency swaps during their lives. Swaptions: Basic characteristics and uses, Concept & role of Credit default Swaps.

Course Outcomes: After completion of the course the student will be able to:

CO1: have good understanding of basics of financial derivatives, their functions & Evolution.

CO2: acquire knowledge about the fundamentals of forwards and futures, their trading mechanisms and difference between the two.

CO3: Explain the basics of option contracts, their types, uses, evaluation and trading strategies

CO4: describe and explain the various financial swaps, conditions for their use and evaluation of profit & loss associated with each party to the contract

Note for Paper Setters

The Question paper shall have two sections. **Section A** will be compulsory and will contain 1 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), each carrying 1 mark. **Section B** will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

Suggested Readings

1. Gupta, L. S. (2010), Financial Derivatives: Theory, Concepts & Problems 9th edition, PHI.
2. Hull, J. (2011), Options, Futures and other Derivatives 8th edition Prentice Hall, New Delhi.
3. Chance, D. (2011), Analysis of Derivatives for the CFA Program, 6th edition, Virginia (USA): CFA Institute (Formerly AIMR).
4. Harish Bansal & Bansal (2011), Derivatives & Financial Innovations, Tata McGraw Hill.
5. Vohra, N.D., Bagri, B. R. (2007), Future and Options, 9th reprint edition, Tata McGraw Hill, New Delhi.
6. Jagdish R. Raiyani (2011), Financial Derivatives in India, New century Publications.

Course Title: Mergers and Acquisitions **Total Marks:100**

Course Code: MBA F10 **University Examination:60**

Examination Duration: 03 Hours **SessionalAssessment:40**

Objective: To equip students with tools for analyzing, assessing accounting and financial motives, and evaluating value enhancing potential of mergers and acquisitions.

Unit I

Introduction to Corporate Restructuring: Overview of Concepts -- mergers, acquisitions, amalgamations, takeovers, divestitures. Types of Mergers -- horizontal, vertical, conglomerate. Motives for Mergers -- economies of scale, economies of vertical merger, complementary resources, surplus funds, eliminating inefficiencies. Irrational Reasons for Mergers-- diversification, increase in EPS, lower financing costs. Recent Trends in Mergers--mergers in India, cross--border mergers.

Unit II

Merger Procedure**:** Estimation of merger gains (NPV method). Valuation of Target**--**Free Cash Flow models, EVA model. Scheme of Merger: determination of share exchange ratio, significance of appointed date and effective date, interim period between appointed & effective date.

Unit III

Financing Merger: Financing merger using stock and cash. Leveraged Buyout (LBO) -- features, junk bonds, financial architecture**.** Implications of various financing methods on stock prices of acquirer, target, and merged company. Tax implications of mergers

Unit IV

Divestiture Procedures: Spin--offs, carve--outs, asset sales, privatization. Takeover Defenses: Pre**--**Offer Defenses**--** Shark repellents—staggered board, supermajority, fair price, restricted voting rights, waiting period, poison pills, poison put. Post**--**offer Defenses**--** Litigation, asset restructuring, liability restructuring. Anti**-t**akeover laws**--**antitrust law.

Unit V

Accounting for Mergers & Acquisitions: Accounting for Mergers-- purchase V*s* pooling methods. Accounting for other Inter**--**Corporate Investments**--** cost and market method, equity method, proportionate consolidation, and consolidation methods**.** Impact of different methods on financial statements

COURSE OUTCOMES

CO1: To get students familiar with concepts related to Corporate Restructuring, mergers and acquisitions.
CO2: To make students get acquainted with Merger Procedure and Estimation of merger gains. **CO3:** To make students recognize several methods for financing a Merger.
CO4: To divulge students regarding Divestiture Procedures and mechanism.
CO5: To make students get acknowledged with Accounting methods for Mergers & Acquisitions.

Note for Paper Setting:
The Question paper shall have two sections. Section A will be compulsory and will contain 1 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), eachcarrying 1 mark.Section B will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

Suggested Reading(latest Editions)

- Chandra, P., M & A: Corporate Valuation and Restructuring, Tata McgrawHill, New Delhi
- Hooke, J.C., M & A: Practical Guide to doing the Deal, McGrawHill, International Edition.
- White, Gerald I., SondhiAshwinpaul C., and Fried Dov, The Analysis and Use of Financial Statements, 3rd Edition, New Jersey, USA: John Wiley & Sons 2003
- Kaur, Gurminder, Corporate Mergers & Acquisitions, Deep & Deep Publication, New Delhi

- Kuchal., M.C., Mergers & Demergers, Concepts and Cases, ICFAI Publications.
- Stanley Foster Reed., The Art of M & A: A Merger & Acquisition Buyout Guide, McGraw Hill (International edition)
- Patrick., A. Goughan, Mergers, Acquisitions and Cor*porate Restructuring*, Wiley Publication, International Edition

Course Title: Performance Management **Total Marks:100**

Course Code MBA H6 **University Examination:60**

Examination Duration: 03 Hours **Sessional Assessment:40**

Objective: The objective of this course is to provide students an introduce students to performance management, a sound foundation for professional development and career in business.

Unit I

Introduction: Definition of performance Management, the performancemanagement contribution, dangers of poorly implemented PM systems, aims and role of PM Systems, characteristics of an ideal PM systems, performance management process, performance management and strategicplanning.

Unit II

Performance Appraisal System Implementation: Defining performance,determinantsofperformance, performance dimensions, approaches tomeasuring performance, diagnosing the causes of poor performance,differentiating task from contextual performance, choosing aperformancemeasurement approach. Measuring results and behaviours, gatheringperformanceinformation,implementing performance management system.

Unit III

Performance Management & Employee Development: Personal development plans. 360 degree feedback as developmental tool. Performance Management and Reward System-performance related remuneration system, performance linked career planning and promotion policy.(Case Study)

Unit IV

Performance Consulting: Concept, the need for performance consulting, role of the performance consulting, designing and using performance relationship maps, contracting for performance consulting services, organizing performance improvement department.

Unit V

Performance Appraisal Management System: ethics and performance management, rating errors, challenges in performance management, issues and challenges inperformancemanagement in Indian socio-political environment.(Case Study)

Course Outcomes

CO 1: To be able to understand the concept of performance management and dangers of poorly implemented performance management system.
CO 2: To understand the concept of performance appraisal system implementation.
CO 3: To bring about thorough understanding of performance management and employee development.
CO 4: To be able to understand the performance consulting and organizing performance improvement department.
CO 5: To be able to demonstrate progressive learning in the performance appraisal management system and challenges in performance management in Indian environment.

Course Title: Interpersonal and Group Processes **Total Marks:100**
Course Code MBA H7 **University Examination:60**
Examination Duration: 03 Hours **Sessional Assessment:40**
Note for Paper Setters

The Question paper shall have two sections. Section A will be compulsory and will contain 1 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), eachcarrying 1 mark.Section B will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

Suggested Readings

1. A. Berger & Dorothy, R. Berger (2007), The Talent Management Handbook, Lance, Tata McGraw Hill.
2. Dixit Varsha (2009), Performance Management, 1st edition Vrinda Publication Ltd.
3. Herman Aguinis (2007), Performance Management, Pearson Education.
4. T. V Rao (2007), 360 Degree Feedback and Assessment and Development Centres, Vol, I, II and III, Excel Books.
5. T. V Rao (2009), Appraising and Developing Managerial Performance, Excel Books.

Objective: The Course is designed to develop among students an understanding and technique of managing interpersonal relations in an organization

Unit I

Nature of Management: functions of managers, leadership; leadership styles and managerial effectiveness, Theories and Perspectives of Effective Leadership; Power and Influence; Charismatic and Transformational Leadership. Managerial conflict; types and causes, resolution of conflicts.

Unit II

Interpersonal Communication: Interpersonal feedback, Interpersonal behavior and influence relationships, Interpersonal style ,Johari window, Interpersonal awareness, social loafing, social facilitation. Impact of interpersonal behavior on organizational effectiveness.

Unit III

An overview of Group Formation: Group development and effectiveness, formal and informal groups, reasons for formation of groups, theories of group, group behavior.Managing group and inter-group dynamics, group cohesiveness, Managerial roles in group decision making process.(Case Study)

Unit IV

Deindividuation: Collective behavior and the crowd Cooperation , competition between groups, Social categories and social identity, Prejudice and discrimination. Building social harmony. Team development and team functioning.

Unit V

Intervention Techniques: Counseling techniques, transactional analysis;Applications of Emotional Intelligence in organizations. Organizational Change; Organizational Development.Sensitivity training, process consulting, skill development techniques.(Case Study)

Learning Outcomes: On successful completion of the course, the student will be able to:

1. Analyze the functions of managers, leadership styles, theories and perspectives of effective leadership.
2. Explain interpersonal awareness and impact of interpersonal behavior on organizational effectiveness.
3. Identify the factors that enhance group performance and increase group cohesiveness.
4. Understand the reasons and stages of group formation, team development and applications of interventions in respond to organizational changes.

Note for Paper Setters

The Question paper shall have three sections. Sections A will be compulsory and will contain 15 question eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), each carrying 1 mark Section B contain 10 shorts answer type questions, two from each unit, the candidates will be required to answer one question from each Unit; each question carrying 05 marks. Section C will contain 05 long answer type questions, one from each unit. Out of five Questions, one question will be on case studies; the student will be required to attempt any three questions, each question carrying 10 marks.

Suggested Readings

1. Baron, Greenberg (2008), Behavior in Organizations. 9thed. Pearson Education.
2. McShane, Von Glinow& Sharma (2012), Organizational Behavior 4th ed. McGraw.
3. Robbins, Judge &Sanghi (2009), Organizational Behavior, 13thed., Pearson Education.
4. Ashwathappa (2008), Organizational Behaviou, Himalaya Publishing House.

5. Newstrom , John W. (2011), Organizational Behaviour: Human Behavior at Work, 12th ed., Tata McGraw Hill.
6. Pareek, U. Rao, T.V. and PertonjeeDM (1996), Behavioural Processes in Organizations, Oxford and IBH, New Delhi.
7. Single B.P. and Chhabra, T.N. (1998), Organization Theory and Behaviour , 2nd ed..
8. Tosi, H. Rizzo, J .and Carroll (1998), Organizational Behaviour, 1st ed..
9. Raobbins S.P. (2012), Organizational Behaviour, 8th ed., Prentice Hall of India, New Delhi.

Course Title: Cross Cultural Management **Total Marks:100**

Course Code: MBA H8 **University Examination:60**

Examination Duration: 03 Hours **SessionalAssessment:40**

Objective: The objective of the course is to enable the students to develop the concept of diversity, crosscultural and diversity issues and challenges and the benefits of diversity in the workplace.

UNIT I Cross-Cultural Management:

Meaning and Concepts; Cross-Cultural Puzzle of Global Human Resource Management; Global Strategy and Culture; Frameworks in Cross-Cultural Management: Kluckhohn and Strodtbeck framework, Hofstede's Cultural Dimensions, Trompenaar's Dimensions, Schwartz Value Survey, the GLOBE Study; Use of Frameworks; International and Cross-Cultural Research: Types and Critiques.

UNIT IIWork Behaviour and Management Values across Cultures:

National Culture Vs Organization Culture; Coping with cultural differences; Understanding socialization; International Ethics and Culture; Explaining the Differences in Comparative HRM, Culture and Institutions, Evidence of Convergence, the Power of Nation States; Cultural Dynamics & Impact of Cultural Distance within Mergers and Acquisitions.

UNIT III Cultural Diversity:

Meaning and Nature; Diversity and exclusion: A critical workforce problem; The importance of valuing diversity; Cultural Synergy; The challenge of work force-diversity: Stereotypes and Prejudice, Dehumanization and oppression, Employment-related discrimination; Types of diversity in teams.

Unit-IV Diversity Management:

Performance Imperative and Equal Opportunities Perspective, Transcending False Dichotomies-Equal opportunities Vs Diversity Management; Managing work-force diversity as a competitive advantage; the impact of diversity on groups/teams; Managing diversity in organizations: Strategies and Guidelines; Towards a globally inclusive workforce: The inclusive workforce model.

UNIT V Multinational Decision Making:

Diversity Management Programmes; Diversity Management in International Organizations: Women in International Management, Role of Organizational Processes, Dual-Career Couples, The

Implications of International Working on Work-Life Balance, Alternative forms of International Working, Measuring the Value of International Assignments..

CO 1: Acquire knowledge about global human resource management.

CO 2: Explain how cultural values and behavioural preferences when working in a team environment has impact on ability to function and manage effectively in a cross-cultural business environment.

CO 3: Understands international ethics for taking international projects.

CO4: Demonstrate the ability to take advantage of work force diversity

CO5: Gain knowledge to maintain work life balance for better performance and ways to measure value of international assignments.

Note for Paper Setters

The Question paper shall have two sections. Section A will be compulsory and will contain 1 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), eachcarrying 1 mark.Section B will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

References:

1. Adler, N.J. (2007): International Organizational Behavior, Cengage Learning, New Delhi.
2. Luthans, F. (2008): Organization Behaviour (11th Ed.), Tata McGraw Hill, New Delhi.
3. Michalle E. & Barak, M. (2014): Managing Diversity: Towards a Globally Inclusive Workplace, Sage, New Delhi.
4. Newstorm& Davis, K. (2002): Organization Behavior-Human Behavior at Work (10th Ed.), Tata McGraw Hill, New Delhi.
5. Prasad, L.M. (2004): Organizational Behaviour (3rd Ed.), Sultan Chand, New Delhi.
6. Rohmetra, N. and Gupta, A. (2014): Cross-Cultural Management: Practice and Research, Primus Books, New Delhi.
7. Rohmetra, N. (2005): Cultural Paradigm in Managing People and Organisations, Excel Books, New Delhi.
8. Rohmetra, N., Gupta, V. and Sharma, D. (2004
9.): Transformative Organizations Across Globe, Response Books, Sage India, New Delhi.

10. Smith, P.B., Peterson, M.F.& Thomas, D.C. (2008): The Handbook of Cross Cultural Management Research, Sage, New Delhi.
11. Thomas, D.C. (2008): Cross-Cultural Management: Essential Concepts, Sage, New Delhi.
12. Valsinger, J. (2007): Culture in Minds and Societies: Foundations of Cross Cultural Psychology, Sage, New Delhi.

Course Title: Participative Management **Total Marks:100**
Course Code: MBA H9 **University Examination:60**
Duration of Examination: 03 Hours **Sessional Assessment:40**

Objective: the course attempts to acquaint students about empowerment and participation processes and practices for effective mobilization of human resources towards attainment of organizational objectives.

Unit 1: Meaning, Objective and Forms of Empowerment and Participation. Liberating the organization through empowerment. Distinction between traditional bureaucracy and liberated organization. External commitment vs Internal commitment.

Unit 11 : Empowerment Process: Delegation and Decentralization Vs Empowerment.Empowerment Process. Job Enrichment, Leadership Styles; Likert's Management Systems including Tannenbaum and Schmidt leadership continuum. Objectives seting and MBO. Team Building; Task Forces, Committees Effectiveness; and self managing groups. TQM and Employees Involvement ,Quality Circles Involvement of Managerial Personnel.(Case Studies Highlighting Empowerment Practices)

Unit 111: Employees Participation: Institutional Framework : Evolution and working of Participative Management Schemes in Industry in India. Suggestion Schemes in Organizations . Board level Employees Participation in Banks. Workers Cooperatives

UNIT 1V: Employees Stock Ownership Plan (ESOP): Evolution in India .Scope and legal/ institutional institutional provisions including current development and working of such schemes in diverse organizations.

UNIT V: International Experience: Review of International experience of cases of Empowerment and Workers Participation Schemes in selected countries using the case studies.

Learning Outcome: After the completion of the course, the students will be able to:

CO 1. Have the ability to understand the relevance of empowerment and bureaucracy in the current environment.

CO2. Know the parameters for maintaining and enhancing quality of product for better performance.

CO 3. Understand role of employees participation in business decision making .

CO 4. Able to understand various leadership style for improving the effectiveness of team

CO5. Recognize various participative schemes in different countries in order to acquire knowledge for project implementation at international level.

Note for Paper Setting: Note for Paper Setting :

Question paper shall be divided into three sections: **Section A** shall be compulsory and will contain 15 questions, which may be very short answer type (not exceeding 20 words), multiple choices, fill in the blanks, or true/false. Each question in this section shall carry one mark. **Section B** shall consist of 10 short answer type questions, two from each unit, and the candidate shall be required to answer one from each unit. Each question in this section shall carry 5marks. Section C will contain 5 long answer type questions one from each unit and student will be required to attempt any three questions. Each question carries 10 marks.

Suggested Readings:

1.Vogt, Judith E ., & Kenneth L. Murrel (1997) Empowerment in Organizations : How to spark Exceptional performance, S.Chand & Co. Ltd., New Delhi.

2. Brown, Rob and Margaret Brown (1994) Empowered! A Guide to Leadership in the Liberated in the Organisation, Research Press, New Delhi.

3. Ken B. Conrand, John P. Carlos and Alan Rendelph, The 3 Key s to Empowerment, Magna Publishing Company, Mumbai.

4. Conger J.A. & Kumango R.N. The Empowerment Process; Integrating Theory and Practice Academy of Management Review, 13 (3) pp. 471 -482, 1988.

5. Das, G.S. Development of an Empowering Scale, Item Analysis and Factor Structure, ASCI, Journal of Management, Vol. 22, No. 2-3, September-December, 1992. 6. Rappaport, J, Swift C., and Hers R.; Studies in Empowerment: Steps towards understanding and Action, Haworth, 1984, New York. 7. Armstrong, Michael, Rewarding Teams, Institute of Personnel and Development, 2000, London. 8. Wheelan, Susan A, Creating Effective Teams: A Guide for Members and Leaders, Sage, London,1999.

Course Title: Strategic Brand Management

Course Code: MBA M6

Objective:

The objective of this course is to familiarize students with the wide range of consumer behaviors and implementation of successful marketing actions related marketing Management.

Unit I

Introduction to Brands and Brand Equity: Concept of brands, brands vs. products, Things that can be branded, Characteristics of Strong brands, Branding: Challenges and opportunities, Strategic brand management process Brand equity: concept, sources of brand equity, brand judgements and brand building implications.

Unit II

Brand Positioning and Values: Identifying and establishing brand positioning, Positioning guidelines, Establishing brand values, internal branding and brand audit guidelines; **Brand Elements:** Criteria for choosing brand elements, options and tactics for brand elements, integration of various branding elements (Case Study).

Unit III

Marketing Programs for Brands: New perspectives of marketing, product and pricing strategy, channel strategy and private label strategies; **Marketing Communication for Brands:**

Communication options, Event marketing and sponsorship, integration of communication programs for brands, Evaluation of communication programs.

Unit IV

Brand Equity Measurement and Management System: Brand value chain, Designing brand tracking studies, Process of brand equity management system, Research techniques: concept and overview, qualitative and quantitative research techniques for brands, Brand resonance dimensions, market performance for brand (Case Study).

Unit V

Branding Strategy: Overview, brand product matrix, breadth and depth of branding strategy, brand hierarchy, building equity at different hierarchical levels, designing branding strategy; **Brand extensions:** concept, advantages and disadvantages of brand extensions, consumer evaluation for brand extensions.

Course outcomes:

Upon successful completion of this course, students will have the knowledge and skills to:

Co1: Introduction to Brands and Brand Equity Analysis.

Co2: Brand Positioning and Values.

Co3: Marketing Programs for Brands and Marketing Communication for Brands.

Co4: Understanding the Brand Equity Measurement and Management System and marketing strategy.

Co5: Branding Strategy and Brand extensions.

Note for Paper Setters

The Question paper shall have two sections. Section A will be compulsory and will contain 1 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), eachcarrying 1 mark.Section B will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

Suggested Readings

1. Don Cowley (1991), Understanding Brands, Kogan Page London.
2. Jean Noel Kapferer (1998), Strategic Brand Management, 2nd edition, KoganPage.
3. Lynn BUpshaw (1995), Building Brand Identity: A strategy for success in a hostile market place, John Wiley & Sons USA.

Course Title: Retail Marketing **Total Marks:100**

Course Code MBA M7 **University Examination:60**

Examination Duration: 03 Hours **SessionalAssessment:40**

Objectives: The objective of this paper is to familiarize students with basic concepts in retail marketing.

Unit I

Nature and Importance of Retailing: Retailing and retailers, place of retailing in marketing mix, retailing economical and social importance, value added by retailing economic justification, size of retail market, operating expenses and profits.

Unit II

Store Retailing: Specialty merchandisers, general merchandiser, mass merchandiser, single line store, general store, variety store, departmental store,(Case Study) supermarket, superstore, combination store, hypermarket, discount store, warehouse showroom, catalogue storing.

Unit III

Non Store Retailing: In home retailing, telephone retailing, catalogue retailing direct response retailing, automatic wending, door to door route sales, party plan selling, etc. franchising-wholesalers-sponsored, voluntary chain, retailers-sponsored cooperative chain, manufacturers sponsored franchising system, franchises, franchisers, franchise agreement.

Unit IV

Retail Decisions: Target market selection, merchandise, merchandise management, location, size, store image, design, layout and shop design, in store promotion, credit and collections front office management: personnel-selection, recruitment and motivation, communication and customer relation.

Unit V

Trends In Retailing: Growth of down town shopping malls, factory outlet, discount and discount malls, power retailer, high--touch and high--tech retailer, increasing power of retailer brand vs manufacturer brand, professional management of retailing(Case Study), green retailing, e-retailing, cooperative retailing across the world, U.S., U.K., Japan & India through case studies of major retailers.

Note for Paper Setters

The Question paper shall have two sections. Section A will be compulsory and will contain 1 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), eachcarrying 1 mark.Section B will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

Course outcomes:

After studying this course, students will be able to:

CO1: explain & understand the nature retailing & its related concepts

CO2: understand the various types of Retail stores and features associated with them

CO3: Understand the ways that retailers use marketing tools and techniques to interact with their customers in non store retailing

CO4: Understand trends and decision in retailing

Suggested Readings

1. David Gilbert (2008), Retail Marketing Management, Pearson, New Delhi.
2. ICFAI Modules on Retail Management 2010.
3. Micheal Levy & Barton A.Weitez (2005), Retailing Management, Tata McGraw Hill.
4. Robert F. Lusch, Patrick Dunne, Myron Gable (2009), Retail Management, South Western Publishing Company, Ohio.

Course Title: International Marketing **Total Marks:100**

Course Code: MBA M8 **University Examination:60**

Examination Duration: 03 Hours **SessionalAssessment:40**

Objective: To familiarize the students with the concept and issues of international marketing and enable them to analyze the foreign market environment and develop international marketing strategies for a business firm.

Course Outcome:*After completing this course students will be able to:*

1. Get familiar with nature, objectives and process of international marketing.
2. Know about International Product Planning and Pricing decisions.
3. Get admittance about International Distribution Decisions and international logistics.
4. Become familiar with how to develop International Promotion Strategies and campaign?
5. Identify Emerging trends in International Marketing.

Unit I

Introduction:

Introduction to International Business- an overview; International marketing management process, International marketing information system. International Marketing Environment: Influence of physical, economic, socio - cultural, political and legal environments on international marketing decisions; International marketing information system. International Market Segmentation, Selection and Positioning; International market entry strategies –Exporting, licensing, contract manufacturing, joint venture, setting -up of wholly owned subsidiaries aboard.

Unit II

International Product Planning and Pricing decisions:

Major Product decisions-product design, labeling, packaging, branding and product support services; Product standardization vs. adaptation; Managing product line; International trade product life cycle; New product development. Pricing decisions for International Markets: Factors affecting international price determination; International pricing process and policies; Delivery terms and currency for export price quotations; Transfer pricing; Counter trade as a pricing tool- types and problems of counter trading.

Unit II

International Distribution Decisions:

Distribution channel- from traditional to modern channel structures, Intermediaries for international markets-their roles and functions; Alternative middlemen choices, Factors affecting choice of channels; Locating, selecting and motivating channel members; International distribution logistics- Issues and Planning.

Unit IV

International Promotion Strategies:

Communications across countries-complexities and issues; Country-of-origin effect; Sales promotions in international markets, trade fairs and exhibitions, International public relations, International Advertising decisions, Personal selling and sales management; Developing international promotion campaign.

Unit V

Emerging trends in International Marketing:

International Marketing through Internet; Ecological concerns and international marketing ethics. Issues and challenges for Indian MNCs going global.

Note for Paper Setters

The Question paper shall have two sections. Section A will be compulsory and will contain 1 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), eachcarrying 1 mark.Section B will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

Suggested Readings:

1. Keegan, Warran J. and Mark C. Green, Global Marketing, Pearson.
2. Cateora, Phillip R. ;Grahm, John L. and PrashantSalwan,InternationalMarketing,Tata McGraw Hill.
3. Czinkota, Michael R. and Illka A. Ronkainon, International Marketing, Cengage Learning.
4. Terpstra, Vern; Foley, James and Ravi Sarathy, International Marketing, Naper Press.
5. Jain, Subash C., International Marketing, South-Western.
6. Kotabe, Masaaki and KristiaanHelsen, Global Marketing Management, John Wiley and Sons.
7. Onkvist, Sak and John J.Shaw, International Marketing; Analysis and Strategy, Psychology Press.
8. Rajagopal, International Marketing, Vikas Publishing House

Course Title: Digital Marketing **Total Marks:100**
Course Code: MBA M9 **University Examination:60**
Examination Duration: 03 Hours **SessionalAssessment:40**

Objective: To familiarize the students with the concept and issues of digital marketing and enable them to analyze the digital market environment and develop marketing strategies for business.

Unit I

Principles and Drivers of New Marketing Environment - Digital Media Industry - Reaching Audience Through Digital Channels- Traditional and Digital Marketing - Introduction to Online Marketing Environment - Dotcom Evolution - Internet Relationships - Business in Modern Economy - Integrating E-Business to an Existing Business Model - Online Marketing Mix - Mobile Marketing - Digital Signage.

Unit II

Purchase Behavior of Consumers in Digital Marketing Format - Online Customer Expectations - Online B2C Buying Process - Online B2B Buying Behavior -Website Designing - Website Content - Forms of Search Engines – Working of Search Engines - Revenue Models in Search Engine Positioning – SEO - Display Advertising – Trends

Unit III

Product Attributes and Web Marketing Implications - Augmented Product Concept - Customizing the Offering - Dimensions of Branding Online - Internet Pricing Influences -

Price and Customer Value - Online Pricing Strategies and Tactics – Time-based Online Pricing - Personalized Pricing - Bundle Pricing.

Unit IV

Internet Enabled Retailing - Turning Experience Goods into Search Goods -Personalization through Mass Customization - Choice Assistance - Personalized Messaging - Selling through Online Intermediaries - Direct to Customer Interaction - Online Channel Design for B2C and B2B Marketing.

Unit V

Integrating Online Communication into IMC Process - Online Advertising – Email Marketing - Viral Marketing - Affiliate Marketing - Participatory Communication Networks - Social Media Communities - Consumer Engagement - Co-Created Content Management- Interactive Digital Networks - Customer – Led Marketing Campaigns- Legal and Ethical aspects related to Digital Marketing.

Note for Paper Setters

The Question paper shall have two sections. Section A will be compulsory and will contain 1 questions eliciting answers in not more than 20 words (Multiple Choice/fill in the blanks), eachcarrying 1 mark.Section B will contain 10 questions, two from each Unit, the candidates will be required to answer one question from each Unit; each question carrying 10 marks.

Course outcomes:

After completion of this course student will be able to learn

CO1: Marketing Environment
CO2: Behavior of Consumers in Digital Marketing
CO3: Product Attributes and Web Marketing Implications
CO4: Internet Enabled Retailing
CO5: Email Marketing - Viral Marketing - Affiliate Marketing

Suggested readings:

1. Smith P R Chaffey Dave, E-Marketing Excellence: The Heart of E-Business, Butterworth Heinemann, USA
2. Richard, G., Charlesworth,A, and Rita Sen. Online-Marketing
3. Chaffey, D., Ellis-Chadwick, F., Johnston, K., & Mayer, R., (2009), Internet Marketing, Strategy, Implementation and Practice, (4th ed.), Prentice Hall,
4. Judy, S., Ansary,A.E.,and Raymond Frost (2010) , Online Marketing –Pearson Education
5. Bob, S and Ron, J(2008), ―Successful Direct Marketing Methods 8th edition, McGraw Hill, 2008

Programmme: M.Sc (IT)

For Year of Introduction: 2013-14	**Maximum Marks : 100**
Course Code: MIT-132	**University Examination: 70**
Course Title: Fundamentals of IT	**Internal Assessment: 30**
Credits: 4	**Duration of Examination:3 Hours**

Objective

The main objective of this course is to develop the basic IT concepts. Due to rapid growth & advancement of technology, the demand of IT professionals is increasing day by day. Keeping this in mind, the course has been designed to develop the IT learningskills.

Unit I

INTRODUCTION TO WINDOWS

Introduction to Operating System, Overview of different operating systems, Functions of operating system, Fundamentals of disk operating system (DOS), Understanding DOS prompt, working with DOS commands. Introduction to Windows, Working with Accessories (Notepad, WordPad and Paint), Personalizing Windows (Installing and Removing Applications, Optimize your system performance etc).

Unit II

INTRODUCTION TO MS-OFFICE

Introduction to MS Office, Fundamentals of MS-Word, Working with menus and Toolbars, Introduction to Macros, Overview of Excel, Working with cells, creating worksheets, working with Formulae bar Introduction to PowerPoint, Creating and Designing slides, working with Animation andHyperlinks.

Unit III

INTRODUCTION TO CYBER SECURITY

Security Policies and Management, Security Policy Design, Designing Security Procedures, Risk Assessment Techniques. Application Security(Databases, Email and Internet etc). Cyber Forensics, Introduction to forensic tools, Evaluation of crime scene and evidence collection, Usage of tools for disk imaging and recovery processes, IT Act, Copy Right Act.

Unit IV

INTRODUCTION TO HTML

HTML tags, formatting text, Controlling fonts, Lists, Tables, Adding Pictures, Hyper links,Adding audio and video. Setting up frames. Working with Forms and form elements: text boxes, radio buttons, check boxes, dropdown menu, submit button.

Unit V

INTERNET TECHNOLOGIES

Programmme: M.Sc (IT)

Using Network & Internet Shared Folders, Browsers (Internet Explorer, Mozilla Firefox, Opera, and Google Chrome), and Opening Web Pages, Creating Bookmarks & Shortcuts, E-mails, Attachments, Search Engines, Groups & Directories, Web Use Ethics.

Programmme: M.Sc (IT)

Course Code: MIT-133 **Course Title: Programming & Problem Solving using C++** **Credits: 4**	**Maximum Marks : 100** **University Examination: 70** **Internal Assessment: 30** **Duration of Examination:3 Hours**

Objective:

The objective of the course is to make students understand the basics of object oriented concepts and their implementation through C++.

Unit I

An Overview of C++:
The Origin of C++, Object Oriented Programming and traits, Output operator, character and Literals. Variables and their Declarations, Program Tokens, Keywords, Initializing Variables, Object Variables and Constants, The input operator, Numeric data Types, The Boolean type, enumeration types, Character Types, Integer Types, arithmetic operators, Increment and decrement operators, Composite assignment Operators, Comparison operators, floating point Types ,Type conversions, Numeric overflow , Round OffErrors.

Unit II

Arrays, Functions and Control Statements
The If… Statement, the If... Else Statement, Nested selection Statements, The Switch statement, the while Statement, The Do while Statement, The for statement, the break and continue statement, gotostatement.Arrays: introduction to arrays, processing arrays, Initializing an array, Two-Dimensional arrays.Functions: Introduction to Functions, types (Standard C++ Library Functions, User defined Functions), Function declarations and definitions. Inline Functions, Friend Functions.

Unit III

Classes and Objects
Class, introduction to classes, Class declaration, Function definitions, Objects, Accessing Class Members, Arrays within a Class, Memory allocation For Objects Static data members, static member functions Arrays of Objects, Objects As function Arguments, Scope Resolution Operator.

Constructor: Introduction to constructors, parameterized constructors, multiple constructors in a class, Constructors with Default arguments, Dynamic Initialization of Objects.

Unit IV

Function overloading and operator overloading:

Function Overloading, Overloading Constructors, default function arguments, default arguments vs. overloading, Function Overloading and ambiguity.

Operator overloading: Introduction, Overloading Unary Operators, Overloading Binary Operators, Overloading Binary operators using Friend Functions, rules for Overloading Operators.

Programmme: M.Sc (IT)

Unit V

Inheritance and Virtual Functions:

Inheritance: Introduction, types (Single, Multiple, Multilevel, Hierarchical and Hybrid), The protected Access Specifier, Overriding Member Functions. Virtual Base Class, Virtual Functions, Virtual attribute is Inherited, Virtual functions are hierarchical, Pure Virtual Functions, Abstract Class, early binding vs. Late binding.

Programmme: M.Sc (IT)

Maximum Marks : 100
University Examination: 70
Internal Assessment: 30
Duration of Examination:3 Hours

Course Code: MIT-231
Course Title: Data & File Structure.
Credits: 4

Objective

The objective of the course is to introduce implementation, evaluation and analysis of the fundamental structures for representing and manipulating data.

Unit-I

Introduction to Data Structure: Concept, Basic Terminology, Elementary Data Structures, Abstract Data Type, Arrays & its representation, Operations on Arrays, Sparse Arrays, Pointers, Linked List (Singly, Double & Circular), Operations on Linked List (Traversing, Insertion, Deletion etc.), Introduction to GarbageCollection.

Unit-II

Stacks and Queues: Basic Concept, implementation, Applications: Recursion (Fibonacci Series, Factorial & Tower of Hanoi problem), Polish Expressions and their Compilations (Infix, Prefix, Postfix), Queues and their implementation, De-Queues, Priority Queues.

Unit III

Trees: Concept, Binary Trees, Tree Traversal Techniques (Preorder, Post order, In order), Complete Binary Trees, Binary Search Tree & Operations on Binary Search Tree (Searching, Insertion & Deletion), Height Balance and Concept of AVL Trees and purpose of B-Trees.

Unit IV

Graphs: Concept, Directed Graphs, Graph Representation (Adjacency Matrix and Linked Representation), Dijkstra's shortest Path Algorithm, Graph Traversal Techniques (Breadth First Search & Depth First Search).
Searching and Sorting: Linear & Binary Search, Merge Sort, Heap Sort, Quick sort.

Unit-V

Files: Basic terminology Attributes of a File, Classification of Files.
File Organizations: Sequential File Organization, Relative File Organization, Indexed Sequential File Organization (Primary, Clustering and Secondary).
Hashing: Basic concept, Hash Table, Hash Function.

Programmme: M.Sc (IT)

Course Code: MIT-331
Course Title: Dot Net Technologies using C#
Credits: 4

Maximum Marks : 100
University Examination: 70
Internal Assessment: 30
Duration of Examination:3 Hours

Objective:

The course is designed to introduce students to the concept the .Net framework. The course shall cover Visual Basic .Net as well as ADO .Net. Emphasis of the course is on enhancing programming skills of students for developingprojects.

Unit-I

.Net Framework and IDE: Introduction To .Net Framework, .Net Architecture, Advantages of Dot Net Frame Work, Common Language Runtime, MSIL And JIT, Class Library, Integrated Development Environment (IDE): IDE Components, Windows Forms and Basic Controls, Windows Forms And Events, Message Box, Basic Controls like Command Buttons, Text Box,List Box, Radio Buttons, Labels, Link Labels, Combo Box, Building SmallApplications.

Unit-II

C# Basics: C# Literals, Variables & Data Types, Operators andExpressions. Working with Events and Event Drivenprogramming

Conditional Logic: Introduction, Decision Making With If Statement, Simple If Statement, If…Else Statement, Nesting Of If …..Else Statements, Else If Ladder, Switch Statement,? Operator.

Looping Logic: Introduction, The While Statement, The Do Statement, For Statement, For Each Statement, Jumps In Loops.

Branching Logic: Arguments, Call by value, Call by reference, Passing Objects and Lists

Unit-III

Manipulating Strings: Introduction, Creating Strings, String Methods, Inserting Strings Using System, Comparing Strings, Finding Substrings, Mutable Strings, Arrays of Strings.

Managing Errors and Exceptions: Introduction, Types of Errors, Exceptions, Syntax of Exception Handling Code, Multiple Catch Statements. Working with Date and Time

Unit-IV

Classes and Objects: Introduction, Inheritance – Single and Multiple, Polymorphism- Function Overloading and Operator Overloading.

Programmme: M.Sc (IT)

Interfaces: Introduction, Defining an Interface, Extending an Interface, Implementing Interfaces, Interfaces and Inheritance, Abstract Class and Interfaces.

Delegates and Events: Introduction, Delegates, Delegate Declaration, Delegate Methods, Delegate Instantiation, Delegate Invocation, Using Delegates.

Unit-V

Data Base Connectivity: Data Access with ADO .Net, Using Databases, Server Explorer, Data Adapter and Datasets, Working with ADO .Net, Architecture of ADO .Net.

Using Data controls: Data Grid, Data Binding, Creating New Data Connection in Code.

Crystal Reports: Creating Crystal Reports, Creating Custom Reports, Report Field Validation &Exporting Reports.

Programmme: M.Sc (IT)

Course Code	Title	Scheme of Examination				Hrs/Week			Credits
		Duration (hrs)	IA	UE	Total Marks	L	T	P	
MIT-141	Data Structure Using C	3	40	60	100	5	0	0	4

Objective

The objective of the course is to develop logical ability and basic programming skills of students and to introduce them to implementation, evaluation and analysis of the fundamental structures for representing and manipulating data.

Unit-I

Introduction to Problem Solving: Concept of Programming Languages, Categories of Languages, Flowcharts and Algorithms (Definition, Symbols & Characteristics).

C-Language: History and Evolution, Features, Structure & Life Cycle of a C- Program Data types and sizes, Variables, Constants, Keywords, Storage Classes, Operators (Arithmetic, Logical and Conditional), Expressions, Control statements (if-else, switch, break, continue, go to), Loops (for, while, do-while).

Unit-II

Arrays: Introduction, Types (One and Two dimensional arrays)& Representation, Operations on 1-D and 2-D Arrays.

Functions & Pointers: Types of Functions (built-in and user defined), declaration, definition, and function call, parameter passing and return types, Call by Value and Call by Reference. Introduction to Pointers.

Structures and Union: Declaration, Accessing Structure and Union Elements, difference, Array of Structures, Passing Arrays and Structures to Functions.

Unit III

Introduction to Data Structure: Basic Terminology, Elementary Data Structures, Abstract Data Type, Pointers, Linked List (Singly, Double & Circular), Operations on Linked List (Traversing, Insertion, Deletion etc.), Introduction to Garbage Collection.

Stacks and Queues: Basic Concept, implementation, Applications: Recursion (Fibonacci Series & Factorial), Polish Expressions and their Compilations (Infix, Prefix, Postfix), De-Queues, Priority Queues

Unit IV

Trees: Concept, Binary Trees, Tree Traversal Techniques (Preorder, Post-order, In-order), Complete Binary Trees, Binary Search Tree & Operations on Binary Search Tree (Searching, Insertion & Deletion).

Graphs: Concept, Directed Graphs, Graph Representation (Adjacency Matrix and Linked Representation), Dijkstra's shortest Path Algorithm, Graph Traversal Techniques (Breadth First Search & Depth First Search).

Unit-V

Searching and Sorting: Linear & Binary Search, Bubble Sort, Insertion Sort, Selection Sort, Merge Sort, Heap Sort and Quick sort.

Programmme: M.Sc (IT)

Course Code	Title	Scheme of Examination				Hrs/Week			Credits
		Duration (Hrs)	IA	UE	Total Marks	L	T	P	
MIT-142	Internet and web Technologies	3	40	60	100	5	0	0	4

Objective

The objective of the course is to make students knowledgeable about Internet Technologies to give them insight into client side and server side programming to make them proficient in web applications.

Unit I

Introduction

Introduction to Internet, Domain & Host names, Types of Internet Connections (Dial up, DSL, ISDN, Leased Line, Satellites and wireless), ISP, Security issues on the internet.

Web page: static, Dynamic, Active. Web site development Phases: Web Designing, Development and Publishing, URL registration, HTTP, browsers, search engines, Web server, Proxyservers.

Unit II

Hyper Text Markup Language

HTML tags, formatting text, Controlling fonts, Lists, Tables, Adding Pictures, Hyperlinks, Adding audio and video. Setting up frames. Working with Forms and form elements: text boxes, radio buttons, check boxes, dropdown menu, submit button.

Unit III

Cascading Style Sheets

Introduction to Style sheet, types of style sheets - Inline, External, Embedded CSS. CSS Properties: Text formatting properties, CSS Border, margin properties, color properties, Font properties, List properties, Alignment of text, Background images. Use of classes in CSS, Creating CSS, applying CSS to HTML documents, use of

& tags.

Programmme: M.Sc (IT)

Unit IV

Scripting Languages

Client Side scripting versus server side scripting. Introduction to **Java script**, variables, operators, conditional statements and loops, functions, events and event handling, Arrays, Properties & Methods of Objects: window, document, Date, Math, Form, String, Validation of text box entries, checkboxes, radio buttons, e-mail address validation, date validation.

Unit V

Introduction to XML

XML: Introduction and features of XML, XML Writing Elements, Attributes, etc. XML with CSS, DSO, XML Namespaces, XML DTD, XML Schemas, Writing Simple Sheets using XSLT, SAX & DOM Parsers.

Programmme: M.Sc (IT)

Course Code	Title	Scheme of Examination				Hrs/Week			Credits
		Duration (hrs)	IA	UE	Total Marks	L	T	P	
MIT-242	Database Management System	3	40	60	100	5	0	0	4

Objective

The aim of the course is to introduce students to the fundamental concepts necessary for designing, using and implementing database systems. It emphasizes relational database modeling & design and the languages and facilities provided by the relational database management systems.

Unit-I

Database System Concepts & Architecture: Concept, Characteristics of database, Database system Vs file system, Introduction to DBMS, Advantages, Disadvantages of DBMS, Databaseusers.

Database System Concept & Architecture: Concept, schemas and instances, DBMS architecture & data independence, Components of DBMS.

Unit-II

Data models: Data modeling using ER-Approach (Concept, ER-Notations, Entities, Entity types, Attributes, Attribute types, Relationships Keysconcept).

Conventional Data Models & Systems: Network data model concept, Hierarchical model concept.

Relational Data Model: Concept, Relational model Constraints (Entity Integrity, Referential Integrity, Key Constraints, Domain Constraints), Codd's Rules, Relational Algebra (Fundamental Operations).

Unit-III

SQL: Introduction, Concept, Characteristics of SQL, Advantages of SQL, Data definition in SQL, literals, Operators, Specifying Constraints in SQL, Data manipulation in SQL, Views & Queries, Insert, Update & Delete Operations, Creating users, Grant and revoke object privileges.

Unit-IV

Relational Database Design & Normalization: Concept of Functional dependencies (Fully, partial, Transitive), Normalization of relational database, Normalization, Join dependencies.

Programmme: M.Sc (IT)

Unit-V

Transaction Management & Recovery: Concept, Transaction states, Transaction properties (ACID Test), Serializability , Recoverability. Concurrency Control & Recovery Techniques: Concurrency control Concept, Concurrency control techniques, Locking (concept, types), Time stamp ordering, Granularity of data items, Dead lock & its Resolution.

Programmme: M.Sc (IT)

Course Code	Course Title	Credits	Scheme of Examination			
			Duration	Marks		
			Hours	IA	UE	Total
MIT-441	Project	24	-----	200	400	600

The Components and bifurcation of marks of the course code MIT-441 in Semester IV shall be as follows:

Components	IA	UE
Project Work	-	100
Presentation	100	150
Viva Voce	100	150
Total	200	400

IA- Internal Assessment
UE- University Examination

Programme: B.Tech Electronic and Communication Engineering

Course Title: Communication Skills | **Max Marks: 100**
Course Code: ECE-121 | **University Exam: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Objective: In this world of globalization English language is the first and foremost criteria to acquire job in reputed companies .This course is designed to hone the soft skills of students to make them proficient in English Language(writing & speaking).

Unit–I

Communication: Scope & importance of communication, types of communication, barriers of communication and techniques to improve communication.

Unit-II

Phonetics: Speech mechanism, organs of speech**,** phonetic transcription, effective speaking. Good Use of Audio Video Devices

Unit-III

Applied Grammar: Articles, prepositions, modal auxiliaries, verbs, antonyms, and synonyms.

Unit-IV

Précis writing: Definition, qualities of a good précis. Ten steps to précis writing. Passages for précis writing.Report Text Formatting, Report Making, Paper Writing

Unit-V

Business Correspondence: Memorandum, Notices, Agendas, Meetings and Minutes. Presentation Preparations, Data Analysis, Plotting Data records,

Course Outcomes :

Upon the completion of the course, the students will be able to:

1. Acquire basic proficiency in English including reading, listening comprehension, writing and speaking skills.
2. Make the students authoritative in self-expression in their day to day life in this fast-changing world.
3. Identify the common errors involved in writing.
4. Understand the nature and style of sensible writing.
5. Write effective and coherent paragraphs.

Text Books:

1. **Lesikar R.V**. and **Pettit Jr.** Business Communication Theory and Applications, Irwin, 2002 Ed.
2. **Bansal R. K. & Harrison J. B.,** Spoken English, Orient Longman Hyderabad

Reference Books:

1. **Gimson A. C.,** an Introduction to the Pronunciation of English, ELBS (YP).

2. **Pal Rajendra** and **Korlhalli, J. S.** Essentials of Business Communication , Sultan C hand &Sons 2007
3. **Rayudu, C. S**. Media and Communication Management, Himalaya Publishing House.

Note for paper setter: The question paper comprises 10 questions. Two questions shall be set from each unit. The students have to attempt five questions, selecting one from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Computer Fundamentals **Max Marks: 100**
Course Code: ECE-123 **University Exam:60**
Duration of Exam: 3 hours **Internal Assessment:40**

Objective: The course is designed to provide basic knowledge of Computing concepts, operating system concepts and to train students in using common computer software applications.

Unit-I

Introduction: History of Computers, Generations of Computers, Classification of Computers, Application of Computers, Computer Hardware, Input, and Output devices. Memory Hierarchy, RAM, ROM, PROM and types, Secondary memory, working of a Hard Disk and its types.Brief Introduction to Next gen processors and memory devices. Brief introduction to Cloud Memory

Unit-II

Software and Languages: Computer Software, System and Application Software, BIOS, POST, Booting Process, Virus, WORM, and Trojans.
Programming Languages, Generations of Languages, Compilers, Assemblers, Machine Language and Assembly Language. Introduction to algorithm and Flow chart: Representation of an algorithm, flowchart symbols and levels of flow chart, rules, advantage and limitations of flowchart and pseudo code.

Unit-III

Data Representation, Number System: Binary, Decimal, Octal and Hexadecimal number systems, Inter conversion of number system, 1's compliment, 2's compliment, 9's compliment, n's compliment. Logic Gates, Boolean algebra, alphanumeric representation, fixed point representation.

Unit-IV

Booting process details of Dos and Windows: - DOS system files, Internal and External Commands, Difference between External and Internal Commands. Internal Commands: MD, CD, RD, COPY CON, TYPE, DATE & TIME, VOLUME VERSION, REN, PROMPT, CLS, DIR/P/W, COPY , DEL External commands: FORMAT, DISKCOPY, DISKCOMP, XCOPY, CHKDISK, SCANDISK, HELP, DEBUG, PRINT. Creation of Batch Files.

Unit-V

Introduction to Computer networks: Applications, types of computer networks, Peer-to-Peer Networks, Client Server Networks, Centralized and Distributed Systems, Internet, Intranet, Extranet, email, ISPs.

Course Outcomes:

Upon completion of this course, the students will be able to:

1. Know the basic components of the computer and working of each device.
2. Understand functioning of Operating System and formulate simple algorithms for arithmetic and logical problems
3. Understand the representation of data in computer.
4. Understand the booting process and several DoS Commands.
   Know the fundamentals of Computer Networking

Text Books:

1. **Peter Norton**, Introduction to Computers, TMH.
2. **Sanjay Toledo Mata**, A First Course in Computers, TMH.

Reference Books:

3. **Rajaraman,** Introduction to Digital Computer Design, Prentice Hall India.
4. **Bartee, Thomas,** Digital Computer Fundamentals, TMH.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Basic Electrical Engineering **Max Marks: 100**
Course Code: ECE-124 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of the course is to impart the knowledge of basic principles of Electrical Engineering and Its applied aspects.

Unit-I

Review of Electric Circuit Laws and Energy Sources: Basic Electrical circuit terminology, concept of charge and energy, circuit parameters (resistance, inductance & capacitance), Ohm's law, Kirchhoff's current law, Kirchhoff's voltage law, series and parallel combinations of resistance, inductance & capacitance. Ideal and practical voltage, current sources and their transformations, dependent voltage and current sources.

Unit-II

D.C. Circuit analysis: Power & energy relations, analysis of series parallel DC circuits, Star Delta transformations (ΔϒY), Loop & Nodal methods, Network Theorems: Thevenin's, Norton's, maximum power transfer and superposition theorems.

Unit-III

Electromagnetism: Review of Fundamentals of Electromagnetism, Ampere's Law, analogies between electric circuits and magnetic circuits, Faraday's laws of electromagnetic induction, direction of induced emf, Lenz's law, magnetic saturation and leakage fluxes.

Unit-IV

A.C. Circuit analysis: Basic terminology and definitions, phasor and complex number representations, power energy relations in AC circuits, application of Network Theorems to AC circuits ,Resonance in series and parallel circuits, Concepts of active & reactive powers, Introduction to 3 phase circuits.

Unit-V

Transformers: Concept of Inductance, Self & Mutual Inductance, Conventions for magnetically coupled circuits, Transformers: introduction, classification & construction of single phase transformer, emf equation and phasor diagrams.

Course Outcomes: At the end of this course, students will demonstrate the ability

1. To understand the concepts and applications of different laws used in the networks and circuits.
2. To study and analyze the D.C. Circuits with different theorems.
3. To study the concepts related to electromagnetism.
4. To study and analyze the A.C. Circuits with different theorems.
5. To understand the principle and working of transformers.

Text Books:

1. **David Bell**, Electrical Engineering Principles. PHI.
2. **Vincent Del Toro**, Electrical Engineering Principles, PHI.

Reference Books:

1. **Cotton H.,** Electrical Technology.

2. **Gupta B.R.,** Principles of Electrical Engineering.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit

Programme: B.Tech Electronic and Communication Engineering

Course Title: Engineering Mechanics **Max Marks: 100**
Course Code: ECE-125 **University Exam:60**
Duration of Exam: 3 hours **Internal Assessment:40**

Objective: The course introduces students to the analysis of dynamic and static systems encountered in engineering design practice.

Unit-I

Two Dimensional force System: Basic Concepts, principal of transmissibility, resultant of a force System, free body Diagrams, Equilibrium and equation of equilibrium Applications. Moment of a force about a point, varrigon theorem friction, law of friction, equilibrium of body lying on horizontal and inclined plane. Ladder friction applications.

Unit-II

Members forces in trusses: planer truss structure, trust joint identification, strategy for planer truss analysis. Statical determinacy and stability of planer trusses. Numerical truss analysis (Method of joints and method of selection)

Unit-III

Kinematics of particles: Velocity and acceleration in rectilinear motion along a plane and curved path. Tangential and normal components of velocity and acceleration motion curves. Kinematics of rigid bodies rotation, absolute motion, relative motion.

Unit-IV

Introduction to centroid and centre of gravity: Centroid and moment of inertia; centroid of plane area and solid bodies. Moment of inertia of plane area. Theorem of parallel axis, Theorem of perpendicular axis, radius of gyration, composite ideas.

Unit-V

Analysis of stress and strains: Forces and stress normal stress and strain under axial loading, ultimate and allowable stresses, mechanical properties, Hooke's law, modulus of elasticity. Factor of safety, deformation of members under axial loading, thermal stresses, Poisson's ratio multi axial loading, bulk modulus, shearing Strain, Relation among shear modulus, Young's Modulus and Bulk Modulus.

Course Outcome:

Upon successful completion of the course, student should be able to:

1. Use scalar and vector analytical techniques for analyzing forces in statically determinate structures.
2. Understand basic kinematics concepts – displacement, velocity and acceleration (and their angular counterparts).
3. Understand the stress, strain and the basic properties of solid material.

Text Books:

1. **S. Ramamrutham,** Strength of Materials, Dhanpal Rai & Co,.

Reference Books:

1. **R. K. Bansal,** Engineering Mechanics and Strength of Materials, Laxmi Publication.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Engineering Drawing **Max Marks: 100**
Course Code: ECE-126 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The course is designed to develop the ability to visualize and communicate three-dimensional shapes and train the students to create drawings following the engineering graphics conventions.

Unit-I

Introduction to Engineering Graphics: Engineering drawing as language of Engineers. Drawing instruments and their uses. **Projections**: The planes of projections, first and third angle projections, projection of points lying in any quadrant. Scale; needs and importance, to find representative factor of a scale, drawing of simple and diagonal scales.

Unit-II

Projection of straight line and their traces: projection of planes. Planes parallel to reference plane; plane perpendicular to both reference planes; planes perpendicular to one and inclined to other reference plane. Projection of solids with their axes perpendicular or inclined to one reference plane but parallel to other.

Unit-III

Section of Solids & Development of surfaces: Definition of sectioning and its purpose, Procedure of sectioning, Illustration through examples, types of sectional planes. Purpose of development, Parallel line, radial line and triangulation method, Development of prism, cylinder, cone and pyramid surface for both right angled and oblique solids.

Unit-IV

Orthographic Projections: Theory of orthographic projections (Elaborate theoretical instructions) Drawing 3 views of given objects (Non symmetrical objects and blocks may be selected for this exercise) Exercises on both first angle are third angle.

Unit-V

Isometric Projection: Classification of pictorial views, Basic Principle of Isometric projection, Difference between isometric projection and drawing, Isometric projection of solids such as cube, prism, pyramid and cylinder.

Course outcomes:

On completion of course, the students will be able:

1. To understand Engineering Drawing, so that the execution of construction work can be made easy and efficient.
2. To represent three dimensional objects by two dimensional views.
3. Students must be in a position to show hidden details of objects or under ground Constructions work by drawing sectional views.
4. Exposure to creating working drawings
5. Exposure to isometric projections in order to visualize aspects of engineering design.

Text Books:

1. **Bhat, N. D. and Panchal, V. M.**, Engineering Drawing, Charotar Publishers, Anand.
2. **Narayana, K. L. and Kannaiah, P.**, Engineering Graphics, Tata McGraw Hill, New Delhi.

Reference Books:

3. **Gill P. S.,** Engineering Graphics and Drafting, Katria and Sons, Delhi.
4. **Luzzadde Warren J**., Fundamentals of Engineering Drawing, PHI.

Note for paper setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit. Question will be set accordingly so that student can be able to answer 5 questions within 3 hours.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Computer Fundamentals Lab **Max Marks: 50**
Course Code: ECE-131 **University Exam: 25**
Duration of Exam: 3 hours **Internal Assessment: 25**

Note: A student is required to undergo training in the following areas:

1. Introduction to Windows.
2. MS-Office software.
3. Create, save, retrieve text file.
4. Spreadsheet program- Create, manage, and manipulate numeric data
5. Presentation software – Create presentations
6. DOS: Internal, external commands.
7. Introduction to the components of a PC.
8. Assembling of a PC.
9. Basic trouble shooting of a PC.
10. Software Installation (both system and application software's).
11. Internal Functioning of SRAMs , DRAMs, SATA Drives, PATA Drives
12. Formatting and Data Retrieval Methods for PC memories
13. LAN based and Wireless Based File Sharing between PCs
14. Basics of DISC Management and De-Fragmenting

Lab Outcomes: Upon the completion of course, the students will be able to:
1. Working on various Operating Systems and their usage
2. Understand and use MS-Office to create documents
3. Understand the basic DoS Commands
4. Recognize Hard Ware components and their assembly
5. Install Operating system on Hardware

Note: These are only the suggested list of experiments. Instructor may add or change some practical relevant to the course contents

Programme: B.Tech Electronic and Communication Engineering

Course Title: Basic Electrical **Max Marks: 50**
Course Code: ECE-132 **University Exam: 25**
Duration of Exam: 3 hours **Internal Assessment: 25**

List of suggested experiments:

1. Introduction to Circuit Elements.
2. Rise Time Fall Time Visulaization of L, C,R Based Circuits
3. Single-Phase & 3-Phase circuit Loads
4. Verification of Ohms Law.
5. Verification of Kirchhoff's Current and Voltage Law (KCL & KVL)
6. Verification of Thevenin's Theorem & Norton's Theorem.
7. Transformation of Star & Delta Networks.
8. Measurement of Power using 2-Wattmeter method.
9. Verification of Superposition Theorem.
10. Verification of reciprocity theorem.
11. To plot the Resonance curve for a Series & Parallel Resonance.
12. Determination of resonance frequency using LCR Meter.
13. Design of few basic Low Pass, High Pass , Band Pass and Band Stop Filters

Course Out-come: Upon the completion of course, the students will be able to:

1. understand different circuit elements.
2. Verify simple electrical laws and theorems.
3. know Transformation of Star & Delta Networks.
4. Verify Superposition and reciprocity Theorem.
5. Plot the Resonance curve for a Series & Parallel Resonance.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Engineering Mechanics **Max Marks: 50**
Course Code: ECE-133 **University Exam: 25**
Duration of Exam: 3 hours **Internal Assessment: 25**

List of Experiments:

1. To conduct tensile test and determine the ultimate tensile strength, percentage elongation and reduction.
2. To conduct the compression test and determine the ultimate compressive strength for a specimen.
3. To determine centroid of Lamina.
4. To determine the hardness of a given specimen using vicker/brinel/Rockwell hardness testing machine.
5. To very Lami's theorem.
6. To verify polygon law of forces.
7. Friction experiment on inclined plane.
8. Experiment on screw Jack.
9. To verify reactions at the supports of a simply supported beam.
10. To determine moment of inertia of various shapes.

Course Out-come: Upon the completion of course, the students will be able to:

6. understand different engineering mechanics apparatus.
7. understand the mechanical properties of materials.
8. understand the moment of inertia of various shapes.
9. Get the practical idea of frictional forces.
10. Get working principle of screw jack.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Workshop Practice **Max Marks:50**
Course Code: ECE-134 **University Exam:25**
Duration of Exam: 3 hours **Internal Assessment:25**

Carpentry Shop:

- Study of tools & operations and carpentry joints
- Simple exercise using jack plane
- To prepare half-lap corner joint, mortise & tennon joints
- Simple exercise on woodworking lathe.

Fitting Shop:

- Study of tools & operations
- Simple exercises involving fitting work
- Make perfect male-female joint
- Simple exercises involving drilling/tapping/dyeing

Smithy Shop:

- Study of tools & operations
- Simple exercises base on black smithy operations such as upsetting, drawing down, punching, bending, fullering & swaging

Welding Shop:

- Study of tools & operations of Gas welding & Arc welding
- Simple butt and Lap welded joints
- Oxy-acetylene flame cutting

Sheet-Metal Shop:

- Study of tools & operations
- Making Funnel complete with 'soldering'
- Fabrication of tool-box, tray, electric panel box etc

Machine Shop:

- Study of machine tools and operations
- Plane turning
- Step turning
- Taper turning
- Threading
- Single point cutting tool grinding

Foundry Shop:

- Study of tools & operations
- Pattern making
- Mould making with the use of a core.
- Casting

Course Outcomes

Upon completion of this laboratory course,

1. Students will get knowledge of basic tools used in carpentry and will be able to make basic wooden joints.
2. Students will be able to fabricate components with their own hands.
3. They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
4. Students will be able to make different typed of geometrical shapes by using sheet metal using different types of joints in sheet metal shop.

5. Students shall be given full exposure the permanent fastening using different types of wielding.

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents

Reference Books:

1. **Kapoor V**. Work Shop Practice.
2. **Raghuwanshi B. S.,** Workshop technology.
3. **Bawa H. S.,** Workshop practice.
4. **Gupta, B. R.,** Production Technology.

Programme: B.Tech Electronic and Communication Engineering

Course Title: C Programming
Course Code: ECE-223
Duration of Exam: 3 hours

Max Marks: 100
University Exam: 60
Internal Assessment: 40

Objective: To enhance the logical skills of students with the basic programming concepts and implementation in C.

Unit-I

Introduction to C Programming: History of C, Structure of a C Program, Compiling & Executing a C program. Flow Charts, Constants, Variables and Data Types, Operators and Expressions, Data Input and Output.

Unit-II

Control Statements: Decision making and branching, IF statement, IF-ELSE statement, nested IF-ELSE statement, Switch statement, break statement, continue statement. Decision making and Looping, while statement, do-while statement, for statement.

Unit-III

Functions: Types of functions, function declaration, calling a function, passing arguments to functions, return values and their types, nesting of functions, recursion.

Unit -IV

Introduction to arrays: One dimensional arrays, Two dimensional arrays and Multidimensional arrays, basic operations on arrays, arrays and strings, basic string operations. Introduction to Unions, Structures and enumerated data types.

Unit-V

Introduction to Files & Pointers: Operations on pointers, pointers & multidimensional arrays, pointers & character strings. Dynamic Memory Allocation in C: malloc, calloc, realloc and free functions. Operations on files like open, close, read and write.

Course Outcomes:

The student will be able:

1. To understand the basic constructs of C programming.
2. To solve the problems using control statements.
3. To decompose a problem into functions and synthesize a complete program.
4. To use various types of arrays and user defined data types
5. To use pointers and files to perform several operations.

Text Books:

1. **Balaguruswamy**, Programming in ANSI C, TMH.
2. **Yashwant Kanitkar**, Let us C, TMH.

Reference Books:

3. **Gottfried, Programming** with C, TMH.
4. **Venugopal,** C Programming, TMH.
5. **Yashwant Kanitkar,** Pointers in C, TMH.

Note for paper setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Basic Electronics | **Max Marks: 100**
Course Code: ECE-224 | **University Exam: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Objective: This course aims to provide students with solid background of semiconductors and some basic solid state electronic devices used in circuits.

Unit-I

Semiconductors: Introduction to seminconductors Classification, semiconductor bonds, Energy band description, Semiconductor types, Energy band diagram for Semi conductors, Drift and Diffusion Current, Mobility of Charged particles, Current density and Conductivity, Conductivity of Semi conductors,Brief overview of semiconductor fabrication,Levels of Doping, Hall Effect.Hall Voltage and its applications,

Unit-II

Introduction to p-n Junction: Structure of PN Diode,Types, I,V Relations in diode, Concept and need for biasing a diode,Current components in p-n junction, Diodes and Characteristics, temperature dependence, equivalent circuits. Rectifiers, half wave, full wave rectifiers, bridged rectifiers (efficiency, ripple factor). Clipping and clamping circuits. Basic Operations of Zener, Avalanche and Photo Diodes.Numerical on rectifiers and clipping clamping circuits,

Unit-III

Transistors: Introduction to transistors,Structure and doping in Transistors,Types of transistors, operation & characteristics, CE, CB and CC configurations, Input output characteristics and graphical analysis of basic amplifier circuits, use of transistor as a switch,Biasing in Transistors, Need for biasing,Basic calculation of current and voltage gain in Transistors

Unit-IV

Field Effect Transistors: Operation and characteristics. JFET, MOSFET, types of MOSFET, operation and characteristics of JFET and MOSFET. Introduction to feedback, Types of feedbacks, Sinusoidal Oscillators, Hartley, Collpitts and Phase Shift oscillators (transistor version only and no derivation).

Unit-V

Biasing Techniques and biasing stability (BJT/FET):- Need for biasing, operating point,load line analysis,fixed bias configuration, emitter bias configuration, voltage divide bias configuration analysis of these biasing techniques , and bias stability.

Course outcomes: At the end of the course, the student will be able to

1. Describe the energy bands and the scientific principles behind conductivity in semiconductors.
2. Analyze the working of PN junction diode and apply diode in various applications such as rectifiers and other wave shaping circuits.
3. Analyze the working of various traditional transistors such as BJT and FET along with the recently used MOSFET based transistors as well as the concept of biasing in these transistors.
4. Understand various feedback systems and oscillators.
5. Design basic analog circuits

Text Books:

1. **Millman & Halkias**, Electronic Devices & Circuits, TMH
2. **Boylestad** and **Nashelky,** Electronic Devices & Circuits, PHI.

Reference Books:

1. **Floyd T. L.,** Electronic Devices, Pearson Education.
2. **Theodore Bogart Jr**., Electronic Devices & Circuits, Pearson Education.
3. **Mehta V. K.**, Electronic Devices, S. Chand and Sons, New Delhi

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit

Programme: B.Tech Electronic and Communication Engineering

Course Title: C Programming
Course Code: ECE-231
Duration of Exam: 3 hours

Max Marks: 50
University Exam: 25
Internal Assessment: 25

List of Experiments:

1. Basic program in Sequential Statement in C
2. Program of multiway control structure (Switch Case)
3. Program of different types of loops nested loops.
4. Program on function (Parameter passing - call by value)
5. Programs on recursion.
6. Programs on string manipulation with or without string function.
7. Program on 1-Dimesional Arrays.
8. Program on 2-Dimensional Arrays.
9. Programs on pointers
10. Programs on file handling.
11. Programs on Real Time solutions of real problems
12. Programs on program minimization
13. Programs translated from famous algorithms

Lab Outcomes:

1. To formulate the algorithms for simple problems
2. To be able to correct syntax and logical errors as reported by the compilers and run time.
3. To be able to write iterative as well as recursive programs
4. To be able to represent data in arrays, strings and structures and manipulate through a program
5. To be able to declare pointers of different types and use them in defining self-referential structures.
6. To be able to create, read and write to and from simple text files.

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents

Programme: B.Tech Electronic and Communication Engineering

Course Title: Basic Electronics **Max Marks:50**
Course Code: ECE-232 **University Exam:25**
Duration of Exam: 3 hours **Internal Assessment:25**

List of Experiments:

1. To determine and plot operating characteristics of a PN junction diode
2. To study the input / output waveforms of Half wave and bridge wave rectifiers
3. To suppress the ripple in rectifiers using RC filters.
4. To study the clipper and clamper circuits.
5. To study the Zener characteristics and its application as voltage regulator
6. To plot characteristics of transistor in CE/CB configuration
7. To plot characteristics of a BJT.
8. To plot MOSFET characteristics.
9. To study frequency response of RC Coupled Oscillators.
10. To Design basic rectifier circuit configurations using lab view and circuit maker
11. To design basic transistor configurations using lab view and circuit maker
12. To simulate and design the basic electronic circuits using Simulink
13. To verify various electronic laws using simulink

Practical Course Outcome:

At the end of practical course the students will be familiarized about the different electronic components which are in use in electronic circuits. The behavior of these components and circuits in different configuration will also be studied and analysed.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Electromagnetic Wave Theory

Max Marks: 100

Course Code: ECE–322 **University Exam:60**

Duration of Exam: 3 Hours **Internal Assessment:40**

Objective: The course has been designed to acquaint the students with basic concepts of Electromagnetic theory.

Unit-I

Vector Calculus: Review of vector analysis, Scalar & vector products, gradient, divergent and curl of a vector and their physical explanation-Divergence, Stokes theorems. Transformation amongst rectangular, cylindrical and spherical co-ordinate system.

Unit-II

Electrostatics: Coulomb's law, application of coulombs law, electric field intensity from point charges, field due to continuous distribution of charges, gauss's law, application of gauss's law, Electric displacement and displacement density potential function, potential field of a point charge, laplace's and poison's equations.

Unit-III

Magnetostatics: Magnetic field intensity and magneto motive force, Ampere's Circuital law,applications of amper's circuitary law, Biot-savart law and its application, vector potential, magnetic dipole. Ampere's work law in differential vector form, continuity of currents, conduction and displacement current.

Unit-IV

Time Varying Fields: Faradays law, Maxwell's equations (Differential, Integral and Phasor forms). Uniform plane waves. Representation of wave motion in free space, perfect dielectrics and Lossy dielectrics (Wave equations). Pointing Theorem and Power density. Propagation in good conductor and Skin effect. Reflection of Uniform plane waves .

Unit-V

Introduction To Wave Guides:Waves between parallel plane; Transverse Electric wave, Transverse magnetic waves; characteristics of TE & TM waves; Transverse Electromagnetic waves; velocity of propagation; Attenuation in parallel plane guides; wave impedance.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Apply vector calculus to static electric-magnetic fields in different engineering situations
- **CO2.** Analyze Maxwell's equation in different forms (differential and integral) and apply them to diverse engineering problems.
- **CO3.** Examine the phenomena of wave propagation in different media and its interfaces.
- **CO4.** Analyze the nature of electromagnetic wave propagation in guided medium.

Text Books

1. **Hayt W.**, Engineering Electromagnetics, TMH. (5^{th} or 7^{th} edition).
2. **Prasad K. D.**, Antenna and Wave Propagation, Satya Prakashan.

Reference Books

1. **Griffith**, Electromagnetics, PHI

2. **Guru & Hizirogli**, Electromagnetic field theory fundamental, Thomson Publication.
3. **Kraus J. D.**, Electromagnetics, TMH, 4th Edition.

Note for Paper Setter: The Question paper shall comprises of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: MATLAB Programming **Max Marks: 50**
Course Code: ECE-331 **University Exam:25**
Duration of Exam: 3 Hours **Internal Assessment: 25**

List of Experiments:

1. Generation of impulse, step, sinusoidal, exponentional etc Signals (both continuous & discrete)
2. Linear convolution, auto correlation & cross correlation of two sequences.
3. Sampling and effect of aliasing
4. Impulse and Step response of 1^{st} & 2^{nd} order systems
5. Fourier transform of various signals
6. Laplace transform of various signals
7. Application of Laplace to solve differential equations and analysis of electric circuits.
8. Z- transform of various signals
9. Applications of Z- transform to solve difference equations and its application.
10. Verification of various network theorems.

Course Outcomes:

After completion of the course student will be able to:

CO1. Generate continuous as well as discrete signals such as impulse, step, ramp, etc.
CO2. Apply Fourier, Laplace & Z transforms on two signals and analyze the results obtained from each
CO3. Solve differential equations and analysis of electric circuits by applying Laplace Transform
CO4. Solve difference equations by applying Z transform.
CO5. Function effectively as a team.

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Analog Communication Systems **Max Marks: 100**
Course Code: ECE-423 **University Exam: 60**
Duration Of Exam: 3 Hours **Internal Assessment: 40**

Objective: The main thrust in this course is on making students familiar with basic communication principles and Technologies in vogue. The stress is on the applied Communication with reference to the relevant technologies.

Unit-I

Introduction to communication systems: Historical Review, Elements of an Electronic Communication System, Communication Channel and their Characteristics, channel capacity, Bandwidth, Signals and their classifications. Concept of time domain and frequency domain representation.

Unit-II

Modulation Techniques: Amplitude modulation, Frequency spectrum of AM Waves, Representations of AM waves, Power relation in AM waves, Need and description of SSB, suppression of carrier, suppression of unwanted side bands, vestigial side band system, frequency modulation (FM), Mathematical representation of FM, frequency spectrum & Band width of FM waves, Carson's rule, Wide band and narrow band FM, Phase modulation (PM), pulse code modulation (PCM).

Unit-III

AM Transmitters And Receivers: AM TRANSMITTERS: Generation of AM, low level and high level modulation, comparison of levels, AM transmitter block diagram, collector class C modulator, Base modulator, AM RECEIVERS: Tuned radio frequency (TRF) receiver. Superheteterodyne receiver, RF section and characteristics, mixers, frequency changing and tracking, IF rejection and IF amplifiers. Detection and automatic gain control (AGC), AM receiver characteristics.

Unit-IV

FM Transmitters and Receivers: Basic requirements and generation of Frequency Modulation (FM), & methods, direct methods, variable capacitor modulator, varactor diode modulator, reactance modulators, disadvantages of direct method, Indirect modulators, RC phase shift modulator, Armstrong FM systems. FM RECEIVERS: LimECErs, single and double tuned demodulator, balanced slope detector, foster seely or phase discriminator, block diagram of FM receiver, RF amplifiers, FM receiver characteristics.

Unit-V

Noise In Receivers: Source of noise, classification of noise - external noise, internal noise, Noise figure, signal to noise ratio (SNR), noise in AM & FM receivers, Pre-emphasis & De-emphasis in FM.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Characterize different components of communication systems and find time domain and frequency domain representation of different signals.
- **CO2.** Apply concept of modulation and carry out power calculations & spectral analysis of AM wave.
- **CO3.** Carry out power calculations, Bandwidth calculations and Spectral analysis of FM wave.
- **CO4.** Calculate Noise figure, signal to noise ratio (SNR) in AM/FM systems and analyze different noises present in communication systems.

Text Book:

1. **Simon Haykin**, Communication Systems, John Wiley & Sons, 4th Ed., 2001.
2. **Taub and Schilling**, Principles of comm.. systems, TMH, New Delhi, 1995.

References Books:

1. **Roddy and Coolen**, Electronic comm., PHI, New Delhi, 4th Edition, 2003.
2. **Bruce Carlson et al**, Comm. systems, McGraw Hill Int., 4th Ed., 2002.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Linear Integrated Circuits **Max Marks: 100**
Course Code: ECE-424 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**

Objective: The course has been designed to get student acquainted with basic concepts, principles and applications. The emphasis is on the relevant technologies.

Unit-I

Operational Amplifier Fundamentals: Integrated circuits-Types, Classification, Package Types and temperature ranges, Op-amp Block Diagram, ideal and practical Op-amp specifications, DC and AC characteristics, 741 op-amp & its features,Basic Op -Amp circuit, Op-Amp parameters – Input and output voltage, CMRR and PSRR, offset voltages and currents, Input and output impedances, Slew rate and Frequency limitations; Biasing of Op-Amps .

Unit-II

Linear application of OP-Amps: Voltage Followers, Non-inverting Amplifiers, Inverting amplifiers, Summing amplifiers, , Integrator and differentiator, Difference amplifier, Instrumentation amplifier, AC amplifier, V to I, I to V converters.

Unit-III

Non Linear application of OP-Amps :: Non- Linear function generation, Comparators, inverting Schmitt trigger circuits, Monostable & Astable multivibrator, Triangular and Square wave generators, Log and Anti log amplifiers , Precision rectifiers..

Unit-IV

Oscillators & Active Filters: Introduction, phase shift oscillator, Wein bridge oscillator Butter worth filters – 1st order,2nd order LPF, HPF filters. Band pass, Band Reject and All pass filters.

Unit-V

Timers & Phase Locked Loops: Introduction to 555 timer, functional diagram, Monostable and Astable operations and applications, Schmitt Trigger. PLL - introduction, Applications of PLL – frequency multiplication, frequency translation

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Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Solve Input and output voltage, CMRR and PSRR, offset voltages and currents, Input and output impedances, Slew rate of op-amps.
- **CO2.** analyze and design Voltage Followers, Non-inverting & Inverting amplifiers, Summing amplifiers, Instrumentation amplifier, AC amplifier, V to I, I to V converters using Op-Amps
- **CO3.** Analyze and design zero crossing detector, Inverting and non-inverting Schmitt trigger circuits, Monostable & Astable multivibrator, Triangular and Square wave generators, Log and Anti log amplifiers, Precision rectifiers using Op-amps
- **CO4.** Analyze Time- base Generators, Timers, Blocking Oscillator and Phase Locked Loops

Text Books :

1. **Chowdhury D. Roy**, Linear Integrated Circuits, New Age International (p) Ltd, 2nd Ed., 2003.

2. **Gayakwad Ramakanth** - Op-Amps & Linear ICs, PHI,1987.

Reference Books:

1. **Sergio Franco** -Design with Operational Amplifiers & Analog Integrated Circuits McGraw Hill, 1988.
2. **Coughlin R.F. & Driscoll Fredrick**- Operational Amplifiers & Linear Integrated Circuits, PHI, 6th Edition.
3. **Millman**- Micro Electronics, McGraw Hill,1988.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Antenna and Wave Propagation **Max Marks: 100**
Course Code: ECE-425 **University Exams: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**

Objective: The course has been designed to get student acquainted with basic concepts, principles and applications related to antenna field. Emphasis is given to latest technologies and recent trends.

Unit-I

Retarded Potentials: Introduction, radiation from an oscillation dipole in free space, induction and radiation fields. Radiated power from a current element, radiation resistance, short antennas , Radiation from a quarter wave monopole and half wave dipole.

Unit-II

Fundamentals Of Antennas & Arrays Of Antennas: Basic ideas of reciprocity properties of antennas, Radiation patterns, directional properties of dipole antennas. Antenna gain, Antenna aperture and its relation to gain, antenna terminal impedance, Antenna temperature and signal to noise ratio.
ANTENNA ARRAYS **-**Arrays of two point sources, linear arrays of n-point sources. Broadside and end fire arrays, pattern multiplication, effect of earth on vertical and horizontal patterns, Binomial array.

Unit-III

Special Purpose Antennas -Reflector type antennas, Lens antenna, V and Rhombic antennas, yagi antenna, slotted and horn antennas, Basic ideas of wide band antennas.

Unit-IV

Ground Wave Propagation, Basic ideas of ground wave, propagation, reflection at the surface of conducting plane, earth (on ground), space and surface waves, tilt of the surface wave, troposphere waves-reflection, refraction, duct propagation.

Unit-V

Ionosphere Propagation: The ionosphere, formation of the various layers, their effective characteristics, reflection and refraction of waves by ionosphere, virtual height, maximum frequency, skip distance, regular and irregular variation of ionosphere, ordinary and extraordinary waves.

Course Outcomes:
After completion of the course student will be able to:

- **CO1.** Understand the important and fundamental antenna parameters and terminology.
- **CO2.** Explain the working of antennas and formation of antenna patterns for different cases.
- **CO3.** Explain loop, slot, patch and horn antennas. Derive expressions for the parameters of loop and slot antennas.
- **CO4.** Explain ionosphere and troposphere propagation.

Text Books:

1. **Prasad K. D -** Antenna and Wave Propagation, Satya Prakashan.

2. **Jorden F.C. & Balmann B.C**-Electromagnetic waves & radiating System, P.H.I.

Reference Books:

1. **Kraus J.D,** Antennas, McGraw Hill.
2. **Rao Narayan** - Basic Electromagnetics with application, PHI

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Electrical Measurement & Instruments **Max Marks:100**
Course Code: ECE-426 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**

Objective: The objective of this course is to expose the students to a broad knowledge of experimental methods and measurement techniques.

Unit-I

Measurement Systems and Characteristics of Instruments: Introduction-Measurements, Significance of measurements, Methods of measurements, Instruments and measurement system, Electronic instruments, Classification of instruments, Deflection and Null type instruments, Comparison Analog and Digital Modes of operation, Application of measurement system, Errors in measurements, Types of errors, Accuracy and Precision, Noise, Resolution or discrimination, loading effects, Units, Absolute units, Fundamental and Derived units.

Unit-II

Electromechanical Indicating Instruments: D'Arsonaval Galvanometer- Construction of D'Arsonaval Galvanometer, Torque equation, Dynamic behavior of Galvanometer, Ballistic galvanometer- Construction and theory, Introduction to PMMC Instruments and Moving iron instruments, Instrument transformers.

Unit-III

Bridge Circuits for RLC Measurements & Potentiometers: Measurement of R, L and C, Wheatstone, Kelvin, Maxwell, Anderson, Schering and Wien bridges Measurement of Inductance, Capacitance, Effective resistance at high frequency, Q-Meter. Potentiometers: principle of operation, DC and AC potentiometers. Application of potentiometers.

Unit-IV

Transducers: Principles of operation, Classification of transducers based upon principle of transduction, Summary of factors influencing the choice of transducer, Qualitative treatment of Strain Gauge, LVDT, Thermocouple, Piezo-electric crystal and photoelectric transducers.

Unit-V

Electronic Instruments: Introduction-Electronic Voltmeter, VTVM Transistor voltmeter, Electronic multimeter, Digital multimeter.
Cathode Ray Oscilloscope: Introduction- CRO, Cathode ray tube, Block diagram of CRO, Measurement of voltage, phase and frequency using CRO, Special purpose oscilloscopes.

Course Outcomes:
After completion of the course student will be able to:

- **CO1.** Test and Measure various electronics quantities with accuracy and precision
- **CO2.** Select accurate galvanometer for different applications and apply concepts of electromagnetic theory to calculate current flowing through galvanometer.
- **CO3.** Measure R, L & C accurately using bridges.
- **CO4.** Apply principles of transducer for selecting different types of transducer appropriate in different engineering applications.

Text Books:

1. **Sawhney A. K.** Electrical & Electronic Measurements & Instr, Dhanpat Rai & Sons
2. **Gupta J. B** -Measurements and Instr, S. K Kataria & Sons, Delhi, First Edn (2003).

Reference Books:

1. **Cooper W. D, Helfrick A. D**. Modern Electronic Instr & Measurement Tech, PHI.
2. **R. K. Rajput**, Electrical Measurements & Measuring Instruments, S Chand,

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit

Programme: B.Tech Electronic and Communication Engineering

Course Title: Analog Communication Systems Lab **Max Marks: 50**
Course Code: ECE-432 **University Exam: 25**
Duration of Exam: 3 Hours **Internal Assessment: 25**

1. To study and calculate the modulation index of AM wave.
2. To study the demodulation of AM wave and find out modulation frequency.
3. To study and observe frequency modulation.
4. Study of DSB-TC and SSB AM modulation and demodulation.
5. Study of PAM, PPM & PWM modulation & demodulation.
6. Study of voice communication using various types of modulation techniques.
7. Study of signal Sampling and reconstruction techniques.
8. Study of Nyquist criteria and aliasing.
9. Comparison of frequency response of 2^{nd} order and 4^{th} order Butterworth low pass filter.
10. Study of AM/FM Transmitter and Receiver.
11. Implement DSB AM using MATLAB
12. Implement SSB AM using MATLAB
13. Implement FM Using MATLAB
14. Implement QAM using MATLAB
15. Design Simulink Models for DSB AM and DSB SC AM
16. Design Simulink Models for SSB AM
17. Design Simulink Models for FM
18. Design Simulink Models for QAM
19. Design Simulink Models for Detection of AM and FM

Course Outcomes:

After completion of the course student will be able to:

CO1. Simulate amplitude modulated wave, DSB-SC, SSB-SC wave by selecting different frequencies for carrier wave and modulating wave.
CO2. Simulate PWM, PAM, PPM modulation and de-modulation and thereby can analyze their characteristics.
CO3. Compare frequency response of 2^{nd} order and 4^{th} order Butterworth low pass filter
CO4. Apply Nyquist theorem and thereby analyze the phenomena of aliasing.
CO5. Function effectively as a team.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents

Programme: B.Tech Electronic and Communication Engineering

Course Title: Linear Integrated Circuits Lab **Max Marks: 50**
Course Code: ECE-433 **University Exam: 25**
Duration of Exam: 3 Hours **Internal Assessment: 25**

1. Study of OP AMPs – IC 741, IC 555, – Functioning, Parameters and Specifications.
2. To demonstrate the relationship between input and output for the inverting and non-inverting configuration of the Op-Amp 741
3. To perform the Application operation – Adder, Subtractor, Comparator Circuits using IC 741.
4. To design a square wave and triangular wave generator using Op-amp's.
5. Active Filter Applications – LPF, HPF (first order & 2^{nd} order)
6. Active Filter Applications – BPF, Band Reject (Wideband) and Notch Filters.
7. IC 741 Oscillator Circuits – Phase Shift and Wien Bridge Oscillators.
8. IC 555 Timer – Monostable Operation Circuit.
9. IC 555 Timer – Astable Operation Circuit.
10. Schmitt Trigger Circuits – using IC 741 and IC 555.
11. IC 565 – PLL Applications.

Course Outcomes:

After completion of the course student will be able to:

CO1. Establish relationship between input and output for the inverting and non-inverting configuration of the Op-Amp 741
CO2. Perform arithmetic operation using IC-741
CO3. Design 1^{st} order and 2^{nd} order active filters using IC-741
CO4. Implement Schmitt trigger circuits using IC-741 & IC-555
CO5. Design square wave and triangular wave generators using op-amps

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents

Programme: B.Tech Electronic and Communication Engineering

Course Title: Electronic Multimedia Engineering **Max Marks: 100**
Course Code: ECE-521 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**

Objective: The course has been designed to get student acquainted with basic concepts, principles and applications related to field. Emphasis is given to latest technologies.

Unit-I

Electroacoustical Transducers: A microphone, Types of microphones their polar frequency response: moving coil, crystal microphone, Ribbon microphone, Single button microphone, condenser microphone, Principle characteristics of microphone, Magnetic microphone, Useful frequency range for microphones, Comparison of microphones, Loudspeakers, mounting of direct radiator loudspeakers, Earphones, Considerations in the design of circuits for hearing aids, A three stages direct coupled circuit for hearing.

Unit-II

Disks And Magnetic Recording And Reproduction: Sound recording, disk recording, and monophonic disk sound recording system, monophonic disk sound reproducing system, Stereophonic disk recording system, stereophonic disk reproducing system, Magnetic recording, Digital recording Pickups.

Unit-III

Recording: Video Cassette recorders, Video Tape characteristics, Tape recording and play back. Basic principal of video recording on Disc, Digital Video Disc (DVD): DVD technology, Disc and data details DVD Audio- DVD Video, Dolby digital sound, Blue ray disc

Unit-IV

Display Fundamentals: Television basics, Composite video signal, Modulation requirement, TV standards requirement, NTSC and PAL colour system, Advanced DTH system, cable TV, IP TV in multimedia, digital TV-HD (High definition) display.

Unit-V

Principle of Vision and Application of Visual Properties: Luminance and Colour, response of eye, Colour representation, Video system characteristics, Function of digital Camera, charged coupled device (CCD), Principle and display application of LED, Liquid crystal and plasma devices, 3D display concept, Touch screen basics

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Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand and analyse various microphones and loudspeakers.
- **CO2.** Know the basic principle of recording and reproduction system like stereo recording and playback.
- **CO3.** Explain the modern digital systems like DVD, Dolby digital sound, Blue ray disc.
- **CO4.** Understand the basics of television standards and advanced HD TV and advanced DTH.
- **CO5.** Acquire knowledge about advanced digital cameras, LED display, 3D display and touch screen.

Text Books:

1. **Ajay**- Dhanpat Rai & Sons Pub Audio Video and T.V Engineering.

2. **Gupta K.G-** Audio and Video Systems, Tata Mc Graw Hill Publication.

Reference Books:

1. **Kinsler**- Fundamentals of Acoustics, John Wiely & Sons.Inc.
2. **Whitaker Jerry** - Electronic Displays Technology, Design, and Applications, McGraw-Hill International Editions. 1994.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Microprocessor & Interfacing **Max Marks: 100**
Course Code: ECE-522 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**

Objective: The objective of this course is to introduce to the students the fundamental of 8085 microprocessor and its interfacing.

Unit-I

Introduction To Microprocessor: History and Evolution, types of microprocessors, 8085 Microprocessor, Architecture, Bus Organization, Registers, ALU, Control section, Instruction set of 8085, Instruction format, Addressing modes, Types of Instructions.

Unit-II

Assembly Language Programming and Timing Diagram: Assembly language programming in 8085, Microprocessor timings, Instruction cycle, Machine cycles, T states, State transition diagrams, Timing diagram for different machine cycles.

Unit-III

Serial I/O, Interrupts and Comparison of Contemporary Microprocessors: Serial I/O using SID, SOD. Interrupts in 8085, RST instructions, Issues in implementing interrupts, Multiple interrupts and priorities, Interrupt handling in 8085 with RIM and SIM, Enabling, disabling and masking of interrupts. Brief comparison of contemporary 8-bit microprocessors like Z-80, M68000 with 8085.

Unit-IV

Data Transfer techniques: Data transfer techniques, Programmed data transfer, Parallel data transfer using 8155. Programmable parallel ports and handshake input/output, Asynchronous and Synchronous data transfer using 8251A. Programmable interrupt controller 8259A. DMA transfer, cycle stealing and burst mode of DMA, 8257 DMA controller.

Unit-V

Microprocessor Interfacing Techniques: Interfacing and refreshing dynamic RAMs, Interfacing a keyboard, Interfacing LED and seven segment displays, Interfacing A/D converters, D/A converters.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Describe the various architectural aspects of 8085 Microprocessor.
- **CO2.** Understand the timing diagram and write basic assembly language programming in 8085
- **CO3.** Explain the serial communication and interrupt phenomenon in 8085
- **CO4.** Elaborate the synchronous and asynchronous data transfer and Direct Memory Access in 8085
- **CO5.** Interface external devices with 8085

Text Books:

1. **R. S. Gaonkar**, µprocessor Architecture, Programming & applications with the 8085/8086A, Wiley Eastern Ltd.

2. **Douglas V Hall**, Microprocessors & Interfacing.

Reference Books:

1. **A. P. Mathur**, Introduction to Microprocessor, Tata McGraw Hill.
2. **Yu-Cheng Liu** & **G A Gibson**, µprocessor System, Arch Programming & Design.

Note for paper setter: The question paper shall comprise of ten questions. Two questions will be set from each unit. The student has to attempt five questions, selecting one question from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Pulse and Switching Circuits **Max Marks: 100**
Course Code: ECE-523 **University Exam: 60**
Duration Of Exam: 3 Hours **Internal Assessment: 40**

Objective: The course puts an emphasis on the applied and industrial applications. The course content has been designed to give a practical shape to the already covered basic courses.

Unit-I

Linear Wave Shaping: High Pass circuits, Response to Standard waveforms, Differentiator, Double differentiation, Low pass circuits, response to standard waveforms, Integrator, Attenuator, RLC circuits, Ringing circuits.

Unit-II

Non- Linear Wave shaping: Clipping circuits: series diode clipper, shunt diode clipper, transistor clipper. Two level clipping. Comparators, Clamping circuit, Clamping Theorem.

Unit-III

Switching Characteristics of devices: Diode as a switch, piecewise linear diode characteristics, Transistor as a switch, Break down voltage consideration of transistor, saturation parameters of Transistor and their variation with temperature, Design of transistor switch, transistor-switching times.Steady state and transient behaviors of electronic (Diode & transistor) Switches, Switching characteristics, Delay time, Rise time, Storage time and fall time,

Unit-IV

Multivibrators: Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using transistors.

Unit-V

Time-Base Generators & Blocking Oscillator: Methods of generating a time –base waveform, exponential sweep circuit, sweep circuit using UJT, sweep circuit using a transistor switch ,A transistor constant-current sweep, Miller and Bootstrap time base generators-basic principles. Blocking- Oscillator Circuits: A triggered transistor blocking oscillator (base timing and emitter-timing), An astable transistor blocking oscillator (Diode-controlled and RC-controlled), Application of blocking oscillator.

Course Outcomes:

After completion of the course student will be able to:

CO1. Solve the problems related to High Pass circuits, Response to Standard waveforms, Differentiator, Double differentiation, Low pass circuits for linear wave shaping.

CO2. Analyze clipper and comparator circuits using transistors for nonlinear wave shaping.

CO3 Analyze switching characteristics of Devices using Diode and Transistors and to study steady and transient behavior of switches.

CO3. Analyze and design Bistable, Monostable & Astable multivibrator using transistors.

CO4. Analyze Time- base Generators, Timers, Blocking Oscillator and Phase Locked Loops

CO5 To analyze and deign exponential sweep circuit, sweep circuit using UJT, sweep circuit using a transistor switch and blocking Oscillator circuits.

Text Books :

1. **Millman J and Taub H Pulse**-Digital and Switching Waveforms, McGraw-Hill.
2. **Bell David A-** Solid State Pulse circuits, PHI, 4th Edn., 2002 .

Reference Books :

1. **Kumar A Anand-** Pulse and Digital Circuits PHI, 2005.
2. **Strauss L -**Wave Generation and Shaping.
3. **Venkataraman R.-**Pulse, Digital Circuits and Computer Fundamentals

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit

Programme: B.Tech Electronic and Communication Engineering

Course Title: Digital Communication Systems **Max Marks: 100**
Course Code: ECE-524 **University Exam: 60**
Duration Of Exam: 3 Hours **Internal Assessment: 40**

Objective: To provide the basic understanding of Digital Communication Systems.

Unit-I

Pulse Digital Modulation: Elements of digital communication systems, advantages of digital communication systems, Elements of PCM: Sampling of analog signals, Quantization, Quantization error, signal to noise ratio due to Quantization, PCM Coding, Companding in PCM systems. Differential PCM systems (DPCM). BW of PCM. Delta modulation, its drawbacks, adaptive delta modulation, comparison of PCM DM systems and DPCM.

Unit-II

Line Coding Schemes: Basic definition, requirements of line coding schemes, different line coding techniques like NRZ (unipolar and bipolar), RZ, Manchester, Alternate mark and Inversion, HDBn, B8ZS, 4B/5B etc. coding schemes. Therir properties and advantages.

Unit-III

Digital Modulation Techniques: Introduction, Generation & Demands of ASK, FSK, PSK, DPSK, DEPSK, QPSK,M-ary PSK, QAM, similarity of BFSK and BPSK, Constellation Diagram.

Unit-IV

Performance of Digital Communication Systems: Additive white Gaussian noise, Bandlimited AWGN, Noise power at the output of LPF, BPF, RC Filter, Integrator and Differentiator, Integratot-&-dump circuit, Base band signal receiver, probability of error, the optimum filter, matched filter, probability of error using matched filter, coherent reception, non-coherent detection of FSK, calculation of error probability of ASK, BPSK, BFSK,QPSK

Unit-V

Spread Spectrum Modulation: Basic definitions of spread spectrum, advantages, Signal space Dimensionality and processing gain-Probability of error, Frequency hop spread spectrum - pseudo-noise sequences – Linear feedback shift register and generation of PN sequences, maximum length and gold codes. Direct sequence spread spectrum with coherent binary phase shift keying – problem in spread spectrum systems.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand different pulse digital modulations and their advantages, disadvantages.
- **CO2.** Understand different line coding techniques and their properties.
- **CO3.** Differentiate between various digital modulation techniques and their advantages & disadvantages.
- **CO4.** Know about white Gaussian noise, mathematical modelling for different types of filters used to reduce noises in communication system.
- **CO5.** Understand different spread spectrum techniques.

Text Books:

1. **Simon Haykin**, Digital communications, John Wiley, 2005
2. **H. Taub and D. Schilling**, Principles of Communication Systems, TMH,

2003

Reference Books:

1. **Sam Shanmugam**, Digital and Analog Communication Systems, John Wiley, 2005
2. **John Proakis**, Digital Communications TMH, 1983
3. **Singh & Sapre**, Communication Systems Analog & Digital TMH, 2004
4. **B.P. Lathi**, Modern Analog & Digital Communication Oxford reprint, 3rd edn, 2004

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Electric Machines | **Max Marks: 100**
Course Code: ECE-526 | **University Exam: 60**
Duration of Exam: 3 Hours | **Internal Assessment: 40**

Objective: The course has been designed to get student acquainted with basic concepts, principles and applications related to field. Emphasis is given to latest technologies.

Unit-I

Transformers: Construction and working principle, classification, concept of ideal transformer, emf equation, transformer on load, phasor diagram on no load and on load, equivalent circuit, O.C and S.C tests. Losses and efficiency, all day efficiency, Voltage Regulation. Parallel operation of single phase transformer. Auto Transformer: Principle of operation, advantages, phasor diagram.

Unit-II

D C Generators: Principle of operation, construction, EMF & torque equation, power stages, losses & efficiency classification of D.C. generators, various characteristics, parallel operation of D.C. Generators, commutation & armature reaction.

Unit-III

D. C. Motors: Construction and principle of operation, classification, Emf & torque equation, characteristics of D.C. motors and their applications, Electric Braking and speed control of various types of dc motors.

Unit-IV

Single Phase Induction Motors: Construction and principle of operation, Types of single phase induction motors, equivalent circuit based on double revolving field theory, Universal motors, fractional horse power motors.

Unit-V

Alternators: Basic Principle of operation, construction, emf equation, rotating magnetic field, factors effecting alternator size, Alternator on load, synchronous reactance, determination of voltage regulation, parallel operation of alternators.

Course Outcomes:

After completion of the course student will be able to:

CO1. Understand the basic concepts and principle of operation of transformers and their types.
CO2. Explain the concept of DC generators.
CO3. Explain the principle of DC motors and characteristics of different DC motors.
CO4. Understand the operation of Single phase induction motors.
CO5. Understand principle of operation of Alternators.

Text Books:

1. **Fitzegerald A F, Kingsley C and Umans S D-**Electrical Machinery, McGraw Hill .
2. **Nagrath I J and Kothari D P-**Electric Machines' Tata McGraw Hill.

Reference Books:

1. **Bimbhra P S, Electrical Machinery**, Khanna Publishers, Delhi, 6th Ed. (2003)

2. **Gupta B R and Singhal V** -Fundamentals of Electric Machines, 2nd Ed., New Age International Pub. (2000).

Note For Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Digital Communication Systems Lab **Max Marks: 50**
Course Code: ECE-531 **University Exam: 25**
Duration of Exam: 3 Hours **Internal Assessment: 25**

1. Study of Pulse Amplitude Modulation and demodulation.
2. Study of Pulse Width Modulation and demodulation.
3. Study of Pulse Position Modulation and demodulation.
4. Sampling Theorem – verification.
5. Study of Time division multiplexing.
6. Pulse code modulation.
7. Study of Differential pulse code modulation.
8. Study of Delta modulation.
9. Frequency shift keying.
10. Study of Phase shift keying.
11. Study of Differential phase shift keying
12. Study of DM and ADM Using MATLAB
13. Design of Simulink models for ASK FSK AND PSK
14. Study of ASK FSK and PSK using MATLAB
15. Visualization of Signal Constellation of Keying systems using Simulink

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Course Outcomes:

After completion of the course student will be able to:

CO1. Understand basic theories of Digital communication system in practical.
CO2. understand sampling theorem and modulation techniques in practical.
CO3. design and implement different modulation and demodulation technique.
CO4. Analyze modulation techniques using MATLAB tool.
CO5. Function effectively as a team.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents

Programme: B.Tech Electronic and Communication Engineering

Course Title: Microprocessor & Interfacing Lab **Max Marks: 50**
Course Code: ECE-532 **University Exam: 25**
Duration of Exam: 3 Hours **Internal Assessment: 25**

1. Study of 8085 Microprocessor Kit.
2. Write a program to add two 8-bit number using 8085 .
3. Write a program to add two 16-bit number using 8085 .
4. Write a program to subtract two 8-bit number using 8085 .
5. Write a program to subtract two 16-bit number using 8085 .
6. Write a program to multiply two 8 bit numbers by repetitive addition method using 8085.
7. Write a program to multiply two 8 bit numbers by rotation method using 8085
8. Write a program to multiply 16-bit number with 8-bit number using 8085.
9. Write a program to generate Fibonacci series using 8085.
10. Write a program to sort series using bubble sort algorithm using 8085.
11. Write a program to control the operation of stepper motor using 8085 microprocessors and 8255 PPI.
12. Write a program to control the temperature using 8085 microprocessors and 8255 PPI.
13. Write a program to control the traffic light system using 8085microprocessors and 8255 PPI.
14. Write a program to control speed of DC motor using 80856 microprocessors and 8255 PPI.

Course Outcomes:

After completion of the course student will be able to:

CO1. Understand the various features of 8085 microprocessor kit.
CO2. Write various arithmetic and logical based assembly language programs in 8085.
CO3. Write various assembly language programs in 8085 related to 8255 PPI.
CO4. Write various string manipulation based assembly language programs in 8085.
CO5. Function effectively as a team.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents

Programme: B.Tech Electronic and Communication Engineering

Course Title: Electric Machines Lab **Max Marks: 50**
Course Code: ECE-533 **University Exam: 25**
Duration of Exam: 3 Hours **Internal Assessment: 25**

1. To perform Ratio, Polarity and the Load Test on a Single Phase Transformer.
2. To perform Open Circuit and Short Circuit Test on a Single Phase Transformer and hence determine its Equivalent Circuit Parameters.
3. Speed Control of a DC Shunt Motor
4. To obtain the load characteristics of
   a. a DC Shunt Motor
   b. a DC Cumulative Compound Generator
   c.
5. To conduct Swinburne test on a DC shunt motor and hence obtain its efficiency at full load
6. To perform no-load and blocked-rotor test on a single phase induction motor and hence determine its equivalent circuit parameters.
7. To obtain OCC & SCC of a synchronous machine by synchronous impedance method.
8. To obtain V-curves & inverted V Curves of a three phase synchronous motor at no load

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Course Outcomes:

After completion of the course student will be able to:

CO1. Understand and perform different load and circuit test on a single phase transformer
CO2. Perform speed control and load characteristics of different motors.
CO3. Perform different test on a single phase induction motor.
CO4. Obtain OCC and SCC of a synchronous machine impedance method.
CO5. To obtain V-curves & inverted V Curves of a three phase synchronous motor at no load.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents

Programme: B.Tech Electronic and Communication Engineering

Course Title: : Power Electronics
Course Code: ECE-621
Duration of Exam: 3 Hours

Max Marks: 100
University Exam:60
Internal Assessment: 40

Objective: The objective of this course is familiarizing students with working of power electronic converters under various loads.

Unit-I

Characteristics of Various Solid State Devices: Power diode: structure, I-V characteristics, turn On and turn Off characteristics. SCR: structure, I-V characteristics, turn On and turn Off characteristics, Two transistor model, triggering circuits. Power transistor, MOSFET, GTO, IGBT: I-V characteristics, rating, comparison, parallel operation.
Triac: I-V characteristics, application. Snubber circuits for Power Diodes, SCR's and BJT's. Applications of power electronics.

Unit-II

AC TO DC Converters: Natural commutation- performance analysis under passive loads of Single phase/three phase bridge, Semi controlled and fully controlled rectifiers- Dual converters- Effect of load and source inductances, Inverter operation.

Unit-III

DC TO DC Converters: Switch mode DC-DC Converters: Introduction, Control. Operation of Buck, Boost and Buck-Boost, Cuk converters. Basic principles of switch mode power supplies.

Unit-IV

DC TO AC Converters: Basic concept of switch mode Inverters, square Wave and Sinusoidal PWM switching scheme. Single- phase inverters: Half bridge and full bridge, Bipolar and Unipolar PWM.
3-Pase Inverters: Square wave with 120 and 180 degree conduction mode, 3-phase PWM. Basic Principle of Switch mode power supplies.

Unit-V

AC TO AC Converters: Single phase and three phase AC voltage controllers using thyristors and Triac integral cycle control –AC choppers-single phase Cyclo converters application –effect of harmonics and Electromagnetic interference.

Course Outcomes:
After completion of the course student will be able to:

- **CO1.** Define the specifications of power semiconductor switches and its industrial applications.
- **CO2.** Explain the working and basic construction of power electronic switches.
- **CO3.** Analyze different power converter circuits.
- **CO4.** Describe the use of power converters in commercial and industrial application

Text Books:

1. **Ned Mohan T. M Undeland & W.P. Robbin,** Power Electronics.
2. **M.H Rashid,** Power Electronics.

Reference Books:

1. **B.K BOSE**, Recent Advances in semiconductor Devices.
2. **M.Ramamurthy**, An introduction to thyristor and their application.
3. **Dubey Doradla, joshi** and **Sinha,** Thyristorised power controllers.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Mobile & Wireless Communication **Max Marks: 100**
Course Code: ECE-622 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**

Objective: The course has been designed to get student acquainted with basic concepts, principles and applications related to field. Emphasis is given to latest technologies

Unit-I

Cellular Mobile Radio Systems: Introduction to Cellular Mobile System, evolution of mobile communication systems, Performance criteria, operation of cellular systems, Hexagonal shaped cells, Cell splitting and frequency reuse, micro cells, hand off.

Unit-II

Interference : Introduction to Co-Channel Interference, real time Co-Channel interference, Co-Channel measurement, fading in mobile environment, inter symbol interference (ISI) and rejection using Near-Maximum Likelihood detection.

Unit-III

Cell Coverage For Signal And Traffic: Free space propagation model, reflection, diffraction and scattering, effect of human made structures, phase difference between direct and reflected paths, constant standard deviation, straight line path loss slope, multipath propagation.

Unit-IV

Cell SECE And Mobile Antennas: Radiation patterns, antenna gain, omni directional antennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas, minimum separation of cell sECE antennas, high gain antennas.

Unit- V:

Multiple Access Techniques & Wireless Systems: Multiplexing techniques - FDMA, TDMA, CDMA, SDMA, spread spectrum direct sequence spread spectrum and frequency hopping spread spectrum, WLL, GSM.

Course Outcomes:
After completion of the course student will be able to:

- **CO1.** Understand cellular mobile system, formulate its performance criteria.
- **CO2.** Characterize the trade-off among frequency reuse, signal to interference ratio, capacity& able to understand interferences in cellular communication.
- **CO3.** Apply the knowledge of mathematics to find out the average received signal strength at a distance from the transmitter using different propagation model.
- **CO4.** Identify the advantages & disadvantages of different mobile antennas.
- **CO5.** Understand multiple access method, spread spectrum techniques, wireless communication system.

Text Books

1. **Lee-** Mobile Cellular Telecommunications, MC Graw Hill, 2 nd Edn., 1989.
2. **Theodore, Rapport**-Wireless Communications Pearson education, 2 nd Edn., 2002.

Reference Books

1. **Blake R-** Wireless Communication Technology, Thompson Asia Pvt. Ltd., 2004.
2. **Mark Jon W and Weihua Zhqung -**Wireless Communication and Networking, PHI, 2005.
3. **Lee** -Cellular & Mobile Communications, MC Graw Hill wireless communications & networks – William Stallings

Note For Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit

Programme: B.Tech Electronic and Communication Engineering

Course Title: Data Comm. & Computer Network **Max Marks: 100**
Course Code: ECE-624 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**

Objective: The course has been designed for explaining the basic concepts and principles to the students. Applied and Industrial Aspects have been taken care of in an appropriate manner.

Unit-I

Communication concepts: Bandwidth and Channel capacity, Nyquist law, Shannon's law, Key components in data communication systems.
Data transmission concepts: Simplex, Half duplex, Full duplex. Characteristics of signals.

Unit-II

Transmission Media: Guided and Unguided Transmission media. Reliable Transmission of data: Asynchronous and Synchronous Transmission. Error Detection: Parity based, CRC based, FCS computation. Error Control and Recovery techniques.

Unit-III

Goals and applications of networks: Classification LAN, MAN, WAN. Network Topology. Network architecture, ISO-OSI Reference model, TCP/IP Model.
IP Addresses, Subnetting, Internet Protocol (IP), Internet control Protocols: ICMP, ARP and RARP.

Unit-IV

Routing: Types of Routing. Routing Algorithms: Interior (RIP, OSPF), Exterior (BGP).
Transport Layer: UDP and TCP concepts.

Unit-V

Data Link Layer Protocols: SLIP, PPP. MAC sub layer. Channel allocation issues.
Multiple access protocols: ALOHA (Pure and Slotted) Protocol, CSMA/CD.
High speed LANS (Fast, Ethernet and FDDI).

Course Outcomes:
After completion of the course student will be able to:

- **CO1.** Understand the fundamental concepts of Data Communication.
- **CO2.** Understand and explain digital transmission over different types of communication media.
- **CO3.** Understand the principles of framing, flow control, error control and access control mechanisms.
- **CO4.** Understand the concept of logical addressing and building the skills of sub-netting.
- **CO5.** Understand and explain the principles and protocols for route calculations.

Text Books:

1. **Stallings W-** Data and Communications, 6th Edn, Prentice Hall, 2000.
2. **Tanenbaum A S-** Computer Networks, 4th Edn, Prentice Hall.

References:

1. **Gallo -**Computer Communications & Networking Technologies, Cengage India.
2. **Peterson and Davie, Morgan Kaufman-**Computer Networks: A systems approach, 2nd Edn.,

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Adv Microprocessor & Microcontrollers **Max Marks: 100**
Course Code: ECE-626 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**

Objective: The course has been designed for explaining the basic concepts and principles of memory management and microcontrollers.

Unit-I

Architecture of 8086 Microprocessor: Special functions of General purpose registers. 8086 flag register and function of 8086 Flags. Addressing modes of 8086. Instruction set of 8086.Assembler directives, simple programs, procedures, and macros.

Unit-II

Hardware: Pin diagram of 8086, Interrupts of 8086, Minimum mode and maximum mode of operation. Timing diagram. Memory interfacing.

Unit-III

Programming: Assembly language programs of 8086 involving logical, Branch & Call instructions, sorting, evaluation of arithmetic, expressions, string manipulation.

Unit-IV

Microcontroller 8051 : Historical background of micro-controllers, Introduction to 8051 Micro-controllers, Architectural details, Bus timing, Memory organization, Memory Map expansion, Fetch / Execute sequences, External Memory Access, Addressing Modes OF 8051,

Unit-V

Hardware description of 8051: Instruction formats, Instruction sets, interrupt structure & interrupt priorities, Port structures & Operation, linear counter Functions, different Modes of Operation and Programming examples, Interfacing, Adding external devices to the bus, some practical examples of interfacing.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Describe the architectural aspects of 8086 microprocessor and understand its instruction set.
- **CO2.** Understand hardware aspects and analyze the different modes of operation of 8086 microprocessor.
- **CO3.** Interface external devices and write assembly language programs of 8086 microprocessor.
- **CO4.** Differentiate between microprocessors and microcontroller and describe the architectural aspects of 8051 microcontroller.
- **CO5.** Analyze the port structure, Timer/Counter Operation and interface external devices with 8051 microcontroller.

Text Books:

1. Advanced microprocessor and Peripherals - A.K.Ray and K.M.Bhurchandi, TMH, 2000.
2. Micro Controllers – Deshmukh, Tata McGraw Hill Edition.

Reference Books:

1. Micro Processors & Interfacing – Douglas U. Hall, 2007.
2. The 8088 and 8086 Micro Processors – PHI, 4th Edition, 2003.
3. Micro Computer System 8086/8088 Family Architecture, Programming and Design - By Liu and GA Gibson, PHI, 2nd Ed.,

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Power Electronics Lab | **Max Marks: 50**
Course Code: ERE-631 | **University Exam: 25**
Duration of Exam: 3 Hours | **Internal Assessment: 25**

1. SCR Characteristics.
2. TRIAC Characteristics..
3. MOSFET Characteristics.
4. IGBT Characteristics. Fully
5. RC Triggering Circuit.
6. Voltage Commutated DC Chopper.
7. UJT Triggering of SCR.
8. Series Inverter.
9. Design of controlled Rectifiers using Simulink
10. Design of Single phase Inverters using Simulink
11. Design of 3-Phase Inverters Using Simulink
12. Study of effect of load and source inductances on Inverter and rectifier responses
13. Study of motor speed control using SCR
14. Study of various triggering circuits

Course Outcomes:
After completion of the course student will be able to:

CO1. Verify the characteristics of Power semiconductor switches using trainer kits.
CO2. Perform and observe the output characteristics of controlled rectifiers at R, RL and RLE load.
CO3. Perform different types of firing circuits to trigger the SCR using trainer kit.
CO4. Verify the theoretical characteristics of cyclo-converter using trainer kit.
CO5. Function effectively as a team.

Note: These are only the suggested list of practicals. Instructor may add or change some practical relevant to the course contents.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Adv. Microprocessor & Microcontrollers Lab **Max Marks: 50**

Course Code: ECE-633 **University Exam: 25**
Duration of Exam: 3 Hours **Internal Assessment: 25**

1. To find the largest signed number in a given series of data (Using 8086). .
2. To copy a block of data from one memory to another (Using 8086). .
3. Multiplication by repetitive addition method, multiplication using MUL instruction, signed multiplication, BCD multiplication (Using 8086). .
4. 16 bit by 8 bit division, division using DIV instruction, signed division, BCD division (Using 8086).
5. Factorial of a given number using recursion(Using 8086). .
6. Reverse a given string (Using 8086).
7. Sorting techniques – Bubble sort, insertion sort, selection sort (Using 8086).
8. Stepper Motor Interface (Using 8086).
9. 7 segment LED display interface (Using 8086).
10. 8051 based minimum system
11. 8051 interface with keyboard matrix
12. 8051 interface with ADC / DAC

Course Outcomes:
After completion of the course student will be able to:

CO1. Understand the various components used in 8086 Microprocessor Kit.
CO2. Perform various programs like addition, copy block of data, Factorial of a number etc. using 8086 Microprocessor.
CO3. Perform various programs in 8051 Microcontroller Kit.
CO4. Interface components with 8051 Microcontroller.
CO5. Function effectively as a team.

Note: These are only the suggested list of practicals. Instructor may add or change some practical relevant to the course contents.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Optical Communication **Max Marks: 100**
Course Code: ECE-722 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**

Objective: The course has been designed for explaining the basic concepts and principles of Optical Communication to the students. Applied and Industrial Aspects of optical communication have been taken care of in an appropriate manner.

Unit–I

Overview of Optical Fiber Communication: Brief Overview of Optical Communication, Basic concepts, light wave components, principle of light transmission, channel capacity etc. Nature of light, polarization, basic laws and definition, mode theory analysis for optical communication, optical fiber modes and configuration, wave propagation in optical fibre,operating wavelength, single mode and multimode fibres, V–numbers, mode field diameter, numerical aperture, refractive index profiles.

Unit–II

Signal Degradation in Optical Fibres: Attenuation, absorption, scattering losses, bending losses in optical fibres. Dispersion in optical waveguides, group delay, material dispersion, waveguide dispersion, intermodal dispersion and chromatic dispersion in single mode fibres, Non Linearities in Fibres

Unit–III

Optical Sources: Basic concepts from semiconductor electronics, energy bands, Concept of Direct and indirect Band Devices. Light emitting diodes: Structure, principle, material, modulation response, transient response.
Laser diodes: Principle of action, structure, efficiency and characteristics of laser diodes, modulation He–Ne lasers, DFB lasers.

Unit-IV

Optical detectors: Basic concepts, photodiodes, PIN photodiode, avalanche photodiode, detector response time, avalanche gain, receiver noise, receiver sensitivity, BER,Eye Diagram Analysis.

Unit–V

Transmission Systems: Overview of analog and digital optical link, power launching and coupling. Point to point link system consideration, Advanced Multiplexing.

Course Outcomes:
After completion of the course student will be able to:

- **CO1.** Recognize and classify the structures of Optical fiber networks and their types.
- **CO2.** Discuss the channel impediments like losses, interference and dispersion.
- **CO3.** Describe the Optical sources and detectors and thus able to illustrate their working principle.
- **CO4.** Familiar with Design considerations of fiber optic systems.
- **CO5.** perform characteristics of optical fiber, sources and detectors, design as well as conduct experiments in software and hardware, analyse the results to provide valid conclusions.

Text Books:

1 **John M Senior -**Optical Comm Techniques **–**PHI

2 **Keiser G-** Optical Fiber Communication, 3rd Edition, Mc Graw Hill International

3 **Mynbacv D.F. and Scheine L -**Fiber Optic Communication Technique, Pearson Education.

Reference Books:

1. **Ghatak & Thyangarajan K**- Introduction to fiber optics, Cambridge university press,1998.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Entrepreneurship Dev & Management **Max Marks: 100**
Course Code: ECE-723 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**

Objective: To give an overview of who the entrepreneurs are and what competences are needed to become an entrepreneur and to create an awareness of the need for systematic management of projects.

Unit-I

Entrepreneurship Development: Meaning, objectives, type of entrepreneurs, importance of entrepreneurship training, factors affecting entrepreneurship, linkage between entrepreneurship and economic development, problem of increasing unemployment, balanced regional growth, harnessing locally available resources, New Industrial Policy and innovation in enterprises.

Unit-II

Entrepreneurship Support System: Small Industries Development Bank of India, Small Industries service Institute, State Small Industries and Export Corporation, District Industrial Centres and Other supporting agencies.

Unit-III

Project Report Preparation: Identifying business opportunities, Project report and its importance, various contents of project report: managerial and entrepreneurial capabilities, socio-economic benefits, Demand analysis, technical feasibility and financial viability.

Unit-IV

Introduction to Marketing Management: Brief introduction to various types of product strategies, Pricing strategies, Channel strategies and Promotional strategies.
Introduction to Production Management: Types of production systems, production planning and control, functions of Production Manager and Materials Management.

Unit-V

Introduction To Human Resource Management: Manpower Planning, Recruitment, selection, placement and induction, training and development, compensation.
Introduction to Financial Management: source of finance and Working Capital management.

Course Outcomes:
After completion of the course student will be able to:

- **CO1.** Understand the basic development of entrepreneurship as a profession.
- **CO2.** Understand marketing strategies for any business enterprise.
- **CO3.** Acquire basic knowledge of human resource management for small business.
- **CO4.** Understand the social responsibilities of business managers.
- **CO5.** Know how to establish and manage a business enterprise.

Text Books:

1. **Holt David H**, Entrepreneurship: New Venture Creation, PHI (4000).
2. **Saini Jasmer Singh**, Entrepreneurship Development Programmes and Practices, Deep and Deep Publications, New Delhi (1997).

Reference Books:

1. **Dollinger**, Entrepreneurship Strategies and Resources, Pearson Education (4003).
2. **Jose Paul & Kumar Ajith N**, Entrepreneurship Development and Management, Himalaya Publishers, New Delhi (4000).
3. **Hisrich Robert D and Micheal Peters P**, Entrepreneurship, TMH, (4002).

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Biomedical Instrumentation | **Max Marks: 100**
Course Code: ECE-741 | **University Exam: 60**
Duration of Exam: 3 Hours | **Internal Assessment: 40**

Objective: The aim of the course is to get the students acquainted with the Biomedical Instrumentation.

Unit-I

Introduction to biomedical instrumentation: Introduction of Biomedical Engineering, Biometrics, Man instrument system, Components of Man instrument system. Resting potential, action potential, typical wave form of action potential, propagation of action potential, recording of action potential.

Unit-II

Electrodes, Transducer and Amplifiers: Introduction of Bio-Electrodes, Properties of Bio-Electrodes, different types of electrodes, Sensors, Diaphragms, Force sensors. Introduction of transducers, classification of transducers, Biological Amplifiers (Instrumentation amplifies, chopper amplifiers)

Unit-III

Electro Potential Recording: The heart and cardiovascular system, ECG, EEG, EMG, lead systems and recording methods, typical waveforms and signal characteristics and block diagrams of ECG,EEG,EMG

Unit-IV

Human Assist Devices: Cardiac pacemakers, Classification of Pacemakers, Defibrillators, AC Defibrillators, DC Defibrillators, Indirect measurement, direct measurement, automated indirect method, magnetic blood flow meters, ultrasonic blood flow meter.

Unit-V

Imaging Techniques: Introduction to X-rays, Properties of X-rays, Production of X-rays, Block Diagram of X-ray Machine, Ultrasound in medicine, physics of ultrasonic waves, types, A-mode, M-Mode, Doppler mode, Introduction of Computed tomography, Introduction of MRI.

Course Outcomes:
After completion of the course student will be able to:

- **CO1.** Understand biomedical instrumentation, propagation of action potential.
- **CO2.** Acquire knowledge of electrodes, transducers & amplifiers used in biomedical instrumentation.
- **CO3.** Apply the knowledge of science, engineering fundamentals & engineering specialization for electrode potential recording.
- **CO4.** Understand different human assist devices.
- **CO5.** Gain knowledge of different imaging techniques used in medical science.

Text Books:

1. Khandpur, R.S., "**Handbook of Biomedical Instrumentation**", TATA McGraw-Hill, New Delhi, 1997.

Reference Books:

1. Joseph J.Carr and John M.Brown, **Introduction to Biomedical equipment Technology**, John Wiley and Sons, New York, 1997.
2. Leislie Cromwell, **Biomedical instrumentation and measurement**, Prentice Hall of India, New Delhi, 2002

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Advanced Control Engineering **Max Marks: 100**
Course Code: ECE-742 **University Exam: 60**
Duration of Exam: 3 hour **Internal Assessment: 40**

Objective: This subject familiarizes a student with state variables and various advanced control techniques.

Unit-I

State Variable Modeling.
Block diagram, transfer function and signal flow graphs in state space.

Unit-II

State Variables: State variable analysis and design solution of state vector equations, design using state – variable feedback. Controllability and observability.

Unit-III

Digital control system: Hardware elements of a digital control system, Z- transform, inverse Z-transform, difference equations, pulse transfer function. Discrete time system analysis.

Unit-IV

Non linear control systems: Linearization of Non-linear control system about and nominal operating point, analysis and design using linearized models.

Unit-V

Control Techniques: Advanced control techniques:

a) Fuzzy logic control

b) Adaptive control

c) Neural Network based control.

Course Outcomes:
After completion of the course student will be able to:

CO1. Understand transfer function and signal flow graph in state space.
CO2. Understand state vector equations with controllability and observability.
CO3. Aquire knowledge of different components used in digital control system.
CO4. Understand and analyse of different non-linear control system.
CO5. Undestand different control techniques used in modern system.

Text Books:

1. **Ogatta** ,Modern Control Systems.
2. **Stefani**, Design of Feedback control systems.

Reference Books:

1. **Palm**, .Modeling, analysis and control of dynamic systems.
2. **Franklin and Powel**, Feedback control of dynamic systems.

Note for Paper Setter: The Question Paper shall comprise of 10 question. Two questions will be set from each unit. The student has to attempt 5 questions at least one from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course: Electronics Workshop Technology **Max. Marks: 100**
Course Code: ECE-743 **University Exam: 60**
Course Duration : 3 Hours **Internal Assignment: 40**

Objective: The aim of the course is to train the students for maintenance and servicing of electronic equipments.

Unit-I

Reliability Aspect & Trouble Shooting Procedure: Equipment failure: Cause of failure, failure rate, MTTF, MTBT,MTTR , maintenance policy, nature of fault, fault location, fault finding aids, functional approach, split half method, divergent path, convergent path, switching path, systematic trouble shooting checks, ground system.

Unit-II

Test Equipment Tools & Electromechanical Components: CRO, multimeters, logic analyzers, logic clip, logic probe, signal generator, hand tools, soft tools, different type of fuses & fuse holders, different types of switches, cable & connectors, circuit boards, transformers, motors & relays.

Unit-III

Soldering & Desoldering Techniques: Soldering: soldering tools, soldering materials (lead free), soldering procedure, soldering techniques, good & bad solder joints, replacement of components, handling of MOS devices, desoldering techniques: de-soldering pump, hot air etc. SMT work.

Unit-IV

Testing of Active & Passive Components: Failures in resistors, capacitors, testing of inductors. Testing of semiconductor devices. Types of failure in diodes, special types of diodes, BJT transistors, power transistors, substitute of transistors.
FETs, Thyristors, IGBT. Fault diagnosis in OP AMP.

Unit-V

Troubleshooting of Audio/Video Equipments: Analysis of users' complaint & report. Physical inspect of the set. Design & testing of various power supply unit. Identification of faulty sections. Identification of faulty stage. Identification of faulty component. Determination of the cause of fault. Repair & servicing.
Importance of earthing in electrical installation.

Course Outcomes:
After completion of the course student will be able to:

- **CO1.** understand different types of failure and method to locate and rectify it.
- **CO2.** know the test tools and their use to measure different parameters for different electromechanical components.
- **CO3.** Study the different soldering and desoldering techniques.
- **CO4.** Test different active and passive components.
- **C05.** Acquire knowledge about the fault location techniques for different

Text Books:

1. **Khandpur R. S**., Modern electronic equipment, Tata McGraw Hill.

Reference Books:

1. **Gupta R. G**., Audio & Video Systems, Tata McGraw Hill.

Note for Paper Setter: The Question Paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt 5 questions at least one from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Industrial Electronics | **Max Marks: 100**
Course Code: ECE–744 | **University Exam: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Objective: The course has been designed for explaining the basic concepts and principles to the students. Applied and Industrial Aspects have been taken care of in an appropriate manner.

Unit-I

D.C. Motor Control: Control of d.c. motor using half controlled and fully-controlled single-phase and three-phase thyristor converters, control of d.c. motor using choppers of different configurations.

Unit-II

A.C. Motor Control: Stator voltage control of induction motors, control of induction motors using voltage source and current source inverters, slip-ring induction motor control.

Unit-III

Industrial circuits: Temperature control circuit, AC voltage regulators, fan regulators/ lamp dimmers, uninterrupted power supplies (UPS). Relays and Timers: The relay (basic construction), AC relay, Reed relay, Solid state relay, 555 timer and its industrial applications.

Unit-IV

Design Of Printed Circuit Boards : Introduction to technology of printed circuit boards (PCB), General lay out and rules and parameters, PCB design rules for Digital, High Frequency, Analog, Power Electronics and Microwave circuits, Computer Aided design of PCBs.

Unit-V

Industrial Appliances Design: Power Transformers and Voltage Stabilizers, Design of 0.5 and 1.0KVA Voltage Stabilizers, Design of Inverters and Battery Chargers for domestic use.

Course Outcomes:
After completion of the course student will be able to:

- **CO1.** Control speed of DC motors.
- **CO2.** Control speed of AC motors.
- **CO3.** Gain knowledge of various Industrial Components.
- **CO4.** Understand PCB design rules. Design of PCB using computer aided tools.
- **CO5.** Design Power transformers, voltage stabilizer, inverter and battery charger.

Text Books:

1. **Mohan N Undeland, T.M. Robins, W.P**. power electronics- converters, application & design, John Wiley 1989
2. **Bose B.K**., Power electronics and A.C Drives, Prentice Hail 1986.

Reference Books:

1. **Dubey G.K. Asarbada, E.R, K**. power electronics devices, IETE book, TMH.
2. **Murphy J.M.D Turnnbull, F.G** power electronics control of A.C motors .
3. **Rashid M.H**. power electronics- circuits, devices, application, Prentice Hall India.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit

Programme: B.Tech Electronic and Communication Engineering

Course Title: Embedded Systems | **Max Marks: 100**
Course Code: ECE–745 | **University Exam: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Objective: The aim of the subject is to help the learners to understand the fundamentals of Embedded Systems.

Unit-I

Introduction to embedded systems: hardware and software components; types, examples, characteristics and challenges in embedded computing system design, embedded system design processes.

Unit-II

Architecture of Embedded System: Hardware components ; SOC , Processors , CPU , Types of memory , Memory management , I/O devices and interfacing .Software components :Interpreter ,Compiler ,Assembler ,Cross Assembler , RTOS , Languages for embedded applications ,Hardware and software architecture. Examples; Cellphone, Smartcard, Digital Thermometer.

Unit-III

OS for Embedded Systems: Introduction to real time theory – Operating System Services – Real time Operating System Concepts – Basic design using a RTOS – Underground tank monitoring system.

Unit-IV

Performance Issues of an Embedded System: CPU performance – CPU Power Consumption – Analysis and Optimization of CPU Power Consumption program execution time – Analysis and optimization of energy and power – Analysis of program size – Hardware accelerators.

Unit -V

Design Examples: Personal Digital Assistants – Set Top Boxes – Ink Jet Printers – Telephone PBX. Introduction to Micro C/OS-II operating system and its uses.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand and design embedded systems.
- **CO2.** Learn basic of OS and RTOS.
- **CO3.** Understand types of memory.
- **CO4.** Understand embedded firmware design approaches.
- **CO5.** Design RTOS embedded systems.

Text Books:

1. **Wayne Wolf**, Computer as Components, Principles of Embedded Computing System Design, Harcourt India Pvt. Ltd.,
2. **David E Simon**, An Embedded Software Primer, Pearson Education,

Reference Books:

1. **Raj Kamal**, Embedded Systems, Architecture, Programming and Design, TMH .
2. **Sriram V Iyer, Pankaj Gupta**, Embedded Real time Systems Programming, TMH.
3. **.K.V.K.K. Prasad**, Embedded/Real time Systems: Concepts, Design and Programming, Dreamtech Press.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Satellite Communication **Max. Marks: 100**
Course code: ECE-748 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: To impart the technical knowledge about satellite services, link techniques and access techniques used
in satellite signal propagation.

Unit-I

Orbital Parameters: Orbital parameters, Orbital perturbations, Geo stationary orbits, Low Earth and Medium
orbits. Frequency selection, Frequency co-ordination and regulatory services, Sun transit outages, Limits of
visibility, Attitude and orientation control, Spin stabilization techniques, Gimbal platform

Unit-II

Link Calculations: Space craft configuration, Payload and supporting subsystems, Satellite uplink -down link
power budget, C/No, G/T, Noise temperature, System noise, Propagation factors, Rain and ice effects,
Polarization calculations

Unit-III

Access Techniques: Modulation and Multiplexing: Voice, Data, Video, Analog and Digital transmission
systems, multiple access techniques: FDMA, TDMA, T1-T2 carrier systems, SPADE, SS-TDMA, CDMA,
Assignment Methods, Spread spectrum communication, Compression-Encryption and Decryption techniques

Unit-IV

Earth Station Parameters: Earth station location, propagation effects of ground, High power Transmitters-
Klystron Crossed field devices, Cassegrania feeds, Measurements on G/T and Eb/No

Unit-V

Satellite Applications: INTELSAT Series, INSAT, VSAT, Remote sensing, Mobile satellite service: GSM. GPS,
INMARSAT, Satellite Navigation System, Direct to Home service (DTH), Special services, E-mail, Video
conferencing and Internet connectivity.

Course Outcomes:

After completion of the course student will be able to:

CO1. Explain the principles, concepts and operation of satellite communication systems.
CO2. Describe the concepts of signal propagation affects, link design, rain fading and link availability and
perform interference calculations.
CO3. Understand modulation techniques and error correction codes for satellite communication.
CO4. Use software tools to simulate and analyse the performance of satellite communication systems, and
use real satellite up/down links (subject to the availability of satellite links) to conduct link

experiments.

CO5. Critically analyse the design requirements and the performance of satellite communication systems.

Text / Reference Books:

1. Bruce R. Elbert," The Satellite Communication Applications Hand Book, Artech House Boston,
1997

2. Wilbur L. Pritchard, Hendri G. Suyderhood, Robert A. Nelson, "Satellite Communication
Systems Engineering", II Edition, Prentice Hall, New Jersey.1993

3. Dennis Rody," Satellite Communication", Regents/Prentice Hall, Eaglewood Cliff, New Jersey, 1983

4. Tri T. Ha, "Digital satellite communication", 2nd Edition, McGraw Hill, New york.1990

5. K. Feher, Digital communication satellite / Earth Station Engineering, PHI., New Jersey, 1983

Programme: B.Tech Electronic and Communication Engineering

Course Title: Power Systems | **Max Marks: 100**
Course Code: ECE-752 | **University Exam: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Objective: The aim of the course is to provide the students adequate knowledge of Power Generation, Transmission and Distribution.

Unit-I

Introduction To Electric Power System: Introduction to Power Systems generation, transmission & distribution. Element of AC and DC distribution. Single fed, double fed and ring main distributor.

Unit-II

Insulators: Overhead line insulator types; pin, suspension, strain, shackle, guy etc. String efficiency & methods of equalizing potential drop over string of suspension insulators.

Unit-III

Transmission lines: Transmission line parameters and their evaluations, types of overhead conductors with calculations of inductance and capacitance. Models of short, medium and long transmission lines. Skin, proximity and Ferranti effect. Power transfer capability of a transmission line. Transmission Towers.

Unit-IV

Cables: Classification of cables, Cable conductors, insulating materials, insulation resistance, electrostatic stress, grading of cables, capacitance calculation, losses and current carrying capacity.

Unit-V

Corona: Corona, Visual & critical voltages, corona loss, effect of corona on line design practical, factors affecting corona, practical importance of corona.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- **CO1.** Understand the concepts of power systems.
- **CO2.** Understand the different overhead line insulators.
- **CO3.** Understand the power transmission lines and towers
- **CO4.** Understand different types of power cables and their properties.
- **CO5.** Understand corona affect and corona loss.

Text Books:

1. **Kothari & Nagrath**, Power System Engineering, Tata McGraw Hill Publishing, New Delhi.
2. **Grainger J.J. and Stevenson W.D**., Elements Of Power system Analysis, McGraw Hill Science Engineering.

Reference Books:

1. **Wadhwa C. L.,** Electric Power System. New Asian Age, New Delhi.
2. **Mehta V.K.,** Principles Of Power System, S. Chand & Company limited.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Neural Networks | **Max Marks: 100**
Course Code: ECE-755 | **University Exam: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Objective: The principal objective of this subject is to introduce students to neural networks and fuzzy theory from an engineering perspective

Unit-I

Introduction: Historical perspective, Basic Neurobiology, Why Artificial Networks? Network architectures, the tasks neural networks can perform, Characteristics of Neural Networks

Unit-II

Basic neuron models: McCulloch-Pitts model, radial basis function model, etc, learning algorithms. Matlab Simulation exercises.

Unit-III

Basic neural network models: The Hebbian Hypothesis. Single-layered neural networks, multilayer perceptron, nearest neighbor based multilayer perceptron, Training of artificial Neural Networks

Unit-IV

Basic learning algorithms: Supervised learning, constructive algorithms, Single-hidden layer algorithms. The Upstart algorithm. The Cascade Correlation algorithm. Neural networks and temporal sequences. Sequence recognition. Sequence generation. Unsupervised learning. Competitive Learning. The back propagation algorithm, self-organization learning, winner-take-all competitive learning, evolutionary learning, etc.

Unit-V

Applications: Character recognition, signal restoration, Pattern recognition etc. Matlab Simulation exercises.

Course Outcomes:

At the end of the course, students should be able to understand and appreciate:

- **CO1.** The role of neural networks in engineering, artificial intelligence, and other areas.
- **CO2.** Understanding of basic neural network models like Mcculloch-Pitts Model, Radial Basis Function Model, resistive networks for vision models, complex dynamical learning models.
- **CO3.** Understanding of the concepts and techniques of neural networks through the study of the most important neural network models.
- **CO4.** Have knowledge of sufficient theoretical background to be able to reason about the behavior of neural networks.
- **CO5.** Able to evaluate whether neural networks are appropriate to a particular application.
- **CO6.** Able to apply neural networks to particular applications, and to know what steps to take to improve performance.

Text Books:

1. **Jacek M. Zurada**, Introduction to Artificial Neural Systems, PWS Publishing Company, (2001)
2. **S. S Haykin**, Neural Networks: A Comprehensive Foundation, Pearson Education.

Reference Books:

1. **Valluru Rao**, C++ Neural Networks and Fuzzy Logic, Honary Holt & Co *(1998)*
2. **Freeman**, Neural Networks, Pearson Publication (2003).
3. **Rajasekaran & Pai**, Genetic Algorithms ;Synthesis and applications, Prentice Hall of India (2004).

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: RF IC Design **Max Marks: 100**
Course Code: ECE-756 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**
Credits: 3 [3-0-0]

Objective: The aim of the subject is to help the students to understand the fundamentals of Radio Frequency Integrated Circuit Designs and make them familiar with the various circuit design techniques.

Unit-I

Introduction: Importance of RF and Wireless Technology: Complexity, design and applications. Choice of Technology. Basic concepts in RF Design: Nonlinearity and Time Variance, Inter-symbol Interference, Random Process and Noise. Definitions of Sensitivity and dynamic range, conversion gains and Distortion. Importance of RF Design, RF Behavior of Passive Components, Chip Components and Circuit Board Considerations, General Transmission Line Equation.

Unit-II

Active RF Component and Modeling: Semiconductor Basics, RF Diode, Bipolar Junction Transistor, RF FETs, High Electron Mobility Transistor, Diode Models, Transistor Models

Unit-III

Analog and Digital Modulation for RF Circuits: Comparison of various techniques for power efficiency. Coherent and Non-coherent detection. Mobile RF Communication systems and basics of Multiple Access techniques. Receiver and Transmitter Architectures and Testing Heterodyne, Homodyne, Image-reject, Direct-IF and sub-sampled receivers.

Unit-IV

Matching & Biasing Network & RF Filter: Overview of RF Filter design, Matching and Biasing Networks. Basic blocks in RF systems and their VLSI implementation, Low noise, Amplifier design in various technologies, Design of Mixers at GHz frequency range, various mixers- working and implementation. Oscillators- Basic topologies VCO and definition of phase noise, Noise power and trade off. Resonator VCO designs, Radio frequency Synthesizers- PLL, Various RF Synthesizer architectures and frequency dividers, Power Amplifier design, Design issues in integrated RF filters.

Unit-V

RF Transistor Amplifier and Oscillators: Characteristics of Amplifiers, Amplifiers Power Relation, Stability Considerations, Constant Gain, Noise Figure Circles, Constant VSWR Circles, Broad Band, High Power and Multistage Amplifiers. Basic Oscillator Model, High Frequency Oscillator Configuration, Basic Characteristics of Mixers.

Course Outcomes:

After completion of the course student will be able to:

CO1. Appreciate the importance and applications of RF and Wireless Technology.

CO2. Model active RF Components used in the RF IC design.
CO3. design analog and digital modulation circuits and biasing for RF Circuits.
CO4. design various types of Amplifiers, oscillators and Mixers in the RF Domain.
CO5. Design and simulate RF IC's using software tools and evaluate their output parameters.

Text Books:

1. Reinhold Ludwig, Pavel Bretchko, "RF Circuit Design", 1st Indian Reprint, 2001, Pearson
Education Asia
2. B Razavi, "Design of Analog CMOS Integrated Circuit", McGraw Hill, 2000.
3. R. Jacob Baker, H.W. Li, D.E. Boyce "CMOS Circuit Design, layout and Simulation" PHI 1998

Reference Books:

1. Y.P. Tsividis "Mixed Analog and Digital Devices and Technology" TMH 1996
2. Thomas H. Lee "Design of CMOS RF Integrated Circuits" Cambridge University Press 1998.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Analog Mixed Signal Design **Max. Marks: 100**
Course code: ECE-841 **External Exam: 60**
Duration: 3 Hours **Internal Assignment: 40**

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Unit1 Mixed Design Introduction: Analog Design, Digital Design, Mixed Design, Introduction to analog VLSI and mixed signal issues in CMOS technologies.

Unit2 MOS Models:Basic MOS models, SPICE Models and frequency dependent parameters. Basic NMOS/CMOS gain stage, cascade and cascode circuits. Frequency response, stability and noise issues in amplifiers.

Unit3 CMOS analog blocks: Current Sources and Voltage references. Differential amplifier and OPAMP design. Frequency Synthesizers, Voltage Controlled Oscillators and Phased lock-loop.

Unit4 Non-linear analog blocks: Comparators, Charge-pump circuits and Multipliers. Data converters. Analog Interconnects. Analog Testing and Layout issues. Low Voltage and Low Power Circuits.

Unit5 RF-Electronics: Introduction to RF Electronics. Basic concepts in RF design,Challenges and Applications

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Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand the basics of analog, digital and mixed signal design
- **CO2.** Design basic cascade and cascade circuits using MOS and extract their performance parameters
- **CO3.** Analyze various CMOS based analog designs
- **CO4.** Design low power and non-linear circuits
- **CO5.** Explain the basics of RF Design and its challenges

Text Books:

1. **David Johns**, "Analog Integrated Circuit Design", John Wiley and Sons 1997
2. **M. Fakhfakh**, "Analog/RF and Mixed signal circuit systematic design", Springer, 2013

Reference Books:

1. **Behzad Razavi**, "Design of Analog CMOS Integrated Circuits", McGraw Hill 2000
2. **Rudy van de Plassche**, "Integrated Analog to digital and digital to analog converters", Springer 2003

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: NANO TECHNOLOGY
Course code: ECE-842
Duration : 3 Hours

Max. Marks: 100
External Exam: 60
Internal Assignment: 40

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Unit 1

INTRODUCTION:

Background to Nano-technology, scientific revolutions, types of Nanotechnology and Nanomachines, Nanomaterials-Atomic structure surface and dimensional space Molecular Nanotechnology.

Unit 2

Materials

Nano powders and Nanomaterials: introduction, preparation and applications.

Unit 3

Nano-Tubes:

CNT:Types,formation/synthesiss of nano tube, applications.

Unit 4

Nano Electronics:

Nano- electronics: introduction, tools for fabrication, Quantum electronic devices, quantum computers

Unit 5

Optics and Nanotechnology:

Optics and Nanotechnology, Nano-holes and photons, nanoparticle based solar absorbers. Optically useful nanostructure polymers, Nanomechanics, Nano-elasticity and Nanomedicne

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Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand the basics of Nanotechnology along with MEMS and NEMS technology.
- **CO2.** Describe the preparation and applications of various nanomaterials.
- **CO3.** Explain the synthesis and application of Carbon Nanotubes.
- **CO4.** Understand various nano-electronic approaches such as CNTFET and quantum devices.
- **CO5.** Get familiarized with various nanotechnology related fabrication and characterization techniques.

Text books:

1. Michael Wilson,Kamali Kannangara,Geoff Smith,Michelk Simon,'Nanotehnology:Basic science and Emerging technolgies'.
2. "Implications of Micro and Nano technologies",committee onImplicationsnanotechnologies, Airforce Science and Technologies,

Programme: B.Tech Electronic and Communication Engineering

Course Title: Advanced 3G and 4G wireless Mobile communication **Max Marks: 100**

Course Code: ECE-843 **University Exam: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

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Objective: This course is intended as an introductory course for the final year student to look at current and upcoming wireless communication technologies for broad band wireless access.

Unit-I

Introduction to Cellular communication: Multiple access technologies, CDMA, PN sequences, Frequency reuse, Cellular processes-call setup, handover etc., Teletraffic theory

Unit-II

Wideband wireless channel Modeling: WSSUS channel modeling, RMS delay spread, Doppler fading, Jakes model, Autocorrelation, Jakes spectrum, Impact of Doppler fading.

Unit-III

OFDM: introduction to OFDM,multicarrier modulation and cyclic prefix, channel model and SNR performance,OFDM issues-PAPR,frequency and timing offset issues.

Unit-IV

MIMO:Introduction to MIMO,MIMO channel capacity,SVD and Eigen modes of the MIMO channel,MIMO special multiplexing-BLAST,MIMO diversity-Alamouti,OSTBC,,MRT,MIMO-OFDM

Unit-V

Ultrwide band: UWB definition and features, UWB wireless channels, UWB data modulation, uniform pulse train, Bit error rate performance of UWB.WCDMA, LTE, WiMAX.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand cellular mobile system and its working.
- **CO2.** Design different wideband channel model.
- **CO3.** Understand OFDM in detail, identify different OFDM issues.
- **CO4.** Identify different ST channels and design MIMO channel.
- **CO5.** Understand Ultra-Wide Band technology, knowledge of WiMAX, WCDMA & LTE.
- **CO6.**

Text Books:

1. **Arogyaswami paulraj:** Introduction to space, time wireless communication. Cambridge university press
2. **John G Proakis**, Digital Communication, McGraw Hill.

Reference Books:

4. **Andreas Molisch**,wireless communication**-**WILEY IEEE press
5. **Mischa Schwartz,** Mobile wireless communication- Cambridge university press

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Optical Networks
Course code: ECE-844
Duration: 3 Hours

Max. Marks: 100
External Exam: 60
Internal Assignment: 40

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Unit1

Introduction to Optical Network: Services, Circuit Switching, Packet Switching, Optical Networks, Optical Layer, Transparency and All Optical Networks, Optical Packet Switching, Transmission Basics, Network Evolution.

Unit2

Optical Amplifiers: Stimulated Emission, Spontaneous Emission, Erbium Doped Fiber amplifiers, Raman amplifiers, Semiconductor Optical Amplifiers, Cross talk in SOAs.

Unit3

Multiplexers and Filters to Wavelength Converters: Gratings, Diffraction Pattern, Bragg Gratings, Fiber Gratings, Fabry-Perot filters, Multilayer Dielectric Thin-Film Filters, Mach-Zehnder Interferometers, Arrayed Waveguide Grating, Acousto-Optic Tunable Filter, High channel Count Multiplexer Architectures, Optoelectronics Approach, Optical Gating, Interferometric Techniques, Wave Mixing.

Unit4

Transmission System Engineering: System Model, Power Penalty, Transmitter, Receiver, Optical Amplifiers, Cross talk, Dispersion, Fiber Nonlinearities, Wavelength Stabilization Design of Soliton Systems, Design of Dispersion –Managed Soliton Systems.

Unit5

WDM Network Elements & Design: Optical Line Terminals, Optical Line Amplifiers, Optical Add/Drop Multiplexers, Optical Cross connects. Cost Trade-Offs: A Detailed Ring Network Example, LTD and RWA Problems, Dimensioning Wavelength-Routing Networks, Statistical Dimensioning Models, Maximum Load Dimensioning Models

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Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand the different optical switching methods and transmission basics in optical networks
- **CO2.** Explain the construction and working of various optical amplifiers
- **CO3.** Get familiar with various multiplexers and filters for wavelength conversion
- **CO4.** Understand the various concepts and aspects of optical transmission systems
- **CO5.** Design wavelength division multiplexing based optical networks by considering various trade-offs

Books

1. Optical Networks: A practical Perspective. RAMASWAMI & K.N. SIVARAJAN Morgan Kaufmann 2nd Edition. *G.P.* Agarwal, " Fiber optic communication systems ", 2nd Edition, John Wiley & Sons, New York, 1997.
2. Franz and Jain, " Optical communication system ", Narosa Publications, New Delhi, 1995.
3. G.Keiser, " Optical fiber communication ", Systems, McGraw-Hill, New York, 2000.
4. Franz & Jain, " Optical communication ", Systems and components, Narosa Publications, New Delhi, 2000.
5. Multiwavelength Optical Networks: A Layered Approach Thomas E. Stern and Krishna Bala Addison Wesley

- Introduction to Optical Fiber Communications Systems William B. Jones HRW
- Optical WDM Networks Principles and Practice Edited by K. M. Sivalingam & S.Subramaniam Kluwer Academic Publishers.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: RTOS | **Max. Marks: 100**
Course code: ECE-845 | **External Exam: 60**
Duration: 3 Hours | **Internal Assignment: 40**

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Unit 1

Introduction to OS: Operating system and function, Evolution of operating system, Batch, Interactive, Time Sharing ,Introduction to Real Time Operating Systems ,Types of Real Time Operating Systems and Real Time Tasks

Unit2

Real Time Systems: Real Time System, System protection. Operating Systems types, Process Concept. Concurrency and Synchronization, Mutual Exclusion and Deadlock Problems.

Unit3

Real Time Process Management: Process Management, Process States, Process scheduling Algorithms and Implementation. Storage Management. Concepts and implementation of Real and Virtual Storage.

Unit4

Real Time File Management: File Management, File Organization, File Systems, Protection and security Performance Evaluation

Unit5

OS Case Study: Case study of the UNIX Operating Systems, Basic issues in Multiprocessor and Distributed Operating Systems.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Understand the basics of real time operating system
- **CO2.** Understand the different types of operating system protection.
- **CO3.** Explain real time process management
- **CO4.** Understand different file management and organisation systems.
- **CO5.** Describe the case study of the unix operating systems.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Device Modeling For Circuit Simulations | **Max. Marks: 100**
Course code: ECE-851 | **External Exam l: 60**
Duration: 3 Hours | **Internal Assignment: 40**

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Unit 1
Basics Semiconductor Physics. Principle of circuit simulation and its objectives.

Unit2
Introduction to SPICE and SIMULINK: AC, DC, Transient, noise, temperature extra analysis.

Unit 3
Semiconductor Device Models Junction Diodes: DC, small signal, large signal, high frequency and noise models of diodes. Measurement of diode model-parameters. **BJT**: DC, small signal, high frequency and noise models of bipolar junction transistors. Extraction of BJT model parameters. **MOSFETs**: DC, small signal, high frequency and noise models of MOSFETs. MOS Capacitors.

Unit4
Device SCALING: short and narrow channel MOSFETs. MOSFET channel mobility model, DIBL, charge sharing and other non-linear effects.

Unit5
MOS Models: Level-1 and level-2 large signal MOSFET models. Introduction to BSIM models. Extraction of MOSFET model parameters. **JFET, MESFETs & HBTs**: modeling of JFET & MESFET and extraction of parameters. **HBTs:** Principles of hetrojunction devices, HBTs, HEMT

Course Outcomes:
After completion of the course student will be able to:

- **CO6.** Simulate characteristics of a simple device using MATLAB, SPICE.
- **CO7.** Explain about the qualitative understanding of the physics of a new device with equations.
- **CO8.** Explain the equations, approximations and techniques available for deriving a model for any semiconductor device.
- **CO9.** Understand different MOS models like BSIM and their modelling procedure.
- **CO10.** Describe the latest devices like HBT, HEMT, MESFET etc.

BOOKS
Text
1 S.M. Kang & Y. Leblibici, “CMOS Digital Integrated Circuits-Analysis & Design”, TMH.
2 S.M. Sze, “Physics of semiconductor devices”, Wiley Pub.
References
1. Rashid, “SPICE”.
2. Sedra, Smith, “SPICE”.
3. Bar Lev, “Basic Electronics”.
4. BG Streetman, “Solid state Electronic Devices”, PHI.
5. Raghuram, Electronic Circuits.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Advanced Communication System **Max. Marks: 100**
Course code: ECE-853 **External Exam: 60**
Duration: 3 Hours **Internal Assignment: 40**

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Unit-I

Spread Spectrum Communication: Direct sequence and frequency hopped spread spectrum, spreading sequences and their correlation functions, Acquisition and tracking of spread spectrum signals

Unit2 Code Division Multiple Access (CDMA): DS-CDMA on AWGN channels, DS-CDMA on frequency selective fading channels, Performance analysis of cellular DS-CDMA, Capacity estimation, Power control effect of imperfect power control on DS-CDMA performance, Soft Hand offs, **S**preading/coding tradeoffs, multi carrier CDMA, IS95A CDMA systems, 3rd Generation CDMA systems, Multi user detection, Optimum receivers, SIC, PIC receivers and performance.

Unit 3 Networks & Services: Network Transmission System Design Services, Characterization of networks & teleservices, The Telephone Network - Past, Present & Future, and Network issues.

Unit-4

Data Communication Networks: Basic principles of data communication - synchronous and asynchronous transmission - digital data transmission formats NRZ, RZ, AMI, ASI & Manchester coding, Error correcting codes, Hamming codes, Orthogonal codes, Switching - Circuit switching, Message switching, Packet switching, Standard communication interface multipliers and concentrators, Protocols (BOP-COP – standard networks and standards, OSI, (D) ARPANET, NICNET, SNA, SELS etc. LAN types of LAN – WAN.

Unit 5

Transmission Principles: Transmission aspects, Signals and Impairments, Digital Speech Transmission Digitisation of Speech & Audio. **ISDN & ATM**: Integrated Services Digital Network – ISDN, Broadband ISDN & ATM, Broadband Access Networks, Optical Networks.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Acquire knowledge of spread spectrum technique used in communication.
- **CO2.** Acquire knowledge of DS-CDMA, their performance analysis, capacity estimation, hand-off techniques and different CDMA systems.
- **CO3.** Acquire knowledge of Network Transmission System design services.
- **CO4.** Understand different line coding techniques, error detection codes, switching techniques. Analyze different protocols used in data communication network.
- **CO5.** Gain knowledge of transmission principles.

Books Recommended

1. Andrew J Viterbi, *"CDMA Principles of spread spectrum communications"*, Addition Wesley, (1995).
2. J S Lee and L E Miller, *"CDMA systems engineering handbook"*, Artech House, (1998).
3. Marvin K Simon, Jim K Omura, Robert A Scholtz, Bary Klevit, *"Spread Spectrum Communications"*, (1995).
4. Sergio Verdu, *"Multiuser Detection",* Cambridge University Press, (1998).
5. Andrew S Tanenbaum, *"Computer Networks"*, Prentice Hall of India.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Electronic and Communication Engineering

Course Title: Digital Image Processing **Max. Marks: 100**
Course code: ECE-854 **External Exam: 60**
Duration: 3 Hours **Internal Assignment: 40**

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Unit 1

Introduction And Digital Image Fundamentals

Digital Image Representation, Fundamental Steps in Image Processing, Elements of Digital image processing systems, Sampling and quantization, some basic relationships like neighbours, connectivity, Distance measure between pixels, Imaging Geometry.

Unit 2

Image Transforms

Discrete Fourier Transform, Some properties of the two-dimensional fourier transform, Fast fourier transform, Inverse FFT. **Image Enhancement** Spatial domain methods, Frequency domain methods, Enhancement by point processing, Spatial filtering, Lowpass filtering, Highpass filtering, Homomorphic filtering, Colour Image Processing.

Unit3

Image Restoration

Degradation model, Diagnolization of Circulant and Block-Circulant Matrices, Algebraic Approach to Restoration, Inverse filtering, Wiener filter, Constrained Least Square Restoration, Interactive Restoration, Restoration in Spatial Domain.

Unit 4

Image Compression

Coding, Interpixel and Psychovisual Redundancy, Image Compression models, Error free comparison, Lossy compression, Image compression standards. **Image Segmentation** Detection of Discontinuities, Edge linking and boundary detection, Thresholding, Region Oriented Segmentation, Motion based segmentation.

Unit 5

Representation and Description

Representation schemes like chain coding, Polygonal Approximatiion, Signatures, Boundary Segments, Skeleton of region, Boundary description, Regional descriptors, Morphology.

Course Outcomes:

After completion of the course student will be able to:

- **CO1.** Explain the various fundamentals of digital image processing.
- **CO2.** Perform Fourier analysis of an image and implement different image enhancement techniques.
- **CO3.** Analyse various spatial and frequency domain image restoration approaches.
- **CO4.** Classify various image compression techniques and implement different image segmentation techniques.
- **CO5.** Interpret various image restoration and description techniques.

Text

1. Rafael C. Conzalez & Richard E. Woods, “Digital Image Processing”, AWL.
2. A.K. Jain, “Fundamental of Digital Image Processing”, PHI.

Reference

1. Rosefield Kak, “Digital Picture Processing”,
2. W.K. Pratt, “Digital Image Processing”

Programme: B.Tech Information Technology Engineering

Course Title: Communication Skills-I | **Max Marks: 100**
Course Code: ITE-121 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Objective: In this world of globalization English language is the first and foremost criteria to acquire job in reputed companies .This course is designed to hone the soft skills of students to make them proficient in English Language(writing & speaking).

Unit–I

Communication: Scope & importance of communication, types of communication, barriers of communication and techniques to improve communication.

Unit-II

Phonetics: Speech mechanism, organs of speech**,** phonetic transcription, effective speaking.

Unit-III

Applied Grammar: Articles, prepositions, modal auxiliaries, verbs, antonyms, and synonyms.

Unit-IV

Précis writing: Definition, qualities of a good précis. Ten steps to précis writing. Passages for précis writing.

Unit-V

Business Correspondence: Memorandum, Notices, Agendas, Meetings and Minutes.

Text Books:

1. **Lesikar R.V**. and **Pettit Jr.** Business Communication Theory and Applications, Irwin, 2002 Ed.
2. **Bansal R. K. & Harrison J. B.,** Spoken English, Orient Longman Hyderabad

Reference Books:

1. **Gimson A. C.,** an Introduction to the Pronunciation of English, ELBS (YP).
2. **Pal Rajendra** and **Korlhalli, J. S.** Essentials of Business Communication , Sultan C hand &Sons 2007
3. **Rayudu, C. S**. Media and Communication Management, Himalaya Publishing House.

Note for paper setter: The question paper comprises 10 questions. Two questions shall be set from each unit. The students have to attempt five questions, selecting one from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Computer Fundamentals **Max Marks: 100**
Course Code: ITE-123 **University Examination:60**
Duration of Exam: 3 hours **Internal Assessment:40**

Objective: The course is designed to provide basic knowledge of Computing concepts, operating system concepts and to train students in using common computer software applications.

Unit-I

Introduction: History of Computers, Generations of Computers, Classification of Computers, Application of Computers, Computer Hardware, Input, and Output devices. Memory Hierarchy, RAM, ROM, PROM and types, Secondary memory, working of a Hard Disk and its types.

Unit-II

Software and Languages: Computer Software, System and Application Software, BIOS, POST, Booting Process, Virus, WORM, and Trojans.
Programming Languages, Generations of Languages, Compilers, Assemblers, Machine Language and Assembly Language.Introduction to algorithm and Flow chart: Representation of an algorithm, flowchart symbols and levels of flow chart, rules, advantage and limitations of flowchart and pseudo code.

Unit-III

Data Representation, Number System: Binary, Decimal, Octal and Hexadecimal number systems, Inter conversion of number system, 1's compliment, 2's compliment, 9's compliment, n's compliment. Logic Gates, Boolean algebra, alphanumeric representation, fixed point representation.

Unit-IV

Booting process details of Dos and Windows: - DOS system files, Internal and External Commands, Difference between External and Internal Commands. Internal Commands: MD, CD, RD, COPY CON, TYPE, DATE & TIME, VOLUME VERSION, REN, PROMPT, CLS, DIR/P/W, COPY , DEL External commands: FORMAT, DISKCOPY, DISKCOMP, XCOPY, CHKDISK, SCANDISK, HELP, DEBUG, PRINT. Creation of Batch Files.

Unit-V

Introduction to Computer networks: Applications, types of computer networks, Peer-to-Peer Networks, Client Server Networks, Centralized and Distributed Systems, Internet, Intranet, Extranet, email, ISPs.

Text Books:

1. **Peter Norton**, Introduction to Computers, TMH.
2. **Sanjay Toledo Mata**, A First Course in Computers, TMH.

Reference Books:

1. **Rajaraman,** Introduction to Digital Computer Design, Prentice Hall India.
2. **Bartee, Thomas,** Digital Computer Fundamentals, TMH.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Basic Electronics | **Max Marks: 100**
Course Code: ITE-124 | **University Exam: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Objective: This course aims to provide students with solid background of semiconductors and some basic solid state electronic devices used in circuits.

Unit-I

Semiconductors: Classification, semiconductor bonds, Energy band description, Semiconductor types, Energy band diagram for Semi conductors, Drift and Diffusion Current, Mobility of Charged particles, Current density and Conductivity, Conductivity of Semi conductors, Hall Effect.

Unit-II

Introduction to p-n Junction: Current components in p-n junction, Diodes and Characteristics, temperature dependence, equivalent circuits. Rectifiers, half wave, full wave rectifiers, bridged rectifiers (efficiency, ripple factor). Clipping and clamping circuits. Basic operations of Zener, Avalanche and Photo Diodes.

Unit-III

Transistors: Types of transistors, operation& characteristics, CE, CB and CC configurations, Input output characteristics and graphical analysis of basic amplifier circuits, biasing and bias stability, use of transistor as a switch.

Unit-IV

Field Effect Transistors: Operation and characteristics. JFET, MOSFET, types of MOSFET, operation and characteristics of JFET and MOSFET, biasing of JFET and MOSFET. Introduction to feedback, Types of feedbacks, Sinusoidal Oscillators, Hartley, Collpitts and Phase Shift oscillators (transistor version only and no derivation).

Unit-V

Biasing Techniques and biasing stability (BJT/FET):- Need for biasing, operating point,load line analysis,fixed bias configuration, emitter bias configuration, voltage divide bias configuration analysis of these biasing techniques , and bias stability.

Text Books:

1. **Millman & Halkias**, Electronic Devices & Circuits, TMH
2. **Boylestad** and **Nashelky,** Electronic Devices & Circuits, PHI.

Reference Books:

1. **Floyd T. L.,** Electronic Devices, Pearson Education.
2. **Theodore Bogart Jr**., Electronic Devices & Circuits, Pearson Education.
3. **Mehta V. K.**, Electronic Devices, S. Chand and Sons, New Delhi

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit

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Programme: B.Tech Information Technology Engineering

Course Title: Engineering Drawing | **Max Marks: 100**
Course Code: ITE-126 | **University Examination: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Objective: The course is designed to develop the ability to visualize and communicate three-dimensional shapes and train the students to create drawings following the engineering graphics conventions.

Unit-I

Introduction to Engineering Graphics: Engineering drawing as language of Engineers. Drawing instruments and their uses. **Projections**: The planes of projections, first and thirdangle projections, projection of points lying in any quadrant.Scale: needs and importance, to find representative factor of a scale, drawing of simple and diagonal scales.

Unit-II

Projection of straight line and their traces: projection of planes. Planes parallel to reference plane; plane perpendicular to both reference planes; planes perpendicular to one and inclined to other reference plane. Projection of solids with their axes perpendicular or inclined to one reference plane but parallel to other.

Unit-III

Section of Solids & Development of surfaces: Definition of sectioning and its purpose, Procedure of sectioning, Illustration through examples, types of sectional planes. Purpose of development, Parallel line, radial line and triangulation method, Development of prism, cylinder, cone and pyramid surface for both right angled and oblique solids.

Unit-IV

Orthographic Projections: Theory of orthographic projections (Elaborate theoretical instructions) Drawing 3 views of given objects (Non symmetrical objects and blocks may be selected for this exercise) Exercises on both first angle are third angle.

Unit-V

Isometric Projection: Classification of pictorial views, Basic Principle of Isometric projection, Difference between isometric projection and drawing, Isometric projection of solids such as cube, prism, pyramid and cylinder.

Text Books:

1. **Bhat, N. D. and Panchal, V. M.**, Engineering Drawing, Charotar Publishers, Anand.
2. **Narayana, K. L. and Kannaiah, P.**, Engineering Graphics, Tata McGraw Hill, New Delhi.

Reference Books:

3. **Gill P. S.,** Engineering Graphics and Drafting, Katria and Sons, Delhi.
4. **Luzzadde Warren J**., Fundamentals of Engineering Drawing, PHI.

Note for paper setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit. Question will be set accordingly so that student can be able to answer 5 questions within 3 hours.

Programme: B.Tech Information Technology Engineering

Course Title: C Programming **Max Marks: 100**
Course Code: ITE-223 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To enhance the logical skills of students with the basic programming concepts and implementation in C.

Unit-I

Introduction to C Programming: History of C, Structure of a C Program, Compiling & Executing a C program. Flow Charts, Constants, Variables and Data Types, Operators and Expressions, Data Input and Output.

Unit-II

Control Statements: Decision making and branching, IF statement, IF-ELSE statement, nested IF-ELSE statement, Switch statement, break statement, continue statement. Decision making and Looping, while statement, do-while statement, for statement.

Unit-III

Functions: Types of functions, function declaration, calling a function, passing arguments to functions, return values and their types, nesting of functions, recursion.

Unit -IV

Introduction to arrays: One dimensional arrays, Two dimensional arrays and Multidimensional arrays, basic operations on arrays, arrays and strings, basic string operations. Introduction to Unions, Structures and enumerated data types.

Unit-V

Introduction to Files & Pointers: Operations on pointers, pointers & multidimensional arrays, pointers & character strings. Dynamic Memory Allocation in C: malloc, calloc, realloc and free functions. Operations on files like open, close, read and write.

Text Books:

1. **Balaguruswamy**, Programming in ANSI C, TMH.
2. **Yashwant Kanitkar**, Let us C, TMH.

Reference Books:

3. **Gottfried, Programming** with C, TMH.
4. **Venugopal,** C Programming, TMH.
5. **Yashwant Kanitkar,** Pointers in C, TMH.

Note for paper setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Basic Electrical Engineering **Max Marks: 100**
Course Code: ITE-224 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of the course is to impart the knowledge of basic principles of Electrical Engineering and its applied aspects.

Unit-I

Review of Electric Circuit Laws and Energy Sources: Basic Electrical circuit terminology, concept of charge and energy, circuit parameters (resistance, inductance & capacitance), Ohm's law, Kirchhoff's current law, Kirchhoff's voltage law, series and parallel combinations of resistance, inductance & capacitance. Ideal and practical voltage, current sources and their transformations, dependent voltage and current sources.

Unit-II

D.C. Circuit analysis: Power & energy relations, analysis of series parallel DC circuits, Star Delta transformations (Δ'Y), Loop & Nodal methods, Network Theorems: Thevenin's, Norton's, maximum power transfer and superposition theorems.

Unit-III

Electromagnetism: Review of Fundamentals of Electromagnetism, Ampere's Law, analogies between electric circuits and magnetic circuits, Faraday's laws of electromagnetic induction, direction of induced emf, Lenz's law, magnetic saturation and leakage fluxes.

Unit-IV

A.C. Circuit analysis: Basic terminology and definitions, phasor and complex number representations, power energy relations in AC circuits, application of Network Theorems to AC circuits ,Resonance in series and parallel circuits, Concepts of active & reactive powers, Introduction to 3 phase circuits.

Unit-V

Transformers: Concept of Inductance, Self & Mutual Inductance, Conventions for magnetically coupled circuits, Transformers: introduction, classification & construction of single phase transformer, emf equation and phasor diagrams.

Text Books:

1. **David Bell**, Electrical Engineering Principles. PHI.
2. **Vincent Del Toro**, Electrical Engineering Principles, PHI.

Reference Books:

1. **Cotton H.,** Electrical Technology.
2. **Gupta B.R.,** Principles of Electrical Engineering.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit

Programme: B.Tech Information Technology Engineering

Course Title: Data Structures Using C **Max Marks: 100**
Course Code: ITE-322 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To provide a good understanding of data structures and their implementation.

Unit-I

Review of Data Types and Concepts: Review of data types, Scalar types, Primitive types, Structures, Unions, Enumerated types, Records, Sparse Matrices, Recursion and its importance.

Unit-II

Expression and Linear Data Structure: Definition of a Data structure, ADT, Linear Data structures. Stack**:** Operations, Applications, implementation using linked list as well as arrays, Expressions and their conversions, Infix, Postfix & Prefix.
Queue**:** Types, Operations, Applications, implementation using linked list as well as arrays. Linked List**:** Types, Operations, Applications, Implementation.

Unit-III

Trees: Preliminaries, Trees, Forest, Binary Trees, Binary Search Tree ADT, Binary Search Trees: Conversion of Forest to Binary Tree, Binary Search Tree, AVL Trees, Tree Traversals, Priority Queues (Heaps), Model, Simple implementations ,Binary Heap.

Unit-IV

Graphs: Definitions, Graphs, Representation of Graphs: Adjacency Matrix, Path Matrix, Operations on Graphs, Traversing a graph: BFS and DFS, Shortest Path Algorithms: Dijkstra's Algorithm and Warshall's Algorithm, Minimum Spanning Tree, Kruskal's Algorithm and Prim's Algorithm.

Unit-V

Searching and Sorting: Searching: Sequential search, Binary search, Hashing, General Idea, Hash Function, Separate Chaining, Open Addressing, Linear Probing.
Sorting: Bubble sort, Insertion Sort, Selection sort, Heap sort, Merge sort, Quick sort, External Sorting.

Text Books:

6. **Tanenbaum A. S.**, Data Structure Using C, Dorling Kindersley Publisher.
7. **Ellis Horowitz and Satraj Sahni**, An Introduction to Data Structures, Computer Science Press, Rockville MA 1984.
8. **M. A. Weiss**, "Data Structures and Algorithm Analysis in C", 2nd ed, Pearson Education Asia.

Reference Books:

9. **E. Horowitz and S. Shani** Fundamentals of Data Structures in C, Galgotia Pub. 1999.
10. **Richard F. Gilberg, Behrouz A. Forouzan**, Data Structures: A Pseudocode Approach with C, Thomson Cole, 1998.
11. **Hopcroft A. J. E. & Ullman J. D.,** Data Structures and Algorithms, Pearson Education Asia, 1983.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Object Oriented Programming **Max Marks: 100**
Course Code: ITE-323 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To provide a good understanding of Object Oriented Programming Language and its implementation with C++.

Unit-I

Concepts of Object-Oriented Programming: Object Oriented Programming Paradigm, Basic concepts of OOP's, Benefits of OOPS, Introduction to object oriented analysis and design, Design steps, Design example, Object oriented languages, Comparison of structured and object-oriented programming languages.

Unit-II

Expressions, Control Structures, Arrays, Pointers and Functions: Data Types, Operators, expressions and control structures. Arrays, Storage of arrays in memory, Initializing Arrays, Multi-Dimensional Arrays, Strings, Pointers, accessing array elements through pointers, Arrays of pointers, Pointers to pointers, Void Pointers, Functions, Arguments, Passing Pointers as Function Arguments.

Unit-III

Classes and Objects: Classes and objects, access specifies in C++, constructors, destructors, Inline Functions, Friend Functions.
Polymorphism: Function Overloading, Operator Overloading, Type Conversions in C++. Dynamic memory allocation in C++.

Unit-IV

Inheritance: Inheritance, single Inheritance, Multiple Inheritance, Multi level inheritance, hierarchical inheritance, hybrid inheritance, Virtual base classes, Virtual functions, function overriding .
Generic programming with templates: Class templates, Function Templates.

Unit-V

Exception Handling and Files: Exceptions, Types of Exceptions, throwing and catching exceptions. Streams and Files: Opening and closing a file, File Pointers and their Manipulations, sequential Input and Output Operations, multi-file Programs, Command Line Arguments.

Text Books:

12. **Robert Lafore,** Object Oriented Programming in Turbo C++, Galgotia Publications.
13. **Balagurusamy E,** Object Oriented Programming with C++, Tata McGraw Hill.

Reference Books:

14. **Bjarne Strustrup,** The C++ programming Language, Addison Wesley.
15. **Booch,** Object Oriented Analysis and Design with Applications, Addison Wesley.
16. **Chair H. Pappas & William H. Murray**, Complete Reference Visual C++, TMH

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt 5 questions selecting at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Digital Electronics **Max Marks: 100**
Course Code: ITE-325 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of this subject is to enable the students to know basic concepts of digital electronics design and build digital hardware.

Unit-I

Review of number systems, BCD, Excess-3, Gray and Alphanumeric codes. Review of Boolean algebra, De-Morgan's Theorems, Standard Forms of Boolean Expressions, Minimization-Techniques: K-MAPS, VEM Technique, Q-M (Tabulation) method.

Unit-II

Logic Gates & families: TTL, MOS, CMOS, Bi-CMOS; Performance parameters of IC families: input and output loading, fan-in, fan-out, tri-state, current drive, voltage levels, noise margins, power-speed tradeoff; Unused inputs; Interfacing between logic families.

Unit-III

Combinational Logic Circuits: Problem formulation and design of Basic Combinational Logic Circuits, Combinational Logic Using Universal Gates. Basic Adders, ALU, Parity-Checkers and Generators, Comparators, Decoders, Encoders, Code Converters, Multiplexer (Data Selector), De-multiplexers

Unit-IV

Sequential Circuits: Latches, Flip-flops (SR, JK, T, D, Master/Slave FF,) Edge-Triggered Flip-Flops, Flip-Flop Operating Characteristics, Basic Flip-Flop Applications, Asynchronous Counter Operation, Synchronous Counter Operation, Up/Down Synchronous Counters.

Unit-V

Shift registers & Memories, Shift Register Functions, Serial In - Serial Out Shift Registers, Serial In-Parallel Out Shift Registers, Parallel In - Serial Out Shift Registers, Parallel In-Parallel Out Shift Registers, Bidirectional Shift Registers, Basics of Semiconductor Memories, Random-Access Memories (ROM), Read Only Memories (ROMs), Programmable ROM's (PROMs and EPROM's), PAL, PLA.

Text Books:

17. **Morris Mano**, Digital Logic Design, TMH.
18. **Kumar Anand**, Digital Logic Design, PHI.

References Books:

19. **Thomas L. F.**, Digital Fundamentals, Prentice Hall, Inc, 4th Edition 1997.
20. **Tocci R. J.** & **Widner**, Digital Systems: Principles and Applications, PHI.
21. **Gothman**, Fundamentals of Digital Electronics, PHI.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Operating System **Max Marks: 100**
Course Code: ITE-326 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment:40**

Objective: To provide good knowledge of basic concepts of Operating System.

Unit-I

Introduction: Operating System and Function, Evolution of Operating System, Batch Systems, Time Sharing and Real Time System, System Protection and Methods.
Operating System Structure**:** System Components, System Structure.

Unit-II

Concurrent Processes: Process concept, Principle of Concurrency, Semaphores and its types. Classical problems in Concurrency, Producer Consumer, Critical Section and readers' writers' problem, Inter Process Communication, Process Generation, Resident Monitors.

Unit-III

CPU Scheduling: Scheduling Concept, levels of Scheduling, Scheduling Algorithm, Multiprocessor Scheduling.
Deadlock**:** System Model, Deadlock Characterization, Prevention, Detection and Recovery.

Unit-IV

Memory Management: Multiprogramming with Fixed Partition and Variable Partition, Multiple Base Register, Paging, Demand Paging, Segmentation, Virtual Memory Concept, Allocation of Frames, Paged Replaced Algorithm, Thrashing, Cache Memory Concept.

Unit-V

I/O Management: I/O Devices and Organization of I/O Function, I/O Buffering, DISK I/O, and Operating System Design Issues.
File System: File Concept, File Organization and Access Mechanism, File Directories, File Sharing,

Text Books:

22. **Milenekovic**, Operating System Concepts, McGraw Hill
23. **Silverschwatz**, Operating System Concepts, Willey & Willey.

Reference Books:

24. **Dietel**, An introduction to operating system, Addision Wesley.
25. **Tannenbaum A. S.**, Operating system design and implementation, PHI

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Microprocessor & Interfacing **Max Marks: 100**
Course Code: ITE-422 **University Exam:60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of this course is to introduce to the students the fundamental of 8085 microprocessor and its interfacing.

Unit-I

Introduction To Microprocessor: History and Evolution, types of microprocessors, 8085 Microprocessor, Architecture, Bus Organization, Registers, ALU, Control section, Instruction set of 8085, Instruction format, Addressing modes, Types of Instructions.

Unit-II

Assembly Language Programming and Timing Diagram: Assembly language programming in 8085, Macros, Labels and Directives, Microprocessor timings, Instruction cycle, Machine cycles, T states, State transition diagrams, Timing diagram for different machine cycles.

Unit-III

Serial I/O, Interrupts and Comparison of Contemporary Microprocessors: Serial I/O using SID, SOD. Interrupts in 8085, RST instructions, Issues in implementing interrupts, Multiple interrupts and priorities, Interrupt handling in 8085 with RIM and SIM, Enabling, disabling and masking of interrupts. Brief comparison of contemporary 8-bit microprocessors like Z-80, M68000 with 8085.

Unit-IV

Data Transfer techniques: Data transfer techniques, Programmed data transfer, Parallel data transfer using 8155. Programmable parallel ports and handshake input/output, Asynchronous and Synchronous data transfer using 8251A. Programmable interrupt controller 8259A. DMA transfer, cycle stealing and burst mode of DMA, 8257 DMA controller.

Unit-V

Microprocessor Interfacing Techniques: Interfacing and refreshing dynamic RAMs, Interfacing a keyboard, Interfacing LED and seven segment displays, Interfacing A/D converters, D/A converters.

Text Books:

1. **R. S. Gaonkar**, µprocessor Architecture, Programming & applications with the 8085/8086A, Wiley Eastern Ltd.
2. **Douglas V Hall**, Microprocessors & Interfacing.

Reference Books:

1. **A. P. Mathur**, Introduction to Microprocessor, Tata McGraw Hill.
2. **Yu-Cheng Liu** & **G A Gibson**, µprocessor System, Arch Programming & Design.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Analog Communication System **Max Marks: 100**
Course Code: ITE-423 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of this course is to introduce to the students the fundamental of analog communication.

Unit-I

Introduction to communication systems: Historical Review, Elements of an Electronic Communication System, Communication Channel and their Characteristics, channel capacity, Bandwidth, Signals and their classifications. Concept of time domain and frequency domain representation.

Unit-II

Modulation Techniques: Amplitude modulation, Frequency spectrum of AM Waves, Representations of AM waves, Power relation in AM waves, Need and description of SSB, suppression of carrier, suppression of unwanted side bands, vestigial side band system, frequency modulation (FM), Mathematical representation of FM, frequency spectrum & Band width of FM waves, Carson's rule, Wide band and narrow band FM, Phase modulation (PM), pulse code modulation (PCM).

Unit-III

AM Transmitters and Receivers: AM TRANSMITTERS: Generation of AM, low level and high level modulation, comparison of levels, AM transmitter block diagram, collector class C modulator, Base modulator, AM RECEIVERS: Tuned radio frequency (TRF) receiver. Superheteterodyne receiver, RF section and characteristics, mixers, frequency changing and tracking, IF rejection and IF amplifiers. Detection and automatic gain control (AGC), AM receiver characteristics.

Unit-IV

FM Transmitters and Receivers: Basic requirements and generation of FM, FM Modulation methods: Direct methods, variable capacitor modulator, varactor diode modulator, reactance modulators, disadvantages of direct method, indirect modulators, RC phase shift modulator, Armstrong FM systems.
Limiters, single and double tuned demodulator, balanced slope detector, foster seely or phase discriminator, block diagram of FM receiver, RF amplifiers, FM receiver characteristics.

Unit-V

Noise in Receivers: Source of noise, classification of noise - external noise, internal noise, Noise figure, signal to noise ratio (SNR), noise in AM & FM receivers,Pre-emphasis & De-emphasis in FM.

Text Book:

1. **Simon Haykin**, Communication Systems, John Wiley & sons, NY, 4th Edn, 2001.

Reference Books:

1. **Roddy and Coolen**, Electronic communication, PHI, New Delhi, 4th Edition, 2003.
2. **Taub and Schilling**, Principles of communication systems, TMH, New Delhi, 1995.
3. **Bruce Carlson et al**, Communication systems, McGraw-Hill Int., 4th Edition, 2002.

Note for Paper setter:-The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit

Programme: B.Tech Information Technology Engineering

Course Title: Database Management System **Max Marks: 100**
Course Code: ITE-424 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To learn how databases work, and how to work with them.

Unit-I

Introduction: Drawbacks of Files Management System, Database System Concepts and Architecture, Data Abstraction, Schemas and Instances, Data Independence, Data Models, Database Language and Interface, DDL, DML, Overall Data Base Structure.
Data Modeling Using Entity Relationship Model: E.R. Model Concept, Notation for ER Diagrams, Mapping Constraints, Weak and Strong Entity Types, Keys, Concept of Super Key, Candidate Key, Primary Key, Extended ER Model, Specialization, Generalizations, Aggregation.

Unit-II

Relational Data Model and Language: Relational Data Model Concepts, Keys Constraints, Integrity Constraints, Domain Constraints, Referential Integrity, Assertions, Triggers, Relational Algebra, Relational Calculus, Domain and Tuple Calculus.

Unit-III

Introduction to SQL: SQL Data Type and Literals, Types of SQL Commands, SQL Operations (DDL, DML, and DCL), Tables, Views and Indexes, Queries and Nested Subqueries, Aggregate and Scalar Functions, Joins, Unions, Intersection, Minus, Triggers, Cursors, Procedures and Functions in SQL.

Unit-IV

Data Base Design and Normalization: Functional Dependencies, Armstrong's Axioms, Normalization: First, Second and Third Normal forms, BCNF, Multi-Valued Dependencies, Fourth Normal form, Join Dependencies and Fifth Normal form, DKNF, Decomposition, Dependency Preservation and Lossless Join.

Unit-V

Transaction & Concurrency Control: Transaction Concept, Transaction State, Schedules, Serializability of Schedules, Conflict & View Serializability, Testing of Serializability, Recoverability, Recovery From Transaction Failures, Log Based Recovery, Checkpoints, Shadow Paging, Recovery with Concurrent Transactions.
Concurrency Control Techniques**:** Concurrency Control, Lock Based Protocols, Timestamp-Based Protocols, Validation-Based Protocols, Multiple Granularity, Multi-Version Schemes, Deadlock Handling.

Text Books:

26. **Korth, Silbertz, Sudarshan**, Database Concepts, Tata McGraw Hill.
27. **Desai**, **Bipin C.** An Introduction to Database Systems, Galgotia Publications.

Reference Books:

28. **Elmasri & Navathe**, Fudamentals of Database Systems, Addision Wesley.
29. **Ramakrishna & Gehkre**, Database Management System, McGraw Hill.
30. **Date C. J.**, An Introduction to Database Systems, Addision Wesley.
31. **Madhulika Jain**, Introduction to Database Systems, BPB Publications.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Design & Analysis of Algorithms **Max Marks: 100**
Course Code: ITE-425 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of this course is to study paradigms and approaches used to analyze and design algorithms and to appreciate the impact of algorithm design in practice.

Unit-I

Introduction to Algorithm: Areas of Study of Algorithms, Algorithm Design Paradigms, Concept of Algorithmic Efficiency, Run Time Analysis of Algorithms, Asymptotic Notations (O, Ω, Θ).
Divide and Conquer: Structure of Divide and Conquer Algorithms: Examples; Binary Search, Finding the Maximum and Minimum, Merge Sort, Quick Sort, Strassen's Matrix Multiplication; Analysis of Divide and Conquer Run Time Recurrence Relations.

Unit-II

Greedy Method: Overview of the Greedy Paradigm, Examples of Exact Optimization Solution (Minimum Cost Spanning Tree Using Prim's and Kruskal's Algorithms), Approximate Solution (Knapsack Problem), Single Source Shortest Paths.

Unit-III

Dynamic Programming: Overview, Difference between Dynamic Programming and Divide and Conquer, Applications: Shortest Path In Graph (Multistage Graph, All-Pairs Shortest Paths, Single-Source Shortest Paths: General Weights), Matrix Chain Multiplication, Traveling Salesman Problem, Longest Common Subsequence Problem.

Unit-IV

Graph Searching and Traversal: Overview, Binary Tree Traversal, Graph Traversal Methods (Depth First and Breadth First Search).
Back Tracking: Overview, 8-Queens Problem, 0/1 Knapsack Problem.

Unit-V

Brach And Bound: LC Searching, Bounding, FIFO Branch and Bound, LC Branch and Bound Application: 0/1 Knapsack Problem, Traveling Salesman Problem.
Basic Concepts of Complexity Classes. P, NP, Polynomial vs. Non-Polynomial Time Complexity, Reducibility, NP-Hard and NP-Complete Classes.

Text Books:

1. **Horowitz E., Sahni S., & Rajasekaran S.**, Fundamental of Computer Algorithms, Galgotia Publication
2. **Basse Sara, Gelder A. V.**, Computer Algorithms, Addison Wesley.

Reference Books:

1. **Cormen T. H., Leiserson, Rivest and stein**, Introduction of Computer algorithm, PHI.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Principles of Marketing and Management **Max Marks: 100**
Course Code: ITE-426 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To provide basic insights of principles of marketing and management.

Unit-I

Forms of Business Organizations: Sole Proprietorship, Partnership, Company-Public and Private Sector Enterprises. Principles of Management, Evolution of Management Function of a Manager**.**

Unit-II

Function of Management: Planning- Nature and purpose- Types of Plans- Objectives, Policies, Procedures, Rules, Strategies, Programmes, Projects.

Unit-III

Staffing: Selection-Recruitment Process, Decision Making Process- Types of Decisions Directing, Leadership, Motivation and Communication. Controlling- Processes, Techniques Budgetary and non- Budgetary.

Unit-IV

Financial Management: Short term and long term sources of Funds- Financing, decision, investment decision, investment decision, introduction to financial, Statements- Production Management- Planning and scheduling, purchasing inventory control.

Unit-V

MarketingManagement: Introduction to marketing Mix, Product, Pricing, Promotion and Place. Personnel management, performance appraisal. Conflict- Identification and Resolution Training and development. Introduction to total quality Management, quality circles.

Text Books:

1. **Koontz, H & Weihrich**, H. Management: A Global Perspective 10th ed.

Reference Books:

1. **Robbins, S. P**, Organizational Behaviour.
2. **Prasad, L. M,** Principles of management.

Note for paper setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Theory of Automata **Max Marks: 100**
Course Code: ITE-521 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of this course is to introduce students to this fundamental area of computer science which enables students to focus on the study of abstract models of computation.

Unit-I

Introduction: Alphabets, Strings and Languages; Automata and Grammars.
Machines: Basic Machine, FSM, Transition Graph, Transition Matrix, Deterministic and Non-Deterministic FSM'S, Equivalence of DFA and NDFA, Mealy & Moore Machines, Minimization of Finite Automata, Two-Way Finite Automata.

Unit-II

Regular Sets and Regular Grammars: Regular Sets, Finite Automata and Regular Expression, Pumping Lemma and Regular Sets, Application of Pumping Lemma, Closure Properties of Regular Sets.
Formal Grammars & Languages: Basic Definitions and Examples of Languages, Chomsky Hierarchy, Regular Grammars, Context Free & Context Sensitive Grammars, Normal Forms - CNF and GNF, Binary Operations on Languages.

Unit-III

Pushdown Automata: Formal Definition, Behavior and Graphical Notation, Instantaneous Descriptions and Language of PDA. Equivalence of PDAS and CFGS.
Linear Bounded Automata: Context Sensitive Language and Linear Bounded Automata

Unit-IV

Turing Machines: TM Model, Representation and Languages Acceptability of TM. Design of TM, Universal TM & Other Modification, Composite & Iterated TM. Properties of Recursive & Recursively Enumerable Languages, Universal Turing Machine and an Undecidable Problem

Unit-V

Decidability: Post's Correspondence Problem, Rice's Theorem, Decidability of Membership, Emptiness and Equivalence Problems of Languages. Time and Tape Complexity Measures of Turing Machines, Random Access Machines, the Classes P and NP, NP-Completeness, Satisfiability and Cook's Theorem.

Text Books:

1. **John E. Hopcroft, Jeffery Ullman**, Introduction to Automata theory, Langauges & Computation, Narosa Publishers.
2. **Xavier S. P. E**.,Theory of Automata and Formal Languages, New Age Intl.2005 Ed.

References:

1. **E. V. Krishnamurthy**, Introductory Theory of computer science.
2. **K. L. P. Mishra**, Theory of computer Science, Prentice Hall of India Pvt. Ltd.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Visual Programming **Max Marks: 100**
Course Code: ITE-522 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The course is designed to introduce the concept of Visual programming. The emphasis of the course is on enhancing the programming skills to develop GUI application.

Unit-I

Introduction: Introduction to Visual Programming, Features of Visual Programming, Integrated Development Environment (IDE), IDE Components. Variables, Constants, Data types, Operators, Conditional Statements and Loops. Procedures, Subroutines, Calling functions and subroutines, Writing Argument Procedures, Type of Procedures, Calling Procedures, Argument Passing Mechanism, Built-in Functions, Overloading functions.

Unit-II

Windows Forms and Basic Controls: Windows Forms and Events, Message Box, Creating MDI, Using basic controls like command buttons, Text Box, List Box, Radio Buttons, Labels, Link Labels, Combo Box, Building Small Applications.

Unit-III

Error handling and OOP implementation: Types of Errors, Introduction to Exception Handling, Unstructured and Structured Exception Handling, Raising an Exception Intentionally, System Exception, Throwing an Exception, Try, Catch and Finally statements. Object oriented programming, Concept of OOP (Abstraction, encapsulation, inheritance and polymorphism), Classes and Objects, Creating Class Libraries, Constructors and Destructors, Overloading, Overriding and Shadowing.

Unit-IV

Advanced controls: Rich Text Box, Scroll Bars, Progress Bars, Date Time Picker, Picture Box, Tree View and List View Controls. Designing Menus, Working with Files and Folders, Accessing Folders and Files .

Unit-V

Data Access with ADO .Net: Data Access with ADO .Net, Using Databases, Server Explorer, Data Adapter and Datasets, Working with ADO .Net, Architecture of ADO .Net, Using Data controls: Data Grid, Data Binding, Creating New Data Connection in Code. Introduction to Structured Query Language, Executing SQL Statements, Selection Queries, SQL joins, Introduction to query builder.

Text Books

1. **Evangelous Petroutsos**, Mastering Visual basic.Net, BPB Publication.
2. **Steven Holzner** ,Visual Basic .net Programming, Black book, Dreamtech Press.

References Books:

1. **David S. Platt**, “Introducing Microsoft .Net”, Microsoft Press, PHI.
2. **Petroutsos Bilgin**, “Visual Basic .Net, Database Programming”, BPB.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Software Engineering **Max Marks: 100**
Course Code: ITE-523 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To teach students about systematic software development methods with emphasis on people, process and product interrelationships.

Unit-I

Introduction: Introduction to software engineering, Importance of software, The Software evolution, Software characteristics, Software components, Software applications, Crisis-Problem and causes.
Software development life-cycle: Requirement analysis, software design, coding, testing and maintenance.

Unit-II

Software requirement Specification: Waterfall model, Prototyping model, Iterative development model, Spiral model, Problem analysis, Requirement Specification, validation, metrics.

Unit-III

System Design: Problem partitioning, Abstraction, Top down and Bottom up–design, Structured approach, Functional versus Object Oriented Approach, Design Specification, Verification, Metrics, Cohesiveness, coupling.

Unit-IV

Coding: Top-Down and Bottom-Up structure programming, information hiding, programming style, and internal documentation, verification, and metrics.
Testing;levels of testing, functional testing, structural testing, test plane, test case specification, reliability assessment, Software testing strategies, Verification and validation, Unit, Integration Testing, Top down and bottom up integration testing, Alpha and Beta testing, System testing and debugging.

Unit-V

Software project Management: Cost Estimation, Project Scheduling, Staffing, Software Configuration Management, Maintenance, Quality Assurance, Project Monitoring, Risk Management.

Text Books

1. **Roger S. Pressman,** Software Engineering: A Practitioner's Approach, McGraw Hill.
2. **Peters**, Software Engineering, Wiley India.
3. **Pankaj Jalote**, An integrated Approach to Software Engineering, Narosa Publishing.

Reference Books:

1. **Thompson**, Software Engineering Project management, Wiley India.
2. **Richard Fairley**, Software Engineering, TMH.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Digital Communication System **Max Marks: 100**
Course Code: ITE-524 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To provide the basic understanding of Digital Communication Systems.

Unit-I

Pulse Digital Modulation: Elements of digital communication systems, advantages of digital communication systems, Elements of PCM: Sampling of analog signals, Quantization, Quantization error, signal to noise ratio due to Quantization, PCM Coding, Companding in PCM systems. Differential PCM systems (DPCM). BW of PCM. Delta modulation, its drawbacks, adaptive delta modulation, comparison of PCM DM systems and DPCM.

Unit-II

Line Coding Schemes: Basic definition, requirements of line coding schemes, different line coding techniques like NRZ (unipolar and bipolar), RZ, Manchester, Alternate mark and Inversion, HDBn, B8ZS, 4B/5B etc. coding schemes. Therir properties and advantages.

Unit-III

Digital Modulation Techniques: Introduction, Generation & Demands of ASK, FSK, PSK, DPSK, DEPSK, QPSK,M-ary PSK, QAM, similarity of BFSK and BPSK, Constellation Diagram.

Unit-IV

Performance of Digital Communication Systems: Additive white Gaussian noise, Bandlimited AWGN, Noise power at the output of LPF, BPF, RC Filter, Integrator and Differentiator, Integratot-&-dump circuit, Base band signal receiver, probability of error, the optimum filter, matched filter, probability of error using matched filter, coherent reception, non-coherent detection of FSK, calculation of error probability of ASK, BPSK, BFSK,QPSK

Unit-V

Spread Spectrum Modulation: Basic definitions of spread spectrum, advantages, Signal space Dimensionality and processing gain-Probability of error, Frequency hop spread spectrum - pseudo-noise sequences – Linear feedback shift register and generation of PN sequences, maximum length and gold codes. Direct sequence spread spectrum with coherent binary phase shift keying – problem in spread spectrum systems.

Text Books:

1. **Simon Haykin**, Digital communications, John Wiley, 2005
2. **H. Taub and D. Schilling**, Principles of Communication Systems, TMH, 2003

Reference Books:

1. **Sam Shanmugam**, Digital and Analog Communication Systems, John Wiley, 2005
2. **John Proakis**, Digital Communications TMH, 1983
3. **Singh & Sapre**, Communication Systems Analog & Digital TMH, 2004
4. **B.P. Lathi**, Modern Analog & Digital Communication Oxford reprint, 3rd edn, 2004

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Computer Graphics & Multimedia	**Max Marks: 100**
Course Code: ITE-525	**University Exam: 60**
Duration of Exam: 3 hours	**Internal Assessment: 40**

Objective: To study graphics techniques/algorithms and multimedia concepts.

Unit-I

Line Generation: Points, pixels and frame buffers, Line and Circle generation algorithms, Graphics Primitive**:** display device, interactive devices, display file structure, Polygon**:** polygon representation, entering polygon & filling polygons.

Unit-II

Transformations & Segments: Matrices transformation, transformation routines, Windowing and Clipping**:** viewing transformation and clipping, generalized clipping, multiple windowing. Segments**:** segment table, creating deleting and renaming segments, visibility, image transformations.

Unit-III

Three Dimension: 3D geometry and primitives, 3D transformations: translation, scaling, rotation, 3D viewing, Projections (perspective and parallel).

Unit-IV

Introduction to multimedia: Introduction to multimedia, Multimedia computer system, Multimedia components, Multimedia terminology: communication modes, media types, Multimedia networks, Applications of multimedia.

Unit-V

Architectures and Issues for Distributed Multimedia Systems: Distributed multimedia systems, Synchronization, QoS Architecture, The role of Standards, A frame work for Multimedia systems.

Text Books:

1. **Steven Harrington**, Computer Graphics, A programming approach second Edn.
2. **John F. Koegel Buford**, Multimedia Systems, Pearson Education.
3. **Fred Halsall**, Multimedia Communications, Pearson Education.

Reference Books:

1. **Rogers**, Procedurals elements of Computer Graphics, McGraw hill.
2. **Newman and Sproul**, Principle of interactive Computer Graphics, McGraw Hill.
3. **A. P Godse**, Computer Graphics, Technical Publications Pune.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Computer Organization & Architecture **Max Marks: 100**
Course Code: ITE-526 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: This subject aims to provide students with fundamental principles and comprehensive knowledge of computer systems and organization

Unit-I

Basic structure of computer: Basics of Computer Architecture and Organization, Stored Program Organization (Von Neumann Architecture), Instruction Formats, Addressing Modes, Stack and Queue Organization.

Unit-II

Arithmetic: Integer and Floating-Point Representation, Fixed Point Arithmetic: Addition, Subtraction, Multiplication and Division With Flowcharts and Hardware Implementations, Floating Point Arithmetic: Addition and Subtraction.

Unit-III

Basic Processing Unit: Fundamental Concepts: Single Bus Organization, Execution of a Complete Instruction, Multiple Bus Organization, Hard-Wired & Micro-Programmed Control Units, Hard-Wired Design Methods, State Table Method, Multiplier Control, Control Memory, Address Sequencing.

Unit-IV

Memory systems: Memory Hierarchy, Main Memory: RAM, ROM, PROM, EPROM, EEPROM, Virtual Memory Concepts, Virtual Memory Address Translation, Interleaved Memories, Cache Memory: Mapping Functions, Replacement Algorithm, Secondary Storage: Magnetic Hard Disks.

Unit-V

Input/output Organization: Accessing I/O Devices, Input/Output Mechanism: Memory-Mapped I/O, Programmed I/O, Interrupts, Direct Memory Access, Standard I/O Interfaces: PCI Bus, SCSI Bus and USB.

Text Books:

1. **Hamacher**, Computer Organization, McGraw Hill.
2. **Moris Mano**, Computer system Architecture, PHI.

Reference Books:

1. **Parthasarthy**, Advanced Computer Architecture, Cengage India.
2. **Tennenbaum A. S.**, Structured Computer Organization, PHI.
3. **Gear C. W**., Computer Organization and Programming, McGraw Hill

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Cryptography & Network Security **Max Marks: 100**
Course Code: ITE-621 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To understand the principles of encryption algorithms: conventional and cryptography. To have a detailed knowledge about authentication, hash functions and application level security mechanisms.

Unit-I

Introduction: To Security Attacks, Services and Mechanisms, Introduction to Cryptology. Conventional Encryption Model, Classical Encryption Techniques-Substitution Ciphers & Transposition Ciphers, Cryptanalysis, Stream & Block Ciphers.

Unit-II

Modern Block Ciphers: Block Ciphers Principles, Standards (DES), Strength of DES, Differential & Linear Cryptanalysis of DES, Block Cipher Modes of Operation, Triple DES, AES Encryption & Decryption, Key Distribution, Random Number Generation.

Unit-III

Public Key Cryptography: Principle of Public Key Cryptography, Prime and Relative Prime Numbers, Modular Arithmetic, Key Management. Diffie-Hellman Key Exchange,Elliptic Curve Architecture and Cryptography. Introduction to Number Theory, RSA.

Unit-IV

Authentication and Hash Function: Authentication Recruitments, Authentication Functions and Message Authentication Codes. Digital Signatures, MD5 Message Digest Algorithm. Secure Hash Algorithm-I (SHA-1).

Unit-V

Network Security & System Level Security:
Electronics Mail Security: Pretty Good Privacy (PGP), S/MIME IP Security: IP Security Overview, Architecture, Authentication Header.
Web Security: Security Socket Layer & Transport Layer Security.
System Security: Intruders, Viruses and Related Threads, Firewall Design Principles.

Text Book:

1. **William Stallings**, Cryptography and Network Security, Principles and Practices, Prentice Hall of India, Third Edition, 2003.
2. **Johannes A. Buchmann**, Introduction to cryptography, Springer Verlag.

Reference Books:

1. **Kaufman C., Perlman R. & Spenser M.**, Network Security, PHI.
2. **Bellovin S. & Chesvick W.**, Internet Security and Firewalls, Second Edition, Addison-Wesley.
3. **Trappe & Washington**, Introduction to Cryptography with Coding Theory, PHI.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Java Programming **Max Marks: 100**
Course Code: ITE-623 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To enhance skills of student with the ever demanding programming language Core Java.

Unit-I

Overview of Java: Introduction to Java, Features of Java, Object Oriented Concepts, Lexical Issues, Data Types, Variables, Arrays, Operators, Java Virtual Machine, Bytecode, Control Statements: Selection, Iteration and Jump Statements, Java Bean Standards.

Unit-II

Classes and Inheritance: Classes, Objects, Constructors, Overloading Method, Access Control, Static and Final Keywords, Nested and Inner Classes, Abstract Class, Object Class, Inheritance, Overriding Methods, Using Super, Dynamic method Dispatch. Packages, Access Protection, Importing Packages, Interfaces.

Unit-III

Exception Handling and Multithreading: Exception Handling, Multiple Catch Clauses, Nested Try and Throw. Multithreading: Thread, Creating a Thread, Creating Multiple Threads, Synchronization, Inter Thread Communication, Deadlock, Suspending, Resuming and Stopping Threads, Multithreading.

Unit-IV

I/O, Applets and String Handing files: Files, Stream Classes, Serialization, Reading Console Input, Writing Console Output, PrintWriter Class, Reading And Writing Files, Transient And Volatile Modifiers, Instanceof, Strictfp, Native Methods.
Applets: Introduction: Applet Fundamentals, Applet Architecture.
Strings: String Constructors, String Operations, String Buffer, String Builder, Sting Tokenizer.

Unit-V

Collections Framework: Collections Overview, Collection Interfaces, Collection Classes, Accessing a Collection via Iterator, Map Classes and Map Interfaces, Comparators, Arrays, Legacy Classes and Interfaces, Wrapper Classes.

Text Books:

1. **P. Naughton & H. Schildt**, Java2 (The Complete Reference), 3rd Edn, TMH 1999.
2. **K. Arnold & J. Gosling**, The Java Programming Language, 2nd Edn, Addison Wesley, 1996.

ReferenceBooks:

1. **Cay S. Horstmann, Gary Cornell**, Core Java 2 Volume I Fundamentals, 5th Edn. PHI, 4000.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Management Information Systems **Max Marks: 100**
Course Code: ITE- 625 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of this subject is to understand the concept of MIS in terms of its various components and as an integrated system.

Unit-I

Introduction: Definition and Importance of MIS, Evolution of MIS, Concept of MIS, Function of MIS, Characteristics of MIS, Managerial Functions, Management Hierarchy, System: Elements of a system, Cybernetic System.

Unit-II

Structure of MIS: MIS structure based on Operating Elements, MIS structure based on Decision Support, MIS structure based on Management Activities, MIS structure based on Organizational Function, Synthesis of MIS Structure: Conceptual and Physical Structure.

Unit-III

Classification of MIS & Information Concept: MIS Classification: Operation Support System, Management Support System and Other Support System. Data and Information, Characteristics of Information, Quality of Information, Classification of Information: John Dearden Classification, Classification in terms of Application and Classification on the basis of usage. Methods of Data and Information Collection, Methods to Avoid misuse of Information.

Unit-IV

Decision-Making and DSS: Types of Decisions: Purpose of Decision Making, Level of programmability, Knowledge of outcomes. Decision Making Models: Simon's Model of Decision Making and Implicit Favorite Model. Decision Support System: Elements of DSS, Objective of DSS, Characteristics of DSS, Classification of DSS.

Unit-V

Enterprise Resource Planning: Introduction, Main Features of ERP, Evolution of ERP, General Model of ERP, Benefits of ERP, Role of Consultants ,Vendors and Users in ERP,ERP Implementation Methodology.

Text Books:

1. **D. P. Goyal**, MIS**,**Macmillan Publishers.
2. **Davis and Olson**, MIS, TMH.
3. **Vinod Kumar Garg**, ERP, PHI Learning Pvt. Ltd.

Reference Books:

1. **Sangeeth Gupta**, MIS.
2. **CSV Murthy**, MIS, Himalaya Publishing House.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Internet & Web Technology **Max Marks: 100**
Course Code: ITE-626 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To impart basic understanding of the methods and techniques of developing websites.

Unit-I

Internet & Web: History and growth of Internet and Web, Introduction to WWW, Web Servers, Web Browsers and Search Engines, TCP/IP Suite, Cyber laws, Web engineering, Symantec Web Technology.

Unit-II

HTML: Introduction to HTML, Elements of HTML syntax, Head and Body sections, Building HTML documents, Lists, types and implementation of lists, Hyperlinks. Presentation and control: Images, Image as buttons, Image maps, Text, Colors and Backgrounds, CSS, Tables: Use of table tags.

Unit-III

Frames: Developing Web pages using frames. Interactivity: Forms, DHTML, JavaScript, Use of Java Applets.

Unit-IV

Security: Principles of security, Web Security: Cryptography, Digital certificates, Digital Signatures, Secure Socket Layer, Network Security: Firewalls, IP Security, Virtual Private Networks.

Unit-V

Wireless Internet: Mobile IP, Mobile TCP, GPRS, Wireless Application Protocol (WAP). Introduction to server side programming: CGI, ASP, JSP, Servlets.

Text Books:

1. **Thomas Powell,**Complete Reference HTML/XHTML.
2. **S. Achyut Godbole and Atul Kahate**, Web Technologies, Tata McGraw Hill.
3. **Raj Kamal**, Internet & Web Design, Tata McGraw Hill.

Reference Books:

1. **Xavier C.**, Web Technology & Design, New Age International Publishers.
2. **Ann Navarro**, Effective Web Design, BPB publications.
3. **Stephen E**, Will Train, HTML 4.0, BPB publication.
4. **Xavier C.**, World Wide Web Design with HTML, Tata McGraw Hill.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: UNIX/LINUX & Shell Programming **Max Marks: 100**
Course Code: ITE-721 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: This subject aims to provide students with fundamental principles and comprehensive knowledge of Unix/Linux & Shell Programming.

Unit-I

Introduction to the kernel: Architecture of the UNIX, the buffer cache. Internal representation of files**,** inode, accessing blocks, releasing blocks, structure of regular files, conversion of a path name to an inode, inode assignment to a new file, and allocation of disk-block.

Unit-II

System Calls: System calls for the file systems**;** open, read, write, close. The pipe system call, opening a named pipe, reading and writing pipes, closing pipes, dup, mounting and un-mounting file system, link, unlink. System calls for time and clock.

Unit-III

Processes: The structure of processes, process states and transitions, layout of system memory, the context of a process, saving the context of the process, manipulation of the process address space.Process Control, process creation, signals, process termination, awaiting process termination, the user id of a process, changing the size of the process, the system boot and init process.

Unit-IV

Shell Programming: Study of different types of shells like Bourne shell, C & K shell. Shell variable, shell script, shell command. Looping and making choices, for loop, while and until, passing arguments to scripts. Programming with different shells.

Unit-V

Inter Process Communication: Inter process communication, process tracing, network communication sockets. Multiprocessor system, problem of multiprocessor systems, solution with master and slave processor, solution with semaphores. Study of distributed UNIX system.

Text Books:

1. **Maurice J Bach.,**The design of the UNIX operating system, Prentice-Hall, 1986.
2. **Raymond S.Eric**, The Art of UNIX Programming, Addison-Wesley Professional.

Reference Books:

1. **Stephen Prata,** Advanced UNIX: A Programmer Guide, Howard W. Sams, 1987
2. **Rochkind,** Advanced Unix Programming,Pearson Education India.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Entrepreneurship Development & Management **Max Marks: 100**

Course Code: ITE-722 **University Exam: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To give an overview of who the entrepreneurs are and what competences are needed to become an entrepreneur and to create an awareness of the need for systematic management of projects.

Unit-I

Entrepreneurship Development: Meaning, Objectives, Type of Entrepreneurs, Importance of Entrepreneurship Training, Factors affecting Entrepreneurship, Linkage between Entrepreneurship and Economic Development, Problem of Increasing Unemployment, Balanced Regional Growth, Harnessing Locally Available Resources, New Industrial Policy and Innovation in Enterprises.

Unit-II

Entrepreneurship Support System: Small Industries Development Bank of India, Small Industries Service Institute, State Small Industries and Export Corporation, District Industrial Centres and other Supporting Agencies.

Unit-III

Project Report Preparation: Identifying Business Opportunities, Project Report and its Importance, Various Contents of Project Report: Managerial and Entrepreneurial Capabilities, Socio-Economic Benefits, Demand Analysis, Technical Feasibility and Financial Viability.

Unit-IV

Introduction to Marketing Management: Brief Introduction to various types of Product Strategies, Pricing Strategies, Channel Strategies and Promotional Strategies.
Introduction to Production Management: Types of Production Systems, Production Planning and Control, Functions of Production Manager and Materials Management.

Unit-V

Introduction to Human Resource Management: Manpower Planning, Recruitment, Selection, Placement and Induction, Training and Development, Compensation.
Introduction to Financial Management: Source of Finance and Working Capital Management.

Text Books:

1. **Holt David H**, Entrepreneurship: New Venture Creation, PHI (4000).
2. **Saini Jasmer Singh**, Entrepreneurship Development Programmes and Practices, Deep and Deep Publications, New Delhi (1997).

Reference Books:

1. **Dollinger**, Entrepreneurship Strategies and Resources, Pearson Education (4003).
2. **Jose Paul & Kumar Ajith N**, Entrepreneurship Development and Management, Himalaya Publishers, New Delhi (4000).

Hisrich Robert D and Micheal Peters P, Entrepreneurship, TMH, (4002).

Programme: B.Tech Information Technology Engineering

Max Marks: 100

Course Title: Advanced Java
Course Code: ITE-741 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To emphasize on the basic concepts of advanced Java and web based development.

Unit-I

Introduction: Concepts of Classes and Objects, Constructors, Inheritance, Function Overloading, Polymorphism, Packages and Interfaces, exception handling, file streams and their manipulation.

Unit-II

Design of User Interfaces: Swing, Japplet, Icons and Labels, Text Fields, Buttons, Jbutton Class, Check Box, Radio Buttons, The Container, Panel, Windows, and Frame Classes, Combo Box, Tabbed Panes, Scroll Panes, Trees, Tables, Custom Rendering of Jlist Cells.

Unit-III

JDBC: JDBC Fundamentals, Establishing Connectivity and working with connection interface, working with statements, Creating and Executing SQL statements, working with Result Set Object & Result Set Meta Data.

Unit-IV

Servlets: Introduction to Servlets, Life cycle of Servlets, Creating, Compiling and running servlet, Reading the servlet Parameters, Reading Initialization parameter, Packages- javax.servlet Package, Handling HTTP Request and Response (GET / POST Request), Cookies and Session Tracking.

Unit-V

Java Beans: Java Bean, Installing, Starting Bean Development Kit, Use of JAR files and the use of Java Beans API.
JSP: JSP Architecture, JSP Access Mode, JSP Syntax Basic (Directions, Declarations, Expression, Scriplets and Comments), JSP Implicit Object, Object Scope, Synchronization Issue, Session Management.

Course Outcomes:

At the end of this course, the students will be able to do the following:

1. Understanding and designing of GUI
2. Understanding the Java Database connectivity
3. Understanding and designing the distributed and web-based applications
4. Understanding the Server-side and client-side programming

Text Books:

1. **Gary Cornell and Horstmann Cay S.,** Core Java, Vol I and Vol II, Sun Microsystems Press.
2. **Herbert Schildt**, Java: The Complete Reference, McGraw-Hill.

Reference Books:

1. **Philip Hanna,** JSP: The Complete Reference, McGraw-Hill.
2. **Deital and Deital,** Java How to Program, Prentice Hall (2007).

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Max Marks: 100

Course Title: .Net Technologies
Course Code: ITE-743 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of the course is to enable a student to acquire the knowledge pertaining to fundamentals of .NET Technology.

Unit-I

Introduction: Microsoft .net Platform, Design Goals and Overview.
Common Language Runtime:CLR Environment and Executables, Metadata, Assemblies, Intermediate Language, CLR Execution.
Programming in .net Framework: Common Programming Model, Features and Languages, Language Integration.

Unit-II

.net Framework Components: Deployment options, Distributed components, COM+ services, Message queuing.

Unit-III

Data and XML:ADO.NET Architecture and Benefits, Content components, Managed providers, Datasets and XML.

Unit-IV

Web services: Web services in practice, Web services Framework, Provider, Customer and Security.
Web forms:ASP, ASP.NET, Web Form syntax, Data binding, Use of templates, State management and scalability, Application development, ASP.NET and Web services.

Unit-V

Windows forms: Introduction, System. Windows. Forms Namespace, Windows Forms development, Windows Forms and Web services.

Course Outcomes:
After the completion of the course, students will be able to:

1. Understand the basic frame work of dot net.
2. Ability to design and implement applications and distributed systems on the .NET platform.
3. Understand the database connectivity with application.
4. Design webpages using ASP.NET
5. Understand the window programming using .NET.

Text Books:

1. **Hoang Lam, Thuan L. Thai**, .NET Framework Essentials, O'Reilly Publications.
2. **Joe Duffy,** Professional .Net Framework 2.0, Wrox Library Books.

Reference Books:

1. **Jeffrey Richter**, Applied Microsoft .NET Framework Programming, Microsoft Press.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Distributed Computing
Course Code: ITE–745
Duration of Exam: 3 hours

Max Marks: 100
University Exam: 60
Internal Assessment: 40

Objective: The objective of this course is to introduce students to the fundamentals and techniques of distributed computing. Students are expected to develop distributed applications using latest technologies.

Unit-I

Introduction: Introduction to Distributed System; Goals, Hardware Concepts, Software Concepts and Client-Server Model. Examples of Distributed Systems.

Unit-II

Process and Interprocess Communication: Communication: Layered Protocols, Remote Procedures Call, Remote Object Invocation, Message-Oriented Communication.
Processes: Threads, Code Migration, Software Agent.

Unit-III

Naming & Synchronization: Naming: Naming Entities, Locating Mobile Entities, Removing Un-Referenced Entities.
Synchronization: Election Algorithms, Mutual Exclusion, Distributed Transactions.

Unit-IV

Consistency and Replication: Consistency and Replication: Introduction, Data Centric Consistency Models, Client Centric Consistency Models, Distribution Protocols.
Fault Tolerance; Introduction, Process Resilience, Reliable Group Communication. Distributed Commit.

Unit-V

Security Policies: Security: Introduction, Secure Channels, Access Control, Security Management.

Course Outcomes:

At the end of this course, the student will able to do following:

1. Understanding distributed Database Architecture & Distributed Database Design.
2. Understanding the concepts of distributed operating systems & the algorithms related to them.
3. Understanding Distributed Transaction & Concurrency Control Mechanism.
4. Understanding the concepts of Distributed File Systems & Distributed Objects & Remote Invocation
5. Understanding the basic concepts of Grid Computing & Cloud Computing

Text Book:

1. **Tannenbaum A. S.**, "Distributed Systems: Principles and Paradigms", PHI.
2. **M. Singhal & N. Shivaratri**, Advanced Concepts in Operating Systems, TMH.

Reference Book:

1. **G. Coulouris, J. Dollimore, and T. Kindberg**, Distributed Systems: Concepts and Design, Pearson Education.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Artificial Intelligence
Course Code: ITE-746
Duration of Exam: 3 hours

Max Marks: 100
University Exam: 60
Internal Assessment: 40

Objective: The objective of this subject is to complement and broaden what students learn in the subject Artificial Intelligence and Natural Language Processing.

Unit- I

Introduction to Artificial Intelligence. Problem Solving Concepts. Definition of Pattern Recognition. Production System. Problem and Production. System Characteristics. Two Path Problem. Analysis of Artificial Intelligence Techniques. Criteria and Success.

Unit- II

Knowledge Representation. Formal And Non-Formal Logic. Representation Evaluation Criteria. Level Of Representation. Formal Logic Schemes. Resolutions. Predicate And Proportional Logic. Conversion To Clause Form. Semantic Networks. Frames. Scripts. Production Systems.

Unit- III

Problem Solving Algorithms and Fuzzy Logic: Problem Solving Strategies. Dealing with Uncertainty. Defining the Problem. Control Strategies. Exhaustive Search. Generate and Test. Matching. Weak Methods. Hill Climbing. Breadth and Depth First Searches. Search Algorithms Based on Probability. Fuzzy Reasoning.

Unit- IV

Neural Networks: Principles and Promises. Pattern and Pattern Recognition Tasks. Conventional Methods Scope.

Unit- V

Expert System: Introduction to Expert System Development. Matlab Simulation.

Course Outcomes:

At the end of the course, students should be able to understand and appreciate:

1. The role of neural networks in engineering, artificial intelligence, and other areas.
2. Understanding of basic neural network
3. Understanding of the concepts and techniques of neural networks through the study of the most important neural network models.
4. Able to evaluate whether neural networks are appropriate to a particular application.
5. Able to apply neural networks to particular applications, and to know what steps to take to improve performance.

Text Books:

1. **Flante Rich,** Artificial Intelligence.
2. **Nilson and Springer**, Principles of Artificial Intelligence.

Reference Books:

1. **David W. Rolston**, Principles of Expert System Development

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Data Mining and Data Warehousing | **Max Marks: 100**
Course Code: ITE-747 | **University Exam: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Objective: To study the methodology of engineering legacy databases for data warehousing and data mining to derive business rules for decision support systems.

Unit-I

Introduction: Dimensional Modeling: Goals of a Data Warehouse, Components of a Data Warehouse, Operational Data Store, Fact and Dimension Tables Star, Snowflake and Hybrid Schemas, Confirmed Facts and Dimensions. Slowly Changing Dimensions, Casual Dimensions, Helper Tables and Surrogate Keys.

Unit-II

Data Warehouse: Introduction, Sources, Users and Applications, Software Architecture and Design, Data Sub System, Data Granularity Model, Characteristics of a Data Warehouse,Data Warehouse Bus Architecture.

Unit-III

Meta Data: Introduction, Need, Types and Metadata Versioning, Metadata Process Concept. Data Marts and Characteristics, Decision Support System and Uses, Using Data Warehouse for DSS, Comparison between OLTP and OLAP.

Unit-IV

Populating a Data Warehouse: Survey of Data Warehouse, Populating Issues, Architecture Solution Models, Techniques and Solutions for constructing a Central Data Warehouse, Extract, Transform and Build Methods, Managing a Data Warehouse Environment.

Unit-V

Introduction to Data Mining and Uses: Introduction to Data Mining and Uses. Introduction to Decision Trees and its Working. Data Mining Techniques: Concept of Neural Networks. Nearest Neighbor & Clustering. Genetic Algorithms and Data Visualization Concepts.

Course Outcomes

Students who complete this course should be able to

1. Describe the fundamental concepts, benefits and problem areas associated with data warehousing.
2. Describe the various architectures and main components of a data warehouse.
3. Design a data warehouse, and be able to address issues that arise when implementing a data warehouse.
4. Ability to apply acquired knowledge for understanding data and select suitable methods for data analysis.
5. Applicability of various classification algorithms in data mining for real-world problems.

Text Books:

1. **Gray & Smith**, Data Warehousing handbook, CRS, PHI.
2. **Berson**, Data Warehousing, Data Mining & OLAP.

Reference Books:

1. **Mallach**, Data Warehousing System, McGraw Hill.
2. **Prabhu**, Data Warehousing:Concepts,Techniques,Products and Applications, 2nd Ed., PHI.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Simulation & Modeling

Course Code: ITE-748 **University Exam: 60**

Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The aim of this subject is to provide the basic knowledge of fundamental concepts of simulation and simulation languages.

Unit-I

Fundamentals: Definition and reasons for simulation. Continuous (time-oriented) and discrete (event) systems, Modeling/programming simple deterministic systems, Rates and system dynamics.

Unit-II

Concepts in Simulation: Stochastic variables; discrete vs. continuous probability; algorithms for generating random numbers, their comparison with respect to speed & validity; continuous uniformly distributed random numbers; methods for generating non-uniform distributions.

Unit-III

Building Simulation Programming Models: Arrival patterns, service times, and queue formation. Formulating systems as events and entities (such as resources, queues, gates, and linkages). Congestion in systems; arrival patterns; Poisson arrivals; the exponential distribution; the coefficient of variation; service times; normal distribution; queuing disciplines; Measures for Queues; Analytic Solutions of Queuing Problems; Utilization as a Design Factor; Other factors like grade of service.

Unit-IV

Discrete Event System Simulation: Discrete events; representation of time; queues and servers; generation of arrival patterns; resource seizing; departures simulation of a telephone system and computer networks; simulating components of an operating system; delayed calls; modeling policies; priority queues; tasks; gathering statistics; counters and summary statistics; measuring utilization and occupancy; recording distributions and transit times.

Unit-V

Introduction to Simulation Languages: Simulation in C++, GPSS, Simulations Packages. Trends in simulation Software. SIMSCRIPT programs; SIMSCRIPT system concepts; organization of a SIMSCRIPT program; blocks, names, and labels; SIMSCRIPT statements; entities, events, and activities; defining the system; defining the system model; referencing variables; the procedural structures; arrival event; timing routine; disconnect event; closing event; execution, debugging and validation; interpreting outputs and system optimization via modification.

Course Outcomes:

1. At the end of the course students should be able to
2. Understand and choose between various simulation models.
3. Analyze, understand and implement problem form simulation point of view.
4. Implement simulation using appropriate simulation model

Text Books:

1. **Law and Kelton**, Simulation Modeling and Analysis, McGraw-Hill, 3rd Edn. 2000.
2. **Banks**, Discrete-Event System Simulation, (Second Edition), Prentice-Hall, 1996.

Reference Books:

1. **Dunning**, Getting Started in GPSS, , Engineering Press, San Jose, CA, 1985.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Real Time Operating System | **Max Marks: 100**
Course Code: ITE-749 | **University Exam: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Objective: The aim of the subject is to provide basic and necessary information about the working of RTOS and Embedded Systems.

Unit 1

Introduction to RTOS and Embedded System
Brief History of Operating system, Introduction to real time operating system, Introduction to Embedded Systems, Definition of RTOS, Characteristics and Features Real Time Kernels, Scheduler, Objects, Services

Unit 2

Tasks & Memory Management
Tasks and memory management: Introduction, Defining Tasks, Task state and scheduling, Task operation, Task structures, Synchronization, communication and concurrency.
Memory management concepts in RTOS

Unit 3

IPC Mechanism
Defining Semaphore, Semaphore operation, use of semaphore.
Defining Message queues, Message queue states, Message queue contents, use
Pipes, Signals, Condition variables.

Unit 4

Exceptions & Interrupts
Defining exceptions and interrupts. How they are implemented. Applications of exceptions and interrupts, Types of interrupts, Handling interrupts

Unit 5

Timer & Timer Services
Real Time clocks and system clocks, Programmable interval timers, Timer interrupt, Service routines.
Basic I/O concepts, The I/O Subsystem.

Course Outcomes:
At the end of this course, the students will able to do the following:
- Understand the basic concept of RTOS and its usefulness for embedded systems
- Understand Theoretical background and practical knowledge of real-time operating systems.
- Understand multitasking techniques in real-time systems.
- Understand the impact of real time operating systems on application area.

Text Books:

1. **Qing Li**, RTOS concepts in Embedded Systems, CMP Publications.
2. **V. Penumchu**, Simple RTOS, Trafford Publications.

References:

1. **Mall Rajib**, Real Time Systems: Theory & Practice.

Note for paper setter:
The question paper shall comprise 10 questions, two questions from each unit. The students are required to attempt five questions, one from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Grid Computing
Course Code: ITE-841
Duration of Exam: 3 hours

Max Marks: 100
University Exam: 60
Internal Assessment: 40

Objective: The aim of the subject is to acquaint the students with the grid computing technology and its impact on engineering sciences.

Unit-I

Introduction: Why Computational Grids? A Discussion of the Need, Potential Users and Techniques for Use of Grids. Grid Requirements of End Users, Application Developers, Tool Developers, Grid Developers and System Managers.

Unit-II

Grid Architecture: Networking Infrastructure, Protocols and Quality of Service. Computing Platforms. Operating Systems and Network Interfaces. Compilers, Languages and Libraries for the Grid.

Unit-III

Grid Scheduling: Grid Scheduling, Resource Management, Resource Brokers, Resource Reservations. Instrumentation and Measurement, Performance Analysis and Visualization.

Unit-IV

Security, Accounting and Assurance: The Globus Toolkit: Core Systems and Related Tools such as the Message Passing Interface Communication Library, The Remote I/O (RIO) Library and the Nimrod Parameter Study Library.

Unit-V

Grid Portal Development: Application Types: Geographically Distributed, High-Throughput, On Demand, Collaborative and Data Intensive Supercomputing. Computational Steering. Real-Time Access to Distributed Instrumentation Systems.

Course Outcomes:

At the end of this course, the students will able to do the following:

- Understand the need for and evolution of Grids in the context of processor- and data-intensive applications
- Be familiar with the fundamental components of Grid environments, such as authentication, authorization, resource access, and resource discovery
- To understand the technology and tool kits for facilitating grid computing
- Design and implement Grid computing applications using Globus or similar toolkits
- Justify the applicability or non-applicability of Grid technologies for a specific application

Text Books:

1. **Craig Fellenstein**, Grid Computing, TMH
2. **Janakiram**, Grid Computing Models, TMH.

Reference Books:

1. **Jaya Krishna**, Grid Computing – an introduction, John Wiley.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Distributed Databases | **Max Marks: 100**
Course Code: ITE-842 | **University Exam: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Objective: The aim of the subject is to make the students aware of the recent trends in building databases on different computer networks.

Unit-I

Distributed Databases- An Overview: Introduction to Distributed Databases, Comparison of Distributed and Centralized Systems, DDBMS, Global Relations, Fragment and Physical Image, Types of Schemas, Methods of Fragmentation of a Relation, Levels of Transparency in a Distributed System, Integrity Constraints.

Unit-II

Query Processing*:* Representation of Database Operation in form of a Query, Operation in form of a Query, Operations on a Query, Unary and Binary Tree in a Query, Converting a Global Query into Fragment Query, Join and Union Operations Involving a Query, Aggregate Functions, Parametric Queries.

Unit-III

Optimization of Access Strategies: Introduction to Query Optimization, Estimation of Profiles of Algebraic Operations, Optimization Graphs, Reduction of Relation Using Semi-Join and Join Operation.

Unit-IV

Distributed Transaction Management: Properties and Goals of Transaction Management, Distributed Transactions, Recovery Mechanism in case of Transaction Failures, Log Based Recovery, Check Pointing, Communication and Site Failures In Case Of a Transaction and Methods to handle them, Serializability and Timestamp in Distributed Databases.

Unit-V

Concurrency Control & Reliability: Introduction to Distributed Deadlocks, Local and Global Wait for Graphs, Deadlock Detection using Centralized and Hierarchical Controllers, Prevention of Deadlocks, 2 and 3 Phase Locking and Commitment Protocols, Reliability in Commitment and Locking Protocols, Reliability and Concurrency Control, Reliability and Removal of Inconsistency.

Course outcome:

At the end of this course, the students will be able to do the following:

- Differentiate the centralized and distributed database, its architecture. and other differences
- Get knowledge of Query optimization, query trees and graphs.
- How relational schema is fragmented for different locations and various methods to retrieve data from distributed location over a network.
- Understand the various techniques of deadlocks recovery in a distributed database.
- Understand the various techniques to handle transactions in a distributed database.

Text Books:

1. **Ceri Stefano and Pelagatti Guiseppe**, Distributed Databases Principles and Systems, McGraw-Hill International Editions.

Reference Books:

1. **T. Connolly, Begg & Strachan,** Distributed Database Systems, Addition Wesley.
2. **Trindbery Tim**, Distributed Database System**,** John Wiley.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Disaster Management
Course Code: ITE-843
Duration of Exam: 3 hours

Max Marks: 100
University Exam: 60
Internal Assessment: 40

Objectives: The aim of the course is to acquaint the students about the disaster, and its management.

Unit-I
Introduction to Disaster: Concept, and definition (Disaster, Hazards, Vulnerability, Resilience, Risk)

Unit-II
Disaster:
Classification, Causes and Impacts (including social, economic, political, environmental, health etc).
Differential Impact- in term of caste, class, gender, age, location, disability.
Global trends in disasters, urban disaster, pandemics, complex emergencies, Climate change.

Unit-III
Approaches to Disaster Risk reduction: Disaster cycle – its analysis, Phase, Culture of safety, prevention, mitigation and preparedness, community based DRR, Structural- nonstructural measures, roles and responsibilities of community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/URBs), state, Centre and other stake-holders.

Unit-IV
Inter relationship between Disasters and Development: Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land – use etc. Climate Adaption, Relevance of indigenous knowledge, appropriate technology and local recourses..

Unit-V
Disaster Risk Management in India: Hazard and Vulnerability profile of India
Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management.
Institution arrangements (Mitigation, Response and Preparedness, DM Act and Policy, Other related policies, Plans, programmes and legislation)

Course Outcomes:-After completing subject, Students will be able to

1. Affirm the usefulness of integrating management principles in disaster mitigation work
2. Distinguish between the different approaches needed to manage pre- during and post- disaster periods
3. Explain the relation between disaster and development
4. Relate to risk transfer.

Text Books:

1. Krishnamurthy et al***Disaster Management: Global Challenges*** 1st Edition, Universities Press (2009).
2. Bhattacharya . ***Disaster Science and Management*** Tata McGraw Hill.

References:

1. Mullick N. H. ***Disaster Management***, Enkay Publishing House (2011).

Note for Paper Setter: The Question paper shall comprise 10 questions, two questions from each unit. The students are required to attempt five questions, one from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Cloud Computing | **Max Marks: 100**

Course Code: ITE-844 | **University Exam: 60**

Duration of Exam: 3 hours | **Internal Assessment: 40**

Objective: The aim of the subject is to provide basic and necessary information about the Cloud Computing and its components.

Unit 1

Evolution to Computing Paradigms

Overview of Existing Hosting Platforms, Grid Computing, Utility Computing, Autonomic Computing, Dynamic Datacenter Alliance, Hosting / Outsourcing

Unit 2

Introduction

Introduction to Cloud Computing, Workload Patterns for the Cloud, "Big Data", IT as a Service, Technology Behind Cloud Computing

Unit 3

A Classification of Cloud Implementations

Amazon Web Services - IaaS, The Elastic Compute Cloud (EC2), The Simple Storage Service (S3), The Simple Queuing Services (SQS), VMware vCloud - IaaS, vCloud Express, Google AppEngine - PaaS, The Java Runtime Environment

Unit 4

Cloud Environment-I

The Datastore, Development Workflow, Windows Azure Platform - PaaS, Windows Azure, SQL Azure, Windows Azure AppFabric, Salesforce.com - SaaS / PaaS, Force.com

Unit 5

Cloud Environment-II

Force Database - the persistency layer, Data Security, Microsoft Office Live - SaaS, LiveMesh.com, Google Apps - SaaS, A Comparison of Cloud Computing Platforms, Common Building Blocks.

Course Outcomes:

At the end of this course, the students will able to do following:

- Develop and deploy cloud application using popular cloud platforms.
- Design and develop highly scalable cloud-based applications by creating and configuring virtual machines on the cloud and building private cloud.
- Explain and identify the techniques of big data analysis in cloud.
- sApply and design suitable Virtualization concept, Cloud Resource Management and design scheduling algorithms.
- Broadly educate to know the impact of engineering on legal and societal issues involved in addressing the security issues of cloud computing.

Text Books:

1. **Raj Kumar Buyya, James Broberg, Andrezei M.Goscinski,** Cloud Computing: Principles and paradigms, 2011
2. **Michael Miller,** Cloud Computing, 2008**.**

References:

1. **Judith Hurwitz, Robin Bllor, Marcia Kaufman, Fern Halper,** Cloud Computing for dummies, 2009.

Note for paper setter:

The question paper shall comprise 10 questions, two questions from each unit. The students are required to attempt five questions, one from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Bio-Informatics | **Max Marks: 100**
Course Code: ITE-847 | **University Exam: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Objective: The objective of bio-informatics is to bring life and computer science together.

Unit-I

Introduction to Bioinformatics and Computational Genomics, Biological Databases, Kinemages for Biological Structure, Dynamic Programming Sequence Alignment, BLAST, FASTA.

Unit-II

3D Structure Computations, NMR, Xtallography, RNA Secondary Structure, Introduction to Microarrays, Review of Structural Genomics, Microarray Clustering and Classification, Vector Machine Applications in Bioinformatics.

Unit-III

Terminologies and Ontologies, Multiple Sequence Alignment, 1D Motifs, Algorithms and Databases, 3D Structure Alignment, MUSTA Algorithm for Geometric Hashing and Multiple Alignments.

Unit-IV

Hidden Markov Models, Molecular Energetics and Dynamics, Protein Structure Prediction, Genetic Networks, Gene Finding Algorithms.

Unit-V

Comparative Genomics Algorithms, Genome Alignment, Phylogenetic Algorithms, Natural Language Processing, Proteomics, 3D Motifs& Final Thoughts.

Course Outcomes:

At the end of this course, the students will be able to do the following:

1. Explain the basic principles that underpin Bioinformatics analyses, and apply these principles when analysing biological data;
2. Survey a selected field within Bioinformatics, synthesise information from primary literature, and coherently report your findings in a written document;
3. Analyse biological data using a variety of Bioinformatics tools; and
4. Interpret correctly the outputs from tools used to analyse biological data and make meaningful predictions from these outputs.

Text Books:

1. **David Mount**, Bio-informatics: Sequence and Genome analysis, 2ed, Cold Spring Harbor Laboratory Press.

Reference Books:

1. **Srinivas**, Bio-metrics: A Modern Approach, PHI.
2. **Bergen**, Bio-informatics Computing, PHI.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Wireless Networks | **Max Marks: 100**
Course Code: ITE-848 | **University Exam: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Objective: The aim of this subject is to provide the basic knowledge of fundamental concepts of Wireless Networks.

Unit I

Cellular wireless Networks:- Introduction: Applications, Replacement of wired Networks, principles of cellular networks, first generation analog, second generation TDMA, second generation CDMA and third generation systems.

Unit II

Satellite communications:- History, Applications, satellite parameters & configurations- GEO, LEO, MEO, capacity allocation (frequency division, time division), routing, localization, Handover.

Unit III

Wireless LANS: - Infrared LANS, spread spectrum LANS, narrowband microwave LANS, IEEE 802.11 wireless LAN standard, Bluetooth and IEEE 802.15, wireless local loop.

Unit IV

Mobile Network Layer:- Mobile IP, Entities and terminology, IP packet delivery, Agent advertisement and discovery, Registration, tunneling and encapsulation, optimizations.

Unit V

Ad Hoc wireless Networks: - what are Ad Hoc networks? Difference between cellular and Ad Hoc wireless networks, applications, technical & research challenges, Important issues in Ad Hoc wireless networks, the need for MAC, MAC layer protocols for Ad Hoc wireless Networks, introduction to quality of service (QoS) in Ad Hoc wireless networks.

Course Outcome:

On successful completion of this unit students will be able to:

1. Identify the basic concept of wireless networks, channel coding, and cellular concepts;
2. Compare and contrastLEO, MEO and GEO. Routing and handover in satellite communication
3. Understand various wireless LAN technologies
4. Understand the terminologies in mobile network layers and the process of packet discovery and registration in network layer.
5. Compare and contrast between cellular and Ad Hoc wireless networks, areas of its applications and challenges

Text Books:

1. **William Stallings**, "Wireless communications & Networking",Prentice Hall
2. **Kaven Pahlavan**, "Principles of Wireless Networks", Pearson Education India.

References:

1. **Nicopolitidis ObaidatH. S**., "Wireless Networks" ,John Wiley.
2. **Ivan Stoimenovic** ,"Handbook of Wireless Networks & Mobile Computing", CRS Press.

Note for Paper setter: The Question paper will comprise of ten questions. Two questions shall be set from each unit. The student has to attempt five questions, at least one from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Embedded Systems | **Max Marks: 100**
Course Code: ITE–849 | **University Exam: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Objective: The aim of the subject is to help the learners to understand the fundamentals of Embedded Systems.

Unit-I

Introduction to Embedded Systems: Hardware and Software Components: Types, Examples, Characteristics and Challenges in Embedded Computing System Design, Embedded System Design Processes.

Unit-II

Architecture of Embedded System: Hardware Components: SOC, Processors, CPU, Types of Memory, Memory Management, I/O Devices and Interfacing. Software Components: Interpreter, Compiler, Assembler, Cross Assembler, RTOS, Languages for Embedded Applications, Hardware and Software Architecture. Examples: Cell Phone, Smartcard, Digital Thermometer.

Unit-III

OS for Embedded Systems: Introduction to Real Time Theory. Operating System Services. Real Time Operating System Concepts. Basic Design using an RTOS. Underground Tank Monitoring System.

Unit-IV

Performance Issues of an Embedded System: CPU Performance. CPU Power Consumption. Analysis and Optimization of CPU Power Consumption Program Execution Time. Analysis and Optimization of Energy and Power. Analysis of Program Size. Hardware Accelerators.

Unit -V

Design Examples: Personal Digital Assistants. Set Top Boxes. Ink Jet Printers. Telephone PBX. Introduction to Micro C/OS-II Operating System and Its Uses.

Course Outcomes:
After completion of the course student will be able to:

1. Understand and design embedded systems.
2. Learn basic of OS and RTOS.
3. Understand types of memory.
4. Understand embedded firmware design approaches.
5. Design RTOS embedded systems.

Text Books:

1. **Wayne Wolf**, Computer as Components, Principles of Embedded Computing System Design, Harcourt India Pvt. Ltd.,
2. **David E Simon**, An Embedded Software Primer, Pearson Education,

Reference Books:

1. **Raj Kamal**, Embedded Systems, Architecture, Programming and Design, TMH.
2. **Sriram V Iyer, Pankaj Gupta**, Embedded Real time Systems Programming, TMH.
3. **K.V.K.K. Prasad**, Embedded/Real time Systems: Concepts, Design and Programming, Dreamtech Press.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Information Technology Engineering

Course Title: Fund. of Digital Image Processing | **Max Marks: 100**
Course Code: ITE–742 | **University Exam: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Objective: Study the image fundamentals, mathematical transforms necessary for image processing, image enhancement techniques, image compression procedures.

Unit-I

Introduction: Digital Image Representation, Fundamental Steps in Image Processing. Elements of Digital Image Process Systems, Application of Digital Image Processing: Medical Science, Industries & Security. Relationship between Pixels. Brief Introduction to Image Data Types and File Formats; 1-Bit Images, 8-Bit Gray Level Images, 8-Bit Color Images, 24-Bit Color Images, Color Lookup Tables, Formats; GIF, JPEG, PNG, TIFF.

Unit-II

Image Enhancement in the Spatial Domain: Background, Some Basic Grey Level Transformations, Histogram Processing, Basics of Spatial Filtering: Smoothing Using Linear/Non-Linear Spatial Filters, Sharpening Spatial Filters; Second Derivative (Laplacian), First Order Derivative (Gradient).

Unit-III

Image Enhancement in the Frequency Domain: Background, Introduction to the 2D-Discrete Fourier Transform and its Inverse, Basics of Frequency Domain Filtering, Image Smoothing Frequency Domain Filters, Image Sharpening Frequency Domain Filters.

Unit-IV

Image Compression: Coding Redundancy, Inter-Pixel Redundancy, Fidelity Criteria, Image Compression Models, Error-Free Compression, Variable Length Coding, Bit-Plane Coding, Wavelet Coding, Digital Image Watermarking, Image Compression Using Discrete Cosine Transform (JPEG).

Unit-V

Image Segmentation: Point, Line and Edge Detection, Edge Linking and Boundary Detection, Thresholding: Global Thresholding, Local Thresholding, Region Based Segmentation: Region Growing, Region Splitting & Merging.

Course Outcomes:

At the end of this course, the students will able to:

1. Mathematically represent the various types of images and analyze them.
2. Process images for the enhancement of certain properties or for optimized use of the resources in spatial domain using various filters.
3. Process images for the enhancement of certain properties or for optimized use of the resources by using various frequency domain filters .
4. Develop and use various algorithms for image compression.
5. Develop and use various algorithms for image segmentation.

Text Books:

1. **Gonzalez R. & Wood E.R.**, Digital Image Processing, Prentice Hall India.
2. **JAIN R. K.**, Fundamentals of Image Processing.

Programme: B.Tech Information Technology Engineering

Course Title: Multimedia
Course Code: ITE-852
Duration of Exam: 3 hours

Max Marks: 100
University Exam: 60
Internal Assessment: 40

Unit-I

Introduction to Multimedia, Multimedia Networks, Multimedia Information Representation, Media & Data Streams, Image, documents, Video & Audio File Formats & their representation.

Unit-II

Audio & Video Compression, Text & Image Compression. Multimedia Communications , Networks & Standards relating to Interpersonal Communication.

Unit-III

Interactive Applications over the Internet, Reference Models, Multimedia Operating System & Synchronization, Multimedia Applications & Multimedia Databases.

Unit-IV

Broadband ATM Networks, Protocol Architecture, ATM LANs, ATM MAN's, High Speed PSTN, Access Technologies.

Unit-V

Architectures and Issues for Distributed Multimedia Systems: Distributed multimedia systems, Synchronization, QoS Architecture, The role of Standards, A frame work for Multimedia systems.

Course Outcomes:

At the end of this course, the student able to do the following:

1. Understand the fundamental of multimedia system
2. Understanding and application of various data compression techniques
3. Design a interactive application using multimedia techniques
4. Designing of a multimedia system for the distributed environment

Text Books:

1. **Steinmetz R & K. Nahrstedt,** Mutimedia Computing,Communication & Application
2. **John F. Koegel Buford,** "Multimedia Systems" , Pearson Education.
3. **Fred Halsall** ,Multimedia Communication

Reference Books:

1. **Jeffcoate J** ,Multimedia in Practice - Technology & Application .
2 **Fred Halsall,**"Multimedia Communications", Pearson Education.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Civil Engineering

Course Title: Communication Skills **Max. Marks: 100**
Course Code: CE-221 **University Exam: 60**
Duration of Exams: 3 hours **Sessional Assessment: 40**

Objective: In this world of globalization English language is the first and foremost criteria to acquire job in reputed companies .This course is designed to hone the soft skills of students to make them proficient in English Language (writing & speaking).

Unit-I

Mechanics of writing: Rules of good writing, paragraph writing, report writing, scientific and technical writing.

Unit-II

Business Correspondence: Format of business letters sales letters, enquiries, reply to enquires, claims and adjustment letters.

Unit-III

Recruitment and Employment correspondence: Application letters, resume, curriculum vitae, interview, reference, letter of acceptance, rejection, resignation.

Unit-IV

Developing Analytical skills: Presentations, mock interviews, seminars, group discussions.

Unit-V

Reading Skills: Process of reading, models, strategies, methodologies, and reading purposes.

Course Outcomes: End of the course students will acquire

1. basic proficiency in technical writing
2. Writing of business and technical letters.
3. About application, resume and CV writing.
4. Presentation skill and group discussion.
5. Reading, writing and listening Comprehension.

Text Books:

1. **Day and Robert A.,** How to Write and Publish a Scientific Paper, Cambridge University Press.
2. **Lesikar R.V.** and **Pettit Jr.** Business Communication Theory and Applications, Irwin 2002 Ed.

Reference Books:

1. **Pal Rajendra** and **Korlhalli, J. S.** Essentials of Business Communication, Sultan C hand &Sons 2007
2. **Rayudu, C. S.** Media and Communication Management ,Himalaya Publishing House.
3. **Bhattacharya Indrajit**, An approach to communication Skills, Jaico Publishing House Mumbai.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions, selecting one from each Unit.

Programme: B.Tech Civil Engineering

Course Title: Structural Analysis-I **Max. Marks: 100**
Course Code: CE-322 **University Examination: 60**
Duration of Exams: 3 hours **Sessional Assessment: 40**

Objective: The objective of this course is to acquaint the students about some basic concepts like bending moments, shear force, stresses, slopes and deflections and buckling loads employed for the analysis of civil engineering structural forms.

UNIT-I

Thin Cylindrical shells: Longitudinal and hoop stresses, volumetric strains; Thick Cylinders: Lame's equations, stresses due to internal and external pressure; Torsion: Circular and non-circular shafts, power transmitted by shafts; Concept of strain energy and resilience; Theories of failure.

UNIT-II

Shear force & Bending moment: SF and BM Diagrams for simply supported, over-hanged and cantilever beams subjected to moments and varying loads; SF, BM & Torque Diagrams for inclined beams & brackets subjected to concentrated load, udl, moments and varying loads.

UNIT-III

Bending in beams: Bending theory, bending equation, bending stresses in rolled steel and built up sections; Shear stresses in beams, variation of shear stresses in beam cross-section, principal stress and principal planes for oblique section, mohrs circle

UNIT-IV

Deflection of beams: Direct integration and Macaulay's methods for simply supported and cantilever beams subjected to concentrated loads, uniformly distributed loads, varying loads and moments

UNIT-V

Columns: Columns and struts subjected to compression and bending, middle third & middle fourth rules, core or kernel of sections, masonry column, dams and retaining walls; Long columns: Euler's, Rankine's and Secant formulae.

Course Outcomes: On completion of the course, the student will be able to:

1. Understand about the Longitudinal and hoop stresses, volumetric strains of Thin and Thick Cylinders;
2. Draw SF and BM Diagrams for simply supported, over-hanged and cantilever beams subjected to moments and various types loads;
3. Understand Bending theory, bending equation, bending stresses in rolled steel and built up sections;
4. Find out Slope and Deflection for simply supported and cantilever beams subjected to moment and various type of beam.
5. Understand the different end conditions of Columns and struts subjected to

compression and bending, difference of short and long column, core or kernel of sections.

Text Books:

1. **Jindal R. L.,** Determinate Structures.
2. **Reddy, C. S**., Basic Structural Analysis, Tata McGraw Hill, New *Delhi, 2003.*

Reference Books:

1. Engineering Mechanics of Solids By E.P.Popov, Pearson Education.
2. Solid Mechanics by S.M.A.Kazimi, TataMcgraw Hill.
3. Strength of materials by S. Ramamrutham& N. Narayan, DhanpatRai Publishing Company
4. Mechanic of Materials by R.C.Hibbeler, Pearsons.
5. Mechanics of Materials by Beer &Jonhston, Dewolf, Mcgraw Hill.
6. Strength of Materials by R. Subramanian, OxfordUniversity Press

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Programme: B.Tech Civil Engineering

Course Title: Hydraulics-I **Max. Marks: 100**
Course Code: CE-323 **University Examination: 60**
Duration of Exams: 3 hours **Sessional Assessment: 40**

Objective: The objective of this course is to acquaint the students about the characteristics and behavior of static and flowing fluids.

Unit-I

Introduction: Physical properties of fluids viz, mass density, viscosity, compressibility, Vapour-pressure, surface tension and capillarity, Ideal Fluids and Real Fluids, Newtonian and Non-Newtonian Fluids. Steady and unsteady, uniform and non uniform, laminar and turbulent flows, One, two and three dimensional flows, Streamlines, Streak lines and Pathlines, Continuity equation, Rotation and Circulation, Elementary explanation of Stream function and Velocity potential.

Unit-II

Fluid Statics: Pressure Intensity, Pascal's law, Pressure-density-height relationships, Manometers; Pressure on plane and curved surfaces, Centre of pressure, Buoyancy, Stability of immersed and floating bodies.

Unit-III

Dynamics of Fluid Flow: Euler's equation of motion along a streamline and its integration to yield Bernoulli's equation, Flow measurement, Flow through orifice meter, Venturi-meter, orifices, mouth pieces, Pitot tubes, Sluice gates under free and submerged conditions, Notches and Weirs.

Unit-IV

Dimensional Analysis and Similitude: Dimensional analysis, Rayleigh's method, Buckingham's pi-theorem, Similitude, types of similarities, important dimensionless numbers and their significance. Model analysis.

Unit-V

Boundary Layer Analysis: Boundary layer thicknesses, momentum & energy thickness, Laminar boundary layer, Boundary layer over a flat plate, Turbulent boundary layer, Separation.

Course Outcomes: At the end of the course, the student will be able to:
1. Apply conservation laws to derive governing equations of fluid flows
2. Compute hydrostatic and hydrodynamic forces
3. Analyze and design simple pipe systems
4. Apply principles of dimensional analysis to design experiment.
5. Understand the important of dimensional numbers and their significance.

Text Books:

1. **Kumar, D. S.,** Fluid Mechanics. Kataria & Sons Publishers, New Delhi, 1998 Ed.
2. **Streter V. L., Wylie, E.B. & Bedford K. W.,** Fluid Mechanics, MGH, 2001 Ed.

Books Recommended:

1. **Garde R. J.**, Engineering Fluid Mechanics, New Age Intl. Publications.
2. **Kumar K. L.,** Engineering Fluid Mechanics, Eurasia Publishing House,1984 Ed.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Programme: B.Tech Civil Engineering

Course Title: Surveying-I **Max. Marks: 100**
Course Code: CE-324 **University Examination: 60**
Duration of Exams: 3 hours **Sessional Assessment: 40**

Objective: The aim of this course is to make the students aware about the art and science of determining relative positions of points by various techniques.

UNIT-I

Introduction: Importance and Principles of Surveying. Types of surveying. Different classification of surveying.
Chain Surveying: Chain Surveying principle, Field Equipment, Methods of chaining, Offsets, Corrections in chaining, Obstacles in chain surveying; Degree of accuracy. Tape and chain corrections.

UNIT-II
Compass Surveying: Instruments, Principle, Types of compass, Traversing, Closed traverse, Open traverse, Problems on included angles, Local attraction, Problems on local attraction, Magnetic declination, Adjustment of closing error. Plotting of compass traverse.

UNIT-III
Plane Table Surveying: Plane Table Surveying principle, Field equipments and accessories, Orientation, Advantages and disadvantages of plane tabling, Methods of plane tabling, Two point and Three point problem, Precautions, Accuracy.

UNIT-IV
Levelling: Levelling Instruments, Temporary adjustment of level, Types of leveling staffs, Types of leveling, Reciprocal leveling, Bench mark & its types, Field book recording, Methods of reduction of levels(HoI, Rise and fall method) Sensitivity of bubble tube. Corrections applied.

UNIT-V
Contouring and Computation: Definition, uses and characteristics of contours, Contour interval and horizontal equivalent, Methods of contouring. Interpolation, Computation of area by different methods and their comparison. Computation of volume.

Course Outcomes: After the completion of the course the students will be able to:
1. Calculate angles, distances and levels
2. Identify data collection methods and prepare field notes
3. Understand the working principles of survey instruments
4. Estimate measurement errors and apply corrections
5. Interpret survey data and compute areas and volumes

TEXT BOOKS

1. Surveying Vols. I & II by Dr. K.R. Arora
2. Duggal, S.K." Surveying" Vols. I & II, Tata McGraw Hill, New Delhi,2004

BOOKS RECOMMENDED

1. Basak "Surveying & Levelling" Tata McGraw Hill, New Delhi
2. Kanetkar, T. P. and Kulkarni, S.V."Surveying & Levelling" Vols. I & II PVG .
3. Surveying & Levelling by' P.B. Shahni
4. Punmia, B.C."Surveying" Vol. 1&2, Laxmi Publications Pvt. Ltd, New Delhi, 2002.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Programme: B.Tech Civil Engineering

Course Title: Building Materials & Construction **Max. Marks: 100**
Course Code: CE-325 **University Examination: 60**
Duration of Exams: 3 hours **Sessional Assessment: 40**

Objective: The objective of this course is to make the students aware about the knowledge of the materials used in buildings and constructional forms like partitions, DPC, floors and roofs etc.

Unit-I

Stones, Bricks and Lime: Stones: Classification, requirements of good materials, Querying of stones Testing of stones. Bricks: Classification of bricks, constituents of a good brick earth, harmful Ingredients, manufacturing of bricks (introduction only), testing of bricks.

Unit-II

Lime and Cement: Lime: Classification, manufacture of lime (introduction only), artificial hydraulic lime, field-testing of lime. Tiles and Terra-cotta: Manufacturing of tiles and terra-cotta (introduction only), types of terra cotta. Cements: Composition, manufactures of Portland cement, field-testing of cement, special types of cements (Introduction only), storage of cement.

Unit-III

Steel, Timber and Polymers: Steel: Types of steel (Mild Steel, Hard Steel, Stainless Steel, Heat resistance steel, Manganese steel, Magnet Steel), marketable forms of steel. Timber: Classification, Structure, Seasoning and defects. Paints and Varnishes, Constituents of paints, types of paints (oil paint, enamel paint, emulsion paint cement paint), constituents and characteristics of varnishes, Polymers: Classification, properties and applications in civil engineering of Polymeric materials viz. PVC, Polyester, HDPE, and LDPE.

Unit-IV

General Construction: Brick and Stone masonry: Various terms used, types and bonds in brick work. Partition and cavity walls: Types of non bearing partition- brick partitions, clay block partitions, timber partitions and glass partitions, construction of masonry cavity walls.

Unit-V

DPC, Floors and Roofs: Dampness: Sources, effects and prevention of dampness, Materials used in damp proofing course. Floors: Components of floor, brick floors, cement concrete floors, terrazzo flooring, mosaic floorings and tiled flooring. Doors and Windows: Locations, sizes general types of door movement, various types of doors and windows (definition only). Roofs (Single Roof: Lean-to-roof, Couple roof, Couple closed roof, Collar-beam roof) & terms used in sloping roof: king post truss, queen post truss.

Course Outcomes: On completion of the course, the student will be able to:

1. Understand the properties of bricks and stone and lime.
2. Understand the manufacturing process of cement and terra cotta.
3. Understand the types of steel and timber used in civil engineering.

4. Understand the construction of bricks and stone masonry.
5. Understand the damp proof course and general construction of floor and roof.

Books Recommended:

1. **Surinder Singh**, Engineering Materials
2. **Sharma and koul,** Building Construction
3. **Kulkarni et.el,** Civil Engineering Materials
4. **B.C. Punmia**, Building Construction

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Programme: B.Tech Civil Engineering

Course Title: Entrepreneurship Development & Manage

Max. Marks: 100

Course Code: CE-326 **University Examination: 60**

Duration of Exams: 3 hours **Sessional Assessment: 40**

Objective: This course is meant to provide a comprehension about entrepreneurship, project reports, marketing and human resource managements.

UNIT-I

Entrepreneurship Development: Meaning, objectives, type of entrepreneurs, importance of entrepreneurship training, factors affecting entrepreneurship, linkage between entrepreneurship and economic development, problem of increasing unemployment, balanced regional growth, harnessing locally available resources, New Industrial Policy and innovation in enterprises.

UNIT-II

Entrepreneurship Support System: Small Industries Development Bank of India, Small Industries service Institute, State Small Industries and Export Corporation, District Industrial Centers and Other supporting agencies.

UNIT-III

Project Report Preparation: Identifying business opportunities, Project report and its importance, various contents of project report material and entrepreneurial capabilities, socio-economic benefits, Demand analysis, technical feasibility and financial viability.

UNIT-IV

Introduction to Marketing Management: Brief introduction to various types of product strategies, priding. Strategies, Channel strategies and Promotional strategies. Introduction to Production Management: Types of production systems, production planning and control, functions of Production Manager and Materials Management.

UNIT-V

Introduction to Human Resource Management: Manpower Planning, Recruitment, selection, placement and induction, training and development, compensation. Introduction to Financial Management: source of finance and Working Capital management.

Course Outcomes: On successful completion of the course, the student will be able to:

1. Explain the importance of entrepreneurship for an individual and for the nation.
2. Understand the role of supporting agencies in creation and promotion of

enterprises.

3. Outline and prioritize various business opportunities in the market and select one best among them
4. Understand the importance of various marketing strategies for a successful business.
5. Evaluate the role of human resource management in developing various training and development strategies for nurturing business skills among the employees.

Text Books:

1. **Jose Paul and Kumar Ajith N,** Entrepreneurship Development and Management, Himalaya Publishers, New Delhi (2000).
2. **Hisrich Robert D and Micheal Peters P,** Entrepreneurship, McGraw-Hill (2002).

Books Recommended:

1**. Holt David H,** Entrepreneurship: New Venture Creation, Prentice Hall of India (2000).
2. **Saini Jasmer Singh,** Entrepreneurship Development Programmes and Practices, Deep and Deep Publications, New Delhi (1997).
3. **Dollinger,** Entrepreneurship Strategies and Resources, Pearson Education (2003).

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Programme: B.Tech Civil Engineering

Course Title: Structural Analysis-I Lab. **Max. Marks: 50**
Course Code: CE - 331 **University Examination: 25**
Duration of Exams: 2 hours **Sessional Assessment: 25**

Course Objective: The course is designed to introduce the structural analysis apparatuses and structural models to understand the basic mechanics of structure.

List of Practical's:

1. To conduct tensile test on a mild steel specimen and to determine limit of proportionality, elastic limit, yield strength, ultimate tensile strength, Young's modulus, percentage elongation and percentage reduction of area. (Plot stress-strain curve).
2. To conduct hardness test on mild steel, brass and aluminum specimens using Rockwell hardness testing machine.
3. To conduct torsion test on a mild steel specimen to determine the modulus of rigidity.
4. To determine the impact strength of notched mild steel test piece by Izod test and Chirpy Test.
5. To determine the Tensile and compressive strength of Timber, Parallel to grains and Perpendicular to grains.
6. To measure deflection, ultimate flexural and stiffness factor. Plot load deflection curve.
7. To determine ultimate shear strength and Shear modulus. Plot shear stress strain curve
8. To determine crippling load of columns with different end conditions and compare theoretical values
9. To verify the Principle of Maxwell's theorem.
10. Testing of Bricks and Stones as per IS Specifications.

Course Outcomes: After the completion of the experiments the students will able to

1. Understand the elastic behavior of solid material.
2. Determine the compressive and tensile strength of solid material;
3. Measure Deflection, Flexural rigidity, stiffness factor, Ultimate shear strength and Ultimate torsional strength.
4. Get practical idea of Maxwell's principle.
5. Get idea about strength of building materials like brick, stone and wood as per the IS specifications.

Programme: B.Tech Civil Engineering

Course Title: Hydraulics-I Lab. **Max. Marks: 50**
Course Code: CE-332 **University Examination: 25**
Duration of Exams: 2 hours **Internal Assessment: 25**

Course Objective: The course is designed to introduce the hydraulics apparatuses and understand the basic mechanics of fluid.

List of Practical's:

1. To determine experimentally the Meta-centric height of a ship model.
2. To determine viscosity by capillary tube viscometer.
3. To verify the Bernoulli's equation experimentally.
4. To determine different Reynold's numbers in the range where laminar flow conditions change over to turbulent flow.
5. To determine the coefficient of discharge, coefficient of velocity and coefficient of contraction of an orifice or a mouthpiece of a given shape.
6. To calibrate an orifice meter and to study the variation of coefficient of discharge with Reynold's number.
7. To calibrate a venturi-meter and to study the variation of coefficient of discharge with Reynolds's Number.
8. To study boundary layer formation over a flat plate and to determine boundary layer thickness, displacement thickness and momentum thickness.
9. To calibrate a sharp crested triangular Weir.
10. To study the variation of friction factor for turbulent flow in smooth and rough commercial pipes.

Course Outcomes: At the end of the course, the student will be able to:

1. Apply dimensional analysis for design of experimental procedures
2. Calibrate flow measuring devices used in pipes, channels and tanks
3. Determine fluid and flow properties
4. Characterize laminar and turbulent flows

Programme: B.Tech Civil Engineering

Course Title: Surveying-I Lab. **Max. Marks: 50**
Course Code: CE-333 **University Examination: 25**
Duration of Exams: 2 hours **Internal Assessment: 25**

List of Practical's:

A. CHAIN SURVEYING

1. Ranging / Chaining a line and recording the field book.
2. Setting-out Right Angles using Tape.
3. Taking offsets and setting-out Right Angles using:
   (a) Cross Staff
   (b) Indian Optical Square
4. Testing and Adjustment of Chain.

B. COMPASS SURVEYING

1. Study of Prismatic Compass
2. Field Work in Compass Surveying
3. Measurement of Angles between the lines meeting at a point.
4. Compass Traversing by radiation method.

C. PLANE TABLE SURVEYING

1. Study of Equipment
2. Setting-up the plane table- Temp. Adjustments.
3. Marking North Direction and Orientation by:
   I. Magnetic Needle/Trough Compass
   II. Back- sighting.
4. Plotting a few points by Radiation Method.
5. Plotting a few points by Intersection Method.
6. Plotting a traverse.
7. Two point and three point problem.

D. LEVELLING

1. Study of Equipment and levelling staff.
2. Temporary adjustments of level. Field.
3. Field work using levelling Instrument:
   I. Taking Staff readings and
   II. Recording the field book.
4. Longitudinal Section of Road/Railway/Canal/Dam

5. Cross Section of a Road/Railway/Canal/Dam.
6. Taking Staff readings on different stations / finding difference of level between them.

Course Outcomes: After the completion of the course the students will be able to:

1. Conduct survey and collect field data
2. Prepare field notes from survey data
3. Interpret survey data and compute areas and volumes

Programme: B.Tech Civil Engineering

Course Title: Structural Analysis-II **Max. Marks: 100**
Course Code: CE-422 **University Examination: 60**
Duration of Exams: 3 hours **Sessional Assessment: 40**

Objective: The objective of this course is to acquaint the students about various methods used to solve indeterminate beams and frames.

Unit-I

Influence lines &travelling loads

Principal of influence lines and their application to determinate structures; beams, arches & bridge trusses. Criteria for maximum moment; Moment and shear under series of moving concentrated loads in beams. Absolute maximum forces in beams under moving udl.

Unit-II

Cables and suspension bridges

Static of a suspension cable, Analysis of cable & suspension bridges with and without stiffening girders, Analysis for static loads

Unit-III

Analysis of beams and arches by force method

Method of consistent deformation for analysis of indeterminate beams. Analysis of fixed beams by integration and moment area methods. Two hinged arch and fixed arch analysis for static loads. Three moment theorem and its application to analysis of continuous beams.

Unit-IV

Approximate analysis of 2D frames

Sub frame method for approximate analysis of frames for gravity load, portal and cantilever methods for analysis of frames under lateral loads.

Unit-V

Introduction of Displacement method of analysis

Analysis of indeterminate beams & frames (with and without sway) by classical Displacement methods-slope deflection method, moment distribution methods.

Course Outcomes: Students who successfully complete this course will be able to:

1. Obtain influence line diagram for statically determinate and indeterminate structure.
2. Analyze cable and arc structure.
3. Analyze fixed and continuous beam.
4. Analysis of frame design and familiarity with contemporary issues in structural engineering.
5. Analyze frame using displacement method.

Text Books

1. **Wang C.K,** Indeterminate Structural Analysis
2. **Jindal R.L,** Indeterminate Structural Analysis

Reference Books:

1. . Hibbler ," Structural Analysis ", Pearson Education
2. T S Thandavmorthy ," Analysis of Structures ", Oxford University Press
3. Wilbur and Norris, "Elementary Structural Analysis", Tata McGraw Hill.
4. Reddy, C.S., "Basic Structural Analysis", Tata McGraw Hill.
5. Jain, O.P. and Jain, B.K., "Theory & Analysis of Structures ". Vol.I & II Nem Chand

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Programme: B.Tech Civil Engineering

Course Title: Hydraulics-II
Course Code: CE-423
Duration of Exams: 3 hours

Max. Marks: 100
University Examination: 60
Sessional Assessment: 40

Objective: The objective of this course is to acquaint the students with the basic knowledge of flow of fluid in pipes and channels. They are also introduced to hydraulic machines.

Unit-I

Flow through Pipes: Nature of turbulent flow in pipes, Hydraulic and energy grade lines. Equation for velocity distribution over smooth and rough pipes, Resistance coefficient and its variation, Loss of head due to sudden expansion, Contraction, Bends etc. Concept of equivalent length, branched pipes, pipes in series and parallels, Transmission of Power**.**

Unit-II

Fluid flow Past Submerged Bodies: Drag and lift, Drag on a flat plate, cylinder and sphere. Circulation and lift on circular cylinder.

Unit-III

Flow in Open Channels: Uniform flow, Critical depth, Normal depth, Specific energy, Resistance formulae, gradually varied flow equations, Classification of water surface profiles, Hydraulic Jump.

Unit-IV

Water Hammer and Surge Tanks: Sequence of events after sudden value closure, pressure diagrams, Gradual closure or opening of the valve, Instantaneous closure of valve in a rigid pipe, Instantaneous closure of valve in an Elastic pipe and Compressible fluid, Methods of Analysis, Surge Tanks. Location and types of surge tanks.

Unit-V

Hydraulic Machines: Types of Turbines, Description and principles of Impulse and Reaction turbines, Unit quantities and specific speed, Runaway speed, Turbine characteristics, Selection of Turbines, Cavitation, Draft Tube, Dimensions and types of draft tubes, Centrifugal pumps, specific speed, power requirements, Reciprocating pumps.

Course Outcomes: The students will be able to

1. Apply their knowledge of fluid mechanics in addressing problems in flow through pipes.
2. Understand about drag and lift force.

3. Apply their knowledge of fluid mechanics in addressing problems in open channels.
4. Understand about the pressure diagram and analysis of surge tank.
5. Have knowledge in hydraulic machineries (pumps and turbines).

Text Books:

1. **Subramanaya K**, Open channel Flow.
2. **Kumar D. S ,** Fluid mechanics, S. K. Kataria & Sons publishers, New Delhi, 1998.

Reference Books:

1. **Garde R. J**, Engineering Fluid Mechanics.
2. **Ranga Raju, K.G,** Flow through Open Channels, TMH Ltd, New Delhi, 1986.
3. **Nigam P.S**, Handbook of Hydropower Engineering.
4. **Deshmukh, M.M.** Water Power Engineering, Dhanpat Rai & Sons, Delhi, 1978.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Programme: B.Tech Civil Engineering

Course Title: Surveying-II
Course Code: CE-424
Duration of Exams: 3 hours

Max. Marks: 100
University Examination: 60
Sessional Assessment: 40

Objective: The objective of this course is to acquaint the students about tachometric and theodolite surveying and will be introduced to setting out works.

UNIT-I

Theodolite Surveying

Different terms used ,Construction, Temporary adjustment of transit Theodolite; Angle measurements(horizontal and vertical) Measurement of deflection angle and magnetic bearing, Theodolite traversing-Traverse calculations; Traverse adjustments. Height of objects.

UNIT-II

Tachometry

Tachometry, Determination of Stadia constants, Anallatic lens, Methods of Tachometry, Heights and distances from stadia intercepts; Subtense method, Tangential method; Measurement of distances, Problems.

UNIT-III

Curves

Curves, Elements of simple curve, Types of horizontal curves, Design and setting out of a simple curve, compound curve, Transition curve objectives, requirements and calculation of lengths, Vertical Curves.

UNIT-IV

Geodetic Surveying

Triangulation- principles: Choice of stations, Base line measurements and corrections applied ,Electronic methods of distance measurements, Satellite station, Triangulation adjustments; Spherical excess, Computations of sides of spherical triangles, Basenet.

UNIT-V

Introduction to Remote Sensing: Idealized remote sensing, Basic principles: EM spectrum, Wavelength regions and their applications in remote sensing, Interaction of EM radiation with atmosphere and earth's surface. Platforms and sensors. Applications of remote sensing.

Course Outcomes: At the end of the course, the student will be able to:

1. Theodolite and its use.
2. About tachometric survey.
3. Understand different types of cures and their design.
4. Understand triangulation and their application.
5. Understand about basic of remote sensing.

TEXT BOOKS

1. Duggal, S.K." Surveying" Vols. I & II, Tata McGraw Hill, New Delhi,20M
2. Punmia, B.C."Surveying" Vol. 1&2, Laxmi Publications Pvt. Ltd, New Delhi, 2002

BOOKS RECOMMENDED

1. Surveying Vols. I & II by Dr. K.R.Arora
2. Basak "Surveying & Levelling" Tata McGraw Hill, New Delhi
3. Kanetkar, T.P. and Kulkarni, S.V."Surveying & Levelling" Vols. I & II PVG Prakashan, Pune, 1994.
4. Surveying & Levelling by P.B. Shahni

Note for Paper Setter: The Question paper shall comprises of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Programme: B.Tech Civil Engineering

Course Title: Construction Tech. & Management **Max. Marks: 100**
Course Code: CE-425 **University Examination: 60**
Duration of Exams: 3 hours **Sessional Assessment: 40**

Objective: The objective of this course is to acquaint the students about equipments employed to construct civil engineering structures and the methodology to execute various construction works.

UNIT-I

Introduction to Project Management: Introduction, project planning, scheduling, controlling, methods of planning & programming, bar chart, development of bar chart, (illustrative examples), shortcomings of bar chart, milestone chart.

UNIT-II

CPM: Network analysis; Introduction, event, activity, activity time, dummy, network rules, graphical guidelines for network, skip numbering, float, free float, independent float, Numerical problems for computation of activity times, total float, free float, independent float for each activity and also to obtain location of the critical path.

UNIT-III

PERT: Network analysis; Introduction, Time estimate(optimistic time estimate, pessimistic time estimate, most likely time estimate),Frequency distribution, plot of frequency distribution curves (illustrative examples),Slack, positive slack, negative slack, zero slack, Introduction to mean, variance and standard deviation, Numerical problems based on computation of earliest expected time, latest occurrence time, slack, critical path.

UNIT-IV

Excavation and Formwork: Earth moving, drilling, blasting, dewatering, shoring, strutting, disposal and underpinning. Well sinking and pile driving. Form Work: types, material and use, Scaffolding.

UNIT-V

Construction Equipments: Selection of equipments, Excavation equipments –Tractor, Bulldozer, Power Shovel and grader, Compaction Equipment-Sheep's foot Roller, Hauling equipments-Truck, Dump truck, Dumpers, Hydraulic cranes.

Course Outcomes: After successfully studying this course, students will have:

1. An understanding of projects and modern construction practices.

2. A good idea of basic construction dynamics- various stakeholders, project objectives, processes, resource required and project economics.
3. A basic ability to plan, control and monitor construction projects with respect to time and cost and an idea of how to optimise construction projects based on costs
4. An idea how construction projects are administered with respect to contract structuresand issues.
5. An idea of all construction equipments.

Books Recommended:

1. Punmia B.C, PERT & CPM.
2. Purifoy R. L, Construction Methods, Plant & Equipment.
3. Arora S.P, Bindra S.P, Building Construction, Dhanpat Rai publication.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Programme: B.Tech Civil Engineering

Course Title: Building Drawing **Max. Marks: 100**
Course Code: CE-426 **External Examination: 60**
Duration of Exams: 4 hours **Internal Assessment: 40**

Objective: The objective of this course is to enable the students to visualize and draw plans, elevations and sections of various components of buildings.

Unit-I

Standard Conventions in Drawing & Foundations: Basic principles of Building Drawing, Graphical Symbols of Elements of building (Excluding electric & sanitary elements) Simple drawing exercises on foundations: (Spread footing foundation, mat foundation, pile foundation, well foundation).

Unit-II

Plans, Elevations and Sections of buildings: Drawings of plans, Elevations and Sections giving construction details of important building components including Foundation, Plinth, DPC, Lintels, Slabs and Roofs, Full Specifications for each component.

Unit-III

Doors, Windows & Lintels: Simple drawing exercises on building Doors(Ledged & battened door, Ledged battened & braced door, Ledged battened braced & framed door, Single, double, four & six paneled door), Windows (panelled window , Panelled & glazed window, Corner window, Bay window, Casement window), Ventilators. Types of Lintels and their construction details.

Unit-IV

Stairs and Staircases: Stair, Technical Terms used in stairs, Proportioning of staircases. Drawing and construction details of Stair-case(solid spandrel filling, open spandrel, Two side stringer, Central-single stringer straight flight, cantilever steps, R.C.C. Stair case: Dog-legged stairs, open well stair, inclined slab).

Unit-V

R.C.C Drawing: Drawing and construction details of RCC slabs (One way, two way) beams (cantilever beam, Simply supported beam), columns with footings (Square, rectangular, circular).Bar bending schedule.

Course Outcomes: On completion of this course, the students will be able to

1. Implement the regulations for layout planning and preparation of drawings.
2. Draw plans and sections of building.

3. Know different types of doors and windows.
4. Draw different types of stairs of buildings.
5. Understand the detailing of RCC beam and slab.

Books Recommended:

1. **M.G. Shah, Tata McGraw Hill,** Building' Drawing.
2. **R. S. Malik,** Civil Engineering Drawing, Computech
3. **R. Chakorobarty,** Civil Engineering Drawing.
4. **J. B Mc. Kay**, Civil Engineering drawing
5. **Sharma &' Koul** Building Construction.
6. **V.B. Sikka:** civil engineering drawing

Note for Paper Setter: The question paper shall comprise of 10 questions with no Theory. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit. Time duration of paper is four hours.

Programme: B.Tech Civil Engineering

Course Title: Structural Analysis-II Lab.
Course Code: CE-431
Duration of Exams: 2 hours

Max. Marks: 50
University Examination: 25
Internal Assessment: 25

List of Practical's:

1. To determine strain in an externally loaded beam with the help of strain gauge. (Apparatus, Strain gauge indicator, Weights, Hanger, Scale, Vernier caliper)

2. To study behavior of different types of columns and find Euler's buckling load. (Apparatus: Column buckling apparatus, Weights, Hanger, Dial gauge, Scale, Vernier calipers)

3. To study three hinged arch for horizontal displacement of the roller end for a given system of loading and to compare the same with analytic values.

4. To study two hinged arch for horizontal displacement of the roller end for a given system of loading and to compare the same with analytic values.
   (Apparatus: two hinge, Arch apparatus, Weights, Hanger, Dial gauge, Scale, Vernier calipers)

5. To study the behaviour of portal frame under different end conditions.
   (Apparatus portal frame apparatus).

6. To determine value of flexural rigidity for a given beam and compare with analytical value.
   (Apparatus Electric properties of deflected beam apparatus).

7. To determine the deflection of pin connected truss.
   (Apparatus Truss apparatus)

8. To determine material fringe value using diffused light research polar scope
   (Apparatus diffused light research polariscope-photo-elastic model)

9. To verify the moment area theorem regarding slopes and deflections of a beam.
   (Moment area theorem apparatus)

10. To determine the moment required to produce a given rotation at one end of a beam when other end is pinned.

Course Outcomes: On completion of this course, the students will be able to

1. Use different apparatus of structural lab .
2. Understand the behavior of column.
3. Understand the behavior of two and three hinged bridges.
4. Determine flexural rigidity of beam.
5. Determine deflection of beam.

Programme: B.Tech Civil Engineering

Course Title: Hydraulics-II Lab.
Course Code: CE-432
Duration of Exams: 2 hours

Max. Marks: 50
University Examination: 25
Internal Assessment: 25

List of Practical's:

1. To determine the loss coefficient for various pipe fittings.
2. To study the velocity distribution in a pipe and also to compute the discharge by integrating the velocity profile.
3. To determine Manning's coefficient of roughness N for the bed of a given flume.
4. To study the velocity distribution in an open channel and to determine the energy and momentum correction factors.
5. To calibrate a broad crested weir.
6. To study the formation of hydraulic jump.

Course Outcomes: On completion of this course, the students will be able to

1. Determine different losses in pipe fittings.
2. Understand the velocity distribution in pipe and OCF.
3. Determine Manning's coefficient of roughness N.
4. Understand the hydraulic jump.

Programme: B.Tech Civil Engineering

Course Title: Surveying-II (Lab.) **Max. Marks: 50**
Course Code: CE – 433 **University Examination: 25**
Duration of Exams: 2 hours **Sessional Assessment: 25**

List of Practicals:

A. THEODOLITE SURVEYING

1. Study of Equipment:
   i. Ordinary Theodolites
   ii. ED M Theodolites
   iii. G T S Theodolites.
2. Temporary Adjustments of a Theodolite.
3. Field work using a Theodolite:
   i. Measurement of Horizontal and Vertical Angles by ordinary and electronic theodolites.
   ii. Measurement of linear and angular measurements using EDM/GTS Instruments. (Basic Introduction)
   iii. Measurement of magnetic bearing.

B. TACHEOMETRIC SURVEYING

1. Study of equipment and graduated staff.
2. Temporary adjustments
3. Field work:
   i. Determination of Constants" K & C "
   ii. Stadia traversing & recording stadia field book
   iii. Location of Details by Tacheometric Methods
4. Subtense Bar Method: Theory and Field work

Course Outcomes: On completion of this course, the students will be able to

1. Understand about theodolite and its use.
2. Perform Techeometric surveying in the field.

Programme: B.Tech Civil Engineering

Course Title: Estimating & Costing **Max. Marks: 100**
Course Code: CE-521 **External Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**

Objective: The aim of this course is to make the students able enough to determine various quantities and the cost of civil engineering projects.

UNIT-I

Estimate & Types of Estimate: Importance, Items of a work and their Units. Types of estimates, viz. preliminary, Plinth are estimate, Cube rate estimate(for buildings),Approximate quantity method estimate, detailed estimate/Item rate estimate, revised estimate, supplementary estimate, bill of quantities and abstract of cost.

UNIT-II

Analysis of Rates: Preparing analysis of rates, labour schedule, material schedule & rate schedule. Analysis of rates - of lime concrete in foundation; Brickwork in Foundation, super structure, R.C.C. work (Beams, Slabs, Columns), Cement Plastering, white washing, earth work in foundation, D.P.C, Steel work for Reinforcement .

UNIT-III

Specifications: General specifications and detailed specifications, Book of specifications, specifications for earth work in foundation, L.C in foundation, R.C.C. work, Brick work, R.B. Work, Wood work in doors, windows. D.P.C, Centering and Shuttering.

UNIT-IV

Methods of Building Estimates: Estimates of building Estimates of walls, methods of building estimate, Long-wall, short-wall and centre line methods, Estimate of masonry platform, estimate of a masonry tank, estimate of roof trusses (wooden/steel). Estimate of a single room. Building-Estimate of a two roomed building, estimate of an R.C.C beam and R.C.C. Slab.

UNIT-V

Road Estimating & Valuation:

Methods of estimating: earth work, estimate of metallic road, Valuation, Purpose of valuation, Methods of valuation,(1:Rental Method, 2:Direct Comparison with the capital value, 3:Valuation based on profit ,4 : Valuation based on profit, 5: Depreciation method of valuation), Depreciation, Methods of calculating depreciation. Valuation of building-various methods, rent fixation, plinth area requirement.

Course Outcomes: On completion of the course, the student will be able to:

6. Understand the different types of estimation.
7. Determine rates of different items.
8. Know specifications of engineering items.
9. Understand methods of estimation.
10. Estimate the various engineering projects.

Books Recommended:

1. **Datta B. N :** Estimating and Costing, UBS Publication
2. **Mahajan S.P, Satya Srakashan:** Civil Estimating, Costing Evaluation & Specifications.
3 **Khanna**: Hand Book of Civil Engineering.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit

Programme: B.Tech Civil Engineering

Course Title: Structural Analysis-III **Max. Marks: 100**
Course Code: CE-522 **University Examination: 60**
Duration of Exams: 3 hours **Sessional Assessment: 40**

Objective: This course aims at honing the skills of students to analyse the indeterminate structures and introducing them to concept of plastic analysis of beans and frames and matrix methods.

UNIT-I

Moment Distribution Method: Analysis of propped cantilevers, continuous beams with fixed and simply supported ends. Analysis of portal frames with and without sway.

UNIT-II

Kani's Method: Analysis of continuous beams and portal frames. Influence lines for indeterminate structure, Muller Breslau's principle.

UNIT-III

Plastic Analysis: Plastic analysis of beams and frames. Redundant pin jointed frames.

UNIT-IV

Matrix Method: Matrix method of structural analysis (Force method). Approximate analysis of multi-story building frames lateral loads for multistory frames. (Portal method

UNIT-V

Displacement and Cantilever Method: Matrix method structural analysis (Displacement method). Approximate analysis of multi-story. Building frames for lateral loads (cantilever method).

Course Outcome: After the completion of the course the students will be able to:

1. Analyse indeterminate structure by moment distribution methods.
2. Analyse indeterminate structure by Kani's methods.
3. Plastic analysis of beams and frames.
4. Analyse structure by force method and approximate analysis of multi-story building frames by portal method.
5. Analyse structure by stiffness method and approximate analysis of multi-story building frames by cantilever method.

Text Books

1. **Wang C. K**, Intermediate Structural Analysis, Mc Graw Hill Publication.
2. **Ramamrutham S & Narayan R**, Theory of Structures, Dhanpat Rai Publishing

Company.

Books Recommended:

1. **Gere & Weaver,** Matrix Analysis of Framed Structures, CBS Publishers & Distributors.
2. **Robert D. Cook**, Concepts & Applications of Finite Element Analysis.
3. **Dawe D. J,** Matrix & Finite Cement Displacement Analysis of Structures.

Note for Paper Setter: The question paper shall comprises of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Programme: B.Tech Civil Engineering

Course Title: Design of Structures-I | **Max. Marks: 100**
Course Code: CE-523 | **University Examination: 60**
Duration of Exams: 3 hours | **Sessional Assessment: 40**

Objective: The aim of the course is to provide basic knowledge to the students about design of civil engineering structures like beams, columns and slabs.

UNIT-I

Introduction: Characteristic strength, stress-strain relationship for concrete and steel, IS specifications (IS 456, 875 & 1893), characteristic imposed loads, DL, EL & WL. Design philosophies – Working stress method and limit state method. Strength and serviceability requirements, Analysis and design for flexure of singly / doubly rectangular– by working stress method.

UNIT-II

Beams: Analysis and design for flexure of singly / doubly rectangular and flanged beam sections – by limit state method. Serviceability limit states for deflection and cracking, requirements for curtailments and detailing of reinforcement, minimum / maximum tension and compression reinforcement, minimum & maximum spacing of bars.

UNIT-III

Bond stress: flexural & anchorage bond stress, design bond stress, development length, anchorage length; Behavior of beams in shear, design for shear & torsion as per limit state method; Reinforcement detailing..

UNIT-IV

Columns: Design of columns, short and long columns, eccentrically loaded columns.

UNIT-V

One-Way and Two-Slabs: Design of one-way and two-slabs with and without corners held down. Introduction to design by moment confidents. Design of footings (Isolated footings only).

Course Outcomes: After successfully studying this course, students will:

1. Understand the different methods of designing concrete structures.
2. Able to design a beam.
3. Understand the concept of bond stresses in reinforced concrete structures.
4. Able to design a short and long column
5. Able to design a one-way slab and two-way slab.

Text Books:

1. **Jain A.K**, Design of Reinforced Concrete: Limit State Design.
2. **Sinha**, Design of R.C.C Structures.

Books Recommended:

1. **Kong and Evans,** Design of reinforced Concrete and Pre-stressed Concrete Structures
2. **Karve and Shah**, Design of R.C.C Structures,

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Programme: B.Tech Civil Engineering

Course Title: Geotechnical Engineering-I **Max. Marks: 100**
Course Code: CE - 524 **University Examination: 60**
Duration of Exams: 3 hours **Sessional Assessment: 40**

Objective: This course aims at giving basic knowledge about formation of soil and its properties - hydralic & compressive. Methods of sub-soil exploration will also be learnt.

UNIT-I
Introduction: Soil and its formation, various processes and agencies for formation. Types of soils. Three phase soil model, Index properties and classification of soils.

UNIT-II
Soil Hydraulics: Flow through soils, Darcy's Law and its validity, Permeability, Factors affecting permeability and determination of permeability in the lab/Field, Steady state flow, Seepage force, Laplace equation for steady state flow, Flow nets, Seepage through earth dam.

UNIT-III
Soil Compressibility: (a) Consolidation: One dimensional consolidation, Terzaghi's equation, Consolidation test e log p curves. Consolidation Settlement, Time required for settlement. (b) Compaction: Laboratory compaction tests, Proctor compaction test, compaction curve and control on field Compaction, Factors affecting compaction.

UNIT-IV
Effective Stress: Total and effective stresses, pore water pressure Stress distribution under concentrated load. Westergard's and Boussineq's method.

UNIT-V
Soil Investigation: Laboratory and Field Investigation. Sub soil exploration, penetration methods, Geo physical methods electromagnetic method, electric resistivity method and Seismic method. Minerals present in clay, dependence of behaviour of clay on type of mineral.

Course Outcomes: After the completion of the course the students will be able to:
1. Understand the formation of soils, types of soils, Characterise and classify soils.

2. Ability to understand, formulate, and solve problems related to soilhydraulics, permeability and seepage.

3. Compute and analyse the consolidation settlements, Understand the principles of compaction and its control.

4.Ability to utilize mathematical, analytical and numerical methods to analyse geotechnic al-al engineering problems related to total and effective stresses.

5. Understand soil exploration methods, clay minerology.

TEXT BOOKS

1. Soil Mechanics by Alam Singh
2. . Soil Mechanics by S.B.Saighal

BOOKS RECOMMENDED

1. Principles of soil Mechanics by D.W.Taylor
2. Theoretical Soil Mechanics by Terzaghi
3. Soil Mechanics by Terzaghi & Peck
4. Soil Mechanics by Witman & Lamb
5. Soil Mechanics by Jumikis
6. Geotechnical Engineering by Purushothama Raj
7. Geotechnical Engineering by C.Venkatramaiah

NOTE FOR PAPER SETTER: - The Question paper shall comprises of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Programme: B.Tech Civil Engineering

Course Title: Concrete Technology **Max. Marks: 100**
CourseCode:CE525 **University Examination: 60**
Duration of Exams: 3 hours **Sessional Assessment: 40**

Objective: Concrete is the most important civil engineering material, often used with steel reinforcement. The course aims to give details about composition of concrete and its characteristics.

Unit-I

Concrete and its Ingredients: Concrete, Types of concrete, Ingredients of Concrete: Cement; Types of cement, Aggregates; Classification of aggregates , Characteristics of aggregate. Grading of aggregates, fineness modulus, Gap grading, bulking of sand, Water Quality requirements

Unit-II

Properties of Concrete: Properties of concrete in plastic state/ hardened state. Factors affecting the properties of concrete, water-cement ratio, Abram's law, Limitations of Abram's law, Gel/Space ratio.

Unit- III

Admixtures and Special Concretes : Admixtures: Chemical admixtures, Mineral admixtures (Fly ash, Silica fumes, Rice husk ash, Meta Kaolin). Effect of admixtures on properties of concrete in fresh /hardened stage. Special Concrete: Cold weather concreting, hot weather concreting, under water concreting, ready mix concrete, Fiber reinforced concrete, Fly ash concrete, Self compacting concrete, light weight concrete, pre-stressed concrete.

Unit-IV

Concrete Mix Design: Principles of concrete mix design, basic considerations in mix design, factors effecting mix design, mix design procedure of (ACI method, USBR method, British mix design method, IS method), numerical on mix design as per IS guideline.

Unit-V

Concreting Operations: Storing of Cement. Batching of Cement, Batching of aggregate. Mixing of concrete (Hand mixing, Machine mixing), Quality control, Compaction of concrete (Hand compaction, Machine compaction), Curing of concrete, Curing-Methods, nominal and controlled concrete, Defects in concrete.

Course Outcomes: The students will be able to

1. Know about the constituent materials use for making the concrete
2. Know the properties and tests as per IS specification for fresh and hardened concrete
3. To design a concrete Mix
4. Know about the properties and effect of chemical and mineral admixtures in concrete.

5. Know about the quality control, compaction of concrete and batching, mixing curing of concrete.

Text Books:

1. Neville. A M, *Properties of Concrete*,
2. M.S. Shetty, *Concrete Technology,*

Reference Books:

1. Kulkarni P. D, Ghosh R. K and Phull Y. R, *Text Book of Concrete Technology,* New Delhi Oxford and IBH Publishing Co.
2. Gupta B.L and Gupta Amit, *Text Book of Concrete Technology,* Standard Publishers and Distributors, Delhi.
3. Varshney R.S, *Concrete Technology,* New Delhi, Oxford and IBH Publishing

Note for Paper setter: The question paper shall comprise of 10 questions and two questions shall be set from each Unit. The student has to attempt five questions, selecting one from each Unit.

Programme: B.Tech Civil Engineering

Course Title: Environmental Engg. I **Max. Marks: 100**
Course Code: CE-526 **External Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**

Objective: It is the important subject of Civil Engg by which the students become aware about the water quality and its purification processes.

UNIT-I

Water supply: Water demands and domestic use, variation in demands; population forecasting by various methods using logistic curve method; per capita supply, basic needs and factors affecting consumption; design period.

UNIT-II

Sources of water: Kinds of water sources and their characteristics, collection of surface and ground water; quality of surface and ground waters; factors governing the selection of a source of water supply; intakes and their design for lakes, streams and rivers, impounding reservoir and canal; determination of the capacity of impounding reservoir.

UNIT-III

Transmission of water: Various types of conduits, capacity and sizes including economical sizes of rising main, structural requirements; laying and testing of water supply pipelines; pipe materials, joints, appurtenances and valves; leakages and control; water hammer and its control measures.

UNIT-IV

Storage and distribution of water: Methods of distribution, pressure and gravity distribution systems, concept of service and balancing reservoirs, capacity of distribution reservoirs; general design guidelines for distribution system, Hardy - Cross method and equivalent pipe method of pipe network analysis; rural water supply distribution system. Water supply, plumbing systems in buildings and houses: water connections.

UNIT-V

Solid waste management: Solid wastes, physical and chemical characteristics of solid waste, generation, collection and disposal of solid waste, land filling operations.

Course Outcomes: After the completion of the course the students will be able to:

1. Analyze physical chemical and biological characteristics of water.

2. Estimate future population and quantity of drinking water and domestic water requirements.

3. Design components of water supply scheme.

4. Aacquainted with physical and chemical characteristics of solid waste and suitable remedies for its safe disposal.

Text books:

1. Peavy, Rowe and Tchobanoglous: Environmental Engineering
2. Metcalf and Eddy Inc.: Wastewater Engineering
3. Garg: Water Supply Engineering (Environmental Engineering Vol.–I)
4. Garg: Sewage Disposal and Air Pollution Engineering (Environmental Engineering Vol. – II).

Recommended Books:

1. Modi, P. N; Water supply Engineering. Volume-I

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Programme: B.Tech Civil Engineering

Course Title: Geotechnical Engg-I Lab. **Max. Marks: 50**
Course Code: CE-531 **University Examination: 25**
Duration of Exams: 2 hours **Internal Assessment: 25**

List of practical's

1. Detennination of water content; bulk density and specific gravity
2. Soil gradation by sieve analysis and hydrometer analysis.
3. Consistency limits; Detennination of plastic, liquid and shrinkage limits.
4. Detennination of permeability by falling head and constant head method
5. Conduct of I-dimensional consolidation.
6. Conduct of standard proctor compaction test.
7. Rapid control Compaction test as per USBR

Course Outcomes: After the completion of the course the students will be able to:

1. Determine index properties of soils
2. Classify soils
3. Determine engineering properties of soils
4. Determine compaction, permeability and consolidation characteristics of soils

Programme: B.Tech Civil Engineering

Course Title: Concrete Technology Lab. **Max. Marks: 50**
Course Code: CE-532 **University Examination: 25**
Duration of Exams: 2 hours **Internal Assessment: 25**

List of practical's

1. To determine
   (a) Standard consistency of cement.
   (b) Initial setting time of cement.
   (c) Final setting time of cement.
   In conformity with IS code.
2. To determine the tensile strength and compressive strength of Cement in accordance with IS code.
3. To determine the particle size distribution and fineness modulus of coarse and fine aggregates in conformity with IS code.
4. To determine the workability of fresh concrete by slump test.
5. To determine the workability of freshly mixed concrete by the compaction factor test.
6. To determine the cube strength of concrete for different mixes and different W/C ratios.
7. To determine the flexural strength (Modulus of Rupture) of concrete (Nominal Mix).
8. To determine the flexural ultimate strength of under reinforced beam and over reinforced beam.
9. To determine the ultimate load carrying capacity of a reinforced concrete column.
10. To determine the bond strength between:
    (a) Mild steel plain bars & concrete
    (b) (Tor Steel) cold twisted bars and concrete

Course Outcomes: After the completion of the course the students will be able to:

1. Determine Standard consistency of cement, Initial setting time of cement and Final setting time of cement in conformity with IS code.
2. Determine the tensile strength and compressive strength of Cement in accordance with IS code.

3. Determine the workability of fresh concrete by slump test.
4. Determine the cube strength of concrete for different mixes and different W/C ratios.
5. Determine the flexural ultimate strength of under reinforced beam and over reinforced beam.

Programme: B.Tech Civil Engineering

Course Title: Environmental Engg. Lab. **Max. Marks: 50**
Course Code: CE-533 **University Examination: 25**
Duration of Exams: 2 hours **Sessional Assessment: 25**

List of Practicals:

1) To determine the total solids, suspended solids and dissolved solids for a given sample of water.

2) To determine the alkalinity of a given sample of water.

3) To determine the total hardness and carbonate hardness for a given sample of water.

4) To determine the turbidity of a given sample of water.

5) To find out the colour and odour of a given sample of water.

6) To determine the percentage of Magnesium, Cadmium, Iron, silica and Aluminium in a given sample of water.

7) To determine the percentage of sulphates, chlorides, Iodide, Fluoride.

8) To determine the percentage of Sodium and Potassium in a given sample of water.

9) To determine the concentration of dissolved oxygen in a given sample of water and find out the oxygen.

10) To determine the percentage of Ammonia and Nitrogen present in a given sample of water.

Course Outcomes: After the completion of the course the students will be able to:

1. Determine the total solids, suspended solids and dissolved solids for a given sample of water.
2. Determine the total hardness and carbonate hardness for a given sample of water.
3. Determine the turbidity of a given sample of water and able to find out the colour and odour of a given sample of water.
4. Determine the percentage of Magnesium, Cadmium, Iron, silica and Aluminium in a given sample of water.
5. Determine the concentration of dissolved oxygen in a given sample of water and find out the oxygen.

Programme: B.Tech Civil Engineering

Course Title: Transportation Engineering-I **Max. Marks: 100**
Course Code: CE-621 **External Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**

Objective: The objective of this course is to provide basic knowledge to the students pertaining to roads, their construction material and bridges.

UNIT I

Elements of Traffic Engineering: Road user, vehicle and road way .Vehicle Characteristics, IRC Standards-Design Speed ,Traffic Volume, Highway Capacity. Road user facilities -Parking facilities, cycle tracks and pedestrian studies.

UNIT II

Elements of Design: Alignment, Cross sectional elements- stopping and passing distance. Horizontal and Vertical curves. Design Problem – hill roads. Introduction to traffic regulation and control, traffic signal.

UNIT III

Highway Materials and Construction: Properties of road aggregates and bituminous materials, design of bituminous concrete mix, methods of preparing sub grade functions of significance of sub grade properties, Base course and construction of various types of surface covers.

UNIT IV

Pavement Analysis and Design: Types and Component parts of Pavements. Factors affecting design and performance of pavements. Analysis and design methods of rigid and flexible pavements.

UNIT V

Bridges: Components and classification of bridges. Standard specifications for bridge design. RC Bridge code, different load and forces on bridges, Introduction to design of RCC and prestressed concrete bridges.

Course outcome: The students will be able to:

1. carry out surveys involved in planning and highway alignment
2. design the geometric elements of highways and expressways
3. Know about the different highway materials and construction methodologies.
4. characterize pavement materials and design flexible and rigid pavements as per IRC
5. Understand the bridge components and their design.

Books Recommended:

1. **Victor,** DJ Essentials of Bridge Engineering, H Oxford and IBH Publishers, New Delhi
2. **Bindra,** S.P Principles and Practice of Bridge Engineering", Dhanpat Rai and Sons, New Delhi.
3. **Bhanot, K. L** "Highway Engineering", S. Chand and Company Pvt. Ltd. New Delhi
4. **Khanna, S & Justo,** Highway Engineering, Nem Chand Brothers Roorke.
5. **Ponnuswamy S. & H. Toto,** Bridge engineering, Mc Graw Hill, New Delhi.
6. **R.J Salter & N.B Hounsel,** Highway Traffic Analysis and
7. Design,Macmillan Press ltd.1996

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Programme: B.Tech Civil Engineering

Course Title: Design of structures-II **Max. Marks: 100**
Course Code: CE-623 **University Examination: 60**
Duration of Exams: 3 hours **Sessional Assessment: 40**

Objective: The objective of this course is to acquaint the students bout design of steel structures utilized in civil engineering like roof trusses, compression, tension and flexural members. Design of timber structures has also been emphasized.

UNIT I

Introduction to steel structure: Common steel structure, advantages and disadvantages of steel structures, type of steel, rolled steel sections, special considerations in steel design, design philosophy, limit state design, design strength, deflection and serviceability limits, stability checks.

UNIT II

Design of Connections: Riveted, bolted and welded connections, classification of bolts and types of bolted connections, **IS 800-2007** specifications for design of bolted connections, worked examples on design of bolted joint, shear capacity and tension resistance of bolts **(IS-1364)**, design examples of fillet and butt weld connections, design of eccentric bolted and welded connections.

UNIT III

Design of Tension members: Design strength of tension member due to yielding of gross section, rupture strength of critical section and block shear, tension splices and lug angles; design of bolted and welded connections for ties subjected to both bending and axial tension.

UNIT IV

Design of Compression members: Shape of compression members, buckling class of cross–section, slenderness ratio, design compressive stresses and strengths, use of **IS800-2007** tables for design stresses, design of compression members, design of laced and battened columns, design of column splices; Column bases: design of slab base and gusseted base.

UNIT V

Design of Beams: Behavior of beam in flexure, section classification, plastic moment carrying capacity of a section, bending and shear strengths of laterally supported beams, design of laterally supported beams, deflection limits, web buckling and web crippling, design of built-up beams, purlins, plate girders.

Course Outcomes: After studying the course student will-

1. Understand the different type of steel structures and different design philosophies.
2. Able to design the connection between different steel sections.

3. Able to design the steel tension members.
4. Able to design the compression members.
5. Understand the behavior of beams in flexure and design them.

Text Books:

1. **Arya A. S and Ajmani J. L,** Design of Steel Structures, Nem Chand, Roorke.
2. **Duggal S. K,** Design of Steel Structures, Standard Publishers and distributors Delhi.

Books Recommended:

1. **Chandra Ram,** Design of steel structures, Standard Publishers and Distributors Delhi.
2. **Kazmi and Jindal,** Design of Steel Structures, Prentice Hall of India New Delhi.
3. **Negi L.S,** Design of Steel Structures, Tata McGraw Hill, New Delhi.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Programme: B.Tech Civil Engineering

Course Title: Geotechnical Engineering-II **Max. Marks: 100**
Course Code: CE-624 **University Examination: 60**
Duration of Exams: 3 hours **Sessional Assessment: 40**

Objective: The course aims at acquainting students with the behavior of soil and acquire knowledge about foundations, earth pressure and stability of slopes.

UNIT I

Shear Strength: Shear strength concept. Mohr's Coulumb equation. Laboratory determination, Different tests and drainage conditions, Direct shear test, Triaxial test under different drainage conditions i.e. undrained, drained and consolidated, Direct compression test, Vane shear test.

UNIT II

Earth Pressure: Lateral earth pressure. Rankine's theory, Active and Passive States. Coulomb's Wedge theory, Lateral earth pressure under various conditions like surcharge, sloping backfill and high water table behind the wall. Earth pressure diagrams, total thrust, tension, Friction circle method.

UNIT III

Bearing Capacity: Basic definitions and methods of determination of bearing capacity, Rankine's analysis, Prandtl's analysis, Terzaghi's bearing capacity theory, Shear failure, Effect of water table, Effects of rigidity of footings, Plate load test. Bearing capacity from SPT.

UNIT-IV

Foundations: Importance and types of foundations. Design principles for footing and rafts. Foundations on clays and sands. Foundations - types and applications, Pile foundation necessity and types, Negative skin friction, Determination of load carrying capacity by dynamic and static formulae, Pile load test, Groups action of piles, Efficiency of pile groups.

UNIT-V

Soil Stabilization & Stability of Slopes: Methods of soil stabilization. Brief introduction to each method of stabilization, Stabilization by Geotextiles, Reinforced earth Infinite slopes, Types of slope failures, Stability number, Swedish and Friction circle methods. Improving stability of slopes, Dynamic behavior of soils i.e. liquefaction of soils.

Course outcome: The students will be able to :

1. Understand and various tests done to find the shear strength of soils.
2. Calculate the active and passive pressure of soils.
3. Calculate the bearing capacity of soils.

4. Know the different type of foundations and their design principles.
5. Understand the methods of soil stabilization and find the stability of slopes.

Text Books

1. Arora K. R, **Soil Mechanics and Foundation Engineering**, Standard Publications, Delhi.
2. Dutta K. Manoj & Gulati Shashi, **Geotechnical Engineering**, Tata Mc Graw Hill, Delhi.

Reference Books

1. Conduto P. Donald, **Geotechnical Engineering**, Prentice Hall India Ltd.
2. Punimia B. C, **Soil Mechanics and Foundation Engineering**, Laxmi Publications Ltd.
3. Varghese P. C, **Foundation Engineering**, PHI Learning Pvt. Ltd.

Note for Paper Setter: - The Question paper shall comprise 10 questions, two questions from each unit. The students are required to attempt five questions, one from each unit.

Programme: B.Tech Civil Engineering

Course Title: Geology & Earthquake Engg. **Max. Marks: 100**
Course Code: CE-625 **University Examination: 60**
Duration of Exams: 3 hours **Sessional Assessment: 40**

Objective: The aim of this course is to make the students aware about the earth, its constitution, rocks and soil, impact of wind and precipitation. Earthquakes has also been incorporated to be studied.

Unit –I

Introduction, Definition and Scope of Engineering Geology with its importance in Civil Engineering. Physical properties of Rock forming Minerals, introduction of Rocks, mode of formation and classification of sedimentary and igneous rocks, agents of metamorphism and zone of metamorphism, physical and engineering properties of some important rocks.

Unit- II

Weathering; mechanical and chemical weathering. Erosion; Erosion by running water and wind fold; study of various types of folds, faults; study of various types of faults, joint; study of various types of joints, civil engineering significance of folds, faults and joints.

Unit –III

Application of rocks as an engineering materials, building stone, groundwater, concepts of zone of aeration and saturation, land-slides, land subsidence, earthquake, classification of earthquake zones in India and its civil engineering significance.

Unit IV

Physical properties of Rock Forming Minerals, Engineering Properties of Igneous Sedimentary and Metamorphic Rocks. Impact of Rock properties on properties of concrete. Mineral Composition of Rocks affecting the properties of Concrete at its Fresh Stage.

Unit- V

Geological investigation techniques. Geological investigations of Dam site and reservoir, bridges, highways, buildings and tunnels. Application of software for the solution of engineering geologic problems. Application of software for interpretation of sub-surface geological strata.

Course outcome: The students will be able to

1. Understand the role of geology in construction process and different types of rocks.
2. Understand about types of weatherin, fault, fold, joints in rock.
3. Understand about ground water recharge and also about the seismic zones in India.
4. Know about the engineering properties of different rocks and its mineralogy.
5. Use the geologic literature to establish the geotechnical framework needed to

properly design and construct heavy civil work projects.

Text Books

1. Parbin Singh, Engineering Geology.
2. Arthur Holmes, Physical Geology.

Books Recommended:

1. Shilling P.B,Structural Geology.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Programme: B.Tech Civil Engineering

Course Title: Environmental Engineering II **Max. Marks: 100**
Course Code: CE-626 **University Examination: 60**
Duration of Exams: 3 hours **Sessional Assessment: 40**

Objective: Water is the divine fluid, important for life. This course has been kept in the syllabi in order to study its treatment, quantity required and the way of supplying water to the user.

UNIT-I

Concepts of water and wastewater quality: physical, chemical and bacteriological examination of water and wastewater. Water borne diseases and their control. Objectives of treatment: Water and wastewater treatment, unit operations and processes and flow sheets.

UNIT-II

Sedimentation: Determination of settling velocity, efficiency of ideal sedimentation tank, different classes of settling; design of primary and secondary settling tanks; removal efficiency for discrete and flocculent settling. Coagulation: Mechanisms of coagulation, coagulants and their reactions, coagulant aids; design of flocculators and clariflocculators.

UNIT-III

Filtration: Theory of filtration; hydraulics of filtration; slow sand, rapid sand and pressure filters, backwashing; brief introduction to other filters; design of filters. Disinfection: Requirements of an ideal disinfectant; kinetics of disinfection, various disinfectants, chlorination and practices of chlorination. Water softening and ion exchange: calculation of dose of chemicals. Adsorption.

UNIT-IV

Wastewater Treatment: Preliminary, primary, secondary and tertiary treatment processes. Primary Treatment: Screens, grit chamber and their design, sedimentation and chemical treatment to be given. Secondary Treatment: Theory of organic matter removal; activated sludge process, design of different units and modifications, extended aeration systems; trickling filters; aerated lagoons, waste stabilization ponds, oxidation ditches.

UNIT-V

Anaerobic digestion of sludge: Design of low and high rate anaerobic digesters and septic tank. Basic concept of anaerobic contact process, anaerobic filter, anaerobic fixed film reactor, fluidized bed and expanded bed reactors and up flow anaerobic sludge blanket (UASB) reactor. Disposal of wastewater on land and in water bodies.

Course Outcomes: At the end of the course, students will be able to-

1. Analyze physical chemical and biological characteristics of waste water.
2. Understand the sedimentation process and design of sedimentation tanks.
3. Design Various component of slow sand and rapid sand filters.
4. Understand and design the different unit processes (Trickling filter, grit chamber etc.)

5. Design of low and high rate anaerobic digesters and septic tank.

Text books:

1. Peavy, Rowe and Tchobanoglous: Environmental Engineering
2. Metcalf and Eddy Inc.: Wastewater Engineering
3. Garg: Water Supply Engineering (Environmental Engineering Vol.– I)

Reference books:

1. Manual on Water Supply and Treatment, C. P. H. E. E. O., Ministry of Urban Development, Government of India, New Delhi
2. Steel and McGhee: Water Supply and Sewerage
3. Fair and Geyer: Water Supply and Wastewater Disposal

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Programme: B.Tech Civil Engineering

Course Title: Transportation Engg. Lab. **Max. Marks: 50**
Course Code: CE-631 **University Examination: 25**
Duration of Exams: 2 hours **Internal Assessment: 25**

List of Practical's:

(A) Tests on Aggregate:

(1) Aggregate grading and determination of specific gravity.
(2) Determination of crushing value.
(3) To carry out Los Angels abrasion test.
(4) To carry out Impact test.
(5) Shape tests: Flakiness and elongation index determination.

(B) Tests on Bitumen:

(1) Determination of Penetration value.
(2) To find out ductility of a bitumen sample.
(3) Determination of Flash & Fire-point.

(C) Tests on Subgrade:

(1) Determination of sub-grade modulus.
(2) Determination of California bearing ratio.

Course Outcomes: The students will be able to find out the different properties of aggregate, bitumen and subgrade soil.

Programme: B.Tech Civil Engineering

Course Title: Geotechnical Engineering–II Lab **Max. Marks: 50**
Course Code: CE-632 **University Examination: 25**
Duration of Exams: 2 hours **Internal Assessment: 25**

List of Practicals:

1) Determination of shear strength parameters of soil by:
   (a) Direct Shear Test
   (b) Triaxial compression Test
   (c) Unconfined Compression Test
   (d) Vane Shear Test

2) Conduct of Standard penetration test.

3) Conduct of Dynamic cone penetration test.

4) Determination of bearing capacity by Plate load test.

5) Rapid moisture content determination by calcium carbide method.

6) Exposure to Static cone Penetrometer.

7) Subsoil exploration by electric resistivity method.

Course Outcomes:
Students know the techniques to determine index properties and engineering properties such as shear strength, compressibility and permeability by conducting appropriate tests**.**

Programme: B.Tech Civil Engineering

Course Title: Survey Camp | **Max. Marks: 50**
Course Code: CE-633 | **University Examination: 25**
Duration of Exams: 3 hours | **Internal Assessment: 25**

A. TWO WEEK DURATION

1. Triangulation:
    i. Ordinary Methods
    ii. On the basis of Global positioning system (GPS)

Shifting of Horizontal and Vertical Controls:

2. Setting out of works

4. Setting out of Curves

5. Contouring:
    i. Contouring of a Dam Reservoir/Railway line
    ii. Preparing a contour plan by various methods
    iii. Setting out of Contour lines of an appropriate site.

Course Outcomes: The students will know how to set out curves and prepare a contour map.

Programme: B.Tech Civil Engineering

Course Title: Transportation Engineering-II **Max. Marks: 100**
Course Code: CE-721 **External Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**

Objective: The objective of this course is to provide basic knowledge to the students pertaining to railways, harbors, docks and airports.

UNIT-I

Railways-I: Importance of transportation system. History of railways and It's development, development of Indian railways. Surveys for Route location. Permanent way and its component parts formation, Ballast Sleepers & Rails. Creep and Tilt in Rails.

UNIT-II

Railways-II: Track fittings and fastenings. Points and crossings. Track resistance and tractive effort. Gauge problem, super elevation near branching of curves. Gradients. Station platforms-Various types of yards and sidings. Signals.

UNIT-III

Harbours: Various types of natural and artificial Harbours. Break water various types of their methods of construction.

UNIT-IV

Docks: Various types-Dry and wet docks, floating docks and spillways. Transit sheds and ware houses: Light house, Navigation aids.

UNIT-V

Airport Engineering: Introduction, Classification of airports: planning, Surveys and site selection of airports. Airport Geometrics: Runway length, Patterns and orientation-wind rose diagram. Design of Airport Pavement ,Run Way and taxiway. Terminal requirements. Design-Difference between highway and airport pavements. Introduction to Airport Drainage and Air Traffic Control.

Course outcome: After successfully studying this course student will:

1. Understand the importance of transportation system and permanent way and its various components.
2. Understand track resistance and tractive efforts and super elevation of curves.
3. Understand various types of harbours and their method of construction.
4. Understand various types of dry and wet docks, spillway and transit sheds.
5. Understand planning, survey and site selection of airport and able to design airport pavement and taxiway.

Books Recommended:

1. **B L Gupta,** Roads, railways, bridge & Tunnels.
2. **Rangawala,** Docks & Harbours.
3. **legot & Dvnn,** Concrete Bridge.
4. **Birdi & Ahuja,** Railway bridges & Tunnels.
5. **N.K.Naswani,** Railway Engineering.
6. **K.F.Antia,** Railways.
7. **Mundery,** Railways track Engineering.
8. **Khanna,** Highway Engineering.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit

Programme: B.Tech Civil Engineering

Course Title: Irrigation & Flood Control **Max. Marks: 100**
Course Code: CE-722 **University Examination: 60**
Duration of Exams: 3 hours **Sessional Assessment: 40**

Objective: This course is meant to provide an understanding to the students about water requirements in irrigation, canal design, diversion works, cross drainage works and measures for flood control.

UNIT-I

Introduction: Present status of irrigation in India, Advantages of irrigation, brief of Gravity, Lift and sprinkler irrigation. Soil moisture and crop water relationships, duty, delta, consumptive use, irrigation requirements, principal Indian crops, multiple cropping, etc.

UNIT-II

Canal Irrigation: Types of canals, parts of canal irrigation systems, channel alignment, assessment of water requirements, estimation of channel losses, Design of Channels, Regime and semi-theoretical approaches; canal lining, facts affecting choice of various types of canal lining.

UNIT-III

Diversion Headwork: Selection of sites and layout, parts of diversion head works, types of weirs/Barrages, design of weirs' on permeable foundations, silt excluders and silt ejectors.

UNIT-IV

Cross Drainage Works: Necessity of cross drainage works, their types and selection; design of various types of cross drainage works such as aqueduct, siphon, super passage, load.

UNIT-V

Flood Control: Flood problem, types of flood control measures, drainage of irrigation lands both saline and alkaline lands.

Course Outcomes: After the completion of the course the students will be able to:

1. Understand the basic requirements of irrigation and various irrigation techniques, requirements of the crops

2. Design irrigation canals and canal network

3. Plan and design diversion head works

4. Design irrigation canal structures

5. Analyze the flood control measures

Text Books:

1. **Bharat Singh,** Fundamentals of irrigation engineering.
2. **Varshney, Gupta & Gupta,** Theory and design of irrigation structures Vol. I & II

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Programme: B.Tech Civil Engineering

Course Title: Design of Structures-III **Max. Marks: 100**
Course Code: CE-723 **University Examination: 60**
Duration of Exams: 3 hours **Sessional Assessment: 40**

Objective: This course aims to strengthen the design skills in foundations, R Walls, domes and Pre stressed structures.

UNIT-I

Foundations: Various types of RCC footings, Design of isolated and combined footings. Introduction to Raft foundation.

UNIT-II

Retaining Walls: Stability analysis of retaining walls, design of cantilever and counter for type RCC retaining walls.

UNIT-III

Water Retaining Structures: Design of underground, circular and rectangular water tanks-reference to IS:3370

UNIT-IV

Shell Structures: Membrane analysis of spherical and conical domes by statical methods. Design of domes and ring beams.

UNIT-V

Pre Stressed Concrete: General principles, Methods of pre stressing, pre-tensioning and post-tensioning, losses in pre stress. Design of rectangular, T and I section beams.

Course Outcomes: After studying the course student will:

1. Able to design the isolated and combined footing.
2. Able to design the retaining walls and analyse them for stability.
3. Capable of designing the different water tanks.
4. Able to do the membrane analysis of domes and design them.
5. Understand the methods of pre-stressing and able to calculate losses in pre-stress members.

Text Books:

1. **Bowels,** Foundation Engineering.
2. **Jain & Jaikrishen,** Design of R.C.C Structures Vol.-II.
3. **Krishnarayan,** Prestress Concrete Structures.

Books Recommended:

1. **Kong & Evans,** Design of reinforced and pre stressed concrete Structures.
2. **A.K. Jain,** Design of R.C.C.-Limit state Method.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Course Outcomes: At the end of the course, the student will be able to:

1. Work in a team to select a problem for project work
2. Review and evaluate the available literature on the chosen problem
3. Formulate the methodology to solve the identified problem
4. Apply the principles, tools and techniques to solve the problem
5. Prepare and present project report

Programme: B.Tech Civil Engineering

Course Title: Environmental Assessment & Modelling **Max. Marks: 100**
Course Code: CE-745 **University Examination: 60**
Duration of Exams: 3 hours **Sessional Assessment: 40**

UNIT-I

Environmental assessment: Evolution of environmental impact assessment (EIA), EIA at project, regional and policy level; strategic EIA, EIA process, screening and scoping criteria, rapid and comprehensive EIA, specialized areas like environmental health impact assessment, environmental risk analysis, economic valuation methods, cost benefit analysis, expert system and GIS applications, uncertainties.

UNIT-II

Environmental policies and legislation: Legislative and environmental clearance procedures in India and other countries, sitting criteria, public participation, resettlement and rehabilitation.

UNIT-III

Methodologies: Practical applications of EIA, EIA methodologies, baseline data collection, prediction and assessment of impacts on physical, biological and socio-economic environment, environmental management plan, post project monitoring, EIA report and EIS, review process.

UNIT-IV

Environmental systems Modelling: Principles of modelling, classification; introduction to air quality models, meteorology, atmospheric stability and turbulence, Gaussian plume model and modification, numerical models.

UNIT-V

Transport and fate of pollutant in aquatic system: introduction to river, estuarine and Lake Hydrodynamics, stratification and eutrophication of lakes, dissolved oxygen model for streams, temperature models.

Course outcome: After successfully studying this course student will:

1. Understand evolution of environmental impact assessment and EIA at project.
2. Understand legislative & environmental clearance procedures in India and other countries.
3. Understand EIA methodologies, base line data collection & post project monitoring.
4. Understand principle of modelling airquality models and Gaussian plume models.
5. Understand dissolved oxygen model for streams and tempreture models.

Text Books

1. Environmental Impact Assessment for Developing Countries: Asit K. Biswas
2. Environmental Impact Analysis Handbook : G.J. Rau and C.D. Wooten
3. Environmental Impact Assessment : L. Canter

Reference Books

1. Air Pollution : J.H. Seinfield
2. Principles of Surface Water Quality Modelling and Control : R.V. Thomann and J. A. Muller

Note for Paper Setter: - The Question paper shall comprise 10 questions, two questions from each unit. The students are required to attempt five questions, one from each unit.

Programme: B.Tech Civil Engineering

Course Title: Maintenance Engineering
Course Code: CE-750
Duration of Exams: 3 hours

Max. Marks: 100
University Examination: 60
Sessional Assessment: 40

UNIT-I

Introduction: Meaning and Objective of Maintenance of buildings, Factors influencing the repair and maintenance, factors causing deterioration such as human, Chemical, environmental and natural disaster, effects of various agencies causing disaster on bricks, timber, concrete paint, metals, plastics and stones. General aspects of maintenance planning, control, safety aspects and man power planning.

UNIT-II

Investigation and Diagnosis: Objective of investigation, Systematic procedure of investigation, Non-destructive tests on building elements and materials, main causes of building defects on various elements such as foundations, basements, DPC, Walls, Columns, beams, Roofs and terraces.

UNIT-III

Repair Materials: Basics Characteristics of repair materials, compatibility of repair materials, Characteristics of anti-corrosion coatings, adhesives mortars, curing compounds, joint sealants, water proofing compounds, protective coatings, selection of repair material for a specific job.

UNIT-IV

Repair Building Defects: Appraisal of damage and deterioration by non-destructive and other techniques, strengthening of Building Components. Such as walls, panel walls by grunting, guniting short getting and under pinning, prevention of water leakage.
Preventive maintenance consideration. Crack repair methods such as Epoxy injection, Growing and sealing, stitching, flexible sealing. Repair of joints, repair of surface defects by bug holes, tie holes, repair of honey comb and larger voids.

UNIT-V

Foundation and Plumbing Repairs: Foundation repair methods such as poured concrete pairs or bell pair method, concrete pressed piling, concrete pressed piling with insert and steel pressed piling, comparison of foundation repair methods.
Trouble shooting toilet problems, defects in cisterns, blocked drains and damaged china wave, Maintenance of GI pipes, repair of traps, repair of **one** head and underground tanks.
Course outcome: After successfully studying this course student will:

1. Understand the meaning and objective of Maintenance of buildings, Factors influencing the repair and maintenance and effects of various agencies causing disaster on bricks, timber, concrete etc.

2. Know the Non-destructive tests on building elements and materials, main causes of building defects on various elements such as foundations, basements etc.
3. Know the repair materials for building such as anti-corrosion coatings, adhesives mortars, curing compounds, joint sealants, water proofing compounds, protective coatings.
4. Understand the repair building defects and crack repair methods such as Epoxy injection, Growing and sealing, stitching, flexible sealing etc.
5. Know various foundation repair methods such as poured concrete pairs or bell pair method and repair of one head and underground tanks.

Text Books:

1. **A.P. Arora, Dhampat Rai & Sons,** A text of building construction.
2. **Ian Chander,** Repair & Renovation of Modern Buildings, McGraw-Hill Professional.

Books Recommended:

1. **R. K. Dhir, R. M. Jones and Li Zheng, Thomas telford,** Repair and Renovation of Concrete structures.
2. **R.C. Mishra,** Maintenance Engineering and Management Prentice- Hall Pvt. Ltd.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Programme: B.Tech Civil Engineering

Course Title: Industrial Training | **Max. Marks: 50**
Course Code: CE-731 | **University Examination: Nil**
Duration of Exams: 2 hours | **Internal Assessment: 50**

Details:

At the end of semester VI students are required to attend an Industrial Training for 6 weeks duration, during summer vacations. After the completion of training every student is required to prepare a detailed report of the training work which he/she has attended in an Organization/Industry/Company. Industrial Training shall be an essential component of curriculum to fulfill the eligibility criteria for appearing in semester VII university examination. The examination of Industrial Training shall be conducted during semester VII examination.

Table 3 Distribution of Weightage for Minor project & Industrial Training of 50 marks.

Component	Weightage
Minor Project : Practical Work/Fabrication of Model/Drawing etc.	35
Industrial Training	15
Total	**50**

Programme: B.Tech Civil Engineering

Course Title: Seminar
Course Code: CE-732
Duration of Exams: 2 hours

Max. Marks: 50
University Examination: Nil
Internal Assessment: 50

Details:

During semester VI students are required to choose any topic that pertains to civil engineering and get the approval from the coordinator of the same semester or Head of the department. The date on which the seminar will be held will be decided by head after consulting the coordinator. The student has to give power point presentation before the students and the committee of the faculty members, framed by HoD and has to reply questions and queries asked by the faculty members of the committee. Marks will be given on overall performance in presentation and response to the queries asked to the student. The coordinator of the seventh semester will be overall in-charge.

Programme: B.Tech Civil Engineering

Course Title: STAAD Pro **Max. Marks: 50**
Course Code: CE-733 **University Examination: Nil**
Duration of Exams: 2 hours **Internal Assessment: 50**

List of Practicals:

1. Introduction to STAAD, its Components, structures and analytical models. Creating Basic Geometry (Beams/Columns), Architectural Drawing – Entering Coordinates. Creating some Geometry parts (Beams/Columns) in Architectural Drawing by Snap/Node Beam Command

2. Creating Geometry of Structures using Split Beam and Stretching of Members. Creating Geometry of Vertical and Horizontal Bracings in the Structure. Creating Geometry of Curved Beams/Solids in the Structure.

3. Selection of Members, Creating Group of Members, Assigning of Property to Members, For Steel Members – Using Section Database.

4. For Concrete Members – Using Define Tab. Creating User Table. Using Section Wizard

5. Using Specification Commands in members- beam. Using Specification Command as Truss, Tension and Compression members. Using Master/Slave Command in Staad. Creating Different types of Supports in Staad using Create Support Command.

6. Applying Different types of Loads – Dead, Live and Snow Load in Structure using Staad. Applying Different types of Loads-Seismic Load, Wind Load and Miscellaneous Load in Structure using Staad.

7. Creating Various Load Combinations in Staad. Pre-Print and Post-Print analysis command in Staad. Various types of Perform Analysis in Staad. Performing Analysis in Staad.

8. Assigning Code to Structure. 2 hours, Assigning Various Parameters to Structure. Slenderness and Unsupported Length Commands. Assigning Commands to Structure. Performing Analysis after Design.

9. Working with Editor Input file of Staad. Familiarity with Various Commands used in Staad Input File. Using Post Processing Command in the Structure. Analyzing various Analysis Results at various members and Joints.

10. Viewing Staad Output File – Design File of Structure, Generation of Project

Report. Queries/Doubts

Course Outcomes: After the completion of the course the students will be able to:

1. Use software to model any type of structure.
2. Compute loads and use computer software to analyse a structure.
3. Use software to design a structure based on IS Codal provisions.

Programme: B.Tech Civil Engineering

Course Title: Architecture and Town Planning **Max. Marks: 100**
Course Code: CE-841 **University Examination: 60**
Duration of Exam: 3 Hrs **Sessional Assessment: 40**

Objectives: The objective of this subject is to study the principles of architecture design and functional planning of buildings. It also aims to realize the process of resource mobilization, organization of land-use, transportation and infrastructure networks both for efficient functioning and creation of pleasant and well ordered environment.

UNIT–I

Introduction to Architecture: Origin & definition, factors affecting Architecture, Aesthetics – Principles, Elements of Aesthetics point, Line, Plane, figure, form, shape, size, Background. Composition-focus, unity, balance, rhythm, harmony, discord, textures, contrast, scale, proportions and character. Colour-psychological impact and other fractures, Circulation.

UNIT–II

Basic Principles: Orientation of building, temperature, effect of sun and wind on orientation, climate- cool, temperate & arid season. Ventilation in buildings, space. Modern concept of building. Comfort, factors affecting planning. Vertical space and shelter, Landscape-architecture. Planning of Buildings – Aims, factors affecting, site selection.

UNIT–III

Town Planning: Introduction to town planning, evolution, objects, principles & importance of town planning. Origin & growth of towns, stages in town development, Planning of modern towns & military towns. Town planning in ancient India & present position. Zoning- Objects, Principles, importance and aspects.

UNIT–IV

Slums, Parks and Industries: Slums-Causes, Characteristics, effects, clearance, re-housing and prevention of slum formation. Parks- classification, park systems design, Park ways, Playgrounds, Industries- Classification, requirements and townships, Classification and principles of design of public buildings, objects of re-planning, garden city.

UNIT–V

Building Bye-laws and Regulation: Building bye-laws, underlying principles. Functions of local authority, applicability of bye-laws, set back, light plane, floor space off-street parking. Building bye-laws for residentional area of a town scheme. Master plan- objects, importance and features. Stages of preparation of development plan. Urban roads, street system and traffic management.

Couse Outcome: After completion of course students will be able to

1. Know about the history of Architecture.
2. Understand the basic principle of Architecture.
3. Understand the different phases in town planning.
4. Know about the different settlements.

5. Acquire knowledge about the building by law and regulations.

Books Recommended:

1. Satish Chandra Agarwala, Architecture &Town Planning, Dhanpat Rai & Co.
2. Gurcharan Singh and Jagdish Singh, Building Planning and Scheduling,
3. Standard Publishers and Distributers.
4. Lewis Keeble, Town Planning Made Plain & town & country planning association;London, 1983
5. Rangwala,S.C.,Town Planning, Charotar Publishing House, Anand India.
6. Hiraqskar, G.K., Fundamentals of Town Planning, Dhanpat Rai & Sons., Delhi Curriculum & Syllabi (B.tech Civil Engineering)
7. Pickering, E., Architecture Design, John Wiley and Sons, London.

Note for Paper Setter: - The Question paper shall comprise 10 questions, two questions from each unit. The students are required to attempt five questions, one from each unit.

Programme: B.Tech Civil Engineering

Course Title: Hydropower Engineering **Max. Marks: 100**
Course Code: CE-846 **University Examination: 60**
Duration of Exams: 3 hours **Internal Assessment: 40**

Objective: The objective of this course is to acquaint the students about the various components of hydel projects like penstocks, spillways, dams.

UNIT- I

Introduction of water power, comparison of hydropower, thermal and nuclear power. Flow duration curves, firm power, secondary power, Load curves, Load duration curves, load factor. Classification of hydropower plants such as run-of-river plants, Valley dam plants, High head diversion plants, Pumped storage plants, Tidal power plants

UNIT-II

Water Conveyance System: Power Canal, alignment, design of power canals, Flumes, covered conduits, tunnels, penstocks, economic diameter of penstocks, anchor blocks. Spillways, spillway gates, design of stilling basins

UNIT-III

Earthen Dams: Introduction of earthen embankments, earthen dams, rockfill dams, Design consideration of earthen dams.

UNIT-IV

Rigid Dams: Types of rigid dams, Gravity dams, Arch dams, buttress dams. Basic principles of design and details of construction, Selection of site, Preliminary and final investigations.

UNIT-V

Power House Details: General layout of power house, arrangement of power Units such as Forebay, intakes and penstocks/tunnels. Underground power stations, General introduction and finandal implications of Power plants.

Course Outcomes: On completion of this course, the students will be able to

1. Understand the different type of hydropower plants.
2. Understand the various systems for water conveyance.
3. Know about the construction of earthen dams and their design consideration.
4. Know about the basic principles of design and details of construction of rigid dams.
5. Understand the general layout of power plants.

Text Books:

1. **Dandekar M.M & Sharma K.N,** Water Power Engineering, Vikas Publishing House Ltd.
2. **Das M. Mohan, Saikia M Das,** Irrigation and Water Power Engineering, PHI Ltd, New Delhi

Books Recommended:

1. **Nigam P.S**, Hand book of Hydroelectric Engineering.
2. **Varshney R.S Nemchand Brothers**, Theory and Design of Irrigation Structures.
3. **H.K, Tata McGraw Hill**, Water Power Engineering by Barrows.
4. **Arora K.R,** Irrigation water power and water Resources Engineering by Standard Publishers.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each Unit. The student has to attempt five questions at least one from each Unit.

Programme: B.Tech Computer Science Engineering

Course Title: Communication Skills **Max Marks: 100**
Course Code: CSE-121 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: In this world of globalization English language is the first and foremost criteria to acquire job in reputed companies .This course is designed to hone the soft skills of students to make them proficient in English Language(writing & speaking).

Unit–I
Communication: Scope & importance of communication, types of communication, barriers of communication and techniques to improve communication, presentations, group discussions, seminars.

Unit-II
Phonetics: Speech mechanism, organs of speech**,** phonetic transcription, effective speaking.

Unit-III
Applied Grammar: Articles, prepositions, modal auxiliaries, verbs, antonyms, and synonyms, précis writing, paragraph writing.

Unit-IV
Recruitment and employment Correspondence: Applications, curriculum Vitae, letter of acceptance, letter of rejection, resignation, reference, interview.

Unit-V
Business Correspondence: Memorandum, Notices, Agendas, Meetings and Minutes, sales letters, enquiries, claims, adjustment letters.

Course Outcomes: Upon the completion of the course, the students will be able:

1. To acquire basic proficiency in English including reading, listening comprehension, writing and speaking skills.
2. To make the students authoritative in self-expression in their day to day life in this fast-changing world.
3. To identify the common errors involved in writing.
4. To understand the nature and style of sensible writing.
5. To write effective and coherent paragraphs.

Text Books:

1. **Lesikar R.V**. and **Pettit Jr.** Business Communication Theory and Applications,Irwin, 2002 Ed.
2. **Bansal R. K. & Harrison J. B.,** Spoken English, Orient Longman Hyderabad

References:

1. **Gimson A. C.,** An Introduction to the Pronunciation of English, ELBS (YP).
2. **Pal Rajendra**and **Korlhalli, J. S.** Essentials of Business Communication , Sultan C hand &Sons 2007
3. **Rayudu, C. S**. Media and Communication Management, Himalaya Publishing House.

Programme: B.Tech Computer Science Engineering

Course Title: C Programming **Max Marks: 100**
Course Code: CSE-223 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To enhance the logical skills of students with the basic programming concepts and implementation in C.

Unit-I

Introduction to C Programming: History of C, Structure of a C Program, Compiling &Executing a C program. Flow Charts, Constants, Variables and Data Types, Operators and Expressions, Data Input and Output.

Unit-II

Control Statements: Decision making and branching, IF statement, IF-ELSE statement, nested IF-ELSE statement, Switch statement, break statement, continue statement. Decision making and Looping, while statement, do-while statement, for statement.

Unit-III

Functions: Types of functions, function declaration, calling a function, passing arguments to functions, return values and their types, nesting of functions, recursion.

Unit -IV

Introduction to arrays: One dimensional arrays, Two dimensional arrays and Multidimensional arrays, basic operations on arrays, arrays and strings, basic string operations. Introduction to Unions, Structures and enumerated data types.

Unit-V

Introduction to Files&Pointers: Operations on pointers, pointers & multi dimensional arrays, pointers & character strings. Dynamic Memory Allocation in C: malloc, calloc, realloc and free functions. Operations on files like open, close, read and write.

Course Outcomes:

The student will be able:

1. To understand the basic constructs of C programming.
2. To solve the problems using control statements.
3. To decompose a problem into functions and synthesize a complete program.

4. To use various types of arrays and user defined data types
5. To use pointers and files toperform several operations.

Text Books:

1. **Balaguruswamy**, Programming in ANSI C, TMH.
2. **YashwantKanitkar**, Let us C, TMH.

Programme: B.TechComputer Science Engineering

Course Title: C Programming Lab **Max Marks: 50**
Course Code: CSE-231 **University Exam: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**

List of Experiments:

1. Basic program in Sequential Statement in C
2. Program of multiway control structure (Switch Case)
3. Program of different types of loops nested loops.
4. Program on function (Parameter passing - call by value)
5. Programs on recursion.
6. Programs on string manipulation with or without string function.
7. Program on 1-Dimesional Arrays.
8. Program on 2-Dimensional Arrays.
9. Programs on pointers
10. Programs on file handling.

Lab Outcomes

1. To formulate the algorithms for simple problems
2. To be able to correct syntax and logical errors as reported by the compilers and run time.
3. To be able to write iterative as well as recursive programs
4. To be able to represent data in arrays, strings and structures and manipulate through a program
5. To be able to declare pointers of different types and use them in defining self-referential structures.
6. To be able to create, read and write to and from simple text files.

Programme: B.TechComputer Science Engineering

Course Title: Database Management System **Max Marks: 100**
Course Code: CSE-326 **University Exam: 60**
Duration of Exam: 3 hours **Internal**
Assessment: 40

Course Objectives:

1. To learn the importance of databases in comparison to file systems.
2. To impart knowledge regarding the design of database and information storage.
3. To teach students how to make use of various queries for data insertion, deletion and retrieval.
4. To impart knowledge of how transactions are handled in databases.

Unit-I

Introduction: Drawbacks of Files Management System, Database System Concepts and Architecture, Data Abstraction, Schemas and Instances, Data Independence, Data Models, Database Language and Interface, DDL, DML, Overall Data Base Structure.

Data Modeling Using Entity Relationship Model: E.R. Model Concept, Notation for ER Diagrams, Mapping Constraints, Weak and Strong Entity Types, Keys, Concept of Super Key, Candidate Key, Primary Key, Extended ER Model, Specialization, Generalizations, Aggregation.

Unit-II

Relational Data Model and Language: Relational Data Model Concepts, Keys Constraints, Integrity Constraints, Domain Constraints, Referential Integrity, Assertions, Triggers, Relational Algebra, Relational Calculus, Domain and Tuple Calculus.

Unit-III

Introduction to SQL: SQL Data Type and Literals, Types of SQL Commands, SQL Operations (DDL, DML, and DCL), Tables, Views and Indexes, Queries and Nested Sub-queries, Aggregate and Scalar Functions, Joins, Unions, Intersection, Minus, Triggers, Cursors, Procedures and Functions in SQL.

Unit-IV

Data Base Design and Normalization: Functional Dependencies, Armstrong"s Axioms,

Normalization: First, Second and Third Normal forms, BCNF, Multi-Valued Dependencies, Fourth Normal form, Join Dependencies and Fifth Normal form, DKNF, Decomposition, Dependency Preservation and Lossless Join.

Unit-V

Transaction & Concurrency Control: Transaction Concept, Transaction State, Schedules, Serializability of Schedules, Conflict & View Serializability, Testing of Serializability, Recoverability, Recovery From Transaction Failures, Log Based Recovery, Checkpoints, Shadow Paging, Recovery with Concurrent Transactions.

Concurrency Control Techniques**:** Concurrency Control, Lock Based Protocols, Timestamp-Based Protocols, Validation-Based Protocols, Multiple Granularity, Multi-Version Schemes, Deadlock Handling.

Course Outcomes:

On successful completion of the course students will be able to:

1. To evaluate the role of database management systems in information technology.
2. Make use of logical design methods and tools for databases and Derive a physical design for a database from its logical design;
3. To remove the various anomalies present in the existing database with the help of various normalization forms.
4. Understand the SQL data definition and SQL query languages;
5. To implement various techniques to handle transactions and Deadlocks in a system.

Text Books:

1. **Korth, Silbertz, Sudarshan**, Database Concepts, Tata McGraw Hill.
2. **Desai**,**Bipin C.** An Introduction to Database Systems, Galgotia Publications.

Programme: B.TechComputer Science Engineering

Course Title: Database Management System Lab **Max Marks: 50**
Course Code: CSE-333 **University Exam:25**
Duration of Exam: 2 hours **Internal**
Assessment: 25

List of Experiments

1. Login and logout of the SQL.
2. Creation of users and roles.
3. Database schema creation.
4. Database schema modification.
5. Dropping of Database schema.
6. Use of Insert command, Update, Delete, Select commands.
7. Use of various aggregate functions.
8. Making reports with SQL report writer.
9. Creation of PL/SQL stored procedures.
10. Creation of Database triggers.
11. Creation of Cursors.
12. One case study on Database Application Development.

Course Outcomes:

At the end of this course, the students will able to do following:

1. Understand the basis of SQL and PL/SQL.
2. Design and implementation of database for an application

Programme: B.TechComputer Science Engineering

Course Title: Data Structures Using C **Max Marks: 100**
Course Code: CSE-322 **University Exam: 60**
Duration of Exam: 3 hours **Internal**
Assessment: 40

Course Objectives:
1. To impart the basic concepts of data structures and algorithms.
2. To understand concepts about searching and sorting techniques
3. To understand basic concepts about stacks, queues, lists, trees and graphs.
4. To enable them to write algorithms for solving problems with the help of fundamental data structures

Unit-I
Review of Data Types and Concepts: Review of data types, Scalar types, Primitive types, Structures, Unions, Enumerated types, Records, Sparse Matrices, Recursion and its importance.

Unit-II

Expression and Linear Data Structure: Definition of a Data structure, ADT, Linear Data structures.

Stack**:** Operations, Applications, implementation using linked list as well as arrays, Expressions and their conversions, Infix, Postfix & Prefix.

Queue**:** Types, Operations, Applications, implementation using linked list as well as arrays. Linked List**:** Types, Operations, Applications, Implementation.

Unit-III

Trees: Preliminaries, Trees, Forest, Binary Trees, Binary Search Tree ADT, Binary Search Trees, Conversion of Forest to Binary Tree, Binary Search Tree, AVL Trees, Tree Traversals, Priority Queues (Heaps), Model, Simple implementations, Binary Heap.

Unit-IV

Graphs: Definitions, Representation of Graphs, Adjacency Matrix, Path Matrix, Operations on Graphs, Traversing a graph: BFS and DFS, Shortest Path Algorithms: Dijkstra's Algorithm and Warshall's Algorithm, Minimum Spanning Tree, Kruskal's Algorithm and Prim`s Algorithm.

Unit-V

Searching and Sorting: Searching: Sequential search, Binary search, Hashing, General Idea, Hash Function, Separate Chaining, Open Addressing, Linear Probing.

Sorting: Bubble sort, Insertion Sort, Selection sort, Heap sort, Merge sort, Quick

sort, External Sorting.

Course outcomes:

At the end of this course, the student will able to do the following:

1. For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness.
2. For a given Search problem (Linear Search and Binary Search) student will able to implement it.
3. For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computation complexity.
4. Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.
5. Student will able to implement Graph search and traversal algorithms and determine the time and computation complexity.

Text Books:

1. **Tanenbaum A. S.**, Data Structure Using C, Dorling Kindersley Publisher.
2. **Ellis Horowitz and SatrajSahni**, An Introduction to Data Structures, ComputerScience Press, Rockville MA 1984.
3. **M. A. Weiss**, “Data Structures and Algorithm Analysis in C”, 2nd ed, Pearson Education Asia.

Reference Books:

1. **E. Horowitz & S. Shani**Fundamentals of Data Structures in C, Galgotia Pub. 1999.
2. **Richard F. Gilberg, Behrouz A. Forouzan**, Data Structures: A PseudocodeApproach with C, Thomson Cole, 1998.
3. **Hopcroft A. J. E. & Ullman J. D.,** Data Structures and Algorithms, Pearson Education Asia, 1983.

Programme: B.TechComputer Science Engineering

Course Title: Object Oriented Programming **Max Marks: 100**
Course Code: CSE-323 **University Exam: 60**
Duration of Exam: 3 hours **Internal**
Assessment: 40

Course Objective: The course will introduce standard tools and techniques for software development, using object oriented approach, use of a version control system, an automated build process, an appropriate framework for automated unit and integration tests.

Unit-I

Concepts of Object-Oriented Programming: Object Oriented Programming Paradigm,

Basic concepts of OOP`s, Benefits of OOPS, Introduction to object oriented analysis and design, Design steps, Design example, Object oriented languages, Comparison of structured and object-oriented programming languages.

Unit-II

Expressions, Control Structures, Arrays, Pointers and Functions: Data Types, Operators, expressions and control structures. Arrays, Storage of arrays in memory, Initializing Arrays, Multi-Dimensional Arrays, Strings, Pointers, accessing array elements through pointers, Arrays of pointers, Pointers to pointers, Void Pointers, Functions, Arguments, Passing Pointers as Function Arguments.

Unit-III

Classes and Objects: Classes and objects, access specifies in C++, constructors, destructors, Inline Functions, Friend Functions.

Polymorphism: Function Overloading, Operator Overloading, Type Conversions in C++. Dynamic memory allocation in C++.

Unit-IV

Inheritance: Inheritance, single Inheritance, Multiple Inheritance, Multi level inheritance, hierarchical inheritance, hybrid inheritance, Virtual base classes, Virtual functions, function overriding .

Generic programming with templates: Class templates, Function Templates.

Unit-V

Exception Handling and Files: Exceptions, Types of Exceptions, throwing and catching exceptions. Streams and Files: Opening and closing a file, File Pointers and their Manipulations, sequential Input and Output Operations, multi-file Programs, Command Line Arguments.

Course Outcomes:

At the end of this course, students will be able to:

1. Specify simple abstract data types and design implementations, using abstraction functions to document them.
2. Recognise features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
3. Name and apply some common object-oriented design patterns and give examples of their use.
4. Design applications with an event-driven graphical user interface.
5. Able to understand exception handling and its use.

Text Books:

1. **Robert Lafore,** Object Oriented Programming in Turbo C++, Galgotia Publications.
2. **Balagurusamy E,** Object Oriented Programming with C++, Tata McGraw Hill.

Reference Books:

1. **BjarneStrustrup,** The C++ programming Language, Addison Wesley.
2. **Booch,** Object Oriented Analysis and Design with Applications, Addison Wesley.
3. **Chair H. Pappas & William H. Murray**, Complete Reference Visual C++, TMH

Programme: B.TechComputer Science Engineering

Course Title: Operating System **Max Marks: 100**
Course Code: CSE-424 **University Exam: 60**
Duration of Exam: 3 hours **Internal**
Assessment:40

Course Objectives:

- To learn the fundamentals of Operating Systems.
- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporary OS
- To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
- To know the components and management aspects of concurrency management

Unit-I

Introduction: Operating System and Function, Evolution of Operating System, Batch Systems, Time Sharing and Real Time System, System Protection and Methods. Operating System Structure**:** System Components, System Structure.

Unit-II

Concurrent Processes: Process concept, Principle of Concurrency, Semaphores and its types. Classical problems in Concurrency, Producer Consumer, Critical Section and readers" writers" problem, Inter Process Communication, Process Generation, Resident
Monitors.

Unit-III

CPU Scheduling: Scheduling Concept, levels of Scheduling, Scheduling Algorithm, Multiprocessor Scheduling.
Deadlock**:** System Model, Deadlock Characterization, Prevention, Detection and Recovery.

Unit-IV

Memory Management: Multiprogramming with Fixed Partition and Variable Partition, Multiple Base Register, Paging, Demand Paging, Segmentation, Virtual Memory Concept, Allocation of Frames, Paged Replaced Algorithm, Thrashing, Cache Memory Concept.

Unit-V

I/O Management: I/O Devices and Organization of I/O Function, I/O Buffering, DISKI/O, and Operating System Design Issues.

File System: File Concept, File Organization and Access Mechanism, File Directories, File Sharing,

Course Outcomes:

At the end of this course, the students will able to do the following:

1. Create processes and threads.
2. Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time.
3. For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
4. Design and implement file management system.
5. For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.

Text Books:

1. **Milenekovic**, Operating System Concepts, McGraw Hill
2. **Silverschwatz**, Operating System Concepts, Willey & Willey.

Reference Books:

1. **Dietel**, An introduction to operating system, Addision Wesley.
2. **Tannenbaum A. S.**, Operating system design and implementation, PHI

Programme: B.TechComputer Science Engineering

Course Title: Data Comm& Computer Networks **Max Marks: 100**
Course Code: CSE-425 **University Exam: 60**
Duration of Exam: 3 hours **Internal**
Assessment: 40

Course Objectives:

- To provide insight about fundamental concepts and reference models (OSI and TCP/IP) and its functionalists.
- To gain comprehensive knowledge about the principles, protocols, and significance of Layers in OSI and TCP/IP
- To know the implementation of various protocols.

Unit-I

Communication concepts: Bandwidth and Channel Capacity, Nyquist Law, Shannon‟s
Law, Key Components in Data Communication Systems. Data Transmission Concepts: Simplex, Half Duplex, Full Duplex. Characteristics of Signals.

Unit-II

Transmission Media: Guided and Unguided Transmission Media. Reliable Transmission of Data: Asynchronous and Synchronous Transmission. Error Detection: Parity Based, CRC Based, FCS Computation. Error Control and Recovery Techniques.

Unit-III

Goals and applications of networks: Classification**:** LAN, MAN, WAN. Network Topology. Network Architecture, ISO-OSI Reference Model, TCP/IP Model. IP Addresses, Subnetting, Internet Protocol (IP). Internet Control Protocols: ICMP, ARP and RARP.

Unit-IV

Routing: Types of Routing. Routing Algorithms: Interior (RIP, OSPF), Exterior (BGP).Transport Layer: UDP and TCP Concepts.

Unit-V

Data Link LayerProtocols: SLIP, PPP. MAC Sub Layer. Channel Allocation Issues. Multiple Access Protocols: ALOHA (Pure and Slotted) Protocol, CSMA/CD.
High Speed LANS (Fast, Ethernet and FDDI).

Course Outcomes:

At the end of this course, the students will able to do the following:

1. Explain the functions of the different layer of the OSI Protocol.
2. Draw the functional block diagram of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) describe the function of each block.
3. For a given requirement (small scale) of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) design it based on the market available component
4. For a given problem related TCP/IP protocol developed the network programming.
5. Configure DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools.

Text Books:

1. **James F. Kurose and Keith W. Ross,** Computer Networking, a Top-Down Approach Featuring the Internet.
2. **Behrouz A. Forouzan,** Data Communications and Networking, Fourth Edition.
3. **W. Stallings**, Data and communications, 6th Edn., Prentice Hall, 2000.

Reference Book:

1. **Gallo**, Computer Communications & Networking Technologies, Cengage India.
2. **Peterson and Davie**, Computer networks: A systems approach, 2nd Edn. Morgan Kaufman.
3. **Tanenbaum A. S.**, Computer Networks, 4th Edn. Prentice Hall.

Programme: B.TechComputer Science Engineering

Course Title: Computer Graphics **Max Marks: 100**
Course Code: CSE-426 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objectives:

1. To understand the basics of various inputs and output computer graphics hardware devices.
2. Exploration of fundamental concepts in 2D and 3D computer graphics.
3. To know the working of multimedia tools.

Unit-I

Line Generation: Points, pixels and frame buffers, Line and Circle generation algorithms, Graphics Primitive**:** display device, interactive devices, display file structure, Polygon**:** polygon representation, entering polygon & filling polygons.

Unit-II

Transformations&Segments: Matrices transformation, transformation routines, Windowing and Clipping**:** viewing transformation and clipping, generalized clipping, multiple windowing. Segments**:** segment table, creating deleting and renaming segments, visibility, image transformations.

Unit-III

Three Dimension: 3D geometry and primitives, 3D transformations: translation, scaling, rotation, 3D viewing, Projections (perspective and parallel).

Unit-IV

Curves and surfaces: Shape description requirements, parametric functions, Bezier methods, Bezier curves, Bezier surfaces, B-Spline methods

Unit-V

Hidden surface removal: Need for hidden surface removal, The Depth – Buffer Algorithm, Properties that help in reducing efforts, Scan Line coherence algorithm, Span– Coherence algorithm, Area-Coherence Algorithms, Warnock"s Algorithm, Priority
Algorithms

Course Outcomes:

1. Students will get the concepts of Graphics display devices, techniques, and different types of graphics drawing algorithms.
2. Students will get the concepts of 2D and 3D Geometrical Transformations
3. Students will get the concepts of Viewing, Curves and surfaces.

4. Students will get the concepts of Hidden Line/surface elimination techniques.
5. Students will get the concepts of some Scan Conversion algorithms.

Text Books:

1. **Steven Harrington**, Computer Graphics, A programming approach second Edn.
2. **John F. Koegel Buford**, Multimedia Systems, Pearson Education.
3. **Fred Halsall**, Multimedia Communications, Pearson Education.

Reference Books:

1. **Rogers**, Procedurals elements of Computer Graphics, McGraw hill.
2. **Newman and Sproul**, Principle of interactive Computer Graphics, McGraw Hill.

Programme: B.TechComputer Science Engineering

Course Title: Computer Graphics Lab **Max Marks: 50**
Course Code: CSE-432 **University Exam:25**
Duration of Exam: 2 hours **Internal**
Assessment: 25

List of Experiments:

1. To draw a line using DDA Algorithm.
2. To draw a line usingBresenham"s Algorithm.
3. To draw a circle using trigonometric Algorithm.
4. To draw a circle using Bresenham"s Algorithm.
5. To implement polygon boundary fill algorithm.
6. To implement polygon flood fill algorithm.
7. To translate an object with translation parameters in X and Y directions.
8. To scale an object with scaling factors along X and Y directions.
9. To rotate an object with a certain angle.
10. To perform composite transformations of an object.
11. Implementation of simple graphics animation.

Course Outcomes:

At the end of this course, the students will able to do following:

1. Design and implementation of various algorithms to draw a number of shapes
2. Design and implementation of various algorithms for designing animation graphics and composite objects
3. Design and simulation of various algorithms using multimedia tools

Programme: B.TechComputer Science Engineering

Course Title: Object Oriented Programming Lab **Max Marks: 50**
Course Code: CSE-433 **University Exam:25**
Duration of Exam: 2 hours **Internal**
Assessment: 25

List of Experiments:

1. Program to break a number into it's factors
2. Program to find the prime numbers from the list
3. Program to overload <= and + operator
4. Program to get tomorrow“s date
5. Program to add two complex numbers using add as member function of class complex
6. Program to add 2 complex numbers using friend function
7. Program to overload unary operator
8. Program to demonstrate multiple inheritance
9. Program to demonstrate multilevel inheritance
10. Program to demonstrate containership
11. Program to demonstrate hybrid inheritance
12. Program to overloading member functions
13. Program to illustrate virtual base class
14. Program to find sum of array passing pointers to functions
15. Program to convert polar to rectangular coordinates using constructor in destination class
16. Program to concatenate 2 strings using inheritance

17. Program to perform operation on strings

Course Outcomes:

At the end of this course, the student will able to do the following:

1. Understanding and implementation of various object oriented programming concepts like inheritance, polymorphism, object and classes etc.
2. Designing the application using the object oriented concepts

Programme: B.TechComputer Science Engineering

Course Title: Visual Programming **Max Marks: 100**
Course Code: CSE-522 **University Exam: 60**
Duration of Exam: 3 hours **Internal**
Assessment: 40

Course Objectives: The student should be made to:

- Understand the foundations of CLR execution
- Learn the technologies of the .NET framework
- Know the object oriented aspects of C#
- Learn web based applications on .NET(ASP.NET)

Unit-I

Introduction: Introduction to the Visual programming, Features of visual programming, Integrated Development Environment (IDE), IDE components. Variables, Constants, Data types, Operators, Conditional Statements and loops. Procedures, Subroutines, Calling functions and subroutines, writing argument procedures, Type of procedures, Calling procedures ,Argument passing Mechanism, Built in function, Overloading functions.

Unit-II

Windows Forms and Basic Controls: Windows Forms and Events, Message Box, Creating MDI, Using basic controls like command buttons, Text Box, List Box, Radio Buttons, Labels, Link Labels, Combo Box, Building Small Applications.

Unit-III

Error handling and OOP Implementation: Types of Errors, Introduction to Exception Handling, Unstructured and Structured Exception Handling, Raising an Exception Intentionally, System Exception, Throwing an Exception, Try, Catch and Finally statements. Object oriented programming, Concept of OOP (Abstraction, encapsulation, inheritance and polymorphism), Classes and Objects, Creating Class Libraries, Constructors and Destructors, Overloading, Overriding and Shadowing.

Unit-IV

Advanced controls: Rich Text Box, Scroll Bars and Progress Bars, Date Time Picker,Picture Box, Tree View and List View Controls. Designing Menus, Working with Files and Folders, Accessing Folders and Files.

Unit-V

Data Access with ADO .Net: Data Access with ADO .Net, Using Databases, Server Explorer, Data Adapter and Datasets, Working with ADO .Net, Architecture of ADO .Net, Using Data controls: Data Grid, Data Binding, Creating New Data Connection in Code. Introduction to Structured Query Language, Executing SQL Statements, Selection Queries, SQL joins, Introduction to query builder.

Course Outcomes:

1. List the major elements of the .NET frame work
2. Explain how C# fits into the .NET platform.
3. Analyze the basic structure of a C# application
4. Debug, compile, and run a simple application.
5. Develop programs using C# on .NET

Text Books

1. **EvangelousPetroutsos**, Mastering Visual basic.Net, BPB Publication.
2. **Steven Holzner**,Visual Basic .net Programming, Black book, Dreamtech Press.

References Books:

1. **David S. Platt**, “Introducing Microsoft .Net”, Microsoft Press, PHI.
2. **PetroutsosBilgin**, “Visual Basic .Net, Database Programming”, BPB.

Programme: B.TechComputer Science Engineering

Course Title: UNIX/LINUX & Shell Programming **Max Marks: 100**
Course Code: CSE-525 **University Exam: 60**
Duration of Exam: 3 hours **Internal**
Assessment: 40

Objective: This subject aims to provide students with fundamental principles and comprehensive knowledge of Unix/Linux & Shell Programming.

Unit-I

Introduction to the kernel: Architecture of the UNIX, the buffer cache. Internal representation of files**,** node, accessing blocks, releasing blocks, structure of regular files, conversion of a path name to an inode, inode assignment to a new file, and allocation of disk-block.

Unit-II

System Calls: System calls for the file systems**;** open, read, write, close. The pipe system call, opening a named pipe, reading and writing pipes, closing pipes, dup, mounting and un-mounting file system, link, unlink. System calls for time and clock.

Unit-III

Processes: The structure of processes, process states and transitions, layout of system memory, the context of a process, saving the context of the process, manipulation of the process address space. Process Control, process creation, signals, process termination, awaiting process termination, the user id of a process, changing the size of the process, the system boot and init process.

Unit-IV

Shell Programming: Study of different types of shells like Bourne shell, C & K shell. Shell variable, shell script, shell command. Looping and making choices, for loop, while and until, passing arguments to scripts. Programming with different shells.

Unit-V

Inter Process Communication: Inter process communication, process tracing, network communication sockets. Multiprocessor system, problem of multiprocessor systems, solution with master and slave processor, solution with semaphores. Study of distributed UNIX system.

Course Outcomes:

At the end of this course, the students will able to do the following:

1. Understanding system calls and its role
2. Understanding the concept of shell programming
3. Able to understand process attributes and its structure.
4. Understanding the working of kernel and implementing them.
5. Implementing the system calls, process management, and inter process communication

Text Books:

1. **Maurice J Bach.,** The design of the UNIX operating system, Prentice-Hall, 1986.
2. **Raymond S. Eric**,The Art of UNIX Programming.

Reference Books:

1. **Stephen Prata,** Advanced UNIX: A Programmer Guide, Howard W. Sams, 1987
2. **Rochkind,**Advanced Unix Programming.

Programme: B.TechComputer Science Engineering

Course Title: Visual Programming Lab **Max Marks: 50**
Course Code: CSE-531 **University Exam:25**
Duration of Exam: 2 hours **Internal**
Assessment: 25

List of Experiments:

1. Creating user interface in Visual Basic.Net
2. Simple Programs with control structures
3. Adding menus and Dialog Boxes to form
4. Creating MDI
5. Creating and using Basic Controls
6. Working with advance controls
7. Data Access with ADO
8. Working with Data Grid Control

Lab Outcomes:

At the end of this course, the students will able to do following:

1. Design and **develop** Graphical User Interfaces;
2. Understand and code **Event**-Driven procedures;
3. Program Visual Basic controls proficiently;
4. Access database from VB.NET programs; and.
5. Design, **develop** and test Visual Basic programs.

Programme: B.TechComputer Science Engineering

Course Title: UNIX/LINUX & Shell Programming Lab **Max Marks: 50**
Course Code: CSE-533 **University Exam:25**
Duration of Exam: 2 hours **Internal**
Assessment: 25

The lab course will address the demand for Information technology professionals with UNIX training and experience.

1. Using the visual editor (vi) and the Pico editor.
2. Setting file and directory permissions.
3. Controlling user processes.
4. Managing, printing, and archiving large files.
5. Accessing and touring graphical desktops.
6. Administering a Linux PC system.
7. General administration issues, root account, creating user in Linux, changing password, deleting user, disabling user account, Linux Password & Shadow File Formats System Shutdown and Restart creating groups, Custom Configuration and administration issues.
8. Practicing various Commands, Using various editors, Shell programming, Networking and TCP/IP on Linux.
9. Common Network Troubleshooting on Linux.
10. FTP and Telnet settings, Web server configuration.

Lab Outcomes:
Upon completion of this course, the student will be able to:
1. You will be able to run various UNIX commands on a standard UNIX/LINUX Operating system (We will be using Ubuntu flavor of the Linux operating system).
2. You will be able to run C / C++ programs on UNIX.
3. You will be able to do shell programming on UNIX OS.
4. You will be able to understand and handle UNIX system calls.

Programme: B.TechComputer Science Engineering

Course Title: Cryptography & Network Security **Max Marks: 100**
Course Code: CSE- 622 **University Exam: 60**
Duration of Exam: 3 hours **Internal**
Assessment: 40

Objective: To understand the principles of encryption algorithms: conventional andcryptography. To have a detailed knowledge about authentication, hash functions and application level security mechanisms.

Unit-I

Introduction: To Security Attacks, Services and Mechanisms, Introduction to Cryptology. Conventional Encryption Model, Classical Encryption Techniques-Substitution Ciphers & Transposition Ciphers, Cryptanalysis, Stagnography, Stream & Block Ciphers.

Unit-II

Modern Block Ciphers: Block Ciphers Principles, Standards (DES), Strength of DES, Differential & Linear Cryptanalysis of DES, Block Cipher Modes of Operation, Triple DES, AES Encryption & Decryption, Key Distribution, Random Number Generation.

Unit-III

Public Key Cryptography: Principle of Public Key Cryptography, Prime and Relative Prime Numbers, Modular Arithmetic, Key Management. Diffie-Hellman Key Exchange. Elliptic Curve Architecture and Cryptography. Introduction to Number Theory, RSA.

Unit-IV

Authentication and Hash Function: Authentication Recruitments, AuthenticationFunctions and Message Authentication Codes. Digital Signatures, Digital Signature Standard (DSS), Proof of Digital Signatures Algorithm, MD5Message Digest Algorithm. Secure Hash Algorithm-I (SHA-1), RIPEMD.

Unit-V

Network Security & System Level Security:

Electronics Mail Security: Pretty Good Privacy (PGP), S/MIME IP Security: IP SecurityOverview, Architecture, Authentication Header.
Web Security: Security Socket Layer & Transport Layer Security.
System Security: Intruders, Viruses and Related Threads, Firewall Design Principles.

Course Outcomes:

At the end of this course, the students will able to do the following:

1. Understand cryptography and network security concepts and applications.
2. Apply security principles to system design.
3. Identify and investigate network security threat.
4. Analyze and design network security protocols.
5. Conduct research in network security.
6. Understand different types of attacks and how to prevent them.

Text Book:

1. **William Stallings**,Cryptography and Network Security, Principles and Practices,Prentice Hall of India, Third Edition, 2003.
2. **Johannes A. Buchmann**, Introduction to cryptography, Springer Verlag.

Reference Books:

1. **Kaufman C., Perlman R. & Spenser M.**, Network Security, PHI.

Bellovin S. &Chesvick W., Internet Security and Firewalls, Second Edition,Addison-Wesley.

Programme: B.TechComputer Science Engineering

Course Title: Java Programming **Max Marks: 100**
Course Code: CSE-623 **University Exam: 60**
Duration of Exam: 3 hours **Internal**
Assessment: 40

Course Objectives:

1. To understand Object oriented concepts like data abstraction, encapsulation, etc.
2. To solve the real world scenarios using top down approach.
3. To understand various Java programming constructs.

Unit-I

Overview of Java: Introduction to Java, Features of Java, Object Oriented Concepts, Lexical Issues, Data Types, Variables, Arrays, Operators, Java Virtual Machine, Bytecode, Control Statements: Selection, Iteration and Jump Statements, Java Bean Standards.

Unit-II

Classes and Inheritance: Classes, Objects, Constructors, Overloading Method, Access Control, Static and Final Keywords, Nested and Inner Classes, Abstract Class, Object Class, Inheritance, Overriding Methods, Using Super, Dynamic method Dispatch. Packages, Access Protection, Importing Packages, Interfaces.

Unit-III

Exception Handling and Multithreading: Exception Handling, Multiple Catch Clauses, Nested Try and Throw. Multithreading: Thread, Creating a Thread, Creating Multiple Threads, Synchronization, Inter Thread Communication, Deadlock, Suspending, Resuming and Stopping Threads, Multithreading.

Unit-IV

I/O, Applets and String Handing files: Files, Stream Classes, Serialization, Reading Console Input, Writing Console Output, Print Writer Class, Reading And Writing Files, Transient And Volatile Modifiers, Instance of, Strictfp, Native Methods.
Applets: Introduction: Applet Fundamentals, Applet Architecture.
Strings: String Constructors, String Operations, String Buffer, String Builder, StingTokenizer.

Unit-V

Collections Framework: Collections Overview, Collection Interfaces, Collection Classes, Accessing a Collection via Iterator, Map Classes and Map Interfaces, Comparators, Arrays, Legacy Classes and Interfaces, Wrapper Classes.

Course Outcomes:

At the end of semester, the students will able to do the following:

1. Understand and explain the fundamental concepts and features of Java Programming language.
2. Implement the basic principles of Object Oriented Programming which includes inheritance, polymorphism, encapsulation and abstraction.
3. Understand the concepts of Exception Handling and Creating multiple threads along with the communication between the threads.
4. Implementing Applets and understanding various Stream classes in java.
5. Implementing Collections and its different Interfaces and Classes.

Text Books:

1. **P. Naughton& H. Schildt**, Java2 (The Complete Reference), 3rd Edn, TMH 1999.
2. **K. Arnold & J. Gosling**, The Java Programming Language, 2nd Edn, AddisonWesley, 1996.

Reference Books:

1. **Cay S. Horstmann, Gary Cornell**, Core Java 2 Volume I Fundamentals, 5th Edn.PHI, 4000.

Programme: B.TechComputer Science Engineering

Course Title: Internet & Web Technology **Max Marks: 100**
Course Code: CSE-626 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To impart basic understanding of the methods and techniques of developing websites.

Unit-I

Internet & Web: History and growth of Internet and Web, Introduction to WWW, Web Servers, Web Browsers and Search Engines, TCP/IP Suite, Cyber laws, Web engineering, Symantec Web Technology.

Unit-II

HTML: Introduction to HTML, Elements of HTML syntax, Head and Body sections, Building HTML documents, Lists, types and implementation of lists, Hyperlinks. Presentation and control: Images, Image as buttons, Image maps, Text, Colors and Backgrounds, CSS, Tables: Use of table tags.

Unit-III

Frames: Developing Web pages using frames. Interactivity: Forms, DHTML, JavaScript, Use of Java Applets.

Unit-IV

Security: Principles of security, Web Security: Cryptography, Digital certificates, Digital Signatures, Secure Socket Layer, Network Security: Firewalls, IP Security, Virtual Private Networks.

Unit-V

Wireless Internet: Mobile IP, Mobile TCP, GPRS, Wireless Application Protocol (WAP).Introduction to server side programming: CGI, ASP, JSP, Servlets.

Course Outcomes:
At the end of this course, the students will able to do the following:

1. Understand the basic principles of web designing
2. Build an attractive websites for various applications as per the requirements
3. Understand the various issues of internet security and their implementation

4. Build dynamic web pages using JavaScript
5. Understand the concepts of server side programming

Text Books:

1. **Thomas Powell,** Complete Reference HTML/XHTML.
2. **S. AchyutGodbole and AtulKahate**, Web Technologies, Tata McGraw Hill.
3. **Raj Kamal**, Internet & Web Design, Tata McGraw Hill.

Reference Books:

1. **Xavier C.**, Web Technology & Design, New Age International Publishers.
2. **Ann Navarro**, Effective Web Design, BPB publications.
3. **Stephen E**, Will Train, HTML 4.0, BPB publication.
4. **Xavier C.**, World Wide Web Design with HTML, Tata McGraw Hill.

Programme: B.TechComputer Science Engineering

Course Title: Java Programming Lab **Max Marks: 50**
Course Code: CSE-631 **University Exam:25**
Duration of Exam: 2 hours **Internal**
Assessment: 25

Course Objective:: This main Objective of this course is introduced to understand the basic concepts of Java,Class syntax, data types, flow of control, classes, methods, objects, arrays, exception handling, multithreading. Writing and testing applets for inclusion in web pages.

List of Experiments:

1. The Fibonacci sequence is defined by the following rule. The fist two values in the sequence are 1 and 1. Every subsequent value is the run of the two values preceding it. Write a Java program that uses both recursive and non recursive functions to print the nth value in the Fibonacci sequence.
2. Write a Java program that reads on file name from the user then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
3. Write a Java program that reads a file and displays a file and displays the file on the screen, with a line number before each line.
4. Write a program to demonstrate the concept of command line arguments
5. Write a program to demonstrate various string operations like concatenation, string copy etc
6. Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.
7. Write a program to demonstrate exception handling
8. Write a program to demonstrate Applet
9. Write a program to demonstrate the concept of single thread creation and multithread creation, inter thread communication
10. Write a program to create package, use that package in some other program. Use different access modifiers to demonstrate
11. Write a program to demonstrate the concept of ArrayList and LinkList

Course Outcomes

1. Implement Object Oriented Programming Concepts(class, constructor, overloading, inheritance, overriding) in java.
2. Use and create packages and interfaces in a Java program
3. Implement exception handling in Java.
4. Implement Multithreading in java.
5.Use of Input/output Streams in java

Programme: B.TechComputer Science Engineering

Course Title: Internet & Web Technology Lab **Max Marks: 50**
Course Code: CSE-632 **University**
Exam:25
Duration of Exam: 2 hours **Internal**
Assessment: 25

1. **Overview of HTML**
   Overview of HTML, Introduction to HTML, Creating an HTML Document

2. **Formatting text with HTML**

   Paragraph Formatting with HTML, Character Formatting with HTML, Comparing Procedural and Descriptive Formatting

3. **Adding local and remote links**
   Adding Local and Remote Links, Adding Internal Links with the Named Anchor Tag

4. **Adding graphics**

   Linking and Embedding Graphics, **Creating lists in HTML,** Creating Lists and Nested Lists

5. **Creating tables in HTML**

   Creating and Modifying Tables, Creating Advanced Table Elements

6. **Setting Body and Background Attributes**

   Setting Background and Text Colors, **Web Page Design Guidelines,** Web Page Design Guidelines

7. **Adding Links to other Internet Services**

   Links to Non-Web Internet Services

8. **An introduction to Java applets and graphical programming**

   Graphical User Interfaces; Drawing;
   Components Java basics: types, variables, statements, syntax Testing and debugging programs
   Setting up applets on the Internet

Learning Outcomes:

At the end of the course, students should be able to:

1. Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's.
2. Have a Good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services.
3. Get introduced in the area of Online Game programming.

Programme: B.TechComputer Science Engineering

Course Title: Fund. of Digital Image Processing **Max Marks: 100**
Course Code: CSE–721 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: Study the image fundamentals, mathematical transforms necessary for image processing, image enhancement techniques, image compression procedures.

Unit-I

Introduction: Digital Image Representation, Fundamental Steps in Image Processing. Elements of Digital Image Process Systems, Application of Digital Image Processing: Medical Science, Industries & Security. Relationship between Pixels. Brief Introduction to Image Data Types and File Formats; 1-Bit Images, 8-Bit Gray Level Images, 8-Bit Color Images, 24-Bit Color Images, Color Lookup Tables, Formats; GIF, JPEG, PNG, TIFF.

Unit-II

Image Enhancement in the Spatial Domain: Background, Some Basic Grey Level Transformations, Histogram Processing, Basics of Spatial Filtering: Smoothing Using Linear/Non-Linear Spatial Filters, Sharpening Spatial Filters; Second Derivative (Laplacian), First Order Derivative (Gradient).

Unit-III

Image Enhancement in the Frequency Domain: Background, Introduction to the 2D-Discrete Fourier Transform and its Inverse, Basics of Frequency Domain Filtering, Image Smoothing Frequency Domain Filters, Image Sharpening Frequency Domain Filters.

Unit-IV

Image Compression: Coding Redundancy, Inter-Pixel Redundancy, Fidelity Criteria,Image Compression Models, Error-Free Compression, Variable Length Coding, Bit-Plane Coding, Wavelet Coding, Digital Image Watermarking, Image Compression Using Discrete Cosine Transform (JPEG).

Unit-V

Image Segmentation: Point, Line and Edge Detection, Edge Linking and Boundary Detection, Thresholding: Global Thresholding, Local Thresholding, Region Based Segmentation: Region Growing, Region Splitting & Merging.

Course Outcomes:

At the end of this course, the students will able to:

- Mathematically represent the various types of images and analyze them.
- Process images for the enhancement of certain properties or for optimized use of the resources in spatial domain using various filters.
- Process images for the enhancement of certain properties or for optimized use of the resources by using various frequency domain filters .
- Develop and use various algorithms for image compression.
- Develop and use various algorithms for image segmentation.

Text Books:

1. **Gonzalez R. & Wood E.R.**, Digital Image Processing, Prentice Hall India.
2. **JAIN R. K.**, Fundamentals of Image Processing.

Reference Books:

1. **Low Andrian**, Introductory Computer Vision and Image Procession, TMH
2. **Robert Scholkoff& John Willey & Sons**, Pattern Recognition-Statistical,Structural and neural approach.
3. **Pratt W.K.**, Digital Image Processing, McGraw Hill.

Programme: B.TechComputer Science Engineering

Course Title: Entrepreneurship Dev & Management **Max Marks: 100**
Course Code: CSE-722 **University Exam: 60**
Duration of Exam: 3 hours **Internal**
Assessment: 40

Objective: To give an overview of who the entrepreneurs are and what competences are needed to become an entrepreneur and to create an awareness of the need for systematic management of projects.

Unit-I

Entrepreneurship Development: Meaning, Objectives, Type of Entrepreneurs, Importance of Entrepreneurship Training, Factors affecting Entrepreneurship, Linkage between Entrepreneurship and Economic Development, Problem of Increasing Unemployment, Balanced Regional Growth, Harnessing Locally Available Resources, New Industrial Policy and Innovation in Enterprises.

Unit-II

Entrepreneurship Support System: Small Industries Development Bank of India, Small Industries Service Institute, State Small Industries and Export Corporation, District Industrial Centres and other Supporting Agencies.

Unit-III

Project Report Preparation: Identifying Business Opportunities, Project Report and its Importance, Various Contents of Project Report: Managerial and Entrepreneurial Capabilities, Socio-Economic Benefits, Demand Analysis, Technical Feasibility and Financial Viability.

Unit-IV

Introduction to Marketing Management: Brief Introduction to various types of Product Strategies, Pricing Strategies, Channel Strategies and Promotional Strategies. **Introduction to Production Management**: Types of Production Systems, Production Planning and Control, Functions of Production Manager and Materials Management.

Unit-V

Introduction to Human Resource Management: Manpower Planning, Recruitment, Selection, Placement and Induction, Training and Development, Compensation.

Introduction to Financial Management: Source of Finance and Working Capital Management.

Course Outcomes:

At the end of this course, the students will able to do following:

- Have the ability to discern distinct entrepreneurial traits
- Understand the systematic process to select and screen a business idea
- Understanding the market strategy and constraints for new business ideas
- Design strategies for successful implementation of ideas
- Write a successful business plan

Text Books:

1. **Holt David H**, Entrepreneurship: New Venture Creation, PHI (4000).
2. **Saini Jasmer Singh**, Entrepreneurship Development Programmes and Practices,Deep and Deep Publications, New Delhi (1997).

Reference Books:

1. **Dollinger**, Entrepreneurship Strategies and Resources, Pearson Education (4003).
2. **Jose Paul & Kumar Ajith N**, Entrepreneurship Development and Management,Himalaya Publishers, New Delhi (4000).
3. **Hisrich Robert D and Micheal Peters P**, Entrepreneurship, TMH, (4002).

Programme: B.TechComputer Science Engineering

Course Title: Fund of Digital Image Processing Lab **Max Marks: 50**
Course Code: CSE–731 **University**
Exam:25
Duration of Exam: 2 hours **Internal**
Assessment: 25

List of Experiments:

1. Working with Image Processing Toolbox
2. Importing and Exporting Images
3. Pre- and Post-Processing Images
4. Enhancing Images
5. Image Transforms
6. Image Conversions
7. Analyzing Images
8. Displaying and Exploring Images
9. Spatial Transformations and Image Registration

Course Outcomes:

At the end of this course, the students able to do the following:

- Understanding of various techniques for working on images
- Simulation on images using Image Processing Toolbox

Required Products
MATLAB.

Related Products
Image Acquisition Toolbox. Acquire ,Mapping Toolbox, Signal Processing Toolbox.

Programme: B.TechComputer Science Engineering

Course Title: Expert Systems **Max Marks: 100**
Course Code: CSE-746 **University Exam: 60**
Duration of Exam: 3 hours **Internal**
Assessment: 40

Objective: The aim of the subject is to provide basic and necessary information about the Expert Systems.

Unit-I

Expert Systems: Definitions Types, Components of an Expert System, Expert System Shells, Architecture for Knowledge Based Systems, Operational Expert Systems, Development Process.

Unit-II

Knowledge Representation Techniques: Logic Frames, Semantic & Nets, etc.

Unit-III

Natural Language Processing: Basic Parsing Techniques, Types of Learning, Inductive Bearing, Explanation Based Learning, Neural Based Learning, Game Playing Examples.

Unit-IV

Planning and Explanation in Expert System: Neural Expert System, Fuzzy Expert System and Real Time Expert Systems.

Unit-V

Implementation Tools: Prolog & Expert System Shell Expert Sys, Etc., Study of Existing Expert Systems-TIERES, AsMycin& AM.

Course Outcomes:
After completing this course, the student should be able to:

- Apply the methodology to transfer human knowledge into an expert system
- Apply knowledge representation and Design a knowledge base
- Understand Natural language processing tools and techniques
- Understand planning and explanation in expert system
- Evaluate Expert System tools

Text Book:

1. **Patterson**, Introduction to AI Expert System, PHI, 2001.

2. **Jackson**, Building Expert System, John Wiley, 2000.

Reference Book:

1. **Joseph C Giarratano**, Introduction to Expert System: Principles and Programming,Vikas Publications, 3rd Edition, 1998.
2. **Peter Jackson**, Introduction to Expert System, Addison Wesley, 1998.
3. **James P Ignigio**, Introduction to Expert System, McGraw Hill, 1990.

Programme: B.TechComputer Science Engineering

Course Title: .Net Technologies **Max Marks: 100**
Course Code: CSE-752 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of the course is to enable a student to acquire the knowledge pertaining to fundamentals of .NET Technology.

Unit-I

Introduction: Microsoft .net Platform, Design Goals and Overview.

Common Language Runtime: CLR Environment and Executables, Meta data ,Assemblies, Intermediate Language, CLR Execution.

Programming in .net Framework: Common Programming Model, Features and Languages, Language Integration.

Unit-II

.net Framework Components: Deployment options, Distributed components, COM+services, Message queuing.

Unit-III

Data and XML: ADO.NET Architecture and Benefits, Content components, Managed providers, Datasets and XML.

Unit-IV

Web services: Web services in practice, Web services Framework, Provider, Customerand Security.

Web forms: ASP, ASP.NET, Web Form syntax, Data binding, Use of templates, Statemanagement and scalability, Application development, ASP.NET and Web services.

Unit-V

Windows forms: Introduction, System. Windows. Forms Namespace, Windows Forms development, Windows Forms and Web services.

Course Outcomes:

After the completion of the course, students will be able to:

1. Understand the basic frame work of dot net.
2. Ability to design and implement applications and distributed systems on the .NET platform.
3. Understand the database connectivity with application.
4. Design webpages using ASP.NET
5. Understand the window programming using .NET.

Text Books:

1. **Hoang Lam, Thuan L. Thai**, .NET Framework Essentials, O"Reilly Publications.
2. **Joe Duffy,** Professional .Net Framework 2.0, Wrox Library Books.

References:

Jeffrey Richter, Applied Microsoft .NET Framework Programming, Microsoft Press.

Programme: B.TechComputer Science Engineering

Course Title: Embedded Systems **Max Marks: 100**
Course Code: CSE–831 **University Exam: 60**
Duration of Exam: 3 hours **Internal**
Assessment: 40

Objective: The aim of the subject is to help the learners to understand the fundamentals of Embedded Systems.

Unit-I

Introduction to Embedded Systems: Hardware and Software Components: Types, Examples, Characteristics and Challenges in Embedded Computing System Design, Embedded System Design Processes.

Unit-II

Architecture of Embedded System: Hardware Components: SOC, Processors, CPU,Types of Memory, Memory Management, I/O Devices and Interfacing. Software Components: Interpreter, Compiler, Assembler, Cross Assembler, RTOS, Languages for Embedded Applications, Hardware and Software Architecture. Examples: Cell Phone, Smartcard, Digital Thermometer.

Unit-III

OS for Embedded Systems: Introduction to Real Time Theory. Operating System Services. Real Time Operating System Concepts. Basic Design using an RTOS. Underground Tank Monitoring System.

Unit-IV

Performance Issues of an Embedded System: CPU Performance. CPU Power Consumption. Analysis and Optimization of CPU Power Consumption Program Execution Time. Analysis and Optimization of Energy and Power. Analysis of Program Size. Hardware Accelerators.

Unit -V

Design Examples: Personal Digital Assistants. Set Top Boxes. Ink Jet Printers. Telephone PBX. Introduction to Micro C/OS-II Operating System and Its Uses.

Course Outcomes:
After completion of the course student will be able to:

- Understand and design embedded systems.
- Learn basic of OS and RTOS.
- Understand types of memory.
- Understand embedded firmware designapproaches.

- Design RTOS embedded systems.

Text Books:

1. **Wayne Wolf**, Computer as Components, Principles of Embedded Computing System Design, Harcourt India Pvt. Ltd.,
2. **David E Simon**, An Embedded Software Primer, Pearson Education,

Reference Books:

1. **Raj Kamal**, Embedded Systems, Architecture, Programming and Design, TMH.
2. **Sriram V Iyer, Pankaj Gupta**, Embedded Real time Systems Programming, TMH.
3. **K.V.K.K. Prasad**, Embedded/Real time Systems: Concepts, Design andProgramming, Dreamtech Press.

Programme: B.TechComputer Science Engineering

Course Title: Artificial Intelligence **Max Marks: 100**
Course Code: CSE-832 **University Exam: 60**
Duration of Exam: 3 hours **Internal**
Assessment: 40

Objective: The objective of this subject is to complement and broaden what students learn in the subject Artificial Intelligence and Natural Language Processing.

Unit- I

Introduction to Artificial Intelligence. Problem Solving Concepts. Definition of Pattern Recognition. Production System. Problem and Production. System Characteristics. Two Path Problem. Analysis of Artificial Intelligence Techniques. Criteria and Success.

Unit- II

Knowledge Representation. Formal And Non-Formal Logic. Representation Evaluation Criteria. Level Of Representation. Formal Logic Schemes. Resolutions. Predicate And Proportional Logic. Conversion To Clause Form. Semantic Networks. Frames. Scripts. Production Systems.

Unit- III

Problem Solving Algorithms and Fuzzy Logic: Problem Solving Strategies. Dealingwith Uncertainty. Defining the Problem. Control Strategies. Exhaustive Search. Generate and Test. Matching. Weak Methods. Hill Climbing. Breadth and Depth First Searches. Search Algorithms Based on Probability. Fuzzy Reasoning.

Unit- IV

Neural Networks: Principles and Promises. Pattern and Pattern Recognition Tasks.
Conventional Methods Scope.

Unit- V

Expert System: Introduction to Expert System Development. Matlab Simulation.

Course Outcomes:

At the end of this course, the student will be able to do following:

- To learn different forms of logic
- Deal with inconsistencies and uncertainties of logic
- Be familiar with informed and uniformed searching techniques
- To study different matching techniques
- To learn pattern recognition and expert systems

Text Books:

1. **Flante Rich,** Artificial Intelligence.
2. **Nilson and Springer**, Principles of Artificial Intelligence.

Reference Books:

1. **David W. Rolston**, Principles of Expert System Development

Programme: B.TechComputer Science Engineering

CourseTitle: Bio-Informatics **Max Marks: 100**
Course Code: CSE-834 **University Exam: 60**
Duration of Exam: 3 hours **Internal**
Assessment: 40

Course Objective: The basic objective is to give students an introduction to the basic practical techniques of bioinformatics. Emphasis will be given to the application of bioinformatics and biological databases to problem solving in real research problems. The students will become familiar with the use of a wide variety of internet applications, biological database and will be able to apply these methods to research problems.

Unit-I

Introduction to Bioinformatics and Computational Genomics, Biological Databases,Kinemages for Biological Structure, Dynamic Programming Sequence Alignment, BLAST, FASTA.

Unit-II

3D Structure Computations, NMR, Xtallography, RNA Secondary Structure, Introduction to Microarrays, Review of Structural Genomics, Microarray Clustering and Classification, Vector Machine Applications in Bioinformatics.

Unit-III

Terminologies and Ontologies, Multiple Sequence Alignment, 1D Motifs, Algorithms and Databases, 3D Structure Alignment, MUSTA Algorithm for Geometric Hashing and Multiple Alignments.

Unit-IV

Hidden Markov Models, Molecular Energetics and Dynamics, Protein Structure Prediction, Genetic Networks, Gene Finding Algorithms.

Unit-V

Comparative Genomics Algorithms, Genome Alignment, Phylogenetic Algorithms, Natural Language Processing, Proteomics, 3D Motifs & Final Thoughts.

Course Outcomes:
At the end of this course, the students will be able to do the following:

- Explain the basic principles that underpin Bioinformatics analyses, and apply these principles when analysing biological data;

- Survey a selected field within Bioinformatics, synthesise information from primary literature, and coherently report your findings in a written document;
- Analyse biological data using a variety of Bioinformatics tools; and
- Interpret correctly the outputs from tools used to analyse biological data and make meaningful predictions from these outputs.

Text Books:

1. **David Mount**, Bio-informatics: Sequence and Genome analysis, 2ed, Cold SpringHarbor Laboratory Press.

Reference Books:

1. **Srinivas**, Bio-metrics: A Modern Approach, PHI.
2. **Bergen**, Bio-informatics Computing, PHI.

Programme: B.TechComputer Science Engineering

Course Title: Data Mining and Data Warehousing **Max Marks: 100**
Course Code: CSE-835 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective:

1. To introduce the basic concepts of Data Warehouse and Data Mining techniques.
2. Examine the types of the data to be mined and apply pre-processing methods on raw data.
3. Learning different classification algorithms for data mining.

Unit-I

Introduction: Dimensional Modeling: Goals of a Data Warehouse, Components of a Data Warehouse, Operational Data Store, Fact and Dimension Tables Star, Snowflake and Hybrid Schemas, Confirmed Facts and Dimensions. Slowly Changing Dimensions, Casual Dimensions, Helper Tables and Surrogate Keys.

Unit-II

Data Warehouse: Introduction, Sources, Users and Applications, Software Architecture and Design, Data Sub System, Data Granularity Model, Characteristics of a Data Warehouse, Data Warehouse Bus Architecture.

Unit-III

Meta Data: Introduction, Need, Types and Metadata Versioning, Metadata Process Concept. Data Marts and Characteristics, Decision Support System and Uses, Using Data Warehouse for DSS, Comparison between OLTP and OLAP.

Unit-IV

Populating a Data Warehouse: Survey of Data Warehouse, Populating Issues ,Architecture Solution Models, Techniques and Solutions for constructing a Central Data Warehouse, Extract, Transform and Build Methods, Managing a Data Warehouse Environment.

Unit-V

Introduction to Data Mining and Uses: Introduction to Data Mining and Uses. Introduction to Decision Trees and its Working. Data Mining Techniques: Concept of Neural Networks. Nearest Neighbor & Clustering. Genetic Algorithms and Data Visualization Concepts.

Course Outcomes

Students who complete this course should be able to

1. Describe the fundamental concepts, benefits and problem areas associated with data warehousing.
2. Describe the various architectures and main components of a data warehouse.
3. Design a data warehouse, and be able to address issues that arise when implementing a data warehouse.
4. Ability to apply acquired knowledge for understanding data and select suitable methods for data analysis.
5. Applicability of various classification algorithms in data mining for real-world problems.

Text Books:

1. **Gray & Smith**, Data Warehousing handbook, CRS, PHI.
2. **Berson**, Data Warehousing, Data Mining & OLAP.

Reference Books:

1. **Mallach**, Data Warehousing System, McGraw Hill.
2. **Prabhu**, Data Warehousing–Concepts, Techniques, Products and Applications, 2nd Edn, PHI.

Programme: B.TechComputer Science Engineering

Course Title: Wireless Networks **Max Marks: 100**
Course Code: CSE-837 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The aim of the subject is to make the students aware of the latest technologies in the field of Wireless Networks.

Unit-I

Cellular wireless Networks:- Introduction: Applications, Replacement of wired Networks, principles of cellular networks, first generation analog, second generation TDMA, second generation CDMA and third generation systems.

Unit-II

Satellite communications:-History, Applications, satellite parameters & configurations-GEO, LEO, MEO, capacity allocation (frequency division, time division), routing, localization, Handover.

Unit-III

Wireless LANS: - Infrared LANS, spread spectrum LANS, narrowband microwave LANS,IEEE 802.11 wireless LAN standard, Bluetooth and IEEE 802.15, wireless local loop.

Unit-IV

Mobile Network Layer:-Mobile IP, Entities and terminology, IP packet delivery, Agent advertisement and discovery, Registration, tunneling and encapsulation, optimizations.

Unit-V

Ad Hoc wireless Networks: - what are Ad Hoc networks? Difference between cellular and Ad Hoc wireless networks, applications, technical & research challenges, Important issues in Ad Hoc wireless networks, the need for MAC, MAC layer protocols for Ad Hoc wireless Networks, introduction to quality of service (QoS) in Ad Hoc wireless networks.

Course Outcome:
On successful completion of this unit students will be able to:

- Identify the basic concept of wireless networks, channel coding, and cellular concepts;
- Compare and contrastLEO, MEO and GEO. Routing and handover in satellite communication
- Understand various wireless LAN technologies
- Understand the terminologies in mobile network layers and the process of

packet discovery and registration in network layer.

- Compare and contrast between cellular and Ad Hoc wireless networks, areas of its applications and challenges

Text Books:

1. Stallings William, ***Wireless Communications & Networking***, PHI.
2. PahlavanKaven, ***Principles of Wireless Networks,***, Pearson Education India.

References:

1. Nicopolitidis, H. S. Obaidat***Wireless Networks***, John Wiley.
2. Stoimenovic Ivan, ***Handbook of Wireless Networks & Mobile Computing***, CRS Presss.

Programme: B.TechComputer Science Engineering

Course Title: Principles of Marketing & Management **Max Marks: 100**
Course Code: CSE-840 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective:

Unit- I : Forms of Business Organizations

Sole Proprietorship, Partnership, Company-Public and Private Sector Enterprises. Principles of Management, Evolution of Management Function of a Manager.

Unit- II :Function of Management

Planning- Nature and purpose- Types of Plans- Objectives, Policies, Procedures, Rules, Strategies,
Programmes, Projects.

Unit- III :Staffing

Selection-RecruitmentProcess, Decision Making Process- Types of Decisions Directing, Leadership, Motivation, Communication. Controlling- Processes, Techniques Budgetary and non- Budgetary.

Unit- IV :Financial Management

Short term and long term sources of Funds- Financing, decision, investment decision, investment decision, introduction to financial, Statements- Production Management-Planning and scheduling, purchasing inventory control.

Unit- V :Marketing Management

Introduction to marketing Mix, Product, Pricing, Promotion and Place. Personnel management, performance appraisal. Conflict- Identification and Resolution Training and development. Introduction to total quality Management, quality circles.

Course Outcomes:
At the end of this course, the students will able to do following:

1. Understand different forms of organizations
2. Understand the functioning of management
3. Understand the process of staffing
4. Understand the several terms associated with financial management
5. Must be able to understand marketing management

References:

1. Koontz, H &Weihrich, H. Management: A Global Perspective 10th ed.
2. Robbins, S. P. Organizational Behavior.
3. Prasad, L. M. Principles of management.

Programme: B.TechComputer Science Engineering

Course Title: Cloud Computing **Max Marks: 100**
Course Code: CSE-841 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: This course offers a good understanding of cloud computing concepts and prepares students to be in a position to design cloud based applications.

Unit-I
Cloud Computing Basics:
Cloud Computing Overview, Characteristics, Applications, Internet and Cloud, Benefits, Limitations, Challenges, Cloud Computing Services and Deployment Models: Infrastructure as a Service, Platform as a Service, Software as a Service, Private Cloud, Public Cloud, Community Cloud, Hybrid Cloud.

Unit-II
Cloud Computing vs Other Computing Technologies:
Overview of Grid, Peer-to-Peer, Pervasive and Utility Computing technologies; their characteristics and comparison with Cloud Computing.
Accessing the Cloud: Hardware and Infrastructure requirements, Access Mechanisms:
Web Applications, Web APIs, Web Browsers.

Unit-III
Understanding Abstraction and Virtualization
Virtualization Technologies, Load Balancing and Virtualization, Hypervisors, Machine Imaging.

Unit-IV
Scheduling in Cloud
Overview of Scheduling problem, Different types of scheduling, Scheduling for independent and dependent tasks, Static vs. Dynamic scheduling, Optimization techniques for scheduling.

Unit-V
Cloud Storage and Cloud Standards:
Overview, Storage as a Service, Cloud Storage Issues, Challenges, Standards.
Cloud Security:
Securing the Cloud, Securing Data, Establishing identity and presence.

Course Outcomes:
At the end of this course, the students will able to do following:

- Develop and deploy cloud application using popular cloud platforms.
- Design and develop highly scalable cloud-based applications by creating and

configuring virtual machines on the cloud and building private cloud.

- Explain and identify the techniques of big data analysis in cloud.
- sApply and design suitable Virtualization concept, Cloud Resource Management and design scheduling algorithms.
- Broadly educate to know the impact of engineering on legal and societal issues involved in addressing the security issues of cloud computing.

Text Books:

Raj Kumar Buyya, James Broberg, AndrezeiM.Goscinski, Cloud Computing: Principles and paradigms, 2011

Anthony T. Velte, Toby J. Velte, and Robert Elsenpeter, Cloud Computing: A Practical Approach, McGraw Hill, 2010.

References:

1. Judith Hurwitz, Robin Bllor, Marcia Kaufman, Fern Halper, Cloud Computing for dummies, 2009.
2. SosinskyBarrie ,Cloud Computing Bible, Wiley India .2011.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Computer Fundamentals **Max Marks: 100**
Course Code: ERE-123 **University Exam:60**
Duration of Exam: 3 hours **Internal Assessment:40**

Objective: The course is designed to provide knowledge of basic computing concepts, & make the student able to perform fundamental operating system functions, to use common software applications.

Unit-I

Introduction: History of Computers, Generations of Computers, Classification of Computers, Application of Computers, Computer Hardware, Input, and Output devices. Memory Hierarchy, RAM, ROM, PROM and types, Secondary memory, working of a Hard Disk and its types.

Unit-II

Software and Languages: Computer Software, System and Application Software, BIOS, POST, Booting Process, Virus, WORM, and Trojans.
Programming Languages, Generations of Languages, Compilers, Assemblers, Machine Language and Assembly Language.Introduction to algorithm and Flow chart: - Representation of an algorithm, flowchart symbols and levels of flow chart, rules, advantage and limitations of flowchart and pseudo code.

Unit-III

Data Representation, Number System: Binary, Decimal, Octal and Hexadecimal number systems, Inter conversion of number system, 1's compliment, 2's compliment, 9's compliment, n's compliment. Logic Gates, Boolean Algebra, Alphanumeric representation, Fixed point representation.

Unit-IV

Booting process details of DOS and Windows: - DOS system files , Internal and External Commands , Difference between External and Internal Commands. Internal Commands:- MD, CD, RD, COPY CON, TYPE, DATE & TIME, VOLUME VERSION, REN, PROMPT, CLS, DIR/P/W, COPY , DEL External commands:-FORMAT , DISKCOPY, DISKCOMP, XCOPY, CHKDISK, SCANDISK, HELP, DEBUG, PRINT. Creation of Batch Files.

Unit-V

Introduction to Computer networks: Applications, types of computer networks, Peer-to-Peer Networks, Client Server Networks, Centralized and Distributed Systems, Internet, Intranet, Extranet, email, ISPs.

Course Outcomes:
Upon the completion of this course, the students will be able to:
1. Know the basic components of the computer and working of each device.

2. Understand the functions of Operating System and soft wares.
3. Understand the representation of data in computer.
4. Understand the booting process and several DoS Commands.
5. Know the fundamentals of Computer Networking

Text Books:

1. **Peter Norton**, Introduction to Computers, TMH.
2. **Sanjay Toledo Mata**, A First Course in Computers, TMH.

Reference Books:

1. **Rajaraman,** Introduction to Digital Computer Design, Prentice Hall India.
2. **Bartee, Thomas,** Digital Computer Fundamentals, TMH.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Basic Electrical Engineering **Max Marks: 100**
Course Code: ERE-124 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of the course is to impart the knowledge of basic principles of Electrical Engineering and Its applied aspects.

Unit-I

Review of Electric Circuit Laws and Energy Sources: Basic Electrical circuit terminology, concept of charge and energy, circuit parameters (resistance, inductance & capacitance), Ohm's law, Kirchhoff's current law, Kirchhoff's voltage law, series and parallel combinations of resistance, inductance & capacitance. Ideal and practical voltage, current sources and their transformations, dependent voltage and current sources.

Unit-II

D.C. Circuit analysis: Power & energy relations, analysis of series parallel DC circuits, Star Delta transformations (ΔϒY), Loop & Nodal methods, Network Theorems: Thevenin's, Norton's, maximum power transfer and superposition theorems.

Unit-III

Electromagnetism: Review of Fundamentals of Electromagnetism, Ampere's Law, analogies between electric circuits and magnetic circuits, Faraday's laws of electromagnetic induction, direction of induced emf, Lenz's law, magnetic saturation and leakage fluxes.

Unit-IV

A.C. Circuit analysis: Basic terminology and definitions, phasor and complex number representations, power energy relations in AC circuits, Resonance in series and parallel circuits, Concepts of active & reactive powers, Introduction to 3 phase circuits.

Unit-V

Transformers: Concept of Inductance, Self & Mutual Inductance, Conventions for magnetically coupled circuits, Transformers: introduction, classification & construction of single phase transformer, emf equation and phasor diagrams.

Course Outcomes:
At the end of this course, students will demonstrate the ability
1. To understand the concepts and applications of different laws used in the networks and circuits.

2. To study and analyze the D.C. Circuit with different theorem.
3. To study the concepts related to electromagnetism.
4. To study and analyze the A.C. Circuits.
5. To understand the principle and working of transformers.

Text Books:

1. **David Bell**, Electrical Engineering Principles. PHI.
2. **Vincent Del Toro**, Electrical Engineering Principles, PHI.

Reference Books:

1. **Cotton H.,** Electrical Technology.
2. **Gupta B.R.,** Principles of Electrical Engineering.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Communication Skills-I **Max Marks: 100**
Course Code: ERE-221 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: In this world of globalization English language is the first and foremost criteria to acquire job in reputed companies .This course is designed to hone the soft skills of students to make them proficient in English Language(writing & speaking).

Unit–I

Communication: Scope & importance of communication, types of communication, barriers of communication and techniques to improve communication, presentations, group discussions, seminars.

Unit-II

Phonetics: Speech mechanism, organs of speech**,** phonetic transcription, effective speaking.

Unit-III

Applied Grammar: Articles, prepositions, modal auxiliaries, verbs, antonyms, and synonyms, précis writing, paragraph writing.

Unit-IV

Recruitment and employment Correspondence: Applications, curriculum Vitae, letter of acceptance, letter of rejection, resignation, reference, interview.

Unit-V

Business Correspondence: Memorandum, Notices, Agendas, Meetings and Minutes, sales letters, enquiries, claims, adjustment letters.

Course Outcomes

Upon the completion of the course, the students will be able to:

1. Acquire basic proficiency in English including reading, listening comprehension, writing and speaking skills.
2. Make the students authoritative in self-expression in their day to day life in this fast- changing world.
3. Identify the common errors involved in writing.
4. Understand the nature and style of sensible writing.
5. Write effective and coherent paragraphs.

Text Books:

1. **Lesikar R.V**. and**Pettit Jr.** Business Communication Theory and Applications, Irwin, 2002 Ed.
2. **Bansal R. K. & Harrison J. B.,** Spoken English, Orient Longman Hyderabad

Reference Books:

1. **Gimson A. C.,** An Introduction to the Pronunciation of English, ELBS (YP).
2. **Pal Rajendra** and **Korlhalli, J. S.** Essentials of Business Communication , Sultan C hand &Sons 2007
3. **Rayudu, C. S**. Media and Communication Management, Himalaya Publishing House.

Note for paper setter: The question paper comprises 10 questions. Two questions shall be set from each unit. The students have to attempt five questions, selecting one from each unit.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: C Programming **Max Marks: 100**
Course Code: ERE-223 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To enhance the logical skills of students with the basic programming concepts and implementation in C.

Unit-I

Introduction to C Programming: History of C, Structure of a C Program, Compiling & Executing a C program. Flow Charts, Constants, Variables and Data Types, Operators and Expressions, Data Input and Output.

Unit-II

Control Statements: Decision making and branching, IF statement, IF-ELSE statement, nested IF-ELSE statement, Switch statement, break statement, continue statement. Decision making and Looping, while statement, do-while statement, for statement.

Unit-III

Functions: Types of functions, function declaration, calling a function, passing arguments to functions, return values and their types, nesting of functions, recursion.

Unit -IV

Introduction to arrays: One dimensional arrays, Two dimensional arrays and Multidimensional arrays, basic operations on arrays, arrays and strings, basic string operations. Introduction to Unions, Structures and enumerated data types.

Unit-V

Introduction to Files & Pointers: Operations on pointers, pointers & multidimensional arrays, pointers & character strings. Dynamic Memory Allocation in C: malloc, calloc, realloc and free functions. Operations on files like open, close, read and write.

Course Outcomes:
The student will be able:

1. To understand the basic constructs of C programming.
2. To solve the problems using control statements.
3. To decompose a problem into functions and synthesize a complete program.
4. To use various types of arrays and user defined data types

5. To use pointers and files to perform several operations.

Text Books:

3. **Balaguruswamy**, Programming in ANSI C, TMH.
4. **YashwantKanitkar**, Let us C, TMH.

Reference Books:

5. **Gottfried, Programming** with C, TMH.
6. **Venugopal,** C Programming, TMH.
7. **YashwantKanitkar,** Pointers in C, TMH.

Note for paper setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Basic Electronics | **Max Marks: 100**
Course Code: ERE-224 | **University Exam: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Objective: This *course* aims to provide *students* with solid background of semiconductors and some basic solid state electronic devices used in circuits.

Unit-I

Semiconductors: Classification, semiconductor bonds, Energy band description, Semiconductor types, Energy band diagram for Semi conductors, Drift and Diffusion Current, Mobility of Charged particles, Current density and Conductivity, Conductivity of Semi conductors, Hall Effect.

Unit-II

Introduction to p-n Junction: Current components in p-n junction, Diodes and Characteristics, temperature dependence, equivalent circuits. Rectifiers, half wave, full wave rectifiers, bridged rectifiers (efficiency, ripple factor). Clipping and clamping circuits. Basic operations of Zener, Avalanche and Photo Diodes.

Unit-III

Transistors: Types of transistors, operation& characteristics, CE, CB and CC configurations, Input output characteristics and graphical analysis of basic amplifier circuits, biasing and bias stability, use of transistor as a switch.

Unit-IV

Field Effect Transistors: Operation and characteristics. JFET, MOSFET, types of MOSFET, operation and characteristics of JFET and MOSFET, biasing of JFET and MOSFET. Introduction to feedback, Types of feedbacks, Sinusoidal Oscillators, Hartley, Collpitts and Phase Shift oscillators (transistor version only and no derivation).

Unit-V

Biasing Techniques and biasing stability (BJT/FET):- Need for biasing, operating point,load line analysis,fixed bias configuration, emitter bias configuration, voltage divide bias configuration analysis of these biasing techniques , and bias stability.

Course outcomes: At the end of the course, the student will be able to

1. Describe the energy bands and the scientific principles behind controlled conductivity in semiconductors.

2. Analyze the working of PN junction diode and apply diode in various applications such as rectifiers and other wave shaping circuits.
3. Analyze the working of the traditional transistor BJT and as well as the concept of biasing.
4. Understand the operation of MOSFET and various issues of scaling in MOSFET.
5. Understand biasing techniques and biasing stability (BJT/FET).

Text Books:

1. **Millman&Halkias**, Electronic Devices & Circuits, TMH
2. **Boylestad**and**Nashelky,** Electronic Devices & Circuits, PHI.

Reference Books:

1. **Floyd T. L.,** Electronic Devices, Pearson Education.
2. **Theodore Bogart Jr**., Electronic Devices & Circuits, Pearson Education.
3. **Mehta V. K.**, Electronic Devices, S. Chand and Sons, New Delhi

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Engineering Drawing **Max Marks: 100**
Course Code: ERE-226 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The course is designed to develop the ability to visualize and communicate three-dimensional shapes and train the students to create drawings following the engineering graphics conventions.

Unit-I

Introduction to Engineering Graphics: Engineering drawing as language of Engineers. Drawing instruments and their uses.**Projections**: The planes of projections, first and thirdangle projections, projection of points lying in any quadrant.Scale; needs and importance, to find representative factor of a scale, drawing of simple and diagonal scales.

Unit-II

Projection of straight line and their traces: projection of planes. Planes parallel to refEEnce plane; plane perpendicular to both reference planes; planes perpendicular to one and inclined to other reference plane.Projection of solids with their axes perpendicular or inclined to one reference plane but parallel to other.

Unit-III

Section of Solids & Development of surfaces: Definition of sectioning and its purpose, Procedure of sectioning, Illustration through examples, types of sectional planes. Purpose of development, Parallel line, radial line and triangulation method, Development of prism, cylinder, cone and pyramid surface for both right angled and oblique solids.

Unit-IV

Orthographic Projections: Theory of orthographic projections (Elaborate theoretical instructions) Drawing 3 views of given objects (Non symmetrical objects and blocks may be selected for this exercise) Exercises on both first angle are third angle.

Unit-V

Isometric Projection: Classification of pictorial views, Basic Principle of Isometric projection, Difference between isometric projection and drawing, Isometric projection of solids such as cube, prism, pyramid and cylinder.

Course Outcomes:

Engineering drawing is language of engineers, without this subject the new ideas regarding modifications in the existing systems or the construction of various magnificent structures and intricate machines could not be made possible. In all engineering branches at all the stages of manufacturing or construction, requirement of conversion of new ideas and design concepts into the basic language of graphics is essential. Therefore, there are many areas (civil, mechanical, electrical, architectural and industrial) in which the skills of the Engineering graphics play major roles in the design and development of new products or construction and modifications in existing systems.

This course is designed to address:

To prepare you to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health.

On completion of course, the students will be able:

1. To understand Engineering Drawing, so that the execution of construction work can be made easy and efficient.
2. To represent three dimensional objects by two dimensional views.
3. Students must be in a position to show hidden details of objects or underground Constructions work by drawing sectional views.
4. Exposure to creating working drawings
5. Exposure to isometric projections in order to visualize aspects of engineering design.

Text Books:

1. **Bhat, N. D. &Panchal, V. M.**, Engineering Drawing, Charotar Publishers, Anand.
2. **Narayana, K. L. and Kannaiah, P.**, Engineering Graphics, Tata McGraw Hill, New Delhi.

Reference Books:

3. **Gill P. S.,** Engineering Graphics and Drafting, Katria and Sons, Delhi.
4. **Luzzadde Warren J**., Fundamentals of Engineering Drawing, PHI.

Note for paper setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit. Question will be set accordingly so that student can be able to answer 5 questions within 3 hours.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Electric Machines-I **Max Marks: 100**
Course Code: ERE-323 **University xamination:60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The student will be able to understand the basic concept and analyze the characteristics of electrical machines and transformer.

Unit I

Transformers: Construction and working principle, classification, concept of ideal transformer, emf equation, transformer on load, phasor diagram on no load and on load, equivalent circuit, O.C and S.C tests. Losses and efficiency, All day efficiency, Voltage Regulation. Parallel operation of single phase transformer.Frequency response & excitation phenomenon of single phase transformers. Auto Transformer:Principle of operation, advantages.

Unit II

Three Phase & Special Purpose Transformers: Principle of operation, construction, 3 phase transformer connections, open delta (V-V) connection, Phase conversions of 3 phase transformer (Scott Connections), Transformer ratings , Parallel operation.Special purpose transformers – Impedance matching transformers, Isolation transformers, constant current & constant voltage transformers. Instrument transformers (Introduction)

Unit III

D C Generators: Principle of operation, construction, EMF & torque equation, power stages, losses & efficiency classification of D.C. generators, various characteristics, parallel Operation of D.C Generators, commutation & armature reaction.

Unit IV

D C Motors: Construction and principle of operation, classification, Emf& torque equation, characteristics of d. c. motors and their applications, speed control of various types of dc motors.

Unit V

D C Motor Starting & Braking: Necessity of starter, three point starter, four point starter, grading of starting resistance, thyristor controlled starters**,** Electric Braking of DC series & shunt motors.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand and analyse single phase transformers
2. Understand and analyse three phase transformers
3. Analyse the operation of DC Generators
4. Understand the operation of dc machines.
5. Understand and analyse the differences in operation of different DC machine configurations.

Text books:

1. **Nagrath I.J** and **Kothari D P,** McGraw Hill “Electric Machines”, Tata (1985).
2. **Chapman S.J**, “Electric Machinery Fundamentals”, McGraw Hill (1983).

Reference books:

1. **Puchstein A F, Lloyds T C** and **Conard A C**, “Alternating Current Machines”, Asia Publishing House (1968).
2. **Bimbhra P S** and **Khanna,** “Electrical Machinery”, Publishers, Delhi, 6th Ed. (4003)

Note for Paper Setter: The Question Paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt 5 questions at least one from each unit.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Digital Electronics **Max Marks: 100**
Course Code: ERE-325 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of this subject is to enable the students to know basic concepts of digital electronics design and build digital hardware.

Unit-I

Review of number systems, BCD, Excess-3, Gray and Alphanumeric codes. Review of Boolean algebra, De-Morgan's Theorems, Standard Forms of Boolean Expressions, Minimization-Techniques: K-MAPS, VEM Technique, Q-M (Tabulation) method.

Unit-II

Logic Gates & families: TTL, MOS, CMOS, Bi-CMOS; Performance parameters of IC families: input and output loading, fan-in, fan-out, tri-state, current drive, voltage levels, noise margins, power-speed tradeoff; Unused inputs; Interfacing between logic families.

Unit-III

Combinational Logic Circuits: Problem formulation and design of Basic Combinational Logic Circuits, Combinational Logic Using Universal Gates. Basic Adders, ALU, Parity-Checkers and Generators, Comparators, Decoders, Encoders, Code Converters, Multiplexer (Data Selector), De-multiplexers

Unit-IV

Sequential Circuits: Latches, Flip-flops (SR, JK, T, D, Master/Slave FF,) Edge-Triggered Flip-Flops, Flip-Flop Operating Characteristics, Basic Flip-Flop Applications, Asynchronous Counter Operation, Synchronous Counter Operation, Up/Down Synchronous Counters.

Unit-V

Shift registers & Memories, Shift Register Functions, Serial In - Serial Out Shift Registers, Serial In - Parallel Out Shift Registers, Parallel In - Serial Out Shift Registers, Parallel In - Parallel Out Shift Registers, Bidirectional Shift Registers, Basics of Semiconductor Memories, Random-Access Memories (ROM), Read Only Memories (ROMs), Programmable ROM's (PROMs and EPROM's), PAL, PLA.

Course outcome
After completion of this course student

1. Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.
2. To understand and examine the structure of various number systems and its application in digital design.
3. The ability to understand, analyze and design various combinational and sequential circuits.
4. Ability to identify basic requirements for a design application and propose a cost effective solution.
5. To develop skill to build, and troubleshoot digital circuits.

Text Books:

1. **Morris Mano**, Digital Logic Design, TMH.
2. **Kumar Anand**, Digital Logic Design, PHI.

Reference Books:

3. **Thomas L. F.**, Digital Fundamentals, Prentice Hall, Inc, 4th Edition 1998.
4. **Tocci R. J.** &**Widner**, Digital Systems: Principles and Applications, PHI.
5. **Gothman**, Fundamentals of Digital Electronics, PHI.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Applied Electronics | **Max Marks: 100**
Course Code: ERE-326 | **University Exam: 60**
Duration of Exam: 3 hours | **Internal Assessment: 40**

Course Objective: The course is designed to introduce the students with advance electronic circuits and applications in fabrications of various devices.

Detailed contents

Unit-I (9 lectures)
Low frequency transistor amplifier and multistage amplifier:
Equivalent circuit of BJT using h parameter for CB,CE and CC & configuration ,calculation of transistor parameter for CB,CE,& CC using h parameter, comparison of transistor amplifier configuration.

Unit-II (9 lectures)
Multistage & Power Amplifier: Multistage Amplifier:
General cascaded system, RC coupled amplifier and its frequency response merits and demerits cascade amplifier, darlington compound configuration multistage frequency effect.
Class A Power Amplifier, Maximum value of efficiency of class A Amplifier ,Transformer coupled Amplifier, Transformer coupled Audio Amplifier , Push pull Amplifier, Complimentary symmetry circuits (Transformer less class B power amplifier).

Unit-III (9 lectures)
Operational Amplifier fundamentals:
Dc analysis of dual input balanced output configuration, Properties of other differential amplifier configuration (dual input unbalanced output), single ended input-balanced /unbalanced output), DC coupling and cascade differential amplifier stages, level translator.
Basis Op-Amp circuit ,Op-Amp parameters-Input and output voltage ,CMRR AND PSRR, offset voltages and currents ,input and output impedances ,slew rate and frequency limitations; biasing of Op -Amps.

Unit-IV (9 lectures)
Linear &Non Inverting Application of OP Amps:
Voltage followers, Non Inverter Amplifiers, Inverting, Summing Amplifiers, Integrator and differentiator, Difference amplifier.Comparators, inverting Schmitt trigger circuits, Monostable and Astablemultivibrator, Triangular and Square wave generators.

Unit V (9 lectures)

Active Filters, Timers & Phase locked loops:

Butter worth filters first order, second order LPF, HPF filter, band pass, Band Reject and all pass filter. Introduction to 555 timer, function diagram, Monostable and Astable operation and applications, Schmitt trigger. PLL– introduction, block schematic, principal and description of individual block, 565 PLL, Application of PLL- Frequency multiplication, frequency translation.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Analyze BJT amplifiers in different configurations at low frequency.
2. Classify power amplifier and analyze performance of different power amplifiers. Also understand the concept of multistage amplifiers.
3. Understand the Operational amplifier fundamentals.
4. Design and analyze various circuits using operational amplifier.
5. Understand the concept of 555 timer and phase locked loop.

Text Books:

1. **Millman**&**Halkias,** Integrated devices & circuits ",by TMH.
2. **Ramakant A. Gayakwad**OpAmps and Linear Integrated Circuits**",** 4th edn, PHI

Reference Books:

1. **David A. Bell**, Operational Amplifiers and Linear IC's**",** 2nd edition, PHI, 4004.
2. **T. L. Floyd**, Electronic Devices by Pearson Education.

Note for paper setter:-The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Network Analysis & Synthesis **Max Marks: 100**
Course Code: ERE-422 **University Exam: 60**
Duration Of Exam: 3hours **Internal Assessment: 40**

Objective: The course has been designed to get student acquainted with basic concepts, principles and applications of electrical networks and their synthesis.

Unit-I

Network Theorems&Network Topology: Network Theorems Superposition, Reciprocity and Millman's, theorems, Thevenin's and Norton's theorems; Maximum Power transfer theorem (A.C Analysis only)
Network Topology: Graph of a network, Concept of tree and co-tree, incidence matrix, tie-set, and cut-set schedules, Formulation of equilibrium equations in matrix form, Solution of resistive networks, Principle of duality.

Unit-II

Capacitive, Inductive Transients & First Order Circuits: Capacitive Transients, Inductive Transients, Combination of Capacitance & Inductance, Initial and Final Conditions, Exponential Functions, Timing Intervals of First and 2^{nd} Order Circuits. Laplace Transform application to solve differential equations and analysis of electric circuits.

Unit-III

Two Port Networks Parameters: Z Parameter, Y parameter, h – parameter, ABCD parameter, Equivalent circuit using these parameters. Condition for reciprocity and symmetry of two port network in different parameters.Interconnection of two port networks.Cascade connection of two port networks parallel connection of two port networks. Series and series parallel connections. Inter conversion of parameters.

Unit-IV

Network Synthesis: Transfer Functions, Natural and Forced Responses, Poles and Zeros of Transfer Functions, Foster and Caure's Forms, Stability, Hurwitz's Polynomials.

Unit-V

Filter Synthesis: Introduction, Classifications of filters, Characteristic Impedance and propagation constant of pure reactive Networks, Ladder Network, T–Section,

Pie Section, Terminating Half Section, Pass Bands and Stop Bands, Design of constant K, n – Derived Filters, Composite Filters.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Apply network theorems for the analysis of electrical circuits.
2. Provide solution for First and second order networks and obtain the transient and steady-state response of electrical circuits.
3. Analyse two-port circuit behaviour.
4. To synthesize various networks using different synthesis techniques.
5. To understand different types of filter.

Text Book:

1. **Valkenberg,** Network Analysis, PHI.
2. **Dorf R. C. & Svoboda J. A.**, Introduction to Electric Circuits, John Wiley & sons 6e

Reference Books:

1. **Stanley,** Network Analysis with applications, Pearson Education.
2. **Mittal G. K.**, Network Analysis, Khanna Publications.

Note for paper setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Power System -I **Max Marks: 100**
Course Code: ERE-424 **University Exam:60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of this course is to develop an understanding of the diverse concepts of power system generation, transmission and distribution. It also involves the study of various power transfer methods and phenomenon associated with power system.

Unit-I

Introduction: Introduction to Power Systems generation, transmission & distribution.
Element of AC distribution. Single fed, double fed and ring main distributor.

Unit-II

Insulators: overhead line insulator types; pin, suspension, strain, schackle, guy etc.
String efficiency & methods of equalizing potential drop over string of suspension insulators.

Unit-III

Transmission Lines: Transmission line parameters and their evaluations, types of overhead conductors with calculations of inductance and capacitance. Models of short,
medium and long transmission lines. Skin, proximity and Ferranti effect. Power transfer
capability of a transmission line. Mechanical Design of transmission line. Electric Power
Transmission Towers.

Unit-IV

Cables: Classification of cables, Cable conductors, insulating materials, insulation resistance, electrostatic stress, grading of cables, capacitance calculation, losses and
current carrying capacity. Location of faults. Location of faults, methods of laying of
underground cables.

Unit-V

Mechanical Design and Corona: Corona, Visual & critical voltages, corona loss, effect

of corona on line design practical considerations

Course Outcome

At the end of this course, students will demonstrate the ability to

1. Understand the various concepts of power systems.
2. Understand the requirement of Insulators and its various types.
3. To understand the various models of Transmission lines.
4. To realise the importance of Cables and their various types.
5. To realise the effect of Corona and its effect on line design.

Text Books:

1. **Kothari** &**Nagrath**Modern Power System Analysis.
2. **J.J. Grainger** and **W.D Stevenson** Elements of Power System Analysis.

Reference books:

1. **B.W. Weedy** and **B.J. Cory,** Electric Power Systems.
2. **C.L. Wadhwa,** Electric Power Systems.
3. **H.Cotton,** Transmission and Distribution of Electrical Energy.

Notefor Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Electrical Machines-II **Max Marks: 100**
Course Code: ERE-425 **University Exam:60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The course has been designed to get student acquainted with basic concepts, principles and applications of AC Machines. Emphasis is given to latest technologies.

Unit I

Three Phase Induction Motors: Introduction of rotating magnetic field**.** Construction and principle of operation, torque-slip characteristics, phasor diagram at standstill and on load, equivalent circuit, No load and blocked rotor tests, methods of starting & speed control, applications

Unit II

Alternators
Basic Principle of operation, construction, emfequationfactors effecting alternator size, Alternator on load, synchronous reactance, determination of voltage regulation, parallel operation of alternators.

Unit III

Synchronous Motors
Principle of operation, types , methods of starting, synchronous motor with differential excitations, salient pole synchronous motor, V and inverted V curves, hunting, synchronous motor applications.

Unit IV

Single Phase Induction Motors
Construction and principle of operation, Types of single phase induction motors, equivalent circuit based on double revolving field theory, Universal motors, fractional horse power motors.

Unit V

Special Machines
Universal motors-application and speed control, reluctance motors, Hysteresis motors,
Stepper motors and its types, Permanent magnet DC motors, Ac & DC servomotors.

Course Outcomes
At the end of this course, students will demonstrate the ability to

1. Understand the operation and characteristics of 3-phase Induction machines.
2. Understand the constructional features, operation and characteristics of alternators.
3. Understand the operation and characteristics of Synchronous machines.
4. Understand the operation and characteristics of 1-phase Induction machines.
5. Understand the operation and characteristics of Universal motors, reluctance motors, Hysteresis motors, Stepper motors, Permanent magnet DC motors, AC& DC servomotors.

Text books:

1. **Nagrath I.J** and **Kothari D P,** McGraw Hill "Electric Machines", TMH.
2. **Chapman S.J**, "Electric Machinery Fundamentals", McGraw Hill (2005).

Reference books:

1. **Puchstein A F, Lloyds T C** and**Conard A C**, "Alternating Current Machines", Asia Publishing House (1968).
2. **Bimbhra P S**, **Khanna Publishers** "Electrical Machinery, Delhi, 6th Ed. (4003)
3. **Gupta B R** and**Singhal V** "Fundamentals of Electric Machines", 2nd Ed., New Age International Pub. (4000).

Note for Paper Setter: The Question Paper shall comprise of 10 question. Two questions will be set from each unit. The student has to attempt 5 questions at least one from each unit.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Electrical Measurement -1 **Max Marks:100**
Course Code: ERE-426 **University Exam: 60**
Duration of Exam: 3hours **Internal Assessment: 40**

Objective: The objective of this course is to expose the students to a broad knowledge of experimental methods and measurement techniques.

Unit-I

Measurement System & Characteristics of Instruments:

Introduction, significance of measurements, methods of measurements, Instruments & measurement system, Classification of instruments – mechanical, electrical & electronic instruments, deflection & null type instruments, Comparison of Analog& digital modes of operation. Application of measurement systems, errors in measurements, types of errors. Accuracy, Precision, Resolution, loading effects.Units-Absolute, Fundamental & derived.

Unit-II

Bridge Circuits:

Wheatstone Bridge- galvanometer sensitivity, current through galvanometer & limitations, Kelvin Double Bridge, Maxwell Inductance Bridge, Maxwell inductance – capacitance bridge, Anderson's bridge, Schering Bridge, Hay Bridge & Wien's Bridge. Measurement of effective resistance, inductance & capacitance at high frequency Meter.

Unit-III

Eectromechanical Indicating Instruments:

D Arsonval Galvanometer- construction & theory, Torque equation, Dynamic behaviour & Galvanometer constants.Ballistic galvanometer- construction & theory.Introduction to PMMC Instruments and Moving Iron Instruments.

Unit-IV

Ammeters, Voltmeters:

DC Ammeter, Multirange Ammeter, , RF Ammeter. DC Voltmeter, Multirange Voltmeter, Extending ammeter & Voltmeter Ranges- Multipliers & shunts, The Aryton Shunt or Universal Shunt, Requirements of a Shunt, Introduction to Instrument Transformers & their application to extension of Instrument range.

Unit-V

Measurement of Energy & Power:

Measurement of power in three phase AC circuits using single phase & three phase wattmeter, Measurement of reactive power (single phase & three phase), Measurement of energy using Induction type meter, Energy meter testing, Power factor meter.

Course Outcomes.

The student will learn:

1. Introduction to Measurement System & Characteristics of Instruments.
2. Exposure to the Bridge Circuits and to learn various measurements techniques used for the measurement of capacitance and inductance.
3. Exposure to Electromechanical Indicating Instruments.
4. Exposure to various types of Ammeters and Voltmeters.
5. Exposure to different methods used in the measurements of Energy & Power.

TEXT BOOKS

1. Albert D.Helfrick and William D. Cooper, "Modern Electronic Instrumentation and Measurement Techniques", Prentice Hall of India, 2007.
2. Ernest o Doebelin and dhanesh N manik, "Measurement systems" ,5th edition ,McGraw-Hill, 2007.

REFERENCES

1. John P. Bentley, "Principles of Measurement Systems", Fourth edition, Pearson Education Limited, 2005.
2. A. K. Sawhney, "Course In Electrical And Electronic Measurement And Instrumentation", DhanpatRai Publisher, 2000.
3. Bouwens,A.J, "Digital Instrumentation", Tata Mc-Graw Hill, 1986.
4. David A.Bell, "Electronic Instrumentation and Measurements", Second edition,
   Prentice Hall of India, 2007.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions selecting one from each unit

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Microprocessor & Interfacing **Max Marks: 100**
Course Code: ERE-522 **University Exam:60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of this course is to introduce to the students the fundamental of 8085 microprocessor and its interfacing.

Unit-I

Introduction To Microprocessor: History and Evolution, types of microprocessors, 8085 Microprocessor, Architecture, Bus Organization, Registers, ALU, Control section, Instruction set of 8085, Instruction format, Addressing modes, Types of Instructions.

Unit-II

Assembly Language Programming and Timing Diagram: Assembly language programming in 8085, Macros, Labels and Directives, Microprocessor timings, Instruction cycle, Machine cycles, T states, State transition diagrams, Timing diagram for different machine cycles.

Unit-III

Serial I/O, Interrupts and Comparison of Contemporary Microprocessors: Serial I/O using SID, SOD. Interrupts in 8085, RST instructions, Issues in implementing interrupts, Multiple interrupts and priorities, Interrupt handling in 8085 with RIM and SIM, Enabling, disabling and masking of interrupts. Brief comparison of contemporary 8-bit microprocessors like Z-80, M68000 with 8085.

Unit-IV

Data Transfer techniques: Data transfer techniques, Programmed data transfer, Parallel data transfer using 8155. Programmable parallel ports and handshake input/output, Asynchronous and Synchronous data transfer using 8251A. Programmable interrupt controller 8259A. DMA transfer, cycle stealing and burst mode of DMA, 8257 DMA controller.

Unit-V

Microprocessor Interfacing Techniques: Interfacing and refreshing dynamic RAMs, Interfacing a keyboard, Interfacing LED and seven segment displays, Interfacing A/D converters, D/A converters.

Course Outcomes

At the end of this course, students will demonstrate the ability to

1. Do understand the Fundamental of Microprocessor.
2. The students will be able to understand the assembly language programming and timing diagram for 8085 microprocessor.
3. Understand and use of masking of interrupts.
4. Understand data transfer techniques.
5. Do understand the External Communication Interface and Applications.

Text Books:

1. **R. S. Gaonkar**, µprocessor Architecture, Programming & applications with the 8085/8086A, Wiley Eastern Ltd.
2. **Douglas V Hall**, Microprocessors & Interfacing.

Reference Books:

1. **A. P. Mathur**, Introduction to Microprocessor, Tata McGraw Hill.
2. **Yu-Cheng Liu** & **G A Gibson**, µprocessor System, Arch Programming & Design.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Control System-I **Max Marks: 100**
Course Code: ERE-523 **University Exam:60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The course puts an emphasis on the Linear control systems. The course content has been designed to give a practical shape to the basic courses.

Unit–I

Introduction: Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems. Transfer functions, Block diagram representation of systems– Reduction using Block diagram algebra – Representation by Signal flow graph - Reduction using mason's gain formula.(Mechanical Systems are excluded).

Unit-II

Time Response Analysis of First and second Order Control Systems: Standard test signals,Examples of First and second order control systems, Time response of Control systems to Impulse and step inputs,Time domain specifications of these systems,steady state response,steady state errors and error constants.

Unit-III

Stability Analysis in S-Domain : The concept of stability,BIBOstability,Relation between characteristic equation roots and BIBO stability,Routh Hurwitz stability criterion,Difficulties encountered in routhscriterion,Relative stability analysis,Root locus concept,construction of root loci,effects of adding poles and zeros to G(s)H(s) on the root loci.

Unit-IV

Frequency Response Analysis : Introduction, Frequency domain specifications,Polarplots,Nyquistcriterion,Procedure for using Nyquistcriterion,Bodediagrams,Determination of Frequency domain specifications and transfer function from the Bode Diagram,Phase margin and Gain margin-Stability Analysis from Bode Plots.

Unit-V

Dynamic Control systems: Proportional Controller, Integral controller, Derivative Controller, Proportional plus integral controller (PI), Proportional plus derivative controller (PD), Proportional plus integral plus derivative controller (PID) and their effects on system dynamics.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand the basics of control systems.
2. Understand the modeling of linear-time-invariant systems using transfer function.
3. Perform Stability Analysis in S-Domain.
4. Know the frequency response for stability analysis.
5. Design the controller.

Text Books:

1. **Nise S-** Control Systems engineering 4th edition John wiley and son's
2. **Ogata Katsuhiko**- Modern Control Engineering Prentice Hall of India Pvt. Ltd., 3rd edition.

Reference Books:

1. **Nagrath. J and Gopal M**- Control Systems Engineering –New Age International (P) Limited Publishers, 2nd edition.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Design of Power Apparatus **Max Marks: 100**
Course Code: ERE-526 **University Exam:60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of this course is to make students familiar with various designing procedures involved in designing electrical machines.

Unit-I

Principles of Electrical Machine Design: Considerations in design, design factors, limitations in design, modern trends in design.

Unit-II

Design of single-phase and three-phase Transformers: Output equation, core design, winding design, yoke design, Design of transformer tank with tubes, design of insulation.

Unit-III

Design of D.C Machines: Output equation, Main dimensions, Armature design, Armature windings, Design of commutator and brushes, Design of Field systems, Design of interpoles.

Unit-IV

Armature Winding Design: Winding design, integrated approach for windings, A.C armature windings, production of emf in windings, Mmf distribution of armature windings, eddy current losses in conductors.

Unit-V

Design of Induction Motor: Output equator, stator design, rotor design, relationship between Dia(D) and length(l) for best power factor, squirrel cage rotor design, effect of saliency magnetic circuit calculation.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Understand the construction and performance characteristics of electrical machines.
2. Understand the various factors which influence the design: electrical, magnetic and thermal loading of Transformer.
3. Understand the various factors which influence the design: electrical and magnetic loading of dc machine.
4. Understand the basic and design of armature winding.

5. Understand the various factors which influence the design: electrical and magnetic loading of Induction motor.

Text Books:

1. **A. K. Sawhney**, A Course in Electrical Machine Design, DhanpatRai Publication.
2. **V. N. Mittle,** Design of Electrical Machines,Standard Publishers Distributors.

Reference Books:

1. **R. K. Agarwal,** Principles ofElectrical machine Design,S. K. Kataria& Sons
2. **S. K. Sen,** Principles ofElectrical machine Design,Oxford&Ibh Publishing Co. Pvt Ltd

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Power Electronics **Max Marks: 100**
Course Code: ERE-621 **University Exam:60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of this course is familiarizing students with working of power electronic converters under various loads.

Unit-I

Characteristics of Various Solid State Devices: Power diode: structure, I-V characteristics, turn On and turn Off characteristics. SCR: structure, I-V characteristics, turn On and turn Off characteristics, Two transistor model, triggering circuits. Power transistor, MOSFET, GTO, IGBT: I-V characteristics, rating, comparison, parallel operation.
Triac: I-V characteristics, application. Snubber circuits for Power Diodes, SCR's and BJT's. Applications of power electronics.

Unit-II

AC TO DC Converters: Natural commutation- performance analysis under passive loads of Single phase/three phase bridge, Semi controlled and fully controlled rectifiers- Dual converters- Effect of load and source inductances, Inverter operation.

Unit-III

DC TO DC Converters: Switch mode DC-DC Converters: Introduction, Control. Operation of Buck, Boost and Buck-Boost ,Cuk converters. Basic principles of switch mode power supplies.

Unit-IV

DC TO AC Converters: Basic concept of switch mode Inverters, square Wave and Sinusoidal PWM switching scheme. Single- phase inverters: Half bridge and full bridge, Bipolar and Unipolar PWM.
3-Pase Inverters: Square wave with 120 and 180 degree conduction mode, 3-phase PWM. Basic Principle of Switch mode power supplies.

Unit-V

AC TO AC Converters: Single phase and three phase AC voltage controllers using thyristors and Triac integral cycle control –AC choppers-single phase Cyclo converters application –effect of harmonics and Electromagnetic interference.

Course Outcomes

At the end of the course the students will be able to

1. Articulate the basics of power electronic devices and characteristics of Power transistor, MOSFET, GTO, IGBT.
2. Express the design and control of converters.
3. Design of power electronic converters in power control applications.
4. Analyze the operation of DC-AC converter and voltage source inverters.
5. Ability to design AC voltage controller, Chopper circuit, Inverter circuit and Cyclo-Converter.

Text Books:

1. **Ned Mohan T. M Undeland& W.P. Robbin,** Power Electronics.
2. **M.H Rashid,** Power Electronics.

Reference Books:

1. **B.K BOSE**, Recent Advances in semiconductor Devices.
2. **M.Ramamurthy**, An introduction to thyristor and their application.
3. **DubeyDoradla, joshi**and**Sinha,** Thyristorised power controllers.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting one from each unit.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Energy Audit and Management **Max Marks: 100**
Course Code: ERE-624 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**

Objective: This course gives an overview of various aspects of conservation, management & audit of electrical energy.

Unit-I

Energy management: Concept of energy management ,energydemad and supply, economic analysis; duties and responsibilities of energy managers

Unit-II

Energy conservation: Basic concepts, energy conservation in household, transportation, agricultural, service and industrial sectors, lighting, HVAC systems

Unit-III

Energy audit: Definition, need, and types of energy audit: energy management(audit) approach, understanding energy costs, bench marking, energy performance, matching energy requirement, maximizing system efficiencies , optimizing the input energy requirements: fuel and energy substitution: energy audit instruments; energy conservation act; duties and responsibilities of auditors

Unit-IV

Electrical energy management: Supply side: method to minimize supply-demand gap, renovation and modernization of power plants, reactive power management, power factor improvement, importance and methods

Unit-V

Electrical system: Energy efficient lighting system, energy efficient motors, soft starters for energy savers, energy efficient transformers

Course Outcomes

At the end of this course, students will demonstrate the ability to

1. Understand the concept of energy management, energy demand and supply.
2. Understand the importance of energy conservation.
3. Learn various auditing techniques used for proper energy management.
4. Realize how energy conservation could be done in Electrical Systems.

5. How electrical energy management could be achieved using new energy efficient devices.

Text Books:

1. Amit Kumar Tyagi," Handbook on energy Audits and Management".

Reference Books:

1. Wayne C Turner,Energy Management Handbook, The Fairmount Press

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Renewable Energy Sources **Max Marks: 100**
Course Code: ERE-625 **University Exam:60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of this course is to train and aware the new and advanced technologies in renewable energy technologies.

Unit-I

Energy scenario in India, Renewable and Non-renewable Energy sources, Energy for sustainable development, Direct Energy conversion systems.

Unit-II

Solar energy – solar photovoltaic, types of solar modules, solar array, solar thermal – types of collectors, applications of solar energy systems, solar water heater, solar cooker.

Unit-III

Wind energy–potential, site selection, types of wind turbines, wind generation and control.

Unit-IV

Bio energy, wave & tidal energy, ocean thermal energy systems, introduction to MHD & fuel cells.

Unit-V

Energy storages: Introduction, characteristics of energy storage system, storage capacity, charging and discharging rate, storage efficiency, storage of mechanical energy, fly wall energy storage, compressed air storage, electro chemical energy storage system (Battery).

Course Outcome:

After learning the subject, student will be able to:

1. Appreciate the importance of energy crises and consequent growth of the power generation from the renewable energy sources
2. Demonstrate the knowledge of physics of solar power generation and the associated issues.
3. Demonstrate the knowledge of the physics of wind power generation and all associated issues.
4. Understand the utilization of Bio Gas Plants, Tidal, MHD, Fuel Cells by identifying the sites where their production is feasible.
5. Demonstrate the ways by which energy can be stored in different forms.

Text books:

1. **B.R. Gupta**, Generation of Electrical Energy.
2. **G.D. Rai**, Non-conventional Energy Sources.

Reference Books:

1. **PadmashreeS.P.Sukhatme**, Solar Energy.
2. **O.I.Elgerd**, Electrical Energy System Theory.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Control System-II

Course Code: ERE-626
Duration of Exam: 3 hours

Max Marks: 100
University Exam: 60
Internal Assessment: 40

Objective: This subject familiarizes a student with state variables and various advanced control techniques.

Unit-I

State Variable Techniques of Continuous Systems: Introduction, concept of state, finding state model of continuous systems from block diagrams/signal flow graphs, finding transfer function of continuous system from state variable models, Solution of state equations, properties of state transition matrix, computation of state transition matrix by Laplace transformation and Cayley Hamilton theorem, Controllability and Observability.

Unit-II

State Variable Techniques of Discrete systems: Introduction, concept of state, finding state model of Discrete systems from block diagrams/signal flow graphs, finding transfer function of Discrete system from state variable models, Solution of state equations, properties of state transition matrix, computation of state transition matrix by Z transformation and Cayley Hamilton theorem

Unit-III

Digital control system: Hardware elements of a digital control system, Z-transform, inverse Z-transform, difference equations, pulse transfer function. Discrete time system analysis.

Unit-IV

Introduction to Optimal Control: Optimal control problems, regulator problem, output regulator, Tracking problem, Principle of Optimality

Unit-V

Introduction to control Problems: Industrial Control Problems, Control Hardware and their models-potentiometers, synchros, LVDT, dc and ac servomotors, Tachogenerators, Electro-pneumatic valves, pneumatic actuators.

Course Outcomes:

At the end of this course, students will demonstrate the ability to

1. Perform state-space representations for stability, controllability and observability, for continuous systems.
2. Perform state-space representations for discrete systems.
3. Understand the digital control systems.
4. Understand the principle of optimality.
5. Understand the industrial control problems.

Text Books:

1. **Ogatta**, Modern Control Systems.
2. **Norman S. Nise**, Control system engineering.

Reference Books:

1. **Stefani**, Design of Feedback control systems.
2. **Palm**, Modeling, analysis and control of dynamic systems.
3. **Franklin** and **Powel,** Feedback control of dynamic systems.

Note for Paper Setter: The Question Paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt 5 questions at least one from each unit.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: MATLAB
Course Code: ERE-632
Duration of Exam: 2 hours

Max Marks: 50
University Exam: 25
Internal Assessment: 25

List of Experiments

1. Introduction to MATLAB, MATLAB-windows and various toolboxes
2. Arithmetic calculations in MATLAB
3. Matrix and Array Operations
4. Logical Operations
5. Programming in MATLAB, Script files, Function files
6. Graphics: 2D and 3D plots. Style Options, titles, axe control, and zoom.
7. Introduction to simpower systems, toolbox and its use.
8. Simulation ac-dc Converters
9. Simulation of dc-ac Converters
10. Simulation of dc-dc Converters

Laboratory Outcome:

At the end of the laboratory the students will be able to:

1. Understand basics of MATLAB window and tool box.
2. Perform various operations in MATLAB.
3. Understand MATLAB script files and function files.
4. Plot 2D and 3D graphs with style operations.
5. Simulate ac-dc, dc-ac, dc-dc converter operation in MATLAB.

Note: These are only the suggested list of practicals. Instructor may add or change some practical relevant to the course contents.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Power System Protection **Max Marks: 100**
Course Code: ERE-721 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: This course makes the student familiar with various types of protection schemes &equipments used for protection of electrical power system.

Unit-I

Relays: Function of protective relaying, fundamental principles, primary and backup relaying, functional characteristics. Operating principles and characteristics of the following electromechanical relays:

Current, voltage, directional, current balance, voltage balance, differential relays, and distance relays.

Unit-II

Protection of Generators&Transformers: Short- circuit protection of stator windings, Overheating protection, Overvoltage protection, Protection against vibration, protection against motoring over speed.

Short circuit protection, over current and earth-fault protection differential protection. Use of biased relay for differential protection, self balance system protection, differential magnetic balance protection, Buchholz relay, protection of parallel transformer banks.

Unit-III

Protection of Feeders, Busbars and Transmission Lines: Protection of feeders, time limit fuse, over current protection for radial feeders, protection of parallel feeders, differential protection for parallel feeders, differential pilot wire protection, Circulating current protection, protection for bus-bars.

Unit-IV

Fuses: Fusing element, classification of fuses, current carrying capacity of fuses, high rupturing capacity (H.R.C.) cartridge fuses, characteristics of H.R.C. fuses, selection of HRC fuses. MCBs

Unit-V

Circuit Breaker: Types of circuit breakers, basic principle of operation, phenomena of arc, initiation of a arc, maintenance of arc, arc extinction, d.c. circuit breaking, a.c. circuit breaking, arc voltage and current waveforms in a.c. circuit breaking, restricting and recovery voltages, de-ionization and current chopping, ratings of

circuit breakers, oil circuit breakers, air blast circuit breakers, SF6 Circuit breakers, Vacuum breakers.

Course Outcomes:

This course will enable student to:

1. Understand the importance of various types of relays.
2. Understand the protection scheme for generators and transformers.
3. Understand the protection scheme of feeder, bus-bar and transmission lines.
4. Understand the concept and use of fuses.
5. Understand the use of circuit breaker in protection schemes of various power system equipments.

Text Books:

1. **C.R Mason**, The Art and Science of Protective Relaying, John Wiley & Sons
2. **Badri Ram,** Power System Protection and switchgear, TMH

Reference Books:

1. **J. L Black. Burn**, Protective relaying, Principles and Applications.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Electrical Drives **Max Marks: 100**
Course Code: ERE-722 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: This course makes a student familiar with various types of AC & DC drives and their industrial applications.

Unit-I

Converter fed D.C Drives: Phase-controlled converter fed D.C Drives, Analysis and performance of drive in continuous and discontinuous conduction modes, Harmonics and p.f, methods of improvement of i/p p.f in phase-controlled converter fed d.c drives, PWM rectifiers

Unit-II

Chopper Fed D.C Drive: Chopper-controlled D.C Drives, single and multi-quadrant operation in continuous and discontinuous modes, dynamic, regenerative and composite braking (more stress on self-commutated devices), Closed loop control of D.C. drives.

Unit-III

Adjustable-voltage control of induction motor drives. Frequency control of induction motor drives (v/f control) using VSI, CSI, PWM VSI, PWM CSI inverters, Cycloconverter-controlled AC drives.

Unit-IV

Slip power controlled induction motor drives, static rotor-resistance control, static Kramer drive, mathematical modeling of induction motor drives, transient response and stability analysis

Unit-V

Synchronous motor drives, SRM drives, static excitation scheme of alternators.

Course Outcomes

At the end of the course the students will be able to

1. Apply the knowledge of drives and use them effectively.
2. Able to control the speed of DC motor and Induction motor.
3. Able to realize different braking methods in DC drive.
4. Suggest the particular type of AC/DC drive system for an application.
5. To apply close loop control in DC Drive.

Text Books:

1. **G.K. Dubey,** Fundamentals of Electrical Drives.
2. **B.K. Bose**, Power Electronics and variable frequency drives.

Reference Books:

1. **G.K. Dubey**, Power semi-conductor controlled drives.
2. **J.M.D Murphy** and **Turnbull,** Power Electronic control of A.C Motors.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Entrepreneurship Dev& Management **Max Marks: 100**
Course Code: ERE-723 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: Course is designed to acquaint the students with the skills required to become entrepreneurs and to create an awareness of the need for systematic management of projects.

Unit-I

Entrepreneurship Development: Meaning, objectives, type of entrepreneurs, importance of entrepreneurship training, factors affecting entrepreneurship, linkage between entrepreneurship and economic development, problem of increasing unemployment, balanced regional growth, harnessing locally available resources, New Industrial Policy and innovation in enterprises.

Unit-II

Entrepreneurship Support System: Small Industries Development Bank of India, Small Industries service Institute, State Small Industries and Export Corporation, District Industrial Centres and Other supporting agencies.

Unit-III

Project Report Preparation: Identifying business opportunities, Project report and its importance, various contents of project report: managerial and entrepreneurial capabilities, socio-economic benefits, Demand analysis, technical feasibility and financial viability.

Unit-IV

Introduction to Marketing Management: Brief introduction to various types of product strategies, Pricing strategies, Channel strategies and Promotional strategies.
Introduction to Production Management: Types of production systems, production planning and control, functions of Production Manager and Materials Management.

Unit-V

Introduction To Human Resource Management: Manpower Planning, Recruitment, selection, placement and induction, training and development, compensation.

Introduction to Financial Management: source of finance and Working Capital management.

Course Outcome

After completion of this subject student will be able to:

1. Understand the meaning, objectives and types of entrepreneurs.
2. Understand the Entrepreneurship Support System.
3. Prepare to Project Report.
4. Analyze business opportunities, technical feasibility and financial viability in context to entrepreneurship.
5. Plan the business.

Text Books:

1. **Holt David H**, Entrepreneurship: New Venture Creation, PHI (4000).
2. **SainiJasmer Singh**, Entrepreneurship Development Programmes and Practices, Deep and Deep Publications, New Delhi (1998).

Reference Books:

1. **Dollinger**, Entrepreneurship Strategies and Resources, Pearson Education (4003).
2. **Jose Paul & Kumar Ajith N**, Entrepreneurship Development and Management, Himalaya Publishers, New Delhi (4000).
3. **Hisrich Robert D and Micheal Peters P**, Entrepreneurship, TMH, (4002).

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Major Project -1 **Max Marks: 100**
Course Code: ERE-724 **University Exam: 0**
Internal Assessment: 100

At the start of VII semester every student shall be allotted a Major Project-I under the supervision of an allotted mentor. Students are required to do preliminary exercise of survey of literature and preparation of a road map of the selected Major Project-I under the supervision of their allotted mentor. Students are required to complete the Major Project-I during semester VII. Major Project-I shall be evaluated internally as per university statutes by a committee consisting of:

i. Head of the Department
ii. One member nominated by Principal
iii. Coordinator(s)/Supervisor(s) of minor project/training

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Seminar
Course Code: ERE-732
Duration of Exam: 2 hours

Max Marks: 50
University Exam: 0
Internal Assessment: 50

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Industrial Training
Course Code: ERE-733
Duration of Exam: 2 hours

Max Marks: 50
University Exam: 0
Internal Assessment: 50

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Electric Substation Design **Max Marks: 100**
Course Code: ERE-741 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: This subject familiarizes students with designing of various types of electrical substations and associated equipments.

Unit-I

Sub-Station Design: General aspects of sub-station design, Site consideration, design consideration and environmental consideration of substation, layout with all equipments.

Unit-II

Bus-Bar Design: Bus bar arrangement with detailed layout-single bus-bar arrangement, single sectionalized bus-bar scheme, main and transfer bus-bar scheme, ring bus scheme, breaker and half scheme, double bus bar arrangement, double bus and transfer bus arrangement.

Unit-III

Switch Operation: Isolating switches, location, rating, selection, operation and control. Interlocking- mechanical and electrical , rating and selection of isolators.

Unit-IV

Transformers and Circuit Breakers: Voltage & Current Transformers. Governing specifications, rating & selection requirement of CT's & PT's for different protection schemes. Standard ratings & selection. Restricting voltage & recovery voltage, particular performance & testing of circuit breaker.

Unit-V

Control & Relay panels: Design of control & relay panels. Planning of control circuit.Voltage selection scheme.Generalearthing of a substation. Complete design of earthing grid.

Course outcome

By the end of this course, the student should be able to:

1. Explain the principles of design and operation of electric Sub-Station Design
2. Apply analytic techniques pertaining to primary Bus-Bar Design systems.
3. Use basic design principles for Switch Operation and facilities.
4. Examine primary Transformers and Circuit Breakers systems using computer-based modeling.

5. Discuss computational algorithms of Control & Relay panels' system analysis and operation.

Text Books:

1. **P.S Satnam**, Substation Design.

Reference Books:

2. **P.V Gupta**, Substation Design and Equipments. DhanpatRai Publications

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: High Voltage Engineering **Max Marks: 100**
Course Code: ERE-742 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: This course familiarizes the students with working principles, operation, measurement and testing of high voltage systems and equipments.

Unit-I

Conduction and Breakdown in Gases:

Gases as insulators, ionization, current growth, Townsend's criterion for breakdown, electro-negative gases, Paschen's Law, Streamer breakdown mechanism, corona discharges, post breakdown phenomena, practical considerations in using gases for insulating materials.

Unit-II

Conduction and Breakdown in Liquid Dielectrics:

Classification of liquid dielectrics, conduction and breakdown in pure liquids and in commercial liquids.

Unit-III

Breakdown in Solid Dielectrics:

Intrinsic breakdown, electromechanical breakdown, thermal breakdown, breakdown of solid dielectrics in practice, breakdown of composite insulation, solid dielectric used in practice.

Unit-IV

Applications of insulating materials in different electrical apparatus:

Applications in power transformers, rotating machines, circuit breakers, cables, power capacitors, electronic equipment.

Unit-V

Generation & Measurement of High Voltages and Currents:

Generation of high d.c. and a.c. voltages, generation of impulse voltages and currents.

Measurement of high d.c., a c. and impulse voltages, Measurement of high d.c, a.c and impulse currents.

Course outcome

At the end of this module students will be able to:

1. Understand different breakdown mechanisms in gases as well as post breakdown mechanisms.

2. Analyze different conduction and breakdown mechanisms in liquid dielectrics.
3. Analyze different conduction and breakdown mechanisms in solid dielectrics.
4. Foresee applications of different insulating materials in electrical apparatus.
5. Analyze the different techniques of generation and measurement of high voltage and current.

Text Books:

1. **E. Kuffel, W.S Zaengl**, High Voltage Engineering Fundamentals,TMH
2. **M.S. Naidu, V. Karamraju**, High Voltage Engineering,TMH

Reference Books:

3. **Dieter kind, Kurt Feser**, High voltage test techniques.
4. **Subir Ray,** An Introduction to High Voltage Engineering.

Note for paper setter: The question paper shall comprise of ten questions. Two questions will be set from each unit. The student has to attempt five questions, selecting one question from each unit.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Disaster Management **Max Marks: 100**
Course Code: ERE-752 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objectives: The aim of the course is to acquaint the students about the disaster, and its management.

UNIT -I
Introduction to Disaster: Concept, and definition (Disaster, Hazards, Vulnerability, Resilience, Risk)

UNIT-II
Disaster:
Classification, Causes and Impacts (including social, economic, political, environmental, health etc). Differential Impact- in term of caste, class, gender, age, location, disability.Global trends in disasters, urban disaster, pandemics, complex emergencies, Climate change

UNIT-III
Approaches to Disaster Risk reduction: Disaster cycle – its analysis, Phase, Culture of safety, prevention, mitigation and preparedness, community based DRR, Structural- nonstructural measures, roles and responsibilities of community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/URBs), state, Centre and other stake-holders.

UNIT-IV
Inter- relationship between Disasters and Development: Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land – use etc. Climate Adaption, Relevance of indigenous knowledge, appropriate technology and local recourses..

UNIT-V
Disaster Risk Management in India: Hazard and Vulnerability profile of India
Components of Disaster Relief: Water. Food, Sanitation, Shelter, Health, Waste Management.
Institution arrangements (Mitigation, Response and Preparedness, DM Act and Policy, Other related policies, Plans, programmes and legislation)

Course Outcomes:-
After completing subject, Students will be able to

1. Understand the need of Disaster Management.
2. Understand the types, cause, and impacts of Disaster.
3. Affirm the usefulness of integrating management principles in disaster mitigation work
4. Explain the relation between disaster and development
5. Understand the Disaster Risk Management in India.

Text Books:

1. **KrishnaMurthy** et-al" disaster Management: global challenges" Universities Press 2009.
2. Bhatacharia T, " Disaster Science and Management, TMH.

Reference Books:

1. Mullik N.H, " Disaster Management " Enkay Publishing House.

Note for paper setter: The question paper shall comprise of ten questions. Two questions will be set from each unit. The student has to attempt five questions, selecting one question from each unit.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Major Project Phase–II **Max Marks: 450**
Course Code: ERE-821 **External Exam: 200**
Internal Assessment: 250

After the university Exam of semester VII every student shall be allotted a Major Project-II pertaining to his/her stream under the supervision of an allotted mentor. Students are required to report in their respective departments to do preliminary exercise of survey of literature and preparation of a road map of the selected Major Project-II under the supervision of an allotted mentor. Students are required to complete the Major Project-II during semester VIII. Depending upon the infrastructure, Computing and other laboratories facilities the students shall be offered in house project on campus are they can complete their project work in any organization/industry outside the campus. Major Project-II shall be evaluated internally as well as externally as per university statues.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: EHV AC & DC Transmission **Max Marks: 100**
Course Code: ERE-831 **University Exam: 60**
Duration of Exam: 3 Hours **Internal Assessment: 40**

Objective: In this course the student gets and in-depth knowledge of various electrical aspects associated with AC & DC transmission of power at Extra High Voltages.

Unit-I

Introduction: Need of EHV transmission, comparison of EHV ac & dc transmission, mechanical considerations of transmission line.

Unit-II

EHV AC Transmission: Parameters of EHV line, over-voltage due to switching, ferroresonance, line insulator and clearance, corona, long distance transmission with series & shunt. Principle of half wave transmission. Flexible ac transmission.EHV AC transmission system, transmission planning and its correlation with generation. Compensations, principle of half wave transmission flexible ac transmission.

Unit-III

EHV DC Transmission: Types of dc links, terminal equipment and their operations, HVDC system control reactive power control, harmonics, multiterminal dc (MTDC) system, ac/dc system analysis, protection of terminal equipments.

Unit-IV

Design of EHV transmission: Transmission network, selection of operating voltage and conductor, calculation of voltage gradient, corona loss, radio interference level

Unit-V

Control of EHV system: Basic principle of control, control implementation, converter firing control system, value blocking and by passing, stopping and power flow reversal.

Course Outcome

This course will allow the students to:

1. Understand the need of EHV transmission.
2. Analyze different parameters of EHV AC transmission systems and study of various compensation methods.

3. Understand different EHVDC transmission systems and various associated protection schemes.
4. Study and understand the design of EHV transmission system.
5. Realize the need for control of EHV systems and implementing the corresponding control strategies.

Text Books:

1. **Rakesh Das Begmudre,** Extra High Voltage AC Transmission Engineering, Wiley Estern Limited.
2. **Padiyar K.R.**, HVDC Power Transmission System ?, Wiley Estern Limited.

Reference Books:

1. **Kimbark E.W.**, EHV-AC and HVDC Transmission Engineering & Practice, Khanna Publishers.

Note for paper setter: The question paper shall comprise of ten questions. Two questions will be set from each unit. The student has to attempt five questions, selecting one question from each unit.

Programme: B.Tech Electrical and Renewable Engineering

Course Title:Energy Economics and Planning **Max Marks: 100**
Course Code: ERE-837 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The aim of the course is to make the students aware about energy economics and planning.

UNIT-I

Introduction:

Basics in economics; Resources scarcity; Concept of opportunity cost; Law of demand; Derivation of demand curve; Different elastic's of demand; Theory of firm; Production function, Output maximization, cost minimization and profit maximization principles; Input demand function; Different cost concept; Supply curve; Theory of market;

UNIT-II

Energy Economics:

Basic concept of energy economics; Calculation of unit cost of power generation from different sources with examples; Eco-ground rules for investment in energy sector; Payback period, NPV, IRR, and benefit-c.ost analysis with example; Overview of national energy use, energy supply and renewable energy program during different plan period.

UNIT-III

Modeling of energy systems and Policies:

Basic concepts of Econometrics and statistical analysis; Econometric techniques used for energy analysis and forecasting with case studies from India; Operation of computer package Basic concept of Input-output analysis; Concept of energy multiplier; Optimization and simulation methods; Energy & development;

UNIT-IV

Rural energy economics:

Rural economic and social development considerations; Technologies, costs and choice of technology, Demand and benefits forecasting and program development; Economics, financial analysis, and bottlenecks of various decentralized renewable energy electrification program; Analysis of models controlled by local bodies

UNIT-V

Financing of renewable energy systems:

Financial performance ;uncertainties and social cost-benefit analysis of renewable energy systems; financing mechanism of different renewable energy systems; case studies; renewable energy projects for reduction in CO2 emissions

Course outcome

At the end of this course, students will be able to:

1. Understand the law of demand subject to resource scarcity.
2. Basic concepts of Energy economics subject to eco ground rules.
3. Understand the econometric forecasting of energy resources.
4. Analyze economics sector of rural area.
5. Analyze financing performance of non-conventional energy systems.

Text books:

1. M. Munasinghe and P. Meier (1993): **Energy Policy Analysis and Modeling**, Cambridge University Press.
2. Dixon, et ai, **Economic Analysis of Environmental Impacts**, Eartscan Publications ltd.,London,.

Reference books:

1. T.e. Kandpal, H. P. Garg, Rnancial Evaluation of Renewable Energy Technology, Macmilan India Ltd.New Delhi, 4003.
2. White J. A., et. aI.,Prindples of Engineering of Economic Analysis, John Wiley and Sons. Inc. 1989.

Note for paper setter: The question paper shall comprise of ten questions. Two questions will be set from each unit. The student has to attempt five questions, selecting one question from each unit.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Digital Electronics Lab **Max Marks: 50**
Course Code: ERE-332 **University Exam:25**
Duration of Exam: 3 hours **Internal Assessment: 25**

Laboratory Objective: The objective of this laboratory is to give thorough knowledge about the fundamental concepts and techniques used in digital electronics lab.

List of Experiments:

1. Study of pin diagram of various ICs and to test the logic gates and verify their truth tables.
2. Implementation of following with Logic Gates.
    a. Half Adder.
    b. Full Adder.
    c. Half Subtractor.
    d. Full Subtractor.
3. Implementation of Boolean functions using 84153 4:1 MUX
4. Implementation of De-multiplexer, Decoder and Encoder.
5. To add two 4 bit binary numbers using IC 8483.
6. To verify the operation of different modes of shift register using IC 8495.
7. Design of BCD to 8 segment display using logical gates.
8. Simulations
    8.1. Introduction to circuit maker and electronic work bench.
    8.2. Implementation of experiments from Serial No. 1 to 8 through simulations.

Laboratory Outcomes:
At the end of this laboratory
1. Have a thorough understanding of the fundamental concepts and techniques used in digital electronics lab.
2. The ability to understand, analyze and design various combinational and sequential circuits.

3. Ability to identify basic requirements for a design application and propose a cost effective.
4. The ability to identify and prevent various hazards and timing problems in a digital design.
5. To develop skill to build, and troubleshoot digital circuits.

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Network Analysis & Synthesis Lab **Max Marks: 50**
Course Code: ERE-431 **University Exam: 25**
Duration of Exam: 3 hours **Internal Assessment: 25**

Laboratory Objective: The student will be able to verify different fundamental theorem. Also student will be able to analyze& synthesize network.

1. Verification of Thevenin's theorem, Norton's theorem.
2. Verification of Maximum power transfer theorem, Superposition theorem.
3. Verification of Reciprocity theorem.
4. Design and implementation of T and Π passive filters.
5. Determination of h-parameters of a network.
6. Study of sinusoidal steady state response of a network.
7. Study of transient response of a network.
8. Study of passive integrator and differentiator.
9. Syntheses of RC-network for a given network function.
10. Verification of equivalence of star and delta transformation.

Laboratory Outcomes
The students will be
1. Know about various networks.
2. Able to analysis various theorems.
3. Able to design and implement passive filters.
4. Able to evaluate steady and transient state of a network.
5. Able to finds many performance indices in the circuit.

Note: Experimentation to be supported by computer simulations.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Electrical Machines-II Lab **Max Marks: 50**
Course Code: ERE-432 **University Exam: 25**
Duration of Exam: 3 hours **Internal Assessment: 25**

Laboratory Objective: The objective of the laboratory is to equip the students with the exposure to the working operation and characteristics of the A.C. Machines.

1. To perform no-load and blocked-rotor test on a single phase induction motor and hence determine its equivalent circuit parameters
2. To perform no-load test and blocked rotor test on a three-phase induction motor and hence determine its equivalent circuit parameters
3. To study torque-speed characteristics of a 3 phase induction motor.
4. To obtain OCC & SCC of a synchronous machine by synchronous impedance method.
5. To perform open circuit and short-circuit test on a three phase alternator and hence determine its voltage regulation by synchronous impedance method
6. To synchronize an alternator with bus bar with bright/dark lamp method.
7. To obtain V-curves & inverted V Curves of a three phase synchronous motor at no load.
8. Parallel operation of alternator by synchronization using light/dark lamp method.
9. Power measurement by two wattmeter method.
10. To perform Scott connection of three phase transformer.

Laboratory Outcomes
At the end of this laboratory the
1.Get an exposure to common electrical machines and their ratings.
2. Understand the basic characteristics of various A.C. machines.
3. Understand the usage of different type of A.C. machines.
4. Get an exposure to the working of general purpose A.C. Machines.
5. Can be able to formulate the model on software package for simulation purpose.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Electrical Measurements -I Lab **Max Marks: 50**
Course Code: ERE-433 **University Exam: 25**
Duration of Exam: 3 hours **Internal Assessment: 25**

Laboratory Objective: The objective of performing this laboratory is to provide knowledge about various types of bridge and transducer for practical problems.

1. To measure frequency and phase of a signal from a Lissajous Pattern using CRO.
2. Measurement of Inductance by Maxwell's Bridge.
3. Measurement of small resistance by Kelvin's Bridge.
4. Measurement of Capacitance by Schering Bridge.
5. Measurement of medium resistance by Wheat Stone's Bridge.
6. To measure a Strain using a Strain Gauge Transducer.
7. To measure a Displacement using LVDT Transducer.
8. To measure a Temperature using Thermocouple Transducer.
9. To measure a Temperature using Thermistor Transducer.

Laboratory Outcomes

Students will:
1. Get an exposure to common electrical and electronic measurements instruments systems and their ratings.
2. Able to measure frequency and phase of signal using CRO.
3. Understand the basic characteristics of various bridges to know the different network parameter.
4. Understand the usage of different type of transducers.
5. Able to measure different quantities using transducers.

Note: These are only the suggested list of practicals. Instructor may add or change some practicals relevant to the course contents.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Microprocessor & Interfacing Lab **Max Marks: 50**
Course Code: ERE-532 **University Exam: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**

List of Experiments:

1. Study of 8085 Microprocessor Kit.
2. Write a program to add two 8-bit number using 8085 .
3. Write a program to add two 16-bit number using 8085 .
4. Write a program to subtract two 8-bit number using 8085 .
5. Write a program to subtract two 16-bit number using 8085 .
6. Write a program to multiply two 8 bit numbers by repetitive addition method using 8085.
7. Write a program to multiply two 8 bit numbers by rotation method using 8085
8. Write a program to multiply 16-bit number with 8-bit number using 8085.
9. Write a program to generate Fibonacci series using 8085.
10. Write a program to sort series using bubble sort algorithm using 8085.
11. Write a program to control the operation of stepper motor using 8085 microprocessors and 8255 PPI.
12. Write a program to control the temperature using 8085 microprocessors and 8255 PPI.
13. Write a program to control the traffic light system using 8085microprocessors and 8255 PPI.
14. Write a program to control speed of DC motor using 80856 microprocessors and 8255 PPI.

Laboratory Outcomes

On completion of this lab course the students will be able to:

1. Understand and apply the fundamentals of assembly level programming of microprocessors.
2. Word with standard microprocessor real time interfaces including GPIO, serial ports, digital-to-analog converters and analog-to-digital converters;
3. Trouble shoot inter actions between software and hardware;
4. Analyze abstract problems and apply a combination of hardware and software to address the problem.
5. Use standard test and measurement equipment to evaluate digital interfaces.

Programme: B.Tech Electrical and Renewable Engineering

Course Title: Control System Lab **Max Marks: 50**
Course Code: ERE-533 **University Exam: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**

List of Experiments:

1. To study the performance of Relay control Combination of P,I and D control schemes in a typical thermal system.(oven)
2. To study the torque-speed characteristics of an AC servomotor.
3. To study the time response of a variety of simulated linear systems.
4. To study the role of feedback in a DC speed control system.
5. To study the role of feedback in a DC position control system.
6. To study the role of a combination of P,I and D control actions in a variety of simulated linear systems.
7. To study the computer simulation of a number of systems.
8. Use of MATLAB / SIMULINK /Control System tool boxes.

Laboratory Outcomes:

The students should know about various control systems and able to

1. Analysis various open loop and close loop control systems.
2. Understand performance characteristics of servo motors.
3. Check the response of various performance indices of various controllers used in the digital control system.
4. Able to understand DC speed and position control.
5. Learn about MATLAB simulink.

Note: These are only the suggested list of practicals. Instructor may add or change some practicals relevant to the course contents.

Programme: M.Sc (Biotechnology)

Duration: **36** HoursBio-1024
Core Course
Credits: 4
Course duration 72 hours

COURSE: MOLECULAR BIOLOGY

Total Marks: **100**
Internal Assessment: **40**
University Examination: **60**
Duration of Exam: **3 Hours**

Unit - 1 Nucleic acid structure and functions

1.1 Nucleic acid as genetic information carriers: experimental evidence; Concept of gene and genome
1.2 Denaturation and Renaturation: hyper and hypo-chromic effect, Denaturation curve, Tm, analysis of denaturation curve.
1.3 DNA supercoiling; underwinding of DNA, linking number of DNA, role of topoisomerases in changing the linking number of DNA.
1.4 Fundamental organizational units of chromatin: nucleosomes- structure and higher level of organization.

Unit – 2 DNA replication, repair and recombination

2.1 Need for replication of DNA, semi-conservative, bidirectional and semi- discontinuous DNA replication; Mechanism of DNA replication, Enzymes and accessory proteins required in DNA replication of *E. coli* chromosome.
2.2 Replication of extrachromosomal DNA and phage DNA. Replication of DNA in eukaryotes; enzymes and accessory proteins involved, control of replication.
2.3 DNA repair mechanism; mismatch repair, base excision, nucleotide excision and direct repair.
2.4 Recombination: homologous recombination; Holiday junction; Proteins involved in recombination; Site-specific recombination; *Cre-lox* recombination.

Unit - 3 Transcription

3.1 Transcription in prokaryotes; factors involved in transcription, mechanism (initiation, elongation and termination), antibiotic inhibitors of transcription in prokaryotes.
3.2 Operon concept; lactose and tryptophan operons, bacteriophage lambda as an example of transcriptional riboswitches.
3.3 Transcription in eukaryotes; general and specific transcription factors, mechanism, enhancers and silencers and DNA binding motifs, antibiotic inhibitors of transcription in eukaryotes.
3.4 Post-transcriptional modifications in eukaryotes: 5' capping and polyadenylation, splicing; spliceosome machinery, alternate splicing, exon shuffling and RNA editing, post-transcriptional gene control; miRNAs and siRNAs.

Programme: M.Sc (Biotechnology)

Unit – 4 Translation

4.1 Genetic code- concept, degeneracy, triplet nature, deviation from universality and Wobble hypothesis.
4.2 Translation in prokaryotes; mechanism of initiation, elongation and termination, importance of co-transcriptional translation in prokaryotes.
4.3 Translation in eukaryotes; mechanism of initiation, elongation and termination, inhibitors of translation.
4.4 Post-translational modification of proteins and transport of proteins; mitochondrial genetic code.

Unit-5 Genome instability and cell transformation

5.1 Mutations, proto-oncogenes, oncogenes and tumour suppressor genes, physical, chemical and biological mutagens.

5.2 Types of mutations; intra-genic and inter-genic suppression; transpositions- transposable genetic elements in prokaryotes and eukaryotes, role of transposons in genome.

5.3 Viral and cellular oncogenes; tumor suppressor genes; structure, function and mechanism of action.

5.4 Activation and suppression of tumor suppressor genes; oncogenes as transcriptional activators.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 10 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 10 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 10 marks.

Course outcome:

- The course has been devised to familiarize students with Molecular Biology which chiefly deals with interactions among various systems of the cell, including those between DNA, RNA and proteins and learning how these are regulated.
- To gain an understanding of chemical and molecular processes that occurs in and between cells.
- To gain insight into the most significant molecular and cell-based methods used today to expand our understanding of biology.
- Will be able to design and implement experimental procedures using relevant techniques.

Programme: M.Sc (Biotechnology)

Recommended Textbooks and References:

1. Watson, J. D., Baker, T.A., Bell, S.P., Gann, A., Levine, M., &Losick, R. (2014) *Molecular Biology of the Gene.* (7^{th}ed.). Pearson Publications USA.
2. Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., & Walter, P. (2002). *Molecular Biology of the Cell.* New York: Garland Science.
3. Lodish, H. F. (2000). *Molecular Cell Biology*. New York: W.H. Freeman.
4. Krebs, J. E., Lewin, B., Kilpatrick, S. T., & Goldstein, E. S. (2014). *Lewin's Genes XI*. Burlington, MA: Jones & Bartlett Learning.
5. Cooper, G. M., &Hausman, R. E. (2009). *The Cell: a Molecular Approach*. Washington: ASM; Sunderland.
6. David P. Clark & Nanette J. Pazdernik (2013). *Molecular Biology*. Elsevier Academic Press, UK. 2^{nd} Ed.
7. Lehninger, A. L. (2012). *Principles of Biochemistry*(6^{th}ed.). New York, NY: Worth.

Programme: M.Sc (Biotechnology)

Bio-1072
Core Course
Credits: **2**
Duration: **36**Hours

BIOMOLECULES

Total Marks: **50**
Internal Assessment: **20**
University Examination: **30**
Duration of Exam: **2 Hours**

Unit-1 Introduction to Biomolecules and Proteins

1.1 Water: structure and properties, ion product, dipolar structure and dielectric constant; concentration of solution- Molarity, Normality, Molality and Strength.

1.2 Chemical foundations of biology: pH, pK, acids, bases, buffers- composition, preparation, Henderson-Hasselbalch, buffer capacity and strength.

1.3 Amino acids: structure and classification; Proteins:characteristics of peptide bond and Ramachandran map; Hierarchy in structure: primary, secondary, tertiary and quaternary structures

1.4 Protein folding- Anfinsen's experiment, Levinthal paradox, chaperons, protein sequencing (N-terminal sequencing, C-terminal sequencing, Edmann degradation)

Unit – 2 Carbohydrates and Lipids

2.1 Carbohydrates: classification, basic chemical structure, monosaccharides – aldoses and ketoses; Configuration and conformation of monosaccharides (pyranose and furanose), stereoisomerism, anomers, epimers and mutarotation

2.2 Polysaccharides: structural polysaccharides - cellulose and chitin; storage polysaccharides - starch and glycogen; glycoproteins: N- and O-glycosylation; Glycosaminoglycans; Glycoproteins

2.3 Lipids – classification of lipids: oils, fats, and waxes, occurrence and properties of fatty acids, esters of fatty acids, phosopholipids, glycolipids, sphingolipids, cerebrosides and gangliosides.

2.4 Lipoproteins, steroids and cholesterol; Eicosanoids, prostaglandins and leukotriene's.

Unit – 3 Nucleic acids, Vitamins and Pigments

3.1 Nucleic acids: purines, pyrimidines, nucleosides, nucleotides: structure of DNA and RNA.

3.2 Vitamins and Co-enzymes: classification, water-soluble and fat-soluble vitamins, dietary requirements, deficiency conditions, coenzyme forms.

3.3 Porphyrins and porphyrin ring system: chlorophyll, hemoglobin and myoglobin.

3.4 Secondary metabolites: isoprenoids, polyphenols and flavonoids.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 6 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 6 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Course Outcome:

- The course is designed to make students appreciate the structure and importance of various biomolecules involved in sustenance and perpetuation of living organisms.
- Learn the elements that are present in biomolecules and different monomers and polymers.
- To acquaint students with the shape, structure, function and importance of proteins.
- Students will understand chemical properties, structure and function of Lipids and Proteins.

Recommended Textbooks and References:

1. Stryer, L. (2015). *Biochemistry* (8th ed.). New York: Freeman.
2. Lehninger, A. L. (2012). *Principles of Biochemistry*(6th ed.). New York, NY: Worth.
3. Voet, D., &Voet, J. G. (2016). *Biochemistry* (5th ed.). Hoboken, NJ: J. Wiley & Sons.
4. *Biochemistry* by Geoffrey L. Zubay. Fourth Edition, Addison-Wesley educational publishers Inc., 2008

5. Horton, H.R., Moran, L. A., Scrimgeour, K.G. Perry, M.D and Rawn, J.D. 2006. *Principles of Biochemistry*, IVth Edition. Pearson Education Internationl. London.
6. Dobson, C. M. (2003). *Protein Folding and Misfolding.* Nature, 426(6968), 884- 890. doi:10.1038/nature02261.
7. Richards, F. M. (1991). *The Protein Folding Problem.* Scientific American, 264(1), 54-63. doi:10.1038/scientificamerican0191-54.

Programme: M.Sc (Biotechnology)

Bio-2014
Core Course
Credits: **4**
Duration: **72**Hours

GENETIC ENGINEERING

Total Marks: **100**
Internal Assessment: **40**
University Examination: **60**
Duration of Exam: **3 Hours**

Unit – 1 Introduction and Tools for Genetic Engineering

1.1 Impact of genetic engineering in modern society; general requirements for performing a genetic engineering experiment.

1.2 Restriction endonucleases and methylases; DNA ligase, Klenow enzyme, T4 DNA polymerase, polynucleotide kinase, alkaline phosphatase.

1.3 Cohesive and blunt end ligation; linkers; adaptors; homopolymeric tailing; labelling of DNA: nick translation, random priming, radioactive and non-radioactive probes.

1.4 Hybridization techniques: northern, southern, south-western and far-western and colony hybridization, fluorescence *in situ* hybridization.

Unit – 2 Different Types of Vectors

2.1 Plasmids; Bacteriophages; M13 mp vectors; pUC19 and Bluescript vectors, phagemids; Lambda vectors.

2.2 Insertion and Replacement vectors; Cosmids; Artificial chromosome vectors (YACs; BACs); Principles for maximizing gene expression: expression vectors, GST, pET-based vectors.

2.3 Protein purification: His-tagged/GST-tagged/MBP- tagged proteins,Inclusion bodies; methodologies to reduce formation of inclusion bodies.

2.4 Mammalian expression and replicating vectors; Baculovirus and *Pichia*vectors system, plant based vectors, Ti and Ri plasmids as vectors, yeast vectors, shuttle vectors.

Unit-3 Different Types ofPCR Techniques

3.1 Principles of PCR: primer design; fidelity of thermostable enzymes; DNA polymerases; proof reading enzymes.

3.2 Types of PCR – multiplex, nested; reverse-transcription PCR, real time PCR, hot start PCR, colony PCR, asymmetric PCR, RACE; Touchdown PCR; RAPD and AFLP.

3.3 Cloning of PCR products; TA cloning vectors; PCR based site-specific mutagenesis; PCR in molecular diagnostics; viral and bacterial

detection.

3.4 Sequencing methods; enzymatic DNA sequencing; chemical sequencing of DNA; automated DNA sequencing; Pyrosequencing; Next generation sequencing technologies; Chemical synthesis of oligonucleotides.

Unit-4 cDNA Analysis

4.1 Insertion of foreign DNA into host cells; transformation, electroporation, transfection.

4.2 Construction of libraries; isolation of mRNA and total RNA; reverse transcriptase, cDNA synthesis and screning.

4.3 Genomic and cDNA libraries: construction and screening. DNA microarrays: construction and applications.

4.4 Study of protein-DNA interactions: electrophoretic mobility shift assay; DNasefootprinting, chromatin immunoprecipitation; protein-protein interactions using yeast two-hybrid system and phage display.

Unit-5 Gene Silencing and Genome Editing Technologies

5.1 Gene silencing techniques; introduction to siRNA; siRNA technology; Micro RNA; construction of siRNA vectors.

5.2 Principle and application of gene silencing; gene knockouts and gene therapy; creation of transgenic plants (Bt Cotton, Flavrsavr tomato and Golden rice); debate over GM crops.

5.3 Introduction to methods of genetic manipulation in different model systems *e.g.* fruit flies (Drosophila), worms (C. *elegans)*.

5.4 Transgenics - gene replacement; gene targeting; creation of transgenic and knock-out mice; disease model; introduction to genome editing by CRISPR-CAS with specific emphasis on Chinese and American clinical trials.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 10 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 10 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 10 marks.

Programme: M.Sc (Biotechnology)

Course Outcome:

- The objectives of this course are to teach students with various approaches to conducting genetic engineering and their applications in biological research as well as in biotechnology industries.
- Genetic engineering is a technology that has been developed based on our fundamental understanding of the principles of molecular biology and this is reflected in the contents of this course.
- To know the basics and concepts of various genetic engineering terms.
- Elucidate different techniques involved in genetic engineering.

Recommended Textbooks and References:

1. Brown, T. A. (2006). *Genomes* (3rd ed.). New York: Garland Science Pub
2. Brown, T. A (2010) *Gene cloning and DNA Analysis: An Introduction*, Wiley-Blackwell Publication
3. Clark, D. P (2005). *Molecular Biology: Understanding the Genetic Revolution.* Academic press
4. Bernard R. Glick, Jack J. Pasternak, Cheryl L. Pattten. (2010). *Molecular Biotechnology: Principles and Applications of Recombinant DNA.* 4th Ed. ASM press.
5. S. Primrose, R. Twyman, B. Old, and G. Bertola (2006), *Principles of Gene Manipulation and Genomics,* Blackwell Publishing Limited; 7th Edition
6. Green, M. R., &Sambrook, J. (2012). Molecular *Cloning: a Laboratory Manual.* Cold Spring Harbor, NY: Cold Spring Harbor Laboratory Press.
7. Selected papers from Scientific Journals, particularly Nature & Science.
8. *Technical Literature from Stratagene, Promega, Novagen, New England Biolab etc.*

Programme: M.Sc (Biotechnology)

Bio-2022
Core Course
Credits: **2**
Duration: **36** Hours

GENOMICS AND PROTEOMICS

Total Marks: **50**
Internal Assessment: **20**
University Examination: **30**
Duration of Exam: **2 Hours**

Unit-1 Basics of Genomics, Proteomics and Genome Mapping

1.1 Brief overview of prokaryotic and eukaryotic genome organization; extra-chromosomal DNA: bacterial plasmids, mitochondria and chloroplast.

1.2 Genetic and physical maps; markers for genetic mapping.

1.3 Methods and techniques used for gene mapping, physical mapping, linkage analysis, cytogenetic techniques, FISH technique in gene mapping.

1.4 Somatic cell hybridization, radiation hybrid maps, *in situ* hybridization, comparative gene mapping.

Unit-2 Genome Analysis and Comparative Genomics

2.1 Sequencing and assembly of genomes: whole genome shotgun sequencing and hierarchical shotgun sequencing, genome sequencing projects for microbes, plants and animals, Human Genome Project.

2.2 Identification and classification of organisms using molecular markers- 16S rRNA typing/sequencing, SNPs., DNA barcoding.

2.3 Locating protein-binding sites in the upstream region: Gel retardation assay, DNA footprinting and Chromatin Immunoprecipitation (ChIP). Use of genomes to understand evolution of eukaryotes, track emerging diseases and design new drugs.

Unit-3 Functional Genomicsand Proteomics

3.1 Aims, strategies and challenges in proteomics; proteomics technologies: 2D-PAGE, isoelectric focusing, mass spectrometry, MALDI-TOF, proteome databases.

3.2 Transcriptome analysis for identification and functional annotation of gene; Transcript mapping by primer extension and S1 nuclease mapping, deletion analysis of the upstream regions; Contig assembly, chromosome walking and characterization of chromosomes, mining functional genes in genome.

Programme: M.Sc (Biotechnology)

3.3 Protein-protein and protein-DNA interactions: yeast 2-hybrid system, phage display; protein chips and functional proteomics; clinical and biomedical applications of proteomics.

3.4 Introduction to metabolomics, lipidomics, metagenomics and systems biology.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 6 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 6 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Course Outcome:

- The objective of this course is to provide introductory knowledge concerning genomics, proteomics and their applications.
- To know the basic concept of genomics and functional genomics.
- Elucidate different techniques involved in Genomics and Functional Genomics.
- Students will acquaint with different methods of genome sequencing and assembly.

Recommended Textbooks and References:

1. Primrose, S. B., Twyman, R. M., Primrose, S. B., & Primrose, S. B. (2006). *Principles of Gene Manipulation and Genomics.* Malden, MA: Blackwell Pub.
2. Liebler, D. C. (2002). *Introduction to Proteomics: Tools for the New Biology.* Totowa, NJ: Humana Press.
3. Campbell, A. M., &Heyer, L. J. (2003). *Discovering Genomics, Proteomics, and Bioinformatics.* San Francisco: Benjamin Cummings.

Programme: M.Sc (Biotechnology)

Bio-2052
Core Course
Credits: **2**
Duration: **36** Hours

PLANT BIOTECHNOLOGY

Total Marks: **50**
Internal Assessment: **20**
University Examination: **30**
Duration of Exam: **2 Hours**

Unit-1 Plant Tissue Cultureand Plant Transformation Techniques

1.1 Plant tissue culture- history; totipotency of plant cells; Principles for aseptic culture techniques, culture media, plant growth regulators.

1.2 Plant regeneration: somatic embryogenesis, importance of haploid production through pollen culture and triploid production through endosperm culture in crop improvement.

1.3 *In vitro* pollination; wide hybridization; somatic cell hybridization (hybrids and cybrids); embryo culture; Synthetic seeds and their importance.

1.4 Methods of gene transfer- *Agrobacterium* mediated gene transfer and electroporation.

Unit-2 Plant Biotechnology for Abiotic and BioticStress Resistance

2.1 Plant biotechnology for enhancing cold and heat stress tolerance; secondary effects of abiotic stress – production of ROS; genes involved in scavenging of ROS.

2.2 Plant biotechnology in enhancing drought and salt stress tolerance; Plant biotechnology for enhancing resistance against fungal pathogens; anti-microbial proteins.

2.3 Plant biotechnology to enhance viral resistance- pathogen derived resistance.

2.4 Coat protein, antisense, siRNA and ribozyme approaches to enhance resistance for extending shelf life of fruits and flowers (ACC synthase gene and polygalacturonase).

Unit-3 Plant Biotechnologyfor Improving CropYield and Quality

3.1 Plant biotechnology in improving fruit ripening and enhancing photosynthesis.

3.2 Golden rice- nutritionally improved rice through biotechnology; transgenic sweet potato.

3.3 Modification of taste and appearance- sweetness, starch and preventing discoloration.

3.4 Bioplastics- biodegradable plastic from plants through biotechnological intervention.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 6 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 6 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Course Outcome:

- To impart theoretical knowledge on various techniques of plant biotechnology like tissue culture, plant genetic transformation and their application in industries.
- To develop concepts, principles and processes in plant biotechnology.
- Students will know about different types of plant tissue culture.
- Elucidation of different methods for the improvement of plants, including plant taste, texture, fruit ripening, sweetness etc.

Recommended Textbooks and References:

1. Bhojwani, S. S. (1990). *Plant Tissue Culture: Applications and Limitations,* Elsevier, Amsterdam.
2. Brown, T. A (2007). *Genomes.* BIOS Scientific Publishers Ltd.
3. Clark, D. P (2005). *Molecular Biology: Understanding the Genetic Revolution.* Academic press.
4. ``Malacinski, G. M (2006). *Essentials of Molecular Biology.* 4th edition. Narosa Publishing House.
5. Primrose, S. B and Twyman, R. M (2007). *Principles of Gene Manipulation and Genomics.* Blackwell Publishing, Oxford, UK.
6. Singh, B. D. (2007). *Biotechnology: Expanding Horizons.* Kalyani Publishers.
7. Slater, A., Scott, N and Fowler, M (2003). *Plant Biotechnology: the Genetic Manipulation of Plants.* Oxford University Press.

8. Bernard R. Glick, Jack J. Pasternak, Cheryl L. Pattten. (2010). *Molecular Biotechnology: Principles and Applications of Recombinant DNA*. 4th Ed. ASM press.
9. H. S. Chawla. (2013). *Introduction to Plant Biotechnology*. Science Publishers.
10. Ruane J, Sonnino A. (2006). *The Role of Biotechnology in Exploringand*Protecting *Agricultural Genetic Resources. Food and Agriculture Organization of the United Nations*, Rome.
11. Razdan, M.K. (1993). *An Introduction to Plant Tissue Culture*, Oxford and IBH.
12. Singh, J.S., Singh, S.P. and Gupta, S.R. (2006). *Ecology, Environment and Resource Conservation*, Anamaya Publishers, New Delhi.

Programme: M.Sc (Biotechnology)

Bio-3012
Core Course
Credits: **2**

ANIMAL BIOTECHNOLOGY

Total Marks: **50**
Internal Assessment: **20**
University Examination: **30**
Duration of Exam: **2 Hours**

Course Objectives

Impart theoretical knowledge of various techniques of animal biotechnology and their application in industries.

Unit-1 Animal Cell Culture and Scaling Up

1.1 Primary and established cell line cultures; equipment and materials for cell culture.

1.2 Cell culture-suspension cultures, culture media, natural and artificial media, initiation of cell cultures, evolution of continuous cell lines.

1.3 Measurement of viability and cytotoxicity of cultured cells.

1.4 Scaling up of animal cell cultures and their applications.

Unit-2 Animal Tissue Culture and Hybridoma Technology

2.1 Organ culture- techniques, advantages, limitations and applications.

2.2 Stem cell lines: origin and types of cultures and maintenance of stem cell lines; stem cell therapy and its applications.

2.3 Hybridoma technology and somatic cell fusion technology its importance in medicine, cell cloning, manipulation and cell synchronization; Flow cytometry techniques.

2.4 Cell culture products: viral vaccines, interferons, recombinant proteins and hybrid antibodies.

Unit-3 Animal Assisted Reproductive Techniques

3.1 *In-vitro* fertilization in humans, wild animals and cattle, embryo transfer in wild animals and cattle, applications of embryo transfer technology, story of Noori, Garima, *etc.*

3.2Ovum pick-up and applications of animal cloning; Production of transgenic animals with special reference to transgenic mice, cow and

sheep.

3.3 Identification and transfer of genes influencing milk quality and disease resistance; production of pharmaceuticals.

3.4 Transfection methods- Ca phosphate precipitation, DEAE-Dextran mediated transfection, lipofection, fusion with bacterial protoplasts, electroporation; targeted gene transfer- gene disruption and gene replacement.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 6 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 6 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Course Outcome:

- To impart theoretical knowledge on various techniques of animal biotechnology and their application in industries.
- To develop concepts, principles and processes in animal biotechnology.
- Students will know about different techniques for in vitro fertilization.
- Elucidation of different methods for the improvement of animals, including poultry production, milk quality, disease resistance etc.

Recommended Textbooks and References:

1. Brown, T. A (2007). *Genomes.* BIOS Scientific Publishers Ltd.
2. Brown, T. A (2010) *Gene cloning and DNA Analysis: An Introduction*, Wiley-Blackwell Publication
3. Clark, D. P (2005). *Molecular Biology: Understanding the Genetic Revolution.* Academic press.
4. Primrose, S. B and Twyman, R. M (2007). *Principles of Gene Manipulation and Genomics.* Blackwell Publishing, Oxford, UK.
5. Singh, B. D. (2007). *Biotechnology: Expanding Horizons.* Kalyani Publishers.

6. Bernard R. Glick, Jack J. Pasternak, Cheryl L. Pattten. (2010). *Molecular Biotechnology: Principles and Applications of Recombinant DNA*. 4th Ed. ASM press.
7. Das, H. K (2010). *Textbook of Biotechnology*. Wiley India Pvt. Ltd.
8. Freshney, R. I (2010). *Culture of Animal Cells*. John Wiley and SonsInc.
9. Kumaresan, V (2008). *Applied Animal Biotechnology*. Saras Publication.
10. Shenoy, M (2015). *Animal Biotechnology*. Laxmi Publications; First edition.

Programme: M.Sc (Biotechnology)

Bio-3042
Core Course
Credits: **2**
Duration: **36** Hours

BIOINFORMATICS AND BIOENTREPRENEURSHIP

Total Marks: **50**
Internal Assessment: **20**
University Examination: **30**
Duration of Exam: **2 Hours**

Unit – 1 Elementary concepts of Bioinformatics

1.1 Introduction to Bioinformatics – Genomics and Proteomics, Bioinformatics – Online tools and offline tools, Biological databases.

1.2 Types of databases – Gen bank, Swiss port, EMBL, NCBI, PIR, DDBJ, Swiss-Prot and PDB.

1.3 Evolutionary basis of sequence alignment, Optimal alignment methods, Statistical significance of alignments, Database similarity searching, FASTA, BLAST; Multiple Sequence Alignment: Progressive alignment methods, Motifs and patterns, ClustalW.

1.4 Phylogeny: Introduction, phenotypic and molecular phylogeny; Tree building methods; Types of trees; Softwares for phenotypic analysis.

Unit-2 Genomics, Proteomics and Structural biology

2.1 Data Mining –ORF, PubMed, Phylogenetic Analysis, MSA, Gen BANK, COG Cluster, OMIM, Gene Mapping, Sequence Assembly & Expression, Alignment of MS.

2.2 Visualization & prediction of Protein Structure, Methods used in protein structure prediction, PROSITE, DNA Micro array (DNA chip).

2.3 Secondary structure elucidation using peptide bond phi, psi and chi torsion angles, Ramachandran map.

2.4 Homology/comparative modeling, fold recognition, threading approaches, Computational design of promoters, proteins & enzymes.

Unit-3: Innovation and Entrepreneurship in Bio-Business and Bio-Markets

3.1 Introduction and scope in Bio-entrepreneurship, Types of bio-industries and competitive dynamics between the sub-industries of the bio-sector (e.g. pharmaceuticals *vs.* Industrial biotech).

3.2 Strategy and operations of bio-sector firms, Entrepreneurship development programs of public and private agencies (MSME, DBT, BIRAC, Make In India), Concept of Profit and Loss Account; Understanding Balance Sheet related concepts.

3.3 Marketing and Negotiations Strategies: Assessment of market demand for potential product(s) of interest; Identifying needs of customers including gaps in the market.

3.4 Knowledge centers and Technology transfer agencies, Understanding of regulatory compliances and procedures (CDSCO, NBA, GCP, GLA, GMP).

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 6 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 6 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Course Outcome:

- The objective of this course is to introduce to provide students with theory and practical experience of use of common computational tools and databases, which facilitate investigation of molecular biology and evolution-related concepts.
- Research and business belong together and both are needed. In a rapidly developing life science industry, there is an urgent need for people who combine business knowledge with the understanding of science & technology.
- Bio-entrepreneurship, an interdisciplinary course, revolves around the central theme of how to manage and develop life science companies and projects.
- The objectives of this course are to teach students about concepts of entrepreneurship including identifying a winning business opportunity, gathering funding and launching a business, growing and nurturing the organization and harvesting the rewards.

Recommended Textbooks and References:

1. A.D. Baxevanis and B.F.F. Ouellette (Eds). (2002), *Bioinformatics: a Practical Guide to the Analysis of Genes and Proteins,* John Wiley and Sons.
2. D.W. Mount, (2001), *Bioinformatics: Sequence and Genome Analysis,* Cold Spring Harbor Laboratory Press.
3. Jones &Peuzner, (2004); *Introduction to Bioinformatics Algorithms;* Ane Books, India.

4. M. M. Rangs, *Bioinformatics* (2007) (2nd Edn.), Agrobios India,
5. DovStekel, (2003); *Microarray Bioinformatics;* Cambridge University Press.
6. Web-resources and suggested reviews/ research papers on Bioinformatics.
7. Adams, D. J., & Sparrow, J. C. (2008). *Enterprise for Life Scientists: Developing Innovation and Entrepreneurship in the Biosciences.* Bloxham: Scion.
8. Shimasaki, C. D. (2014). *Biotechnology Entrepreneurship: Starting, Managing, and Leading Biotech Companies.* Amsterdam: Elsevier. Academic Press is an imprint of Elsevier.
9. Onetti, A., &Zucchella, A. *Business Modeling for Life Science and Biotech Companies: Creating Value and Competitive Advantage with the Milestone Bridge.* Routledge.
10. Jordan, J. F. (2014). *Innovation, Commercialization, and Start-Ups in Life Sciences.* London: CRC Press.
11. Desai, V. (2009). *The Dynamics of Entrepreneurial Development and Management.* New Delhi: Himalaya Pub. House.

Programme: M.Sc (Biotechnology)

Bio-3054
Core Course
Credits: **4**
Duration: **72**Hours

IMMUNOLOGY

Total Marks: **100**
Internal Assessment: **40**
University Examination: **60**
Duration of Exam: **3 Hours**

Unit 1--Introduction to immunology

1.1 1Types of immunity, innate and adaptive, hematopoiesis.The host-microbe relationship: Normal body flora; Pathogen and their abilities to cause disease.Host defense barriers and its breach for the establishment of infection and disease; Virulence factors and ability of pathogen to escape host to spread disease.

1.2 Cells and organs of immune system: B and T cells, macrophages, dendritic cells, NK cells, eosinophills, neutrophills and mast cells, organs; thymus, bursa of fabricus, spleen, lymph nodes and lymphatic system.

1.3 Immunoglobulin: structure, classes and subclasses; Nature and biology of antigens, immunogenicity versus antigenicity, epitopes, antigen- antibody interactions and heptans.

1.4 Generation of antibody diversity; Basis of self and non-self-discrimination.

Unit 2--Humoral and cell mediated immunity

2.1 Major histocompatibility complex and HLA system, recognition of antigens by T-cells and role of MHC; implication of linkage disequilibrium and disease association.

2.2 Antigen processing and presentation: endogenous and exogenous antigens; super antigens.

2.3 Complement fixing antibodies and complement pathways; ADCC.

2.4 Cytokines, types and functions, cell adhesion molecules, cytokine related diseases; therapeutic uses of cytokines.

Unit 3--Clinical Immunology

3.1 Type I, type II, type III and type IV hypersensitivity reactions.

3.2 Autoimmune disorders: Systemic lupus erythematosus (SLE), Multiple sclerosis (MS) and Arithritis

3.3 Cancer: oncogenes and proto-oncogenes, tumor antigens, tumor evasion of immune system. Organ transplantation: Role of CD4+ T cells; immunological basis of graft rejection and immunosuppressive therapy.

3.4 AIDS, HIV infection of Target Cells and Activation of Provirus.Infectious disease epidemiology: Reservoirs of infectious diseases; Modes of transmittance of infectious diseases; Mode of occurrence of disease in the population; Nosocomial Infections; Infectious diseases and Public Health Organizations.

Programme: M.Sc (Biotechnology)

Unit 4-- Immunodiagnostic Procedures

4.1 Techniques: flow cytometry, ELISA, RIA (principles, properties and applications).Serological reactions and techniques: Neutralization; Precipitation; Agglutination; Complement fixation test
4.2 Immunofluorescence and Fluorescence microscope; Western Blotting
4.3 Immunodiffusion: Mancini and Ouchterlony methods; immunoelectrophoresis.
4.4 Separation of immunoglobulin from serum.

Unit 5—Immunobiotechnology and Transplantation

5.1 Monoclonal antibodies: production, detection and applications; chimeric and hybrid monoclonal antibodies.
5.2 Active and passive immunization: live, killed, attenuated; conventional vaccines**.** Vaccine technology: recombinant DNA and peptide vaccines.
5.3 Stem cells: overview of stem cells, functions and medical applications.

5.4 Transplantation of tissues and organs; Allograft Rejection and role of Immunosuppressive Agents; HLA-matching; Transplant survival and immunotherapy; Xenotransplantation; Role of transgenic animals as organ donors.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 10 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 10 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 10 marks.

Course Outcome:

Programme: M.Sc (Biotechnology)

- The objectives of this course are to make students learn about the structural features of the components of the immune system as well as their function.
- The major emphasis of this course will be on the development of the immune system and mechanisms by which our body elicit the immune response. This will be imperative for the students as it will help them to think like an immunologist and predict about the nature of immune response that develops against bacterial, viral or parasitic infection, and prove it by designing new experiments.
- Students are able to understand basic concepts of Immunology, properties of immune system and types of immunity.
- Elucidation of immunodiagnostic procedures and monoclonal antibodies.

Recommended Textbooks and References:

1. Lansing M Prescott, John P. Harley, Donald A Klein, *Microbiology;* Sixth edition, McGraw Hill Higher education.
2. Alcomo, I.E. 2001. *Fundamentals of Microbiology*. VI Edition, Jones and Bartlett Publishers, Sudbury, Massachusetts.
3. Coleman, R.M.,Lombard, M.F. and Sicard, R.E. 1992. *Fundamental Immunology*, 2nd ed, Dubuque, Iowa: Wm. C. Brown.
4. Janeway, C.A., and Travers, P. 1997, *Immunobiology: The immune system in health and disease*, 3rd ed. New York, Garland Publishing.
5. Kuby, J. 1997, *Immunology*, 3rded. New York, W.H. Freeman.
6. Male, D., Champion, B., Cooke, A. and Owen, M. 1991. *Advanced Immunology*. Mosby Publication, Baltimore.

Programme: M.Sc (Biotechnology)

Bio-3062
Core Course
Credits: **4**
Duration: **72**Hours

ANALYTICAL TECHNIQUES

Total Marks: **100**
Internal Assessment: **40**
University Examination: **60**
Duration of Exam: **3 Hours**

Unit – 1 Chromatography and Spectroscopic Techniques

4.1 Methods of cell disintegration; Enzyme assays and controls; Detergents and membrane proteins; Dialysis, Ultrafiltration and other membrane techniques.

4.2 Protein structure, purification and characterization. Chromatographic techniques: Principle and applications of Adsorption, Partition, Ion-exchange, Size exclusion and Affinity chromatography; HPLC and FPLC.

4.3 ***Overview and Applicationsof Spectroscopic Techniques***: Ultraviolet and visible light spectroscopy; Fluorescence spectroscopy; Light Scattering and Circular dichroism spectroscopy.

4.4 ***Overview and Applicationsof Spectroscopic Techniques***: Infrared and Raman spectroscopy; Surface Plasmon Rasonance; NMR and X-ray diffraction

Unit – 2 Electrophoretic, Centrifugation and Immunotechniques (*Overview and Applications only)*

3.1 Electrophoretic Techniques; Electrophoresis of proteins and nucleic acids; Capillary electrophoresis and Microchip electrophoresis.

3.2 Centrifugation: Basic principle of centrifugation; Preparative and Analytical Centrifugation; Mass spectrometry: MALDI-TOF; ESI-MS; Proteomics.

3.3 Radioisotopes and its usage in biochemical techniques. Immunochemical techniques: Production of Antibodies; Immunoassay and Immunoelectrophoresis formats; Immunomicroscopy; Epitope mapping; Immunoblotting;

3.4 Fluorescence Activated Cell Sorting (FACS); Immunocapture PCR; Immunoaffinity chromatography; Biosensors and Antibody-based biosensors.

Unit – 3 Molecular Biology Techniques (*Principles and Applications only)*

3.1 Nucleic acid hybridization: Blotting techniques; Chemical Synthesis of DNA; DNA amplification by PCR; DNA libraries. DNA transfer into Eukaryotic Cells and Mammalian Embryos; Transgenic Animals; Determination of eukaryotic gene function by Gene Silencing or

knockout.

3.2 PCR and its modifications: Nested PCR; Quantitative Real-time PCR; RT-PCR; Inverse PCR; Anchored PCR; RACE; Touchdown PCR; RAPD and AFLP; Labeling of Nucleic Acids: Isotopic and Non-Isotopic labeling; Molecular beacons; FISH; Colony hybridization; Phage display; Yeast-two hybrid assay.

3.3 Transcript Analysis; DNA Microarray; Electrophoretic mobility shift assay; Footprinting assay; Site-directed mutagenesis; Cassette mutagenesis; Primer extension method; Overlap extension method; Megaprimer PCR; Random mutagenesis.

3.4 DNA Sequencing; Chain termination method; Automated sequencing; Chemical degradation method; Pyrosequencing. Next generation sequencing technologies: Illumina (Solex) sequencing; Ion torrent Sequencing. Chromatin Immuno precipitation. (ChIP).

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 6 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 6 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Course Outcome:

- The objective of this course is to familiarize students with the basic concepts and applications of modern techniques used in Biochemistry, Biophysics, Cell and Molecular Biology.
- The students will be able to understand the principle and working of different chromatography techniques.
- The students will be able to understand the principle and working of different centrifugation techniques.
- The students will be able to understand the principle and working of different Electrophoretic and molecular biology techniques.

Recommended Textbooks and References:

Programme: M.Sc (Biotechnology)

1. E. H. Segel. *Biochemical Calculations: How to Solve Mathematical Problems in General Biochemistry*, 2nd Edition, John Wiley Publications.
2. Branden, C. and Tooze, J. (1999). *Introduction to Protein Structure*. Garland Publishing New York.
3. Tanford, C. (1961). *Physical Chemistry of Macromalocules*. John Wiley and Sons.
4. Wilson, K and Walker, J. (2011). *Principles and Techniques of Biochemistry and Molecular Biology*. Cambridge University press.
5. Friefilder, D. (1987). *Essentials of Molecular Biology*. Jones and Bartlett Publications.
6. Clark, D. P. (2005). *Molecular Biology: Understanding the Genetic Revolution*. Academic Press.
7. Nelson, D. D. L., Lehninger, A. L. and Cox, M. M. (2013). *Lehninger Principles of Biochemistry*. W.H. Freeman Publishers.

Programme: M.Sc (Biotechnology)

Bio-3512
Discipline Centric Elective
Credits: **2**
Duration: **36** Hours

CROP BIOTECHNOLOGY

Total Marks: **50**
Internal Assessment: **20**
University Examination: **30**
Duration of Exam: **2 Hours**

Unit-1 Plant Genome Organization

1.1 Features of plant chromosomes: centromere, telomere, euchromatin, heterochromatin and nucleolus organizing region (NOR); karyotype (asymmetric and symmetric).

1.2 C-value paradox, range of interspecific and intraspecific variation, origin of quantitative DNA variation.

1.3 Estimation of various components of higher-plant genome: highly repetitive sequences, middle repetitive sequences, and unique DNA sequences.

1.4 Rice and maize genome sequencing projects; cereal genome databases.

Unit-2 Biotechnological Approach For Crop Improvement

2.1 Biotechnological approaches for disease resistance, protection against fungal pathogens and drought tolerance.

2.2 Modification of crop-plant nutritional content (vitamins, amino acids and lipids).

2.3 Modification of crop-plant taste and appearance (sweetness, starch and preventing discoloration).

2.4 Polyploidy: induction of polyploidy by artificial methods; role of polyploidy in crop improvement.

Unit-3 Molecular Markers And Crop Improvement

3.1 Types of molecular markers used in analyzing genetic diversity for crop improvement; molecular mapping and tagging of agronomically important traits.

3.2 Molecular cytogenetic markers: FISH and GISH, their application in crop improvement.

Programme: M.Sc (Biotechnology)

3.3 Transposable elements: mechanism of action and their role in crop improvement.

3.4 Quantitative trait loci (QTL) mapping: introduction, types of mapping populations; role in crop improvement.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 6 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 6 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Course Outcome:

- The crops produced need to increase with ever increasing population. Conventional methods for crop improvement are not able to deliver fully. Therefore, high use of throughput technologies is need of the hour. This course is intended to give some idea to students how crop plants can be improved quantitatively and qualitatively using biotechnological approaches.
- Students are able to understand plant genome organization.
- To acquaint students with recent techniques for crop improvement
- Application of molecular markers for crop improvement.

Recommended Textbooks and References:

1. Clark, D. P. (2005). Molecular Biology: Understanding the Genetic Revolution. Academic Press.
2. Malacinski, G. M. (2006). Essentials of Molecular Biology. Narosa Publishing House. (4th edition).
3. Primrose, S. B and Twyman, R. M. (2007). Principles of Gene Manipulation and Genomics. Blackwell Publishing, Oxford, UK.
4. Slater, A., Scott, N. and Fowler, M. (2003). Plant Biotechnology: The Genetic Manipulation of Plants. Oxford University Press.
5. Bernard, R. G., Jack J. P., Cheryl, L. P. (2010). Molecular Biotechnology: Principles and Applications of Recombinant DNA. 4th Ed.
6. Chawla, H. S. (2013). Introduction to Plant Biotechnology Science Publishers, Recent Edition.

Programme: M.Sc (Biotechnology)

Bio-3522
Discipline Centric Elective
Credits: **2**
Duration: **36** Hours

HUMAN GENETIC DISORDERS

Total Marks: **50**
Internal Assessment: **20**
University Examination: **30**
Duration of Exam: **2 Hours**

Unit-1 Introduction to Genetics

1.1. Basic mechanisms of inheritance: Mendel's Laws of Inheritance, extensions of Mendelism- dominance, co-dominance and incomplete dominance.

1.2. Alleles& gene interactions: multiple alleles, pleiotropic effects, partial penetrance & variable expressivity, lethal alleles.

1.3. Linkage and recombination: recombination as the basis of gene mapping, linkage mapping, tetrad analysis, genetic fine structure mapping.

1.4. Extra-nuclear inheritance: cytoplasmic inheritance and maternal effects.

Unit-2 Genetic Disorders-I

2.1. History of human genetics.

2.2. Pedigrees: gathering family history, pedigree symbols, construction of pedigrees, presentation of molecular genetic data in pedigrees.

2.3. Autosomal inheritance: dominant, recessive, consanguinity and its effects.

2.4. Sex-linked inheritance, sex-limited and sex-influenced traits, genomic imprinting.

Unit-3 Genetic Disorders-II

3.1 Genetic disorders caused by structural and numerical chromosomal abnormalities: Di- George Syndrome, Cry-du-chat syndrome, Down's Syndrome, Patau Syndrome, Edward Syndrome, Klinefelter Syndrome, Turner Syndrome.

3.2 Genetic disorders caused by a single gene: haemophilia, cystic fibrosis, and muscular dystrophy.

3.3 Polygenic diseases- diabetes mellitus, atherosclerosis; inborn errors of metabolism and their genetic bases- phenylketonuria, maple syrup urine syndrome.

Programme: M.Sc (Biotechnology)

3.4 Genetic counseling, pre-implantation, pre-natal, peri-natal, adult (for late on-set diseases) screening of genetic diseases.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 6 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 6 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Course Outcome:

- The course deals with basic concepts of heredity and genetics. Students will be acquainted with genetics of single gene, polygenic and chromosomal disorders.
- Genetic counseling in common genetic disorders will also be dealt with.
- To understand the different types of genetic interaction, incomplete dominance, co-dominance, multiple alleles etc.
- To study genetic disorders caused by structural and numerical chromosomal abnormalities

Recommended Textbooks and References:

1. Benjamin A. Pierce. (2013): *Genetics: A Conceptual Approach*, 5th Edition, Freeman Press, USA.
2. John, Ringo. (2006): *Fundamental Genetics*. Cambridge University Press, UK.
3. Daniel, L. Hartl (2006). *Essential Genetics: A Genomics Perspective*. Boston: Jones and Bartlett Publishers
4. Gardner, Simmons, Snustad. (2006). *Principles of Genetics*, 8th Edition. John Wiley & Sons.
5. Thompson and Thompson. (2008). *Genetics in Medicine*, 8th Edition. Elseiver Press.
6. Peter, J. Russell. (2002). *Genetics*, 5th Edition. Benjamin / Cummings Publishing Inc.
7. Lynn B., Jorde*et al.* (2006). *Encyclopedia of Genetics, Genomics, Proteomics and Bioinformatics*. Wiley Publishers.

Programme: M.Sc (Biotechnology)

Bio-3532
Discipline Centric Elective
Credits: **2**
Duration: **36** Hours

SIGNAL TRANSDUCTION AND CANCER BIOLOGY

Total Marks: **50**
Internal Assessment: **20**
University Examination: **30**
Duration of Exam: **2 Hours**

Unit 1 Signalling I- General Properties And Structural Diversity

1.1General principles of signalling: overview of recognition of signalling molecules by extracellular receptors, general overview of nuclear receptors.

1.2 Signalling molecules and their mode of transmission-autocrine, paracrine, juxtacrine and endocrine signalling, secondary messengers.

1.3 Signalling receptors: general structure of G-protein coupled receptors (GPCRs), types of G proteins- trimeric and monomeric G proteins, their structure and function.

1.4 General structure of Ion Channel receptors and enzyme linked receptors: overview of Receptor Tyrosine Kinases (RTKs) and Receptor serine/threonine kinase.

Unit II Signalling II- Functional Diversity

2.1 Mechanism of action of GPCRs: GPCRs that regulate ion channels- acetylcholine receptors in heart muscles and rhodopsin receptors in rod cells of eyes.

2.2 Mechanism of action of Receptor Tyrosine Kinases (RTKs) and Ras/MAP kinase pathway- role of secondary messengers in the pathway.

2.3 Mechanism of action of signalling pathway mediated by protein cleavage and Ubiquitination: Notch/Delta pathway and Wnt pathway for control of gene expression.

2.4 Mechanism of Quorum sensing in bacteria: general account of chemotaxis in bacteria and two-component system in bacteria.

Unit III Cancer Biology

3.1 General overview of cancer: benign and malignant cancers, their characteristics, properties of cancer cells, general account on Multi Hit model of cancer induction.

Programme: M.Sc (Biotechnology)

3.2 Genetic basis of cancer cells: oncogenes, tumor suppressor genes, gain of function mutations and loss of function mutations, inherited mutations, concept of epigenetics and cancer induction by epigenetic changes.

3.3 Cancer induction by unregulated cell cycle phases: unregulated entry of cell cycle from G1 to S phase, loss of function of p53 in DNA damage checkpoints, role of Rb (Retinoblastoma) and BRCA1 (Breast Cancer Susceptibility gene 1) in cancer induction.

3.4 Programmed cell death- apoptosis: extrinsic pathway and intrinsic pathway, role of apoptotic proteins in apoptosis, general concept of carcinogens and caretaker genes.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 6 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 6 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Course Outcome:

- The present course has been designed to expose the students to cell signaling, its components and relation with cancer.
- To understand general principles of signaling and nuclear receptors.
- To understand mechanism of action of signalling pathway mediated by protein cleavage.
- To understand genetic basis of cancer cells: oncogenes, tumor suppressor genes and gain of function mutations.

Recommended Textbooks and References:

1. Albert, B., Bray, D., Raff, M., Roberts, K. and Watson, J.D. (2004). *Molecular Biology of the Cell*. Garland Publishing Inc., New York. 6th Ed.
2. Cooper, G. M. and Hausman, R.E. (2006). *The Cell: A Molecular Approach*. ASM Press, Washington DC. 4th Ed.
3. Karp, G. (2007). *Cell and Molecular Biology*, John Wiley and Sons Inc. 5th Ed.
4. Kleinsmith, L. J. and Kish, V. M. (1995). *Principles of Cell and Molecular Biology*. Harper Collins College Publishers, New York, USA. 2nd Ed.

5. Lodish, H., Berk, A., Zipursky,S.l., Matsudaira, P., Baltimore, D., and Darnell, J. (2004). *Molecular Cell Biology*. W. H. Freeman and Company, 5th Ed.
6. Raymond,W. Ruddon (2007). *Cancer Biology*. University of Michigan Medical School Ann Arbor, Michigan 4th Ed.

Programme: M.Sc (Biotechnology)

Bio-3542
Discipline Centric Elective
Credits: **2**
Duration: **36** Hours

PROTEIN ENGINEERING

Total Marks: **50**
Internal Assessment: **20**
University Examination: **30**
Duration of Exam: **2 Hours**

Unit-1 Protein Structure, Purification and Characterization

1.1 Basic structural concepts – Primary, secondary, tertiary and quaternary structures; Ramachandran plot, super secondary structures – motif and domain. Protein folding; protein function and structure-function relationships; Identification of putative enzymes in sequence databases, bioinformatic analysis.

1.2 Isolation of genes from host organisms, cloning, preparation of recombinant proteins, host organisms, Homologous and heterologous protein expression; Overexpression.

1.3 Protein purification; Cell disruption, Chromatographic techniques including Ion exchange, Gel filtration, Hydrophobic Interaction Chromatography, Metal chelation chromatography, Affinity chromatography.

1.4 Structural characterization of proteins, an overview of spectroscopic techniques for the analysis of protein secondary and tertiary structure; an overview of techniques for analysis of protein quaternary structure. Introduction to protein crystallography and overview of structure determination by X-ray crystallography and Cryo-Electron microscopy.

Unit-2 Protein Engineering: Targets and Strategy

2.1 Enzymes, enzyme catalysis, factors influencing the speed of enzymatic reaction.

2.2 Enzyme applications and Industrially important enzymes, Proteases, Amylases, Lipases and Esterase, targets of protein engineering, Biosensors and Biomarkers (GFP and its variants), Engineering Therapeutically important proteins (e.g. Streptokinase), Antibodies and its fragments, Alternative scaffolds and artificial binding proteins.

2.3 Protein engineering approaches: their advantages and limitations. Rational design, prediction of the structure of enzyme variant; Site directed mutagenesis, evaluation of the effect of mutations on enzyme structure and function.

2.4 Directed evolution; Library creation, Random mutagenesis by error prone PCR, DNA shuffling, screening and selection; Semi and High-throughput screening strategies; optimization of variants by recombination and/or site saturation mutagenesis.

Programme: M.Sc (Biotechnology)

Unit-3 *In Vitro* Screening; Display Technologies and Applications of Protein Engineering

3.1 Cell surface and phage display technologies; Cell-free protein engineering technologies; ribosome display; mRNA display.

3.2 Emulsion techniques including water in oil emulsion and oil in water emulsion. Use of FACS and microfluidics in screening.

3.3 Examples of application of protein engineering to improve enzyme catalytic efficiency and to improve protein stability.

3.4 Examples of application of protein engineering to improve enzyme enantioselectivity and affinity of binding proteins including antibodies and artificial binding proteins. Techniques to monitor protein affinity, including FRET and SPR.

Note for the paper setter:

The question paper will have two Sections. Section 'A' carrying 6 compulsory, objective-cum-short answer type questions, 2 from each unit. Each question will carry 1 mark. Section 'B' will have 6 descriptive answer questions, 2 from each unit. Students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Course Outcome:

- The aim of this course is to introduce methods and strategies commonly used in protein engineering.
- At the end of the course, students should be able to understand and explain differences between rational design and directed evolution.
- Students will acquire knowledge about miscellaneous topics such as searches in bioinformatics databases, isolation, expression and purification of novel proteins.
- Students will also get an overview of several biophysical techniques used for analysis of secondary, tertiary and quaternary structure, as well as of screening methods used for selection of novel protein variants with improved properties.

Recommended Textbooks and References:

1. *Protein Engineering: Principles and Practice* by Jeffrey L. Cleland and Charles S. Craik, publisher-Wiley-Liss-A John Wiley & Sons, INC.
2. *Protein Design: Methods and Applications* by Raphael Guerois and Manuela Lopez de la Paz, publisher- Humana Press
3. *Protein Engineering and Design* by Sheldon J. Park and Jennifer R. Cochran, Publisher- CRC press.

4. *Protein Purification: Principle and Practice* by Robert K. Scopes, Publisher- Springer.
5. Carl Brandon & John Tooze, "Introduction *to Protein Structure,"* "2nd Edition" Garland Publishing, 1999
6. Paul R. Carey, "Protein *Engineering and Design,"* Academic Press, 1996.
7. *Protein engineering handbook.* Edited by Stefan Lutz - UweBornscheuer. Weinheim: Wiley-VCH, 2009. xli, 409-9. ISBN 9783527318506.
8. *Directed evolution library creation: methods and protocols.* Edited by Frances Hamilton Arnold - George Georgiou. Totowa, N.J.: Humana Press, 2003. x, 224. ISBN 1588292851.
9. Fersht, Alan. *Structure and mechanism in protein science : a guide to enzyme catalysis and protein folding.* New York: W.H. Freeman, 1998. xxi, 631 s. ISBN 0-7167-3268-8.
10. Jennifer Cochran and Sheldon Park *Protein Engineering and Design,* eds., Taylor and Francis, 2009.
11. K. Dane Wittrup and Gregory L. Verdine, *Methods in Enzymology- Protein Engineering for Therapeutics, Parts A and B,* eds. Elsevier, 2012.

Programme: M.Sc Zoology

Course code: Zol-151 **Maximum Marks:50**

Course title: Animal resources and their Utilization **Internal Assessment: 20**

Credits: 02 **External Examination: 30**

Duration of Exam: 2 hours

Unit 1: Animal diversity and its assessment

1.1 Diversity and classification of animals; theories of classification, phenetic and cladistic approaches to classification, classification and phylogeny.

1.2 Characterization of animal resources; salient morphological features of one well documented representative sample of major animal orders.

1.3 Zoogeography – concepts and importance, Zoogeographical regions of India and their characteristic fauna; endemism – concept and importance; endemic fauna of India and Jammu and Kashmir

1.4 Faunal diversity of Jammu and Kashmir state; present status and future needs/prospects, threatened fauna of the state and the strategies adopted to conserve this fauna, economic importance of the fauna of Jammu and Kashmir state

Unit 2: Aquatic animals, insects and earth worms

2.1 Edible species of fishes, fish culture: sources of fish seed, types of culture practices, selection of species. Indian and exotic cultivable species.

2.2 Types of fish ponds, layout of a typical fish pond, management techniques, maturing, supplementary and artificial feeding. Control of aquatic weeds and predators.

2.3 Edible species of aquatic invertebrates, prawn, lobster, mollusks and crabs; shell fish prawn and pearl oyster farming.

2.4 Sericulture, apiculture, lac culture, vermiculture, milliculture, diseases associated with various cultures, advances in insect based industries in India.

Unit 3: Animal products and management

3.1 Pharmaceuticals from animals; (sea food): value addition and export, role of Marine Product Export Development Authority (MPEDA) in promoting production and export of marine products.

3.2 Meat, leather and wool industries and their production with special emphasis on their export potential; poultry farming (chicken, duck and quail); commercial breeds in India, major poultry diseases, egg industry (eggry); present status in India.

3.3 Dairy farming in India, breeds of cattle and buffalo, role of assisted reproduction in breed

improvement, milk production and pasteurization techniques.

3.4 Animal waste recycling: biogas and its production; types of biogas plants, slaughter house wastes and their utilization / management, fish byproducts; fish meal: methods of processing and uses.

Note for the paper setter:

The question paper will have 2 Sections. Section 'A' will be compulsory having six questions of one mark each. The questions will be either short answer type having answers not exceeding 20 words or multiple choice type having 4 options each or fill in the blanks type. Section' B' will contain six long answer questions of 08 marks each, two from each Unit. The candidates will be required to answer one question from each Unit.

Course outcome

- *Since the dawn of civilization, humankind realized the importance of animals, domesticated them and utilized their services in one way or the other.*
- *The present course is designed to acquaint students with the biology of these animals, their management and judicious utilization based on scientific principles.*
- *Provides students with a broad background in domestic animal biology.*
- *The course focuses on animal products and theirmanagement.*

Books recommended:

1. Black welder. E. Richard. (1996): Taxonomy: A Text and Reference book, 3rd Edition, Jhon Wiley and Sons INC, NewYork, London, Sydney.
2. Jabde V. Pradip. (2005): Text book of Applied Zoology, 1st Edition, Discovery Publishing House, New Delhi.
3. Malhotra P. (2008): Economic Zoology, 5th Edition, Adhyayan Publishers, New Delhi.
4. Shukla G.S. and Upadhay (2001): Economic Zoology, 4th Edition, Rastogi Publications, Meerut.

Programme: M.Sc Zoology

Course Code: Zol-155 **Maximum Marks: 50**

Course Title: Elements of Toxicology **Internal Assessment: 20**

Credits: 02 **External Examination: 30**

Duration of Exam: 2 hours

Unit-1 Introduction to toxicology and Air pollution

1.1 Toxicology: Definition, scope and classification of toxicants.
1.2 Pollution: Definition and types.
1.3 Air pollution: Definition, primary and secondary air pollutants, their chemistry and sources.
1.4 Effects of air pollution on human and animal health, acid rains and possible remedies to control air pollution.

Unit-2 Water and Noise pollution

2.1 Water pollution: Definition, types of water pollution and sources (Sewage, Industrial, Thermal, Surface Run off and Oil Spills).
2.2 Effects of water pollution on human and animal health.
2.3 Bio-indicators of water pollution and remediation of water pollution.
2.4 Noise pollution: Introduction, decibel scale, sources of noise pollution and its control.

Unit-3 Pesticides, Carcinogens and Radiations

3.1 Pesticides: Types of pesticides and their formulations.
3.2 Characteristics of pesticides, pesticide residues in environment.
3.3 Pesticides with reference to human health (harmful and beneficial aspect).
3.4 Environmental carcinogens: Introduction, categories, examples and exposure.
3.5 Radiations, their sources and impact on environment, animal and human health.

Note for the paper setter:

The question paper will have two sections. Section A carrying 6 compulsory Objective – cum – short answer type questions, two from each unit. Each question will carry 01 mark. Section B will carry 6 questions, two from each unit. The students will attempt 1 question from each unit. Each question will carry 8 marks.

Course outcome:

- *The course is designed to help students in understanding influence of toxic elements on the environment and human health.*
- *To know about the different sources that causes air, water and noise pollution.*
- *To gain an understanding about radiations and their impact on human health.*
- *Acquainted with effects of water pollution on human and animal health.*

Books Recommended:

1. Sharma P. D. (2007). Ecology and Environmental, 7th Edition, Rastogi Publications.
2. Rana S. V. S. (2006). Environmental Pollution: Health and Toxicology, Alpha Science International Limited.
3. Cremlyn R. J. W. (1978). Pesticides: Preparation and Mode of action, John Wiley & Sons Ltd.
4. Kaloyanova F. P. and El Batawi M. A. (1991). Human Toxicology of Pesticides, CRC Press.
5. Appropriate online available material.

Programme: M.Sc Zoology

Course Code: Zol- 251 **Maximum Marks: 50**

Course Title: Genetic Engineering **Sessional Assessment: 20**

Credits: 02 **University Examination: 30**

Duration of Exam: 2 hours

Unit 1: Genetic engineering techniques - I

1.1 Definition, brief history and scope of genetic engineering; Milestones in the development of genetic engineering as technology.

1.2 Molecular tools employed in genetic engineering: restriction enzymes-types, nomenclature and cleavage patterns; concept of linkers and adapters, ligases-types and nature of action.

1.3 Cloning Vectors for prokaryotes: properties of an ideal vector, plasmid vectors- pBR322 vectors, pUC8 vectors, M13 bacteriophage vectors, cosmids and shuttle vectors.

1.4 Cloning vectors for eukaryotes: Yeast integrative plasmids (YIps), Yeast artificial chromosome vectors (YAC) and bacterial artificial chromosome (BAC) vectors.

Unit 2: Genetic engineering techniques - II

2.1 Gel electrophoresis: Agarose, pulsed field and PAGE, Blotting techniques:Northern blotting, Southern blotting and Western blotting (Overview).

2.2 Polymerase Chain Reaction: principle, applications and importance; variation in PCR.

2.3 Genomic/cDNA libraries – construction, screening and choice of vectors.

2.4 DNA sequencing – chemical degradation and enzymatic methods, Automatic DNA Sequencers; DNA Fingerprinting – technique and applications.

Unit 3: Applications of genetic engineering

3.1 Gene transfer in animal cells, various methods used including transfer and particle bombardment mediated gene transfer.

3.2 Transgenic animal models and their significance for human welfare.

3.3 Gene therapy: introduction and its applications in human diseases (ADA and CFTR).

3.4 Production of recombinant proteins: Recombinant insulin, Human growth hormone and Recombinant factor VII.

Note for the paper setter:

The question paper will have two sections. Section A carrying 6 compulsory Objective – cum – short answer type questions, two from each unit. Each question will carry 01 mark. Section B will carry 6

questions, two from each unit. The students will attempt 1 question from each unit. Each question will carry 8 marks.

Course outcome

- *Genetic Engineering involves manipulation of genetic material for improvement and value addition of bioresources.*
- *This course will help students to learn the basic techniques of gene manipulation.*
- *To gain an understanding about the process of recombinant DNA technology.*
- *How gene therapy is applied to overcome diseases.*

Books recommended:

1. Brown, T. A. (2006). Gene Cloning – An Introduction. Blackwell Publishing. (5^{th} edition).
2. Clark, D. P. (2005). Molecular Biology: Understanding the Genetic Revolution. Academic Press.
3. Clark, D. P. and Pazdernik, N. J. (2009). Biotechnology: Applying the Genetic Revolution. Elsevier Inc.
4. Davies, J. A. and Reznikoff, W.S. (1992). Milestones in Biotechnology, Classic Papers on Genetic Engineering. Butterworth – Hienemann, Boston.
5. Kingsman, S. M. and Kingsman, A. J. (1998). Genetic Engineering: An Introduction to Gene Analysis and Exploitation in Eukaryotes. Blackwell Scientific Publications, Oxford.
6. Walker, M. R. and Rapley, R. (1997). Route Maps in Gene Technology, Blackwell Science Ltd, Oxford.
7. Williams, J., Ceccarelli, A. and Wallace, A. (2001). Genetic Engineering *Second Edition*. Springer – Verlag, New York Inc.

Programme: M.Sc Zoology

Course code: Zol- 252 **Maximum Marks: 100**
Course title: Fundamentals of Biochemistry **Sessional Assessment: 40**
Credits: 04 **University Examination: 60**
Duration of Exam: 3hours

Unit – 1: Carbohydrates and lipids

1.1 Carbohydrates: classification, basic chemical structure, monosaccharides – aldoses and ketoses, cyclic structure of monosaccharides, anomers and epimers.

1.2 Polysaccharides, structural polysaccharides - cellulose and chitin; storage polysaccharides- starch and glycogen; glycosaminoglycans and glycoproteins.

1.3 Heterocyclic compounds and secondary metabolites in living systems- nucleotides and pigments.

1.4 Lipids – properties, classification and structure; phospholipids, glycolipids, glycerophospholipids, steroids; metabolic roles of lipids - isoprenoids and eicosanoids.

Unit - 2: Protein structure, classification and function

2.1 Amino acids –structure, classification, chemical reactions and physical properties; proteins-general structure: characteristics of peptide bond.

2.2 Enzymes: classification, nomenclature, mechanism of action.

2.3 Hierarchy in structure: primary, secondary, tertiary and quaternary structures, protein folding. Proteomics- an introduction.

2.4 Protein sequencing (N-terminal sequencing, C-terminal sequencing Edmann degradation)and Ramachandran plot.

Unit-3: Carbohydrate metabolism

3.1 Principles of bioenergetics: energy transformation, laws of thermodynamics, spontaneity of a process, life and thermodynamics.

3.2 Carbohydrate metabolism: aerobic and anaerobic pathways, glycolysis, citric acid cycle, oxidative phosphorylation and electron transport chain.

3.3 Alternate pathways of glucose metabolism-pentose phosphate pathway, glyoxalate cycle, Andglucuronic acid cycle.

3.4 Gluconeogenesis, glycogen synthesis and breakdown.

Unit –4: Lipid metabolism

4.I Oxidation of lipids: beta oxidation, oxidation of unsaturated and odd chain fatty

acids and formation of ketone bodies.

4.2 Biosynthesis of fatty acids: carbon sources, acetyl CoA carboxylase and reactions of fatty acid synthase complex, synthesis of odd chain and unsaturated fatty acids.

4.3 Lipoproteins: low density lipoproteins (LDL), very low density lipoproteins (VLDL), high density lipoproteins (HDL).

4.4 Biosynthetic pathways of cholesterol.

Unit - 5: Protein metabolism

5.1 Oxidative degradation of amino acids: transamination, oxidative deamination, urea cycle and ammonia excretion.

5.2 Biosynthesis of essential (leucine, isoleucine and valine) and non-essential (alanine, asparagine and glutamine) amino acids.

5.3 Regulation of amino acid biosynthesis, genetic defects in amino acid metabolism.

5.4 Biosynthesis of purine and pyrimidine nucleotides, regulation of nucleotide synthesis.

Note for the paper setter:

The question paper will have two sections. Section A carrying 10 compulsory, objective – cum – short answer type questions, two from each unit. Each part will carry 01 mark. Section B will have 10 questions, two from each unit. The students will attempt 1 question from each unit. Each question will carry 10 marks.

Course outcome

- *The course is designed to make students learn the chemical nature of biomolecules and their involvement in chemical reactions in living cells in order to maintain homeostasis.*
- *Students will acquaint with the knowledge of Enzymes: classification, nomenclature, mechanism of action.*
- *Oxidation of lipids: beta oxidation, oxidation of unsaturated and odd chain fatty acids and formation of ketone bodies.*
- *Biosynthesis of essential (leucine, isoleucine and valine) and non-essential (alanine, asparagine and glutamine) amino acids.*

Books recommended:

1. Cox Michael M. and Nelson. D. L. (2008): Principles of Biochemistry, W. H. Freeman and Company, New York, 5th Ed.
2. Heldt Hans-Walter and Piechulla Birgit (2010): Plant Biochemistry, Academic Press. 4thEd.

3. Plummer, T. David. (2004): An Introduction to Practical Biochemistry, Tata McGraw-Hill Publishing Co. 4th Ed.

4. Stryer. L. (2005): Biochemistry, 6th Edition, W.H. Freeman and Company, San Francisco.

5. Voet. Donald, Voet Judith., W. Pratt. Charlotte. (2008): Fundamentals of Biochemistry, John Wiley, New York**,** 3rd Ed.

6. Wilson K., and J. Walker, (2010): Principles and Techniques of Biochemistry and Molecular Biology Techniques, Cambridge Univ. Press. 7th Ed.

Programme: M.Sc Zoology

Course Code: Zol-253 **Maximum Marks: 50**

Course Title: Bioinformatics and Biostatistics **Sessional Assessment: 20**

Credits: 02 **University Examination: 30**

Duration of Exam: 2 hours

Unit 1: Introduction to computer and its applications

1.1 Evolution of computers; different generations of computers; classification of computers; basic computer organization (input/output unit), storage unit, control unit, Central Processing Unit.

1.2 Number systems (Binary number system, octal number system, hexadecimal number system); converting from one number system to another.

1.3 Basic units of computers (CPU, ALU); primary and secondary memory (RAM, ROM, PROM, EPROM, EEPROM, hard disk, compact disk and flash drives).

1.4 Computer softwares (definition, relationship between software and hardware, types of softwares); what is an operating system and main functions of an operating system, some popular operating systems (Microsoft Windows); internet: definition and practical utility. Use of Word processing and Excell sheet.

Unit 2: Bioinformatics

2.1 Introduction to bioinformatics, skills, application and uses.

2.2 Databases:- introduction, sequence and structure databases, information retrieval from biological databases, NCBI, EMBL, DDBJ, PIR, Swiss-Prot.

2.3 Sequence Alignments: introduction, pairwise alignment, significance of sequence alignment, multiple Sequence alignment, FASTA, BLAST.

2.4 Phylogenetic Analyasis: introduction, elements of phylogenetic models, phylogenetic data analysis, tree building methods, Phylogenetic softwares.

Unit 3: Basics of biostatistics

3.1 Statistics: definition, history, applications and limitations; concept of Biometry, population and sample.

3.2 Data collection and tabulation, primary and secondary data, methods of collecting primary data, sources of secondary data, editing of primary and secondary data, rule of tabulation, parts and types of tables and role of tabulation of data.

3.3 Frequency distribution: classification of data, histogram, frequency polygon, cumulative frequency curves, designs and limitations of graph.

3.4 Measures of central tendency: arithmetic mean, median, mode; measures of dispersion: standard deviation, standard error and coefficient of variation, tests of significance: t-test, F-test and X^2 test and Correlation (types, methods; Karl Pearson's coefficient) and regression (linear) analysis and their uses, ANOVA.

Note for the paper setter:

The question paper will have two sections. Section A carrying 6 compulsory Objective – cum – short answer type questions, two from each unit. Each question will carry 01 mark. Section B will carry 6 questions, two from each unit. The students will attempt 1 question from each unit. Each question will carry 8 marks.

Course outcome

- *Mathematics and statistics are making deep in - roads into biology and it is therefore necessary to provide sound foundations of these subjects to students who can build on these later in life.*
- *Evolution of computers; different generations of computers; classification of Computers.*
- *Statistics: definition, history, applications and limitations; concept of Biometry, population and sample.*
- *Introduction to bioinformatics, skills, application and uses.*

Books recommended

1. M Campbell A. M., Heyer L. J. (2006) Discovering Genomics, Proteomics and Bioinformatics II Edition. Benjamin Cummings
2. Gupta, S.P. (2005). Statistical Methods, Sultan Chand and Sons, New Delhi.
3. Gupta, C.B. and Gupta, V. (2005). An Introduction to Statistical Methods, Vikas Publishing House Pvt Ltd, New Delhi.
4. Ghosh Z. and Bibekanand M. (2008) Bioinformatics: Principles and Applications. Oxford University Press.
5. Gun, A.M., Gupta, M.K. and Dasgupta, B (2005). Fundamentals of Statistics, The World Press Pvt. Ltd, Kolkata.
6. Pevsner J. (2009) Bioinformatics and Functional Genomics. II Edition. Wiley-Blackwell.
7. Sinha, P.K. and Sinha, P. (2005). Computer Fundamentals, BPB Publication.
8. Rajaraman, V. (2004). Fundamentals of Computers, Prentice-Hall of India Pvt. Ltd., New Delhi.

Programme: M.Sc Zoology

Course Code: Zol-350

Course Title: Animal Biotechnology

Credits: 04

Maximum Marks: 100

Sessional Assessment: 40

University Examination: 60

Duration of Exam: 3 hours

Unit 1: Animal markers used for characterization of transgenic livestock

1.1 Introduction to animal genomics, marker based methods for characterization of animal genomes- RFLP, RAPD, SNP and ITS.

1.2 Immunology based methods for identification of domestic and wild animal species, detection of meat adulteration using DNA-based methods.

1.3 Production of transgenic livestock: production of pharmaceuticals, production of donor organs and disease-resistant livestock.

1.4 Transgenic Livestock: transgenic animals for food and improved traits-improving milk quality.

Unit 2: Animal cell culture and scaling up

2.1 Culture media: natural- serum based media and artificial media, suspension cultures, initiation of cell cultures.

2.2 Primary animal cell cultures: methods of tissue disaggregation: mechanical and enzymatic methods- trypsin and collagenase mediated action, establishment of cell line cultures.

2.3 Measurement of viability and cytotoxicity of cultured cells, manipulation and cell synchronization.

2.4 Scaling up of animal cell cultures: scale up in suspension cultures and monolayer cultures and organ cultures.

Unit 3: Stem cell biology and Nano-biotechnology

3.1 Introduction to stem cells, stem cell systems: basic principles and methodologies.

3.2 Animal stem cells: Embryonic stem cells andbone marrow derived stem cells of animal models in preclinical research.

3.3 Stem cells and Neurodegenerative diseases, Stem Cells from early mammalian embryos.

3.4 Nano-biotechnology: Introduction, types, DNA and protein based applications, nano-biosensors and risk potential of nanomolecules.

Note for paper setter:

The question paper will have two Sections. Section 'A' carrying 10 compulsory, objective cum-short answer type questions, two from each unit. Each question will carry 01 mark. Section B will have 10 questions, two from each unit. The students will attempt 1 question from each unit. Each question will carry 10 marks.

Course Outcome:

- *Human population is increasing at fast rate.*
- *The resources required to sustain the ever increasing population are not increasing at the same pace. Conventional methods for animal improvement are not able to deliver fully.*
- *Manipulation of genome by incorporating desirable genes is the option available. This course is intended to give some idea to students how animal bioresources can be improved through biotechnology.*
- *Introduction to stem cells, stem cell systems: basic principles and methodologies*.

Books recommended:

1. Brown, T. A (2007). Genomes. BIOS Scientific Publishers Ltd.
2. Clark, D. P (2005). Molecular Biology: Understanding the Genetic Revolution. Academic press.
3. Das, H. K (2010). Textbook of Biotechnology. Wiley India Pvt. Ltd.
4. Daniel R. Marshak, Richard L. Gardner and David Gottlieb (2014). Stem Cell Biology, Cold Spring Harbor Laboratory Press.
5. Freshney, R. I (2010). Culture of Animal Cells. John Wiley and Sons Inc.
6. Malacinski, G. M (2006). Essentials of Molecular Biology. Narosa Publishing House. 4th Ed.
7. Primrose, S. B and Twyman, R. M (2007). Principles of Gene Manipulation and Genomics. Blackwell Publishing, Oxford, UK.
8. Singh, B. D. (2007). Biotechnology: Expanding Horizons. Kalyani Publishers.

Programme: M.Sc Zoology

Course code: Zol-351 **Maximum Marks: 50**

Course title: Animal Resources: Assessment, Threats and Conservation **Internal Assessment: 20**

External Examination: 30

Credits: 02 **Duration of Exam: 2 Hour**

Unit 1 Animal resources and control

1.1 Economic importance of fishes; larvivorous fishes and public health; important cold water fish resources.

1.2 Dams as threat to fish population, assessment of pollution hazards to fishes: control of unwanted fishes and aquatic weeds.

1.3 Overview of some important rat species, rats as threat to food grain resources; control of rats: chemical and biological measures, use of traps and integrated techniques for rat control.

1.4 Insect Pest Management; various measures including mechanical and chemical measures, biological control measures, pest surveillance, use of pheromones, attractants and repellants.

Unit 2Wildlife and its management

2.1 Wild life: significance, scope of wild life studies, conservation and management; values of wildlife: positive and negative, status of wildlife in India.

2.2 Important wild life species in different regions of India, endangered and endemic wildlife species of India.

2.3 Population estimation; fecal analysis of ungulates and carnivores - fecal samples, Pug marks and census method, wild life conservation projects of government of India, habitat management.

2.4 Concept and Scope of Remote Sensing with respect to wild life management, definitions, Process and Characteristics of Remote Sensing System, advantages and limitations; GIS.

Unit 3 Biodiversity and Conservation

3.1 Biodiversity-its measurement, assessment and conservation, Major threats to biodiversity: Habitat loss, poaching of wildlife, biological invasions.

3.2 Conservation of biodiversity: National parks, Wildlife sanctuaries, biosphere reserves, single species / single habitat based conservation programme (e.g. Project tiger).

3.3 Human-wildlife interactions: Conflict between man and wildlife, Ecotourism-its cost and benefits.

3.4 Wildlife damage, assessment and control, Role of NGOs like IUCN, CITES, WWF in wildlife conservation.

Note for the paper setter:

The question paper will have 2 sections. Section 'A' will be compulsory having 06 questions of one mark each. The questions will be either short answer type having answers not exceeding 20 words or multiple choice type having 4 options each or fill in the blanks type. Section 'B' will carry 6 questions, two from each unit. The candidates will attempt 1 question from each unit. Each question will carry 8 marks.

Course Outcome:

- *The present course is based on the realization of the importance of domesticated and wild animals for meeting various needs of mankind.*
- *Economic importance of fishes; larvivorous fishes and public health; important cold water fish resources.*
- *Important wild life species in different regions of India, endangered and endemic wildlife species of India.*
- *Biodiversity-its measurement, assessment and conservation, Major threats to biodiversity: Habitat loss, poaching of wildlife, biological invasions.*

Books recommended:

5. G.S. Shukla and Upadhay (2001): Economic Zoology, Rastogi publications, Meerut, 4th Edition.
6. Gopal Rajesh (2012): Fundamentals of wild life management, S. Chand Publishers, 7th Edition.
7. Negi S. S. (2012): Wild life conservation, Natraj Publishers 5th Edition.
8. P. Malhotra (2008): Economic Zoology, Adhyayan Publishers, New Delhi, 5th Edition.
9. Pradip. V. Jabde (2005): Text book of applied zoology, Discovery publishing house, New Delhi. 1st Edition.
10. Richard. E. Blackwelder (1996): Taxonomy A text and reference book, Jhon Wiley and Sons INC, NewYork, London, Sydney, 3rd Edition.

Programme: M.Sc Zoology

Course code: Zol-355 | **Maximum Marks: 50**

Course title: Principles of Parasitology | **Internal Assessment: 20**

Credits: 02 | **External Examination: 30**

Duration of Exam: 2 hours

Unit 1: Introduction to Parasitology

1.1 Basic concept of parasitism, animal associations – symbiosis, commensalisms, phoresis, mutualism, parasitism and hyper parasitism.

1.2 Parasite and host relationship; parasitic adaptations and parasitic Zoonoses.

1.3 Factors influencing parasitic fauna: Influence of age of the host on parasite fauna, Food of the host and its mode of life. Migration of the hosts, Effects of geographical factors on parasitic fauna. Influence of human activity on parasite.

1.4 Introduction of parasitic protozoa. Classification of parasitic Sarcomastigophora and Ciliophora. *Entamoebahistolytica*, *E. coli*,*E. gingivalis* and *Giardia lamblia*: Morphology, life-cycle, mode of infection, disease, chemotherapy and prevention.

Unit 2: Protozoology and helminthology

2.1 Morphology, lifecycle, mode of infection of *Plasmodium*, *Trypanosomes* and *Leishmania*. Molecular biology of Plasmodium – drug targets, mechanism of drug resistance, vaccine strategies.

2.2 General organization and classification of Medical and Veterinary Platyhelminthes. Trematoda and Cestoda: General life cycle, morphology and ultra structure of tegument.

2.3 *Schistosomamansoni*, *S. haematobium*, *S. japonicum*, *Taeniasolium. T. saginata*, *Fasciolagigantica*, and *F. hepatica* - Morphology, lifecycle, mode of infection, chemotherapy and prevention.

2.4 Classification of parasitic nematodes, Diagnostic features of various orders and families. Gastro-intestinal nematodes: *Ascaris* and *Ancylostoma*- morphology, life-cycle, chemotherapy and prevention.

Unit 3: Parasite Biochemistry and Immunology

3.1 Introduction to parasite biochemistry and Immunology. Biochemical adaptations. Excretory / secretory role of tegument. Biochemistry of egg-shell formation.

3.2 Type of Immune responses against parasitic infections: Innate and acquired immunity. Immune evasive strategies of parasites.

3.3 Natural resistance and acquired immunity to malaria. Antigenic variation in Trypanosomes and mechanism of protective immunity.

3.4 Immune response, self-defense mechanisms of parasites; parasites of veterinary importance.

Note for the paper setter:

The question paper will have 2 sections. Section 'A' will be compulsory having 06 questions of one mark each. The questions will be either short answer type having answers not exceeding 20 words or multiple choice type having 4 options each or fill in the blanks type. Section 'B' will carry 6 questions, two from each unit. The candidates will attempt 1 question from each unit. Each question will carry 8 marks.

Course Outcome:

- *The course has been designed to understand the parasite biology, life cycles, host–parasite relationship, environmental and host factors regulating parasitic diseases and to recognize the general outlines of parasite treatment and control.*
- *Study Parasite and host relationship; parasitic adaptations and parasitic Zoonoses.*
- *Study Protozoology and helminthology*
- *Study Parasite Biochemistry and Immunology*

Recommended Books:

1. Chandler, A. C. & Read. C. P. (1961). Introduction to Parasitology, John Wiley 10th Edition.
2. Smyth, J. D. (1994). Animal Parasitology. Cambridge University Press. Soulsby, 3rd Edition.
3. Marr, J., Nilsen, T.W. &Komuniecki, R.W. (2002). Molecular Medical Parasitology. Academic Press. 1st Edition.
4. Hyde, John E. (1990). Molecular Parasitology. Chapman & Hall.
5. Kennedy, M.W. & Harnett, W. (2001). Parasitic Nematodes. CABI Publishing. 1st Edition.
6. Bush, A.O., Esch, G.W. & Seed, J.R. (2001). Parasitism: The Diversity and Ecology of Animal Parasites. Cambridge University Press. 1st Edition.
7. Wakelin, D. (1996). Immunity to Parasites : How Parasitic Infections are Controlled. Cambridge University Press. 2st Edition (Revised)
8. Cohen, S. &Sadun, E.H. (1976). Immunology of Parasite infection. Blackwell Scientific Publications. 1st Edition.

Programme: M.Sc Zoology

Course code: Zol-356 **Maximum Marks: 50**

Course title: Insect Morphology & physiology **Internal Assessment: 20**

Credits: 02 **External Examination: 30**

Duration of Exam: 2 hours

Unit: 1 General structure of insect body

1.1 General organizations of the insect body, structure of integument/cuticle.
1.2 Head: sutures and area of cranium, tentorium; gnathal appendages.
1.3 Thorax: Pro- legs and its modification.
1.4 Wings venation, modifications and wing coupling apparatus.

Unit: 2 Digestive, Excretory, Circulatory and Respiratory system

2.1 Digestive system: structure of alimentary canal and its modification; physiology of digestion in phytophagous, omnivorous and carnivorous insects
2.2 Excretory system, excretory function of hind gut and significance of cryptonephridial system.
2.3 Circulatory system, Diaphragm and heart, haemolymph and its functions.
2.4 Respiratory system, Organs of respiration and their modifications.

Unit: 3 Nervous and Reproductive system and Sense organs.

3.1 Nervous system and its modification; sense organ: mechanoreceptor, chemoreceptor; auditory organ; light producing organ; sound producing organ.
3.2 Visual organ, physiology of vision and hearing, brief account of sound and light production.
3.3 Male and female external genitalia and their modification.
3.4 Reproductive system: morphology, anatomy and physiology of male and female reproductive system, the associated ducts and glands.

Note for the paper setter:

The question paper will have 2 sections. Section 'A' will be compulsory having 06 questions of one mark each. The questions will be either short answer type having answers not exceeding 20 words or multiple choice type having 4 options each or fill in the blanks type. Section 'B' will carry 6

questions, two from each unit. The candidates will attempt 1 question from each unit. Each question will carry 8 marks.

Course Outcome:

- *The course has been designed to provide students with sufficient information about the morphology, diversity and physiology of insects which form the basis for undertaking entomological studies by the students subsequently.*
- *Students will learn General structure of insect body.*
- *Study Digestive, Excretory, Circulatory and Respiratory system.*
- *Learn Nervous and Reproductive system and Sense organs.*

Books Recommended:

1. Timothy, (2007). Insect Ecology. Marc J. Klowden Elsevier Inc.
2. Marc J. Klowden (2007). Physiological Systems in Insects. Elsevier Inc.
3. Waldbauer, (2007). The Handy Insect G.K. Book.Jaico Publ. House.
4. Pedigo and Rice, (2009). Entomology and Pest Management. Publ. PHI Learning, Pvt. Ltd.
5. R.F. Chapman, (1998). The Insect; Structure and Function.4th Ed.

Programme: M.Sc Zoology

Course Code: Zol-450
Course Title: Ecology and Environmental Biology
Credits: 02

Maximum Marks: 50
Sessional Assessment: 20
University Examination: 30
Duration of Exam: 2 hours

Unit 1:Ecology: Autecological and Synecological concepts

1.1 Ecology: definition, history, scope and subdivisions. Role of ecology in sustainable development.
1.2 Characteristics of Populations – size, density, dispersion, age, structure, natality and mortality; factors affecting population growth.
1.3 Intra–specific and inter–specific interactions; competition, coexistance, mutualism, commensalism and prey-predator interactions.
1.4 Genecology–ecological amplitude, ecads, ecotone, ecotypes, ecospecies, coenospecies, k–selection and r–selection populations.

Unit 2: Ecosystem Ecology

2.1 Concept of ecosystem – structure and function; Primary productivity (methods of measurement, global patterns, controlling factors).
2.2 Energy dynamics; trophic organization; energy flow pathways; ecological efficiency.
2.3 Ecosystem stability: concept (resistance and resilience); ecological perturbations (natural and anthropogenic).
2.4 Major vegetations and soil types of the world.

Unit 3: Community Dynamics

3.1 Succession – concept, definition and reasons; classification of succession: changes – autogenic and allogenic, primary and secondary, autotrophic and heterotrophic.
3.2 Retrogressive changes, concept of Climax or stable communities, ecological balance and survival thresholds.
3.3 Concept of limiting factors: Liebig and Shelford's laws of limiting factors.
3.4 Biogeochemical cycles: concept, gases and sedimentary cycles.

Note for the paper setter:

The question paper will have 2 sections. Section 'A' will be compulsory having 06 questions of one mark each. The questions will be either short answer type having answers not exceeding 20 words or multiple choice type having 4 options each or fill in the blanks type. Section 'B' will carry 6 questions, two from each unit. The candidates will attempt 1 question from each unit. Each question will carry 8 marks.

Course Outcome:

- *The course is designed to help students in understanding principles of ecology, environmental biology, and the relationship between man and nature.*
- *Students will learn Ecology: Autecological and Synecological concepts.*
- *Study Community Dynamics.*
- *Study Major vegetations and soil types of the world.*

Books recommended:

1. Ali, M. (2012). Diversity of Ecosystems, In Tech
2. Douglas, J. Futuyma (1998). Evolutionary Biology (3rd Edition), Sinauer Associates.
3. Eldon, D., Enger, Bradley, Smith, F. (1995). Environmental Science. W C Brown publications.
4. Grant, W. E. and Swannack, T. M. (2008). Ecological Modelling. Blackwell.
5. Kormondy, E. J. (Ed.) (1999). Concepts of Ecology. Prentice Hall.
6. Michael, P. (1984). Ecological methods of field and laboratory investigations. Tata McGraw Hill.
7. Miller, G. Tyler, Jr. (2005). Sustaining the Earth, 7th edition. Brooks/Cole- Thomson Learning, Pacific Groove, California.
8. Odum, E. P. (III Edn) (1991). Fundamentals of Ecology. Saunders and Com.
9. Ramade, F. (1981) Ecology of natural resources. John Wiley and Sons.
10. Wilkinson, D. M. (2007). Fundamental Processes in Ecology: An Earth system Approach. Oxford.

Programme: M.Sc Zoology

Course Code: Zol-455 **Maximum Marks: 50**

Course Title: Human genetics **Internal Assessment: 20**

Credits: 02 **External Examination: 30**

Duration of Exam: 2 hours

Unit 1: Human Genome

1.1 Human genome project: applications and ethical issues; human mitochondrial genome.

1.2 Genetic and physical mapping of human genome, homozygosity mapping, linkage disequilibrium mapping, radiation hybrid mapping.

1.3 Discovering human disease genes:functional and positional candidate gene cloning strategies.

1.4 Detection of mutations in human genes: single-strand conformation polymorphism analysis, denaturing gradient gel electrophoresis, heteroduplex analysis, chemical mismatch cleavage, direct DNA sequencing, protein truncation test.

Unit 2: Behavioral and Clinical Genetics

2.1 Polygenic inheritance, heritability and its measurements and quantitative trait loci (QTL).

2.2 Genetics of neurological disorders: Schizophrenia, Parkinson, Alzheimer and Huntington disease.

2.3 Family history and congenital malformations: chromosomal disorders, neural tube defects, teratogenic effects, multiple malformation syndromes.

2.4 Disease and carriers screening: prenatal screening, neonatal screening, carrier detection and presymptomatic screening of adults.

Unit 3: Population Genetics

3.1 Hardy–Weinberg Law: rate of change in gene frequency through mutation, migration, non-random mating, genetic drift and natural selection; Neutral theory of molecular evolution.

3.2 Concept of phenotype, allele, genotype, heterozygosity and homozygosity; Heterozygosity advantage.

3.3 Population structure: gene pool, genetic distance, genetic identity and phylogeny.

3.4 Genetic markers: classical and molecular markers used in human population genetics.

Note for the paper setter:

The question paper will have two sections. Section A carrying 6 compulsory Objective – cum – short answer type questions, two from each unit. Each question will carry 01 mark. Section B will carry 6

questions, two from each unit. The students will attempt 1 question from each unit. Each question will carry 8 marks.

Course Outcome:

- *The course is designed to afford the student a broad understanding of the important branch of genetics.*
- *Study of human genetics can be useful as it can answer questions about human nature, understand the diseases and development of effective disease treatment and to better understand and improve the quality of human life.*
- *Students will be acquainted with Behavioral and Clinical Genetics.*
- *Students will be exposed with Population Genetics.*

Books recommended:

1. Human Genetics: McConky
2. An Introduction to Medical Genetics: Roberts and Pembrey
3. Essentials of Medical Genetics: Ferguson Smith
4. Human Genetics: Vogel and Motulsky

Programme: M. Sc Botany

Course Code: Bot- 150 **Maximum marks: 100**
Course Title: Algae and Lichens: structure and diversity **Sessional Assessment: 40**
Credits: 04 **University Examination: 60**
Duration of Exam: 3 hours

Objectives:

Representing two most interesting plant groups on planet earth and growing at all kinds of habitats, algae and lichens represent rich resource for human use particularly in agriculture, medical and biotechnology based industry. This necessitates knowledge about their structural diversity, biology and utility.

Unit I Algal diversity – I

1.1 Modern trends in classification of algae

1.2 Salient features of Chlorophyta and Bacillareophyta with special reference to structure and composition of cell and cell wall, flagella, chloroplasts, pyrenoids, eye spot and overall body form

1.3 Salient features of Xanthophyta, Phaeophyta and Rhodophyta with special reference to structure and composition of cell and cell wall, flagella, chloroplasts, pyrenoids, eye spot and overall body form

1.4 Salient features of Euglenophyta and Dinophyta with special reference to structure and composition of cell and cell wall and overall body form

Unit II Algal diversity – II

2.1 Salient features of Chrysophyta, and Cryptophyta with special reference to structure and composition of cell and cell wall and overall body form

2.2 Evolutionary aspects of thallus organization and sex in algae

2.3 Algal pigments and reserve food material: a comparative account of all the algal groups

2.4 Ecological adaptations of algae to diverse habitats (terrestrial, fresh water, marine); modes of perennation in algae

Unit III Reproduction and importance of algae

3.1 Reproduction and life cycle patterns in Chlorophyta, Xanthophyta, Phaeophyta

and Rhodophyta

3.2 Economic importance of algae (a general account), algae as pollutants and pollution indicators; algal blooms

3.3 Toxic algae and their role, algae as parasites and pathogens

3.4 Algal biofertilizers, algae in biotechnology, algae as space food

Unit IV Lichen diversity and systematics

4.1 Classification of lichens: basis for classification

4.2 Morphology of lichen thallus: Ascolichens, Basidiolichens and Lichen imperfectii; ultrastructure of lichenized symbionts (phycobionts, mycobionts)

4.3 Reproduction of lichens – morphology of reproductive structures; vegetative, sexual and asexual modes of reproduction; dispersal of lichens

4.4 In vitro lichen culture and its importance

Unit V Physiology and importance of lichens

5.1 Development of symbiotic relationships between phyco - and mycobiont; physiological and evolutionary significance of symbiosis in lichens; parasymbionts

5.2 Water relations, photosynthesis and carbohydrate mobilization in lichens

5.3 Respiration, nitrogen metabolism and minimal requirements of lichens

5.4 Lichens as primary colonisers in ecological succession, heavy metal accumulators, pollution indicators, sources of natural dyes and paedogenesis, lichens as food and fodder

Note for the paper setter:
The question paper will have two sections. Section A carrying 10 compulsory, objective – cum – short answer type questions, two from each unit. Each part will carry 01 mark. Section B will have 10 questions, two from each unit. The students will attempt 1 question from each unit. Each question will carry 10 marks.

Books recommended:

1. Ahmadjian, V. and Hale, E. M. (1973). The Lichens, Academic Press.
2. Barsanti, L. and Gualieri, P. (2005). Algae; Anatomy, Biochemistry and Biotechnology, 1st edition, CRC Press.

3. Doyle Alisha, M. and Jayden, A. B. (2011). Algal Biofuels: Where We've Been, Where We're Going, 1st edition,Nova Publishers.
4. James, G., Wilcox, L. W. and Graham, L. M. (2008). Algae, 2nd edition**,** Benjamin Cummings publishers
5. Hawksworth, D. and Hill, D. (1984). The Lichen-forming Fungi**.** Blackie. Chapman & Hall.
6. Christiaan, H. (1996). Algae: An Introduction to Phycology. Cambridge University Press
7. Nash, T. H. (2008). Lichen Biology, Cambridge University Press.
8. Philip, S. (1997). A Biology of the Algae. 3rd edition, Mcgraw-Hill College Publishers.
9. Purvis, W. (2000). Lichens, Smithsonian Books.
10. Sandgren, C. D. (1995). Chrysophyte Algae: Ecology, phylogeny and development. 1st edition,Cambridge University Press.
11. Sarabhai, B. P and Arora, C. K. (1995) Text Book of Algae, Anmol Publications Pvt. Limited.
12. Sharma, O. P. (1986) Textbook of Algae. Tata McGraw-Hill Education.

Programme: M. Sc Botany

Course code: Bot-151 **Maximum Marks: 100**
Course Title: Bryophytes and Pteridophytes: Structure and Diversity **Sessional Assessment: 40**
University Examination: 60
Credits: 04 **Duration of Exam: 3 hours**

Objectives:

Bryophytes and Pteridophytes represent important stages in the evolution of plant kingdom particularly the terrestrial habit. The course is designed to equip students with knowledge about the diversity and biology of these plants.

Unit I. Bryophytes-Diversity in structure and reproduction

1.1 General characters of bryophytes, criteria used for classification, classification as given by Proskauer (1957), alternation of generation in the life history of bryophytes, bryophytes as amphibians of plant kingdom.

1.2 Hepaticopsida: distinguishing features, morphology and anatomy of sporophyte and gametophyte, vegetative and sexual reproduction in Marchantiales (*Riccia, Marchantia*) and Jungermanniales (*Pellia, Porella)*.

1.3 Anthocerotopsida: distinguishing features, morphology and anatomy of sporophyte and gametophyte, vegetative and sexual reproduction in *Anthoceros, Notothylus*

1.4 Bryopsida: distinguishing features, morphology and anatomy of sporophyte and gametophyte, vegetative and sexual reproduction in *Funaria, Polytrichum.*

Unit II. Bryophytes: origin, evolution and ecological importance.

2.1 Theories of origin of bryophytes from algal and pteridophyte ancesstors, their affinities with the two groups.

2.2 Evolution of sporophyte in bryophytes; apospory and apogamy, and factors affecting their occurrence in bryophytes.

2.3 Ecological importance of bryophytes: as indicators of air and water pollution.

2.4 Biochemical and molecular mechanisms of dessication tolerance in bryophytes.

Unit III. Pteridophytes – diversity in structure and reproduction

3.1 General characters of pteridophytes, principles and modern trends in pteridophyte classification as given by Riemers (1956).

3.2 Distinguishing features of Psilopsida and Lycopsida. Morphology, anatomy, vegetative and sexual reproduction in *Psilotum* , *Lycopodium* and *Selaginella.*

3.3 Distinguishing features of Sphenopsida. Morphology, anatomy, vegetative and sexual reproduction in *Equisetum.*

3.4 Distinguishing features, life history and classification of Pteropsida; study of vegetative development, reproduction in *Adiantum, Marsilea, Salvinia and Azolla.*

Unit IV. Pteridophytes- origin, evolution and economic importance

4.1 Origin of Pteridophytes from algal and bryophyte ancesstors, antithetic theory.

4.2 Apospory and apogamy , their significance in pteridophytes; Telome theory.

4.3 Soral and prothallial evolution in ferns; economic importance of pteridophytes.
4.4 Stelar system and evolution in pteridophytes, heterospory and seed habit in pteridophytes.

Unit V. Fossils of bryophytes, pteridophytes and Geological time scale.

5.1 Geological time scale: concepts of epoch, era, period; origin of important plant groups during different periods in geological history.
5.2 Fossils- types, causes of fossil formation, methods to study fossils and reorganization of fossil genera.
5.3 Fossil bryophytes: *Naiadita lanceolate, Sporogonites exuberans, Hepaticites kidstonii*.
5.4 Fossil pteridophytes*: Rhynia, Calamites, Sphenophyllum. Lepidodendron.*

Note for the paper setter:

The question paper will have two sections. Section A carrying 10 compulsory, objective – cum – short answer type questions, two from each unit. Each part will carry 01 mark. Section B will have 10 questions, two from each unit. The students will attempt 1 question from each unit. Each question will carry 10 marks.

Books recommended:

1. Agashe, S. N. (1995). Paleobotany, Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.
2. Arnold, A. C. (2005). An Introduction to Pteridophytes, Agrobios, Jodhpur
3. Chopra, R. N. (2005). Biology of Bryophytes, New Age International Publishers.
4. Chopra, R. N. and Kumar, P. K. (1988). Biology of Bryophytes. John Wiley & Sons, New York.
5. Langton, R. B. E. (2009). Bryophytes and Lichens, Cambridge University Press.
6. Parihar, N. S. (1996). Biology and Morphology of Pteridophytes, Central Book Depot, Allahabad.
7. Parihar, N. S. (1996). Bryophytea, Central book report, Allahabad.
8. Parihar, N. S. (1976). Biology and Morphology of Pteridophytes, Central Book Depot. Allahabad.
9. Parihar, N. S. (1980). Bryophytes: An Introduction to Embryophyta. Vol I. Central Book
10. Rashid, A. (1998). An Introduction to Pteridophyta: diversity, development and differentiation, Vikas Publishing House, Noida.
11. Rashid, A. (1998). An Introduction to Bryophyta: diversity, development and differentiation, Vikas Publishing House, Noida.
12. Sharma, O. P. (1990). Text Book of Pteridophyta, MacMillan India Ltd., Delhi.
13. Sundar Rajan, S. (1999). Introduction to Pteridophytes, CSIR; New Delhi
14. Shaw, A. J. (2000). Bryophyte Biology, Cambridge University Press.
15. Sporne, K. R. (1996). The Morphology of Pteridophytes, B I Publishing Pvt. Ltd., Bombay.
16. Sporne, K. R. (1986). The Morphology of Pteridophytes. Hutchinson University Library, London.
17. Stewart, W. N. and Rothwell, G. W. (2005). Paleobotany and the Evolution of Plants. 2nd edition, Cambridge University Press.
18. Zoltán, T., Slack, N. G. and Stark, L. Y. (2011). Bryophyte Ecology and Climate Change, Cambridge University Press.

19. Vanderpoorten, A. and Bernard, G. (2009). Introduction to Bryophytes, Cambridge University Press.
20. Vashista, B. R., Sinha, A. K . and Kumar, A. (2008). Botany for Degree Students – Bryophyta, S. Chands Publication.

Programme: M. Sc Botany,

Course code: Bot-153 **Maximum Marks: 50**
Course Title: Cell Biology **Sessional Assessment: 20**
Credits: 02 **University Examination: 30**
Duration of Exam: 2hours

Objectives:

The present course has been devised to familiarize students with the structural and functional aspects of cell, the basic unit of life, and its different organelles. Knowing the components of cells and how they work is fundamental to all biological sciences.

Unit I Microscopy, cell architecture and Cell Organelles

1.1. Microscopy: Light microscopy; Principles and applications of Bright field microscopy and Fluorescence microscopy; **Electron microscopy:** Principles and applications of scanning electron microcopy (SEM) and transmission electron microscopy (TEM).

1.2. Cell architecture: Cell theory**,** structure of Prokaryotic and Eukaryotic cells (plant cell); Plant cell wall-ultrastructure and functions.

1.3. Plasma membrane: Fluid Mosaic Organization (model) and functions; membrane proteins – peripheral, integral and transmembrane proteins; active and passive transport, channels, pumps and carriers.

1.4. Nucleus: Ultrastructure, nuclear membrane and nuclear pore complex, nucleolus, transport of proteins and RNAs across nuclear membrane.

Unit II Cell Organelles: structure and function

2.1. Mitochondria: Structure and functions, genome organization, protein import and mitochondrial assembly (protein targeting to the mitochondrial inner membrane, outer membrane and intermembrane space)

2.2. Chloroplast: Structure and functions; genome organization, import and sorting of chloroplast proteins. **Peroxisomes:** structure, functions of peroxisomes, peroxisome assembly and import of peroxisomal proteins.

2.3. Endoplasmic Reticulum: Structure, Types, overview of protein sorting, protein targeting to ER (Cotranslational and Posttranslational translocation of proteins into the ER), protein folding and processing in the ER, protein misfolding and unfolded protein response, protein export from ER.

2.4. Golgi complex: organization of Golgi, protein glycosylation within Golgi, mannose phosphoralation, protein sorting and export from the Golgi apparatus, mechanism of vesicular transport and vesicle fusion.

Unit III Cytoskeleton, Cell cycle and cell death

3.1. Lysosomes–structure and functions, endocytosis, phagocytosis and autophagy. **Ribosomes:** structure of prokaryotic and eukaryotic ribosomes.

3.2. The cytoskeleton: Organization and role of microtubules, microfilaments and associated motor proteins and intermediate filaments.

3.3. The cell cycle: Phases of cell cycle, cyclin-dependent kinases and cyclins, cell cycle check points and role of p53 and Rb (retinoblastoma) proteins in regulation of cell cycle.

3.4. Programmed cell death-PCD (Apoptosis): Caspases: the executioners of apoptosis, Central regulators of apoptosis: role of the Bcl-2 family in PCD.

Note for Paper Setter:

The question paper will have 2 Sections. Section 'A' will be compulsory having 6 questions of 01 mark each. The questions will be either short answer type having answers not exceeding 20 words or multiple choice type having four options each or fill in the blanks type. Section 'B' will carry 6 long answer type questions, two from each Unit. The students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Books recommended:

1. Albert, B., Bray, D., Raff, M., Roberts, K. and Watson, J. D. (2015). Molecular Biology of the Cell. Garland Publishing Inc., New York. 6th Ed.
2. Brown, T. A. (2016). Gene Cloning – An Introduction. Blackwell Publishing. (7th edition).
3. Clark, D. P. (2005). Molecular Biology: Understanding the Genetic Revolution. Elsevier Academic Press, UK.
4. Cooper, G. M. and Hausman, R. E. (2016). The Cell: A Molecular Approach. ASM Press, Washington DC. 7th Ed.
5. Karp, G. (2007). Cell and Molecular Biology. John Wiley and Sons Singapore Pte.Ltd. 7th Ed.
6. Karp, G. (2007). Cell Biology. John Wiley and Sons Singapore Pte.Ltd. 7th Ed.
7. Kornberg, A. and Baker, A. T. (2005). DNA Replication. W.H. Freeman & Company. 2nd Ed.
8. Krebs E, J., Goldstein S, E. and Kilpatrick, T. S. (2013). Lewins Gene XI. Jones and Bartlett publishers, Inc.
9. Lodish, H., Berk, A., Zipursky, S., Matsudaira, P., Baltimore, D. and Darnell, J. (2016). Molecular Cell Biology, W. H. Freeman and Company, 8th Ed.
10. Wayane, R. (2009). Plant Cell Biology. Academic Press.

Programme: M. Sc Botany, Semester I
Course Code: Bot-152 **Maximum marks: 100**
Course Title: Anatomy and Developmental Biology Of Angiosperms **Sessional Assessment: 40**
Credits: 04 **University Examination: 60**
Duration of Exam: 3 hours

Objectives:

Morphology is the basis for describing a plant form and structure. The study of plant anatomy has important industrial implications; structure of wood determines its utilitarian value and marketability as timber. The course is designed to create awareness among students about these basic science disciplines.

Unit I: Plant morphology

1.1 Origin and probable ancestors of angiosperms; organization of angiosperm plant body.

1.2 Nature of leaf; determination of leaf growth; phyllotaxy, diversity in leaf form; morphological nature of stamen and carpel

1.3 Nature and evolution of flower; genetics of floral organ differentiation, homeotic mutants in *Arabidopsis;* morphological features of various sex expression mechanisms of flowering plants.

1.4 Nature of angiosperm inflorescence; homology of floral appendages - perianth, ovule, endosperm, fruit and seed; fruit types in Ranunculaceae, Brassicaceae, Solanaceae, Rosaceae and Poaceae.

Unit II Plant anatomy-I: apical meristem and non-vascular tissues

2.1 Organization of root apical meristem (RAM); cell fates and lineages; development of lateral roots, root hairs

2.2 Organization of shoot apical meristem (SAM); anatomical features

2.3 Determination of epidermis and epidermal appendages with special reference to stomata, trichomes and mesophyll

2.4 Structure and ontogeny of cork; commercial importance of cork.

Unit III Plant anatomy–II: vascular tissues

3.1 Structure of primary and secondary vascular tissues and cambium; vascular tissue differentiation from cambium.

3.2 Mechanism of anomalous secondary growth in mono- and dicots.

3.3 Anatomy of roots: xeromorphic, hydromorphic, drought-stressed and aerial roots

3.4 Nodal anatomy with specific reference to the structure of vascular tissue and its use in systematics.

Unit IV Floral and fruit anatomy

4.1 Vascular traces of floral appendages; anatomy of simple and complex flowers; fusion in the floral structure.

4.2 The inferior ovary, adnation of flower to other flowers and organs; placental vascular supply; vestigial vascular tissue.

4.3 Fruit morphology (fleshy and dry fruits), vascular structure of fruit, placental vascular supply.

4.4 The seed: histological structure of seed coat, vascular supply of seed coat.

Unit V Ecological anatomy

5.1 Anatomy of sun and shade leaves, xeromorphic, succulent, poikilohydric, halophytic and hydromorphic leaves and leaves of alpine and epiphytic plants.

5.2 Ecological wood anatomy: growth rings, hydraulic architecture.

5.3 Development and structure of wood in relation to environment; industrial implications of wood structure.

5.4 Anatomy and pollution: affect of gaseous air pollutants, ozone injury, acid rain, carbon dioxide, ionizing UV radiation and insectides and herbicides on plant anatomy.

Note for the paper setter:

The question paper will have two sections. Section A carrying 10 compulsory, objective – cum – short answer type questions, two from each unit. Each part will carry 01 mark. Section B will have 10 questions, two from each unit. The students will attempt 1 question from each unit. Each question will carry 10 marks.

Books recommended:

1. Dickison, W. C. (2000). Integrative Plant Anatomy. Academic Press.
2. Eames, A. J. and Lawrence, H. and Daniels, M. (1972). An Introduction to Plant Anatomy, TaTa McGraw Hill Publishing Company, New Delhi.
3. Eames, A. J. (1983). Morphology Of Vascular Plants, Stanford University Press, NewYork
4. Katherine, E. (1983). Plant Anatomy, 2nd edition, Wiley Eastern Publication.
5. Fahn, A. (1982). Plant Anatomy, Pargamon Press.
6. Mauseth, J. D. (1988). Plant Anatomy. The Benjammin/Cummings Publisher, USA.
7. Rudall, P. (1994). Anatomy of Flowering Plants: an introduction to structure and development. Cambridge University Press, England.
8. Sporne, K. R. (1974). The Morphology of Angiosperms, B. I Publications, Pvt. Ltd., Bombay.

Programme: M. Sc. Botany, Semester I
Course code: Bot-154 **Maximum Marks: 50**
Course Title: Molecular Biology **Sessional Assessment: 20**
Credits: 02 **University Examination: 30**
Duration of Exam: 2 hours

Objectives: ***The course familiarizes students with Molecular aspects of cell which chiefly deal with interactions among various systems of a cell, including those between DNA, RNA and proteins and learning how these are regulated.***

Unit I: DNA-Structure, Replication, Damage and Repair

1.1. DNA: DNA structure and types, DNA as genetic material (experimental proof); satellite, repetitive, unique DNA sequences and concept of melting temperature (Tm).

1.2. Mechanism of DNA replication (Semi-conservative), Rolling – Circle Replication; bidirectional replication in Eukaryotes.

1.3. Chromosome organization: Nucleosome organization, molecular organization and role of centromeric and telomeric regions in organization of eukaryotic chromosomes.

1.4. DNA damage and repair mechanisms. Oxidative damage, alkylating agents**,** intercalating agents, radiations (UV); direct repair, base excision, nucleotide excision and mismatch repair.

Unit II Transcription and Regulation of gene expression

4.1. RNA: Structure, types and properties of RNA (mRNA, tRNA, rRNA); microRNA (miRNA), small interfering RNAs (siRNAs), Piwi-interacting RNA (piRNA).

4.2. Transcription: RNA polymerases, accessory proteins, mechanism of transcription, major differences between prokaryotes and eukaryotes (at transcriptional level).

4.3. **Post-transcriptional modifications in eukaryotes**: Capping, polyadenylation, splicing, RNA editing and their importance.

4.4. Regulation of gene expression: Prokaryotes (lactose *(lac)* operon and trpyptophan *(trp)* operon) and Eukaryotes (activators, repressors, histone modifications (histone code), DNA methylation and RNA interference).

Unit III Translation and Post-translational modifications

5.1. Genetic code: Concept, degeneracy, wobble hypothesis.

5.2. Translation: Mechanism of protein synthesis, initiation, elongation and termination, major differences between prokaryotes and eukaryotes (at translational level), inhibitors of translation.

5.3. **Post-translational modifications**: protein folding (chaperones and enzymes), proteolytic cleavage, glycosylation and attachment of lipids.

5.4. **Post-translational modifications:** protein phosphorylation, ubiquitin mediated protein degradation (ubiquitin-proteasome pathway).

Note for the paper setter:

The question paper will have 2 Sections. Section 'A' will be compulsory having 6 questions of 01 mark each. The questions will be either short answer type having answers not exceeding 20 words or multiple choice type having four options each or fill in the blanks type.

Section 'B' will carry 6 long answer type questions, two from each Unit. The students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Books recommended:

1. Albert, B., Bray, D., Raff, M., Roberts, K. and Watson, J. D. (2015). Molecular Biology of the Cell. Garland Publishing Inc., New York. 6th Ed.
2. Clark, D. P. (2005). Molecular Biology: Understanding the Genetic Revolution. Elsevier Academic Press, UK.
3. Cooper, G. M. and Hausman, R. E. (2016). The Cell: A Molecular Approach. ASM Press, Washington DC. 7th Ed.
4. Karp, G. (2007). Cell and Molecular Biology. John Wiley and Sons Singapore Pte.Ltd. 7th Ed.
5. Kornberg, A. and Baker, A. T. (2005). DNA Replication. W.H. Freeman & Company. 2nd Ed.
6. Krebs E, J., Goldstein S, E. and Kilpatrick, T. S. (2013). Lewins Gene XI. Jones and Bartlett publishers, Inc.
7. Lodish, H., Berk, A., Zipursky, S., Matsudaira, P., Baltimore, D. and Darnell, J. (2016). Molecular Cell Biology, W. H. Freeman and Company, 8th Ed.
8. Burton E. Tropp & David Freifelder (2012). Molecular Biology, 4th edition, Jones and Bartlett India Pvt. Ltd. New Delhi
9. David P. Clark & Nanette J. Pazdernik (2013). Molecular Biology. Elsevier Academic Press, UK. 2nd Ed.
10. James, D. Watson, Baker and Bell. (2013). Molecular Biology of the Gene, Cold Spring Harbor Laboratory Press, New York. 7th Ed.
11. Krebs E, J., Goldstein S, E., Kilpatrick T. S. (2013). Lewins Gene XI, Jones and Bartlett publishers, Inc.

Programme: M. Sc. Botany, Semester II

Course Code: Bot-250 **Maximum marks: 50**

Course Title: Gymnosperms: structure and diversity **Internal Assessment: 20**

UniversityExamination:30

Credits: 02 **Duration of Exam: 2 hours**

Objectives:

Gymnosperms are a dominant element of Himalayan forests and a major source of timber. The present course is designed to equip students with knowledge about the diversity and biology of these plants which will help in their conservation and sustainable utilization.

Unit I: Structural diversity and reproduction of Cycadales, Ginkgoales and Coniferales

1.1 Classification of Gymnosperms: modern trends, classification proposed by Sporne (1965) and Sandra Holmes (1986).

1.2 Cycadales and Ginkgoales: morphology and anatomy of vegetative organs.

1.3 Cycadales and Ginkgoales: morphology and anatomy of reproductive organs; life cycle.

1.4 Coniferales: morphology and anatomy of vegetative and reproductive organs, life cycle.

Unit II: Structural diversity and reproduction of Ephedrales, Welwitschiales and Gnetales

2.1 Ephedrales, Welwitschiales and Gnetales: morphology and anatomy of vegetative organs.

2.2 Ephedrales, Welwitschiales and Gnetales: morphology and anatomy of reproductive organs; life cycle.

2.3 Structural complexity of female gametophytes of gymnosperms.

2.4 Economic importance of gymnosperms.

Unit III: Fossil gymnosperms

3.1 Progymnosperms: concept and general account.

3.2 Brief account of families of Pteridospermales: Lygenopteridaceae, Medullosaceae, Caytoniaceae and Glossopteridaceae.

3.3 General account of Cycadeoidales and Cordaitales.

3.4 Distribution of fossil gymnosperms in the world and living gymnosperms in India.

Note for the paper setter:
The question paper will have two sections. Section A carrying 6 compulsory Objective – cum – short answer type questions, two from each unit. Each question will carry 01 mark. Section B will carry 6 questions, two from each unit. The students will attempt 1 question from each unit. Each question will carry 8 marks.

Books recommended:

1. Agashe S.N. (1995). Paleobotany, Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.
2. Bhatnagar S. P. and Moitra A (1996) Gymnosperms. New Age International Publishers, New Delhi.
3. Bhatnagar, S. P. and Naitrea, A. (1996). Gymnosperms: Encyclopedia of Plant Anatomy, Gebruder boraegar, Berlin.
4. Sporne, K.R. (1967). The Morphology of Gymnosperms.
5. Stewart W.N. and Rothwell G.W. (2005). Paleobotany and the Evolution of Plants. 2nd edition, Cambridge University Press.

Programme: M. Sc. Botany, Semester II

Course Code: Bot - 251
Course Title: Mycology and Plant Pathology
Credits: 04

Maximum Marks: 100
Internal Assessment: 40
University Examination:60
Duration of Exam: 3 hours

Objectives:

Knowledge regarding Mycology plays a pivotal role in making students understand the diversity, structure and reproduction in the Kingdom Fungi. Knowledge about plant pathology enables students appreciate the range and kind of diseases caused to plants and animals by various fungal pathogens and the management practices to contain these diseases.

Unit I: Fungi: general introduction

1.1 General characteristics of fungi and its significance; Ultrastructure of fungal wall and septa; cell wall composition of fungi.
1.2 Thallus organization in fungi: unicellular, coenocytic and multicellular; Main growth forms of fungi.
1.3 Mode of nutrition in fungi: saprobic, biotrophic and symbiotic.
1.4 Reproduction in fungi; Homothallism and Heterothallism; parasexuality

Unit II: Fungi: classification

2.1 Recent trends and criteria used in the classification of fungi with reference to vegetative and reproductive structures.
2.2 General account of Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina and Deuteromycotina.
2.3 Mycotoxin producing storage fungi and major mycotoxins produced by them.
2.4 Factors responsible for fungal growth and mycotoxin production in agricultural commodities.

Unit III: Fungi: economic importance

3.1 Role of fungi in industries with reference to production of medicines (antibiotics), organic acids (citric acid) and food (cultivation of yeast, button and oyster mushroom)
3.2 Plant disease caused by fungi in cereals: loose smut of wheat, black stem rust of wheat, false smut of paddy and brown spot of maize.
3.3 Symptoms, causal organisms and control measures of downy mildew of grapes and powdery mildew of cucurbits.
3.4 Fungal diseases of human beings and crop plants: apple scab, red rot of sugarcane and tikka disease of groundnut.

Unit IV: Pathogenesis: introduction and mechanism

4.1 Concept of diseases in plants; significance of plant diseases; disease triangle.

4.2 Production, types and survival of inocula of plant pathogens.
4.3 Active and passive dispersal of plant diseases.
4.4 Pre penetration activities of pathogens on host surface, direct penetration through intact plant surfaces, penetration through natural openings, post penetration development.

Unit V: Pathogenesis and Defense mechanism

5.1 Plant disease epidemic forecast, disease warning systems and important examples of plant disease forecast system.
5.2 Defense mechanisms in plants: morphological, histological, cytoplasmic and biochemical; phytoalexins, Pathogenesis-related (PR) proteins.
5.3 Role of enzymes, growth regulators, and toxins (host specific and non – host specific) in plant diseases.
5.4 Integrated Disease management- General account of plant disease control (quarantine, chemical and biological methods).

Note for the paper setter:

The question paper will have 2 Sections. Section 'A' will be compulsory having 10 questions of 01 mark each. The questions will be either short answer type having answers not exceeding 20 words or multiple choice type having four options each or fill in the blanks type. Section 'B' will carry 10 long answer questions, two from each Unit. The students will be required to answer 1 question from each unit. Each question will carry 10 marks.

Books recommended:

1. Agrios, G.N. (2012). Plant Pathology, 5th Edn. Academic Press, London.
2. Alexopoulus, C.J., Mims, C.W. and Blackwell, M. (1996). Introductory Mycology. John Wiley & sons Inc. New York.
3. Burns, R. (2010). Plant Pathology: Techniques and Protocols. Humana Press Inc., USA.
4. Lane, C. R., Beales, P. A. and Hughes, K. J. D. (2012). Fungal Plant Pathogens. CABI Publishing, UK.
5. Schumann, G. L. and D'Arcy, C. J. (2009). Essential Plant Pathology. Amer Phytopathological Society, USA.
6. Singh, R. S. (2014). Introduction to principles of plant pathology. Oxford & Ibh Publishing Co Pvt Ltd.
7. Sumbali G. (2010). The Fungi, 2nd Edn. Narosa Publishing House, New Delhi.
8. Webster, J. and Weber, R.W.S. (2007). Introduction to Fungi. Cambridge University Press, USA.

Programme:M. Sc. Botany, Semester II
Course Code: Bot-252 **Maximum Marks: 100**
Course Title: Plant Taxonomy **Internal Assessment: 40**
Credits: 04 **External Examination: 60**
Duration of Exam: 3 hours

Objectives:

This course has been designed to make students aware of the vast diversity in plants around us and to prepare them theoretically and practically to study and analyze this diversity scientifically. Sound theoretical knowledge of taxonomy will go long way in elucidating the natural grouping of flowering plants which exists in the biodiversity around us, and will also help in sustained utilization of bioresources for human welfare.

Unit 1: Plant taxonomy: bases and historical background

1.1 Classification, taxonomy, systematics; historical background of angiosperm classification (concept of artificial, natural and phylogenetic approaches to classification).
1.2 Importance of and need for taxonomy: importance of taxonomy in biology; relevance of taxonomy to society; need for taxonomy in unraveling biodiversity.
1.3 Bentham & Hooker's and Engler & Prantl's systems of classification (outline and merits & demerits).
1.4 Takhtajan's system of classification (outline and merits & demerits); Angiosperm Phylogeny Group (APG) (outline of APG classification).

Unit II: Plant taxonomy: components

2.1 Plant description: taxonomic characters and character states; vegetative and floral characters; diagnostic characters; characters and definition of taxa; essentials of good plant description.
2.2 Plant identification: principles for identification; methods of identification: taxonomic keys and their types, construction and use of dichotomous keys; essentials of practical plant identification.
2.3 Plant nomenclature: need for scientific names; ICN - brief history and operative principles, valid publication, priority of publication, author citation, type method (concept and kinds), synonyms, name changes.
2.4 Plant classification: taxonomic categories - species, infra- and supra-specific categories; taxonomic hierarchy; numerical and cladistic approaches to classification (general account).

Unit III: Plant taxonomy: sources of evidence

3.1 Morphology, anatomy and palynology (role as sources of taxonomic evidence in angiosperms).
3.2 Cytotaxonomy: concise account of cytological characters of taxonomic value in angiosperms - chromosome number and morphology (karyotypes), chromosome banding.
3.3 Chemotaxonomy: general account of chemical constituents of taxonomic significance - primary and secondary plant metabolites.

3.4 Molecular taxonomy: taxonomic value of amino acid sequencing; role of DNA sequencing in taxonomy (overview); DNA barcoding – concept and limitations.

Unit IV: Variation, species concepts and speciation

4.1 Types of variation: intra- and inter-specific variation; continuous and discontinuous variation; developmental-, environmental-, and genetic variation; causes of variation in populations.

4.2 Species and species concepts: species as basic unit of taxonomy; species concepts (concise account of taxonomic-, biological and phylogenetic species concepts).

4.3 Speciation: abrupt- and gradual speciation; phyletic and additive speciation, modes of additive speciation (concise account of allopatric-, parapatric-, and sympatric speciation).

4.4 Isolation and speciation: geographical and ecological isolation; reproductive isolation: pre-zygotic mechanisms (temporal, behavioral, mechanical, and gametic), and post- zygotic mechanisms (hybrid inviability, hybrid sterility, and hybrid breakdown).

Unit V: Primitive and advanced angiosperms

5.1 Taxonomic description of basal angiosperms: Amborellaceae, Nymphaeaceae, Annonaceae and Magnoliaceae .

5.2 Taxonomic description of basal (Acoraceae and Alismataceae) and petaloid (Liliaceae and Orchidaceae) monocots.

5.3 Taxonomic description of commelinid monocots (Arecaceae and Poaceae).

5.4 Taxonomic description of eudicots (Ranunculaceae) and core eudicots (Caryophyllaceae).

Note for the paper setter:

The question paper will have two Sections. Section 'A' will be compulsory having 10 questions, two from each unit; each question will carry 01 mark. The questions will be either short answer type having answers not exceeding 20 words or multiple choice type having 4 options each or fill in the blanks type. Section 'B' will have 10 long answer questions, two from each unit. The students will be required to answer one question from each Unit; each question will carry 10 marks.

Books recommended

1. Cole, A.J. (1969) Numerical Taxonomy, Academics Press, London.
2. Cronquist, A. (1981). An Integrated System of Classification of Flowering Plants. Columbia University Press, New York.
3. Davis, P.H and Heywood, V.H. (1973) Principles of Angiosperm Taxonomy. Robert E. Kreiger Pub. Co., New York
4. Grant, V. (1971). Plant Speciation.. Columbia University Press, New York.
5. Harrison, H. J. (1971). New Concepts in Flowering Plant Taxonomy. Hieman & Co-Educational Books Ltd., London.

6. Heywood , V.H. and Moore, D.N. (1984). Current Concepts in Plant Taxonomy. Academic Press, London.
7. Jeffrey, C. (1968). An Introduction to Principles of Plant Taxonomy.
8. Jones, S.B. Jr. and Lunchsinger, A.E. (1986). Plant Systematics, 2nd Edition. McGraw Hill Book Co; New York.
9. Lawrence, G.H.M. (1951). Taxonomy of Vascular Plants. Oxford & IBH Publ. Co., Pvt. Ltd.
10. Nordenstam, B; El Gazaly, G and Karsas, M. (2000). Plant Systematics for 21st Century. Portland Press Ltd., London
11. Radford, A.E. (1986). Fundamentals of Plant Systematics. Harper & Row Publications, U.S.A.
12. Simpson, M. G. (2006). Plant Systematics. Elsevier Academic Press, USA.
13. Singh, G. (2010). Plant Systematics. Science Publishers, USA.
14. Sivirajan, V.V. (1991). Introduction to Principles of Plant Taxonomy. Oxford, IBH.
15. Solbrig, O.T. (1970). Principles and Methods of Plant Systematics. The MacMillan Co. Collier – MacMillan Ltd, London
16. Stace, C.A. (1989). Plant Taxonomy and Biosystematics, 2nd Edition. Edward Arnold Ltd., London.
17. Takhtajan, A.L. (1997). Diversity and Classification of Flowering Plants. Columbia University Press, New York.
18. Walter, S. Judd et al., (2010). Plant Systematics: phylogenetic approach. IIIre edition. Springer.
19. Woodland, D.W. (1991). Contemporary Plant Systematics. Prentice Hall, New Jersey.

Programme: M. Sc. Botany, Semester II

Course Code: Bot-253 **Maximum Marks: 50**
Course Title: Bacteria and viruses: structure and diversity **Internal Assessment: 20**
University Examination: 30
Credits: 02 **Duration of Exam: 2 hrs**

Objectives:

The course is designed to acquaint students with the enormous diversity that microbes exhibit and equip them with the understanding of their structure and biology.

Unit I Viruses: biology and diversity

1.1 General characteristics; origin and nature; symptomatology; diversity, genome organization, RNA single stranded, RNA double stranded, DNA single stranded, DNA double stranded, virus like agents: virions, viroids, prions- structure and importance.

1.2 Viruses: nomenclature and taxonomy; basis of classification; International Committee of taxonomy of viruses;.

1.3 Isolation and purification of viruses, Infection cycle with reference to RNA and DNA containing viruses (TMV, Cotton leaf virus, Cauliflower Mosaic virus); mechanism of viral replication (TMV, Cotton leaf virus, Cauliflower Mosaic virus); differences between DNA and RNA viruses.

1.4 Viral transmission (general account): mechanical, seed mediated and insects, aphids, white fly, hopper, nematodes.

Unit II Bacterial diversity

2.1 Bacterial classification and its basis; International Code of Nomenclature for Bacteria-salient features.

2.2 Archaebacteria: major groups- methanogenic, extreme halophiles, thermoacidophiles-diversity of form (general account); ultrastructure of cell and cell wall; Phytoplasmas-general characteristics.

2.3 Cyanobacteria: diversity of form (general account), ultrastructure of cell and cell wall; heterocysts: ultra structure and functions.

2.4 Eubacteria; diversity of form (general account), ultra structure of cell and cell wall.

Unit III Nutrition, reproduction and utility of Bacteria

3.1 Nutritional types of bacteria; nutritional mutants and their importance in genetic and physiological studies.

3.2 Modes of bacterial reproduction and recombination: asexual and sexual: conjugation, transformation and transduction.

3.3 Utility of bacteria in industry: material processing, energy production, waste processing

3.4 Bioremediation, corrosion resistance, production of drugs and manufacture of polymers.

Note for the paper setter:
The question paper will have two sections. Section A carrying 6 compulsory Objective – cum – short answer type questions, two from each unit. Each question will carry 01 mark. Section B will carry 6 questions, two from each unit. The students will attempt 1 question from each unit. Each question will carry 8 marks.

Books recommended:

1. Ananthanarayan, R. and Paniker, C. K. J. (2009). Textbook of Microbiology. University Press Pvt. Limited.
2. Clifton, A. (1958) Introduction to the Bacteria. McGraw Hill Book Co; New York.
3. Ingraham, J. L. and Ingraham, C. A. (2005). Microbiology An Introduction. Cengage Learning Ltd.
4. Kale, V. and Bhusari, K. (2007). Applied Microbiology. Himalaya Publishing House.
5. Khan, J and Dijstra, J. S. ( ). Handbook of Plant Virology. Taylor and Francis.
6. Khan, J and Dijstra, J. S. (2012). Plant viruses as molecular pathogens. CRC Press.
7. Madigan, M T. Martinko, J. M and Parker Jack; (I996): Brock's Biology of Microorganisms, 8th edition, Prentice Hall, N,J. U.S.A.
8. Madigan, M T. Martinko, J. M and Parker Jack. (2000). Brock's Biology of Microorganisms, 9th edition, Prentice Hall. N,J. U.S.A.
9. Maloy, S. R., Cronan Jr, J. E. and Freifelder, D (2006) Microbial Genetics. Narosa Publishing House.
10. Mandahar, C.L. (1978). Introduction to Plant Viruses. Chand & CO. Ltd; Delhi.
11. Pelczar, M. J., Chan, E. C. S and Kreig, N. R. (1993). Microbiology. Tata McGraw Hill Education Private Limited, New Delhi.
12. Pommerville, J. C. (2011). Alcamo's Fundamentals of Microbiology. Jones and Bartlet Publishers. LLC.
13. Prescott, L.M., Harley, J.P. and Klein, D.A. (1992). Microbiology, WCB Publishers.
14. Schlegel, H. G. (2012). General Microbiology. Cambridge University Press.

15. Sumbali, G. and Mehrotra, R. S. (2009). Principles of Microbiology. 1st Edn. Tata McGraw Hill Publishing Co. Ltd. New Delhi.

Programme: M.Sc. Botany, Semester III
Course Code: Bot- 350 **Maximum Marks: 100**
Course Title: Cytology and Cytogenetics **Internal Assessment Marks: 40**
Credits: 04 **University Examination Marks: 60**
Duration of Exam: 03 hours

Objectives:

The course is designed to make students aware about the structure and functions of chromosomes and chromosomal aberrations, both numerical and structural. It will help students understand and appreciate the anomalies in chromosomal behavior and their impact on the survival of species.

Unit I: Chromosome organization

1.1 Structure of eukaryotic chromosome; nucleosome model; banding patterns for identification of chromosomes (Q, C, N, G and R bands).

1.2 Morphology of chromosomes: centromeres, secondary constriction; knob; telomeres; satellite and nucleolar organizer region (NOR).

1.3 Different forms of chromosomes; somatic metaphase chromosomes; meiotic prophase chromosomes; polytene chromosomes; B chromosomes; lampbrush chromosome.

1.4 Karyotype symmetry; chromosome numbers; symbols & terminology; euchromatin and heterochromatin.

Unit II: Chromosomal aberrations (structural)

2.1 Duplications: origin, occurrence and production of duplications; chromosome pairing in duplication heterozygotes.

2.2 Deficiencies: types of deficiencies; production of deficiencies through irradiation; meiosis and breeding behavior of deficiency heterozygotes.

2.3 Inversions: types of inversions; origin, occurrence and production of inversions; meiotic pairing in inversions heterozygotes.

2.4 Interchanges: natural origin and artificial induction of interchanges; cytological behavior of interchanges; Robertsonian translocations.

Unit III: Chromosomal variation (numerical) and its evolutionary significance

3.1 Haploidy in higher plants: origin occurrence and production of haploids; detection of haploids; phenotypic effects and uses of haploids in plant breeding.

3.2 Polyploidy in higher plants – autopolyploidy: origin and occurrence of autopolyploids in nature; induced autopolyploidy; phenotypic effects of autopolyploidy; meiotic behavior in autopolyploids.

3.3 Allopolyploidy: criteria for distinction between auto - and allopolyploids; spatial arrangement of chromosomes of different genomes in hybrids and allopolyploids; evolutionary significance of allopolyploidy.

3.4 Aneuploidy: classification of aneuploids; aneuploids in diploids vs. polyploids; trisomics in diploids; tetrasomics in plants; evolutionary significance of aneuploidy.

Unit IV: Molecular cytogenetics- I

4.1 Chromosomal DNA content and C-value paradox; chromosomal DNA evolution.

4.2 Repetitive DNA; techniques for detecting repetitive DNA; chemical complexity vs sequence (kinetic) complexity.

4.3 Estimation of GC-AT content in genome.

4.4 Chromosomal microdissection and microcloning: introduction, applications and limitations.

Unit V: Molecular cytogenetics-II

5.1 Construction of cytogenetic maps using chromosome specific markers.

5.2 Construction of restriction maps; use of partial digests, end labeling and hybridization in restriction mapping.

5.3 GISH: application of GISH in identification of component genomes in allopolyploids, interspecific hybrids, intergeneric hybrids and somatic hybrids.

5.4 FISH: application of FISH in physical mapping of repetitive and single copy DNA sequences in plant chromosomes.

Note for the paper setter:

The question paper will have two sections. Section 'A' will carry 10 compulsory, objective cum short answer type questions, two from each unit. Each question will carry 01 mark. Section 'B' will have 10 long answer type questions, two from each unit. The students will be required to attempt 1 question from each unit. Each question will carry 10 marks.

Books recommended:

1. Gupta, P.K. 2005. Genetics and Cytogenetics. Rastogi Publications, Meerut.
2. Hartk, D.L. and Jones, E.W. 1998. Genetics: Principles and Analysis (Fourth Edition). Jones and Bartlett Publishers, Massachusetts, USA.
3. Khush, G.S 1973. Cytogenetics of Aneuploids. Academic Press, New York, London.
4. Sharma, A. K. and Sharma, A. 1980. Chromosome techniques- Theory and Practice. Butterworth and Co. (Publishers) Ltd., London. .
5. Sinha, U. and Sinha, S. 1998. Cytogenetics, Plant Breeding and Evolution. Vikas Publishing house Pvt. Ltd. New Delhi.
6. Singh, R. 2015. Plant Cytogenetics- 2nd Edition. CRC Press.
7. Snustad, D. P and Simmons, M. J. 2011. Principles of Genetics, 6th Edition. Wiley.
8. Swanson, C. P. 1957. Cytology and Cytogenetics. Prentice-Hall, Inc., New Jersey.
9. Swanson, C. P., Merz, T. and Young, W. J. 1967. Cytogenetics. Prentice-Hall, Inc., New Jersey.

Programme:M.Sc. Botany, Semester III

Course Code: Bot – 351 | **Maximum Marks: 100**

Course Title: Reproductive Biology of Angiosperms | **Internal Assessment Marks: 40**

Credits: 04 | **University Examination Marks: 60**

Duration of Exam: 3 hours

Objectives:

Teaching of reproductive biology is important in making students understand modes of reproduction in flowering plants, their population structure and generation of variability. The course so framed on these aspects includes classical as well as experimental approaches to the phenomena of sporogenesis, gametogenesis, fertilization, embryogenesis and seed development.

Unit I: Sex expression & breeding systems

1.1 Essence of sexual reproduction, costs and benefits of sex, various concepts; sex differentiation at the level of individual; inflorescence and flower.

1.2 Factors affecting sex expression; chromosomal, genetic, hormonal and environmental control of sex expression.

1.3 Breeding systems;concepts and types; contrivances, advantages and disadvantages of selfing.

1.4 Contrivances, advantages and disadvantages of out-crossing. Concepts of mixed mating, Inbreeding depression and heterosis.

Unit II: Environmental & genetic control of flower development

2.1 Floral evocation and development of floral meristem, acquisition of competence to flower; anatomical changes.

2.2 Flowering time genes- promotion pathways; light, temperature and hormonal control.

2.3 Meristem identity genes; shoot meristem identity genes and floral meristem identity genes with *Arabidopsis* as model system.

2.4 Floral organ identity genes – homeotic mutants in *Arabidopsis* and *Antirrhinum*.

Unit III: Development of gametes and their interaction

3.1 Anther and pollen development- a general account; identification and expression of genes involved in stamen development.

3.2 Ovule and embryo sac development- a general account. Gene expression during ovule development.

3.3 Pollen and stigma- structural diversity; pollen transfer to stigma- self *vs* cross pollination; agents involved in pollen transfer.

3.4 Pollen adhesion to stigma and pollen hydration; pollen polarization and germination. Pollen tube invasion, growth into stigma, in style and in ovary.

Unit IV: Analysis of fertilization process

4.1 Nuclear migration and cellular communication in the embryo sac, preferential fertilization.

4.2 Genetic and molecular control of embryogenesis. Gene expression during early and late embryogenesis and transition to germination.

4.3 Embryo maturation; synthesis of maturation proteins; genetic regulation of embryo maturation, embryo dormancy.

4.4 Cellular organization of endosperm; the odyssey of free nuclei to a cellular tissue. Accumulation of storage products.

Unit V: Experimental analysis of fertilization process; genetic blocks

5.1 Cell cycle and fertilization, pollen tube attraction, synergid degeneration and gamete delivery.

5.2 In-vitro studies of fertilization, Ca^{++} waves, sites of fusion and egg activation.

5.3 Types of self-incompatibility mechanisms; female specificity determinants; biochemical and structural characteristics of S – proteins.

5.4 S-locus- F-box genes: Male specificity genes; other genes modulation S1 response.

Note for the paper setter:

The question paper will have two sections. Section 'A' will carry 10 compulsory, objective cum short answer type questions, two from each unit. Each question will carry 01 mark. Section 'B' will have 10 long answer type questions, two from each unit. The students will be required to attempt 1 question from each unit. Each question will carry 10 marks.

Books Recommended:

1. Atwell, B.J., Knedermann, P.E. and Jumbull, C.G.N. (1999). Plants in Action-Adaption in Nature: Performance in cultivation. MacMillan Education, Sydney, Australia.
2. Bewley, J.D. and Black, M. (1994). Seeds Physiology of Development and Germination. Plenum Press, New York.
3. Bhojwani, S.S. and Bhatnagar, S.P. (2000). The Embryology of Angiosperms. 4th Edn. Vikas Publishing House, New Delhi.
4. Burgess, J. (1985). An Introduction to Plant Cell development. Cambridge University Press, Cambridge.
5. Faegri, K. and Vander Pijl, L. (1979). The Principles of Pollination Ecology. Pergamon Press, Oxford.
6. Fahn, A. (1982). Plant Anatomy. 3rd Edn. Pergamon Press, Oxford.
7. Fosket, D.E. (1994). Plant Growth and Development: A Molecular Approach. Academic Press, San Diego.
8. Geber, M.A., Dawson, T.E. and Delph, L.F. (1999). Gender and Sexual dimorphism in Flowering Plants. Springer Berlin-Heidelberg.
9. Howell, S.H. (1998). Molecular Genetics of Plant Development. Cambridge University press, Cambridge.
10. Leivs, P., Tucker, S.C. and Endress, P.K. (1988). Aspects of Floral Development. J. Cramer, Germany.
11. Lyndow, R.F. (1990). Plant Development: The Cellular Basis. Unnin Hyman, London.
12. Murphy, T.H. and Thompson, W.F. (1988). Molecular Plant Development. Prentice Hall, New Jersey.
13. Proctor, M. and Yeo, P. (1973). The Pollination of Flowers. William Collins Sons, London.
14. Raghavan, V. (1997). Molecular Embryology of Flowering Plants. Cambridge University Press, Cambridge.
15. Raghavan, V. (1999). Developmental Biology of Flowering Plants. Springer-Verlag, New York.

16. Salisbury, F.B. and Ross, C.W. (1992). Plant Physiology. 4th Edn. Wadsworth Publishing, Bolmont, California.
17. Shivanna, K.R. and Sawhney, V.K. (1997). Pollen Biotechnology for Crop Production and Improvement. Cambridge University Press, Cambridge.
18. Shivanna, K.R. and Rangaswamy, N.S. (1992). Pollen Biology-A Laboratory Manual. Springar-Verlag, Berlin.
19. Shivanna, K.R. and Johri, B.M. (1986). The Angiosperm Pollen: Structure and Function. Wiley Eastern Ltd., New York.
20. Steeves, T.A. and Sussex, I.M. (1989). Patterns in Plant development. 2nd Edn. Cambridge Univ. Press, Cambridge.
21. The Plant Cell. Special issue on Reproductive Biology of Plants, Vol. 5(10) (1993). The American society of Plant Physiologists. Rockvills, Maryland, USA.
22. Raghvan, V. (2006). Double Fertilization. Springar Verlag, Berlin-Heidelberg.

Programme: M. Sc. Botany, Semester III
Course Code: Bot-352 **Maximum Marks: 100**
Course Title: Plant Resources and Utilization **Internal Assessment Marks: 40**
Credits: 04 **University Examinations Marks: 60**
Duration of Exam: 3 hours

Objectives:

This course has been designed with the objective to acquaint the students with plant bioresources, their traditional and non-traditional uses, current status and recent developments in value addition and future prospects.

Unit I Plant resources: origin, domestication and improvement

1.1 Prehistoric plant human interactions; discovery of plant use to humans, resurgence of interest in plant bioresources due to plant explorations and ethnobotanical studies during 19^{th} and 20^{th} centuries.

1.2 Origin of cultivated plants: Vavilovian concept of Centres of origin of crop plants; Centres of origin of maize, rice and wheat; concept of primary and secondary Centres of origin of crop plants

1.3 Domestication of crop plants; beginning of agriculture; dissemination and spread of agriculture; domestication and evolution of crop plants.

1.4 Plant use improvement: development of improved agricultural crops through plant breeding; evolution of high yielding crop varieties through genetic engineering; uses and production of improved varieties in wheat, rice and maize.

Unit II Plant resources in the service of mankind-traditional uses-I

2.1 Food supplements: *Agaricus bisporous*, *Hippophae rhamnoides* (distribution, botany, classification, part and method of use, nutritive value)

2.2 Spices and condiments: *Crocus sativus*, *Piper nigrum* (distribution, botany, classification, parts used and method of use).

2.3 Sources of beverages: non-alcoholic: *Camellia sinensis* (tea) and *Coffea arabica* (coffee); alcoholic: *Vitis vinifera* (grapes) (distribution, botany, classification, part and method of use).

2.4 Fodders and fibres: Fodders: *Grewia optiva* and *Morus alba* (distribution, botany, part and methods of use); Fibers: *Gossypium* spp., *Chorchorus capsularis* (distribution, botany, classification, part used and durability);

Unit III Plant resources in the service of mankind-traditional uses-II

3.1. Timbers: *Pinus roxburghii*, *Dalbregia sissoo*, *Tectona grandis* (distribution, botany, classification, wood structure and properties).

3.2. Dye-yielding plants: definition; history and sources of natural dyes, commonly used dye plants: *Lawsonia inermis* and *Indigofera tinctoria.*

3.3. Less used colouring matter: balsam, marigold, *Punica granatum*, *Reinwardtia indica* (distribution, botany, part used and commercial importance).

3.4. Bio-preservatives: (mustard, sugar) (distribution, botany, part used and commercial importance).

Unit IV Medicinal plants

4.1. Medicines: antioxidants (*Ginkgo biloba*); adaptogens (*Eleutherococcus senticosus, Cordyceps sinensis*) (distribution, botany, classification, part and method of use, and medicinal value).

4.2. Anodynes (*Atropa belladona, Zingiber officinale*); laxatives (*Aloe vera* and *Plantago ovata*) (distribution, botany, classification, part and method of use, and medicinal value).
4.3. Aromatic oils (*Thymus serpyllum* and *Lavandula angustifolia*) (distribution, botany, classification, part and method of use, and medicinal value).
4.4. Anti-cancerous (*Taxus baccata* subsp. *wallichiana, Podophyllum hexandrum*) (distribution, botany, classification, part and method of use, and medicinal value).

Unit V Other useful plants

5.1. Bio-sweeteners (*Stevia rebaudiana* and *Glycyrrhiza glabra*) (distribution, botany, classification, part and method of use and efficacy).
5.2. Bio-flavors (*Vanilla planifolia* and *Fragaria virginiana*) (distribution, botany, classification, part and method of use and efficacy).
5.3. Bio-gums (*Caesalpina spinosa, Trigonella foenum-graecum*) (distribution, botany, classification, part and method of use and efficacy)
5.4. Bio-cosmetics (*Aloe vera* and *Santalum album*) (distribution, botany, classification, part and method of use).

Note for the paper setter:

The question paper will have two sections. Section "A" will carry 10 compulsory, objective – cum – short answer type questions, two from each unit. Each question will carry 01 mark. Section "B" will have 10 long answer- type questions, two from each unit. The students will be required to attempt 1 question from each unit. Each question will carry 10 marks.

Books recommended:

1. Anonymous (1970-1988). The Wealth of India: Raw Materials, Vol. I-XI. CSIR. New Delhi. (Reprinted 1984-1989).
2. Judd, W. S., Campbell, C. S., Kollogg, E. A., Stevens, P. F. and Donohue, M. J. (2008). Plant Systematic: Phylogenetic Approach. Sircuier Associates, Inc.
3. Sharma, O.P. (2001). Hill's Economic Botany, Tata McGraw-Hill Pub. Ltd.
4. Sharma, R. (2006). Growth and Development of Agriculture. Biotech Book.
5. Singh, R.V. (1982). Fodder Trees of India, Oxford & IBH Publishing Co.
6. Singh, B. P. and Srivastava, U. (2013). Plant Genetic Resources in Indian Perspective, Theory and Practices. ICAR Publication
7. Vankar, S.P. (2006). Handbook on Natural Dyes for Industrial Applications (with Color Photographs). National Institute of Industrial Research, Delhi.

Programme: M.Sc. Botany, Semester III

Course Code: Bot-353 **Maximum Marks: 50**

Course Title: Biostatistics and Bioinformatics **Internal Assessment Marks: 20**

University Examination Marks: 30

Credits: 02 **Duration of Exam: 2 hours**

Objectives:

Mathematics and statistics are making deep in-roads into biology and it is therefore, necessary to provide sound foundations of these subjects to students who can build on these later in life.

Unit I: Introduction to computer and its applications

1.1. Basic computer organization (input/output unit), storage unit, control unit, Central Processing Unit; primary and secondary memory (RAM, ROM, PROM, EPROM, EEPROM, hard disk, compact disk and flash drives).

1.2. Computer softwares (definition, relationship between software and hardware, types of softwares); Operating system: concept and functions; some popular operating systems (Microsoft Windows); Internet: definition and practical utility.

1.3. Bioinformatics: brief history, introduction, applications and limitations.

1.4. Databases: introduction, sequence and structural databases, information retrieval from biological databases: NCBI, EMBL, PIR, Swiss Prot.

Unit II: Basics of biostatistics

2.1. Statistics: definition, history, applications and limitations; concept of biometry, population and samples.

2.2. Data collection and tabulation, primary and secondary data, methods of collecting primary data, sources of secondary data, editing of primary and secondary data, rule of tabulation, parts and types of tables and role of tabulation of data.

2.3. Frequency distribution: classification of data, histogram, frequency polygon, cumulative frequency curves, designs and limitations of graph.

2.4. Measures of central tendency: arithmetic mean, median, mode; their merits and demerits.

Unit III: Application of biostatistics

3.1 Measures of dispersion: standard deviation, standard error and coefficient of variation; Tests of significance: T-test, F-test and X^2 test

3.2 Binomial, Poisson and Normal distribution; Deviation, properties and applications of normal distribution

3.3 Correlation: types, methods; Karl Pearson's coefficient) and regression (linear) analysis and their uses

3.4 Principles of experimental designs: Completely Randomised Designs (CRD) and Randomised Block Designs (RBD); ANOVA: One way ANOVA and Two way ANOVA

Note for the paper setter:

The question paper will have two sections. Section "A" will carry 6 compulsory Objective–cum–short answer type questions, two from each unit. Each question will carry 01 mark.

Section "B" will carry 6 long answer-type questions, two from each unit. The students will be required to attempt 1 question from each unit. Each question will carry 8 marks.

Books recommended:

1. Gupta, S.P. (2005). Statistical Methods. Sultan Chand and Sons, New Delhi.
2. Gupta, C.B. and Gupta, V. (2005). An Introduction to Statistical Methods. Vikas Publishing House Pvt Ltd, New Delhi.
3. Ghosh, Z. and Bibekanand M. (2008). Bioinformatics: Principles and Applications. Oxford University Press.
4. Gun, A.M., Gupta, M.K. and Dasgupta, B. (2005). Fundamentals of Statistics. The World Press Pvt. Ltd, Kolkata.
5. Sinha, P.K. and Sinha, P. (2005). Computer Fundamentals. BPB Publication.
6. Rajaraman, V. (2004). Fundamentals of Computers. Prentice-Hall of India Pvt. Ltd., New Delhi.

Programme: M.Sc. Botany, Semester III

Course Code: Bot-354 **Maximum Marks: 50**
Course Title: Forest Ecology-I **Internal Assessment Marks: 20**
Credits: 02 **University Examinations Marks: 30**
Duration of Exam: 2 hours

Choice- based Complimentary Elective

Objectives:

This course is designed to provide students with the conceptual background needed to understand the complexity of interactions that occur within a forest ecosystem over time.

Unit I: Forest and forest environment

1.1. Forest and forest environment: what are forests; importance of forests in environmental conservation, wildlife, and biodiversity.
1.2. Forest ecosystem concept: introduction, composition & structure of forest ecosystem.
1.3. Forest stand, pure & mixed stand, even & uneven aged stand, use of mixed stand, irregular stands.
1.4. Relationship between man and forest in the Himalaya; major and minor forest produce; forests for food.

Unit II: Forest ecosystem functions

2.1. Forest ecosystem function: Primary productivity of forest ecosystems; methods of measurement; productivity patterns.
2.2. Forest litter: types of litter and coarse woody debris, litter fall, forest floor litter mass; importance of forest litter.
2.3. Litter decomposition and factors affecting it, such as microbes, fauna, abiotic factors and litter characters.
2.4. Nutrient cycling and nutrient conservation strategies. Water cycle in a forested area: impact of forest on precipitation apportionment, role of water in nutrient cycling.

Unit III: Changes in forest ecosystems

3.1. Eco-physiology of forest trees: characteristics of tropical trees; shoot growth in forest trees.
3.2. Phenology of trees; forest seed dormancy and germination; regeneration ecology of forest trees.
3.3. An idea of forest succession with particular reference to Himalaya.
3.4. Attributes of species of different successional stages, recovery measures of disturbed sites, species selection for disturbed sites in Himalaya.

Note for the paper setter:

The question paper will have 2 Sections. Section 'A' will be compulsory, having 6 questions of 01 mark each. The questions will be either short answer type having answers not exceeding 20 words or multiple choice type having four options each or fill in the blanks type. Section 'B' will carry 6 long answer type questions, two from each Unit. The students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Books recommended:

1. Barnes, B V; Zak, D R; Denton, S R and Spurr, S R (1998). *Forest ecology* (4th edition). John Wiley and Sons.
2. Champion, H.G. and Seth, S.K. (1968). *A Revised Survey of the Forest Types of India* (Reprinted 2004). Natraj Publicaiton, Dehradun.
3. Diwedi, A P (1993). *Forestry in India*, Surya Publications, Dehradun.
4. Evans, J. and Turnbull, J. (2004). *Plantation Forestry in the Tropics* (3rd Edition). Oxford University Press.
5. Kimmins, J.P. (2004). *Forest Ecology* (2nd edition). Pearson Education.
6. Newton, A. (2007). *Forest Ecology and Conservation.* Oxford University Press.
7. Perry, D. A. 1994. Forest Ecosystems. The Johns Hopkins University Press. Baltimore
8. Puri, G.S., V.M. Mehar-Homji, R.K. Gupta and R.K. Puri (1960). Forest Ecology. Oxford and IBH Pub.Co. New Delhi.
9. R. H. Waring and W. H. Schlesinger. (1985). Forest Ecosystems: Concepts and Management. Academic Press, Orlando.
10. Raymond, Y.A. and Ronald G.L. (2003). *Introduction to Forest Ecosystem*: S*cience and Management* (3rd edition). John Wiley and Sons.
11. Richards, P. W. (1996). The *Tropical Rain Forest* (2nd edition). Cambridge University Press.
12. Singh, S.P. and Singh, J.S. 1992. Forests of the Himalaya: Structure, Functioning and Impact of Man. Gyanodaya Prakashan, Nainital, India, pp 294.
13. Whitmore, T.C. (1998). *The Tropical Rain Forest*. Oxford University Press.

Programme: M.Sc. Botany, Semester III

Course Code: Bot –355 **Maximum Marks: 50**
Course Title: Recombinant DNA Technology **Internal Assessment Marks: 20**
Credits: 02 **University Examination Marks: 30**
Duration of Exam: 2 hours

Choice –Based Complimentary Elective

Objectives:

The course has been designed to acquaint the students with concepts of Recombinant DNA technology. The course content designed so will make the students aware about the material and methods being used in the transfer of DNA and its expression in the target organism. Also students will learn about the vast scope of the subject.

Unit 1: Introduction to Recombinant DNA Technology

1.1 Overview of recombinant DNA technology. Restriction and modification systems, restriction endonucleases and other enzymes used in manipulating DNA molecules,

1.2 Separation of DNAby gel electrophoresis. Extraction and purification of plasmid DNA.

1.3 Plasmids and bacteriophages as vectors for gene cloning. Cloning vectors based on *E. coli* plasmids, pBR322, pUC8, pGEM3Z.

1.4 Joining of DNA fragments: **l**igation of DNA molecules. DNA ligases, sticky ends, blunt ends, linkers and adapters.

Unit 2: Introduction of DNA into Cells

2.1 Uptake of DNA by cells, preparation of competent cells. Selection for transformed cells. Identification for recombinants - insertional inactivation, blue-white selection.

2.2 Introduction of phage DNA into bacterial cells. Identification of recombinant phages.

2.3 Methods for clone identification: The problem of selection, direct selection, marker rescue. Gene libraries,

2.4. Identification of a clone from gene library, colony and plaque hybridization probing, methods based on detection of the translation product of the cloned gene.

Unit 3: Applications of Recombinant DNA Technology

3.1 Applications in medicine, production of recombinant pharmaceuticals such as insulin, human growth hormone, factor VIII. Recombinant vaccines, Gene therapy.

3.2 Applications in agriculture - plant genetic engineering, herbicide resistant crops, problems with genetically modified plants, safety concerns.

3. DNA sequencing, Sanger Dideoxynucleotide sequencing, Maxam – Gilbert Sequencing, automated sequencing techniques.

3.4 Polymerase chain reaction (PCR) – principle, technique and applications.

Note for paper setter:

The question paper will have two sections. Section "A" carrying 6 compulsory, objective cum short answer type questions, two from each unit. Each question will carry 01 mark. Section "B" will have 6 long answer type questions, two from each unit. The students will be required to attempt 1 question from each unit. Each question will carry 8 marks

Books recommended:

12. Brown, T. A. (2016). Gene Cloning – An Introduction. Blackwell Publishing. (7^{th} edition).
13. Primrose, S.B., and Twyman, R. M., (2014) Principles of Gene Manipulation and Genomics, 7th ed., Blackwell publishing (Oxford).
14. Glick B.R., Pasternak, J.J. and Patten, C.L., Molecular Biotechnology: Principles and Applications of Recombinant DNA, 4th ed., ASM Press (Washington DC).
15. Williams, J., Ceccarelli, A. and Wallace, A. (2001). Genetic Engineering, *Second Edition*. Springer – Verlag, New York Inc.

Programme: M.Sc. Botany, Semester III

Course Code: Bot-356 **Maximum Marks: 50**
Course Title: Plant Biotechnology-I **Internal Assessment Marks: 20**
Credits: 02 **University Examination Marks: 30**
Choice based Complimentary Elective **Duration of Exam: 2 hours**

Objectives:

The course is designed to provide students an insight into non - conventional methods of plant propagation and the use of these methods in storage and conservation of germplasm.

Unit I: Plant tissue culture

1.1 Plant tissue culture- history; lab requirements and general techniques; culture environment and culture media.

1.2 Cell culture and concept of plasticity and cellular totipotency; plant growth regulators.

1.3 Plant regeneration: somatic embryogenesis, haploid production through andro - and gynogenesis and triploid production.

1.4 *In vitro* pollination; wide hybridization; somatic cell hybridization (hybrids and cybrids); embryo culture and embryo rescue.

Unit 2: Germplasm storage, conservation, protection and uses

2.1 Protoplast isolation and culture, plant germplasm storage by cryopreservation, advantages of cryopreservation.

2.2 Bio-control agents and biopesticides; biological control of crop pests; biological control of pathogens and weeds; mycoherbicides.

2.3 Production of secondary metabolites (SMs); strategies used to optimize product yield.

2.4 Commercial aspects of SMs, scale up, economic outlook and success stories.

Unit 3: Material production

3.1 Production of pathogen - free plants, virus elimination by heat treatment, virus elimination by meristem culture.

3.2 Single cell proteins (SCP) - health benefits and advantages of single cell proteins (Spirulina,

Chlorella, Scenedesmus); Yeast as SCP.

3.3 Biofuel production: ethanol, biogas, hydrogen, concept and applications.

3.4 Mushroom cultivation**,** important edible mushrooms, nutritive and medicinal value of edible mushrooms; mushroom cultivation and its advantages.

Note for the paper setter:

The question paper will have 2 Sections. Section 'A' will be compulsory having 6 questions of 01 mark each. The questions will be either short answer type having answers not exceeding 20 words or multiple choice type having four options each or fill in the blanks type. Section 'B' will carry 6 long answer type questions, two from each Unit. The students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Books recommended

1. Bhojwani, S. S. (2013). Plant Tissue Culture: Applications and Limitations. Elsevier, Amsterdam.
2. Bhojwani, S. S. and Razdan, M. K. (2008). Plant Tissue Culture: Theory and Practice. North Holland, An imprint of Elsevier.
3. Das, H. K. (2010).Text Book of Biotechnology. Wiley India.
4. Hammond, J. H., Mcgarvey, P. and Yusibov, V. (eds). (2000). Plant Biotechnology Springer Verlag, Heidelberg.
5. Narayanswamy, S. (1994). Plant Cell and Tissue Culture. Tata McGraw-Hill Publishing Company Ltd., New Delhi.
6. Razdan, M. K. (2011). Introduction to Plant Tissue Culture, 2nd edn. Oxford and IBH Publishing CO. Pvt. Ltd., New Delhi.

Programme: M. Sc Botany, Semester III

Course Code: Bot- 357 **Maximum marks: 50**

Course Title: Biodiversity and Conservation -I **Internal Assessment Marks: 20**

Credits: 02 **University Examination Marks: 30**

Choice based Complimentary Elective **Duration of Exam: 2 hours**

Objectives:

The course provides essential knowledge and cutting edge practical methodologies that are fundamental to the study of biodiversity, its measurement, valuation and uses.

Unit I: Concepts, components and magnitude of Biodiversity

1.1. Biodiversity: concept and definition; scope and distribution of biodiversity.
1.2. Biodiversity through ages: biodiversity patterns through geological times; current centers of biodiversity.
1.3. Components of biodiversity: genetic diversity, species/organismal diversity, ecological/ecosystem diversity, landscape/pattern diversity, agro-biodiversity, biocultural diversity and urban biodiversity.
1.4. Magnitude of biodiversity: Estimates of biodiversity at global level; extent of known biodiversity in India and Jammu & Kashmir Himalaya.

Unit II: Measuring biodiversity

2.1. Extent and measurement of genetic diversity; measuring of species diversity: sampling unit – shape, size and number, issue of scale.
2.2. Approaches for measuring biodiversity: floral and faunal surveys; physiognomic, phytosociological and grid methods; their advantages and disadvantages.
2.3. Biodiversity surrogates (types and use); role of remote sensing and GIS in biodiversity assessment and monitoring.
2.4. Modern approaches to measuring organismal diversity: species richness, species evenness, measurement of biodiversity at spatial level (α, β, γ diversity); Shannon-Wiener Index and Simpson Index.

Unit III: Value and uses of biodiversity

3.1. Values of biodiversity: instrumental/utilitarian values and their types, direct use values.
3.2. Indirect/non-consumptive use values: ethical and aesthetic values, anthropocentrism, biocentrism, eco-centrism and religions; intellectual value.
3.3. Methodologies for valuation of biodiversity: Changes in productivity method and Contingent Valuation method.
3.4. Methodologies for valuation of biodiversity: Hedonic Pricing method and Travel Cost method; introduction i.e. ecological economics for estimation of ecosystem services (introduction).

Note for the paper setter:

The question paper will have 2 Sections. Section 'A' will be compulsory, having 6 questions of 01 mark each. The questions will be either short answer type having answers not exceeding 20 words or multiple choice type having four options each or fill in the blanks type. Section 'B' will carry 6 long answer type questions, two from each Unit. The students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Books recommended:

1. Trivedy, R. K.; Goel, P.K. and Trisal, C. L. 1998. Practical Methods in Ecology and Environmental Science. Enviro Media Publishers, Karad Maharashtra.
2. Magurran, A. E. 1988. Ecological Diversity and its Measurement. Princeton University Press, USA.
3. Misra, R. 2013. Ecology Workbook. Scientific Publishers, India.
4. Groom, M. J., Meffe, G. R. and C. R. Carroll. 2006. Principles of Conservation Biology. Sinauer Associates, Inc., USA.
5. Krishnamurthy, K. V. 2003. Textbook of Biodiversity. Science Publication.
6. Primack, R. 2006. Essentials of Conservation Biology.Sinauer Associates, Inc., USA.
7. Hambler, C. 2004. Conservation. Cambridge University Press.
8. Van Dyke, F. 2008. Conservation Biology: Foundations, Concepts and Applications, 2nd Edition Springer.

Programme: M.Sc. Botany, Semester IV

Course Code: Bot – 450 **Maximum Marks: 100**
Course Title: Ecology and Environmental Biology **Internal Assessment Marks: 40**
University Examination Marks: 60
Credits: 04 **Duration of Exam: 3 hours**

Objectives:

The course is designed to help students in understating principles of ecology, environmental biology, and the relationship of humans with the natural world.

Unit I: Ecology and autecological concepts

1.1 Ecology: definition, history, scope and subdivisions; role of ecology in sustainable development.
1.2 Characteristics of populations: size, density, dispersion, age, structure, natality and mortality; factors affecting population growth.
1.3 Intra–specific and inter–specific interactions: competition, coexistance, mutualism, commensalism and prey-predator interactions.
1.4 Genecology: ecological amplitude, ecads, ecotone, ecotypes, ecospecies, coenospecies, k–selection and r–selection populations.

Unit II: Ecosystem ecology

2.1 Concept of ecosystem: structure, function and classification: primary productivity (methods of measurement, global patterns, controlling factors and scope); gross productivity.
2.2 Energy dynamics: trophic organization; energy flow pathways, food chains and food webs, ecological pyramids; ecological efficiency.
2.3 Ecosystem stability: concept (resistance and resilience); ecological perturbations (natural and anthropogenic); successional evolution of ecosystems.
2.4 Major vegetation ecosystems and soil types of the world and India.

Unit III: Community dynamics

3.1 Succession: definition, concept and causes; classification of successions; successional changes – autogenic and allogenic, primary and secondary, autotrophic and heterotrophic.
3.2 Retrogressive changes in succession: concept of climax or stable communities, ecological balance and survival thresholds.
3.3 Concept of limiting factors: Liebig and Shelford's laws of limiting factors and their significance.
3.4 Biogeochemical cycling: concept; carbon cycle, nitrogen cycle and sedimentary

cycles; nutrient uptake and cycling.

Unit IV: Ecotoxicology

4.1 Principles and mechanism of toxicity; toxicants in the environment, factors affecting concentration of toxicants in environment.
4.2 Biotransformation, bioaccumulation, biomagnification (a general account); ecotoxicology of herbicides.
4.3 Toxicity of heavy metals: Pb, Hg, Cd and As (general account of each): mutagens and immunotoxic agents.
4.4 Risk and hazards; risk analysis, risk management, environmental toxicants and human health – role of FAO, WHO and EPA.

Unit V: Environmental Impact Assessment

5.1 Environmental impact assessment (EIA): introduction, origin and development, aims and objectives of EIA, development of EIA in India.
5.2 Requirements for impact assessment: main steps of impact assessment: pre - study, study period and post - study period activities.
5.3 Methods of EIA: adhoc method, checklists, matrix, networks, evaluation systems, modeling and computer - aided assessment.
5.4 Writing of environmental impact statement, environmental management plan, environmental auditing, cost and benefit analysis; role of public participation in environmental decision making.

Note for the paper setter:

The question paper will have two sections. Section 'A' will carry 10 compulsory, objective cum short answer type questions, two from each unit. Each question will carry 01 mark. Section B will have 10 long answer type questions, two from each unit. The students will be required to attempt 1 question from each unit. Each question will carry 10 marks.

Books recommended:

1. Douglas, J. Futuyma (1998). Evolutionary Biology (3rd Edition). Sinauer Associates.
2. Eldon, D., Enger, Bradley, Smith, F. (1995). Environmental Science. W C Brown Publications.
3. Grant, W. E. and Swannack, T. M. (2008). Ecological Modelling. Blackwell.
4. Kormondy, E. J. (Ed.) (1999). Concepts of Ecology. Prentice Hall.
5. Michael, P. (1984). Ecological Methods of Field and Laboratory Investigations. Tata McGraw Hill.
6. Miller, G. Tyler, Jr. (2005). Sustaining the Earth, 7th edition. Brooks/Cole- Thomson Learning, Pacific Groove, California.
7. Odum, E. P. (1991). Fundamentals of Ecology(III Edn). Saunders and Com.
8. Ramade, F. (1981) Ecology of Natural Resources. John Wiley and Sons.
9. Wilkinson, D. M. (2007). Fundamental Processes in Ecology: An Earth System Approach. Oxford.

Programme:M.Sc. Botany, Semester IV
Course Code: Bot – 451 **Maximum Marks: 100**
Course Title: Plant Physiology and Biochemistry **Internal Assessment Marks: 40**
Credits: 04 **University Examination Marks: 60**
Duration of Exam: 3 hours

Objectives:

The course is intended to provide students up-to-date knowledge about fundamental physiological/biochemical processes in plants viz. mineral nutrition, photosynthesis, respiration, nitrogen metabolism and growth regulators.

Unit I: Mineral nutrition and translocation

1.1.Macro and micro nutrients; role and their associated deficiencies and plant disorders.
1.2.Membrane transport: Active and passive transport mechanism; transport proteins.
1.3. Water potential and its components; mechanism of water transport through xylem; transpiration (process, principle and significance).
1.4.Mechanism of translocation in phloem; phloem loading and unloading.

Unit II: Photochemistry and photosynthesis

2.1. Photosynthesis: concept, historical background, photosynthetic pigments (types and role), photosystems (concept, constitution and role).
2.2. Electron transport system; mechanism of electron transport pathways (cyclic and non-cyclic electron transport).
2.3. Carbon assimilation pathways: Calvin cycle (C3 pathway), C4 pathway ; relative efficiency of C3 and C4 plants.
2.4. Crassulacean acid metabolism (CAM) pathway; photorespiration and its significance.

Unit III: Respiration and lipid metabolism

3.1. Respiration: concept and significance; mechanism-glycolysis, citric acid cycle and pentose phosphate pathway
3.2. Mitochondrial electron transport system, process and major steps; ATP synthesis, cyanide resistant respiration.
3.3. Lipid metabolism: lipids, their classification and role; fatty acid biosynthesis.
3.4. β-Oxidation of fatty acids (purpose and process); glyoxylate cycle and its significance.

Unit IV: Enzymes and nitrogen metabolism

4.1. Enzymes: concept, definition, properties and classification; kinetics of single-substrate enzyme catalyzed reactions- Michaelis-Menton equation and its significance.
4.2. Mechanism of action of enzymes; enzyme inhibition and specificity.
4.3. Nitrogen metabolism: nitrogen in environment; mechanism of nitrate uptake and assimilation; ammonium assimilation; need for nitrogen in metabolism.

4.4. Biological nitrogen fixation; nodule formation and nod factors, importance of nitrogen fixation, nitrogen fixing plants.

Unit V: Photoreceptors and plant growth regulators

5.1. Phytochromes and cryptochromes: discovery, structure, photochemical and biochemical properties, cellular localization and responses; role of phytochromes and cryptochromes in plants.

5.2. Photoperiodism: concept and types of photoperiods; vernalization: process and role.

5.3. Physiological effects and mechanism of action of auxins, gibberellins, cytokinins and ethylene.

5.4. Physiological effects and mechanism of action of abscisic acid, salicylic acid, jasmonic acid, brassinosteroids and polyamines.

Note for the paper setter:

The question paper will have two sections. Section "A" will carry 10 compulsory, objective cum short answer type questions, two from each unit. Each question will carry 01 mark. Section "B" will have 10 long answer type questions, two from each unit. The students will be required to attempt 1 question from each unit. Each question will carry 10 marks.

Books recommended:

1. Hopkins, W.G. and Huner, N.P.A. (2009). Introduction to Plant Physiology. Wiley. 4th Ed.
2. Taiz, L.E., Zeiger, I.M., Muller and Murphy, A. (2015) Plant Physiology and Development. Sinauer Associates. 6th Ed.
3. Davies P.J. (2004) Plant Hormones Biosynthesis, Signal Transduction, Action. Kluwer Academic Publishers.
4. Salisbury, F.B., Ross C.W. (1992). Plant physiology. Belmont, Calif. : Wadsworth Pub. Co., 4th ed.
5. Pareek, A., Sopory, S.K., Bohnert, H.J. and Govindjee (2010). Abiotic Stress Adaptation in Plants. Springer Netherlands.
6. Ashraf, M. Ozturk, M. Athar, Habib-ur-Rehman (2009). Salinity and Water Stress Improving Crop Efficiency. Springer Netherlands
7. Srivastava, L. M. (2002). Plant growth and development: hormones and environment. Academic press. 1st Edition

Programme:M. Sc Botany, Semester IV
Course Code: Bot-452 **Maximum Marks: 50**
Course Title: Biotechnology and Genetic Engineering of Plants and Microbes **Internal Assessment Marks: 20**
University Examination Marks: 30
Duration of Exam: 2 hours
Credits: 02

Objectives:

Biotechnology and genetic engineering concern with the manipulation of genetic material for improvement of bioresources for human welfare. This course will help students learn the science and basic techniques of genetic manipulation and educate them with the scope of the subject.

Unit I Introduction to genetic engineering

1.1 Molecular tools employed in genetic engineering: restriction enzymes – types, nomenclature, Cleavage patterns. Ligases – types and nature of action; modification enzymes.
1.2 Vectors: properties of an ideal vector; types of vectors, plasmids, cosmids, phagemids, shuttle vectors, bacteriophages, and artificial chromosomes (BAC).
1.3 Nucleic acids: purification, yield analysis, amplification and its applications.
1.4. Expression of heterologous genes in prokaryotes (bacteria) and Eukaryotes (yeast).

Unit II Genetic engineering techniques

2.1 Polymerase Chain Reaction: principle, variations in PCR (RT, Ligase, Inverse), applications and importance.
2.2 Site –directed mutagenesis using PCR, primers, linkers and adapters.
2.3 Preparation of cDNA libraries; construction and screening of genomic libraries.
2.4 DNA sequencing – chemical degradation, enzymatic methods and next generation sequencing.

Unit III Transgenic science in plant and microbes

3.1. Transformation in plants- *Agrobacterium* - mediated and direct methods. Success stories of transgenic plants- Bt cotton and Golden rice.
3.2. Biopharming - plants as bioreactors for recombinant proteins.
3.3. Microbial biotechnology: genetic manipulation in microbes for the production of antibiotics and enzymes.
3.4 Engineering microbes for the production of insulin, growth hormones and for clearing oil spills.

Note for the paper setter:

The question paper will have 2 Sections. Section 'A' will be compulsory having 06 questions of 01 mark each. The questions will be either short answer type having answers not exceeding 20 words or multiple choice type having four options each or fill in the blanks type. Section 'B' will carry 06 long answer type questions, two from each Unit. The students will be required to answer 1 question from each unit. Each question will carry 08 marks.

Books recommended:

1. Brown, T. A. (2016). Gene Cloning – An Introduction. Blackwell Publishing. (7^{th} edition).

2. Clark, D. P. (2005). Molecular Biology: Understanding the Genetic Revolution. Academic Press.
3. Clark, D. P. and Pazdernik, N. J. (2009). Biotechnology: Applying the Genetic Revolution. Elsevier Inc.
4. Primrose SB and Twyman R.M. (2014). Principles of gene manipulation and genomics, seventh edition
5. Williams, J., Ceccarelli, A. and Wallace, A. (2001). Genetic Engineering, *Second Edition*. Springer – Verlag, New York Inc.

Programme: M.Sc. Botany, Semester IV

Course Code: Bot –455 **Maximum Marks: 50**
Course Title: Stress Biology **Internal Assessment Marks: 20**
Credits: 02 **University Examination Marks: 30**
Duration of Exam: 2 hours

Choice –Based Complimentary Elective

Objectives:

The course is intended to make students aware about the concepts of abiotic and biotic stress in plants as well as adaptations and bioengineering approaches developed to overcome this stress.

Unit I: Abiotic stress and adaptations

1.1. Salinity stress: effects on growth and photosynthesis of plants; various adaptations of plants to avoid and overcome salinity stress (ion homeostasis and salt tolerance).
1.2. Water deficit: effects of water deficit on plant growth and development, resistance to water deficit (avoidance and tolerance), stomatal signaling during water stress and role of ABA.
1.3. Heavy metal toxicity: Effects of heavy metals on plants, mechanism of heavy metal detoxification and role of phytochelatins in heavy metal stress tolerance.
1.4. Ozone toxicity: effects of ozone on plants, ozone tolerance mechanisms in plants.

Unit II: Biotic stress and plant defense

2.1. Plant defenses against pathogens: role of cutin, waxes and suberin; effectors and resistance (R) genes.
2.2. Hypersensitive response, role of phytoalexins in counteracting biotic stress, role of salicylic acid and its signaling during biotic stress.
2.3. Jasmonate induced defense responses in plants; jasmonic acid biosynthesis and its signaling during biotic stress.
2.4. Role of alkaloids, cyanogenic glycosides and glucosinolates in biotic stress tolerance.

Unit III: Bioengineering plants for stress tolerance

3.1. Transgenic approaches for improved stress tolerance: Arabidopsis as a model system.
3.2. Adoption of genetically modified (GM) crops; future challenges in agriculture; GM strategies for insect and virus resistance, glyphosate tolerance – case studies.
3.3. RNA interference (RNAi) – role in virus and bacterial disease management.
3.4. Building stress tolerance through over-producing trehalose in transgenic plants.

Note for the paper setter:

The question paper will have 2 Sections. Section 'A' will be compulsory having 6 questions of 01 mark each. The questions will be either short answer type having answers not exceeding 20 words or multiple choice type having four options each or fill in the blanks type. Section 'B' will carry 6 long answer questions, two from each Unit. The students will be required to answer 1 question from each unit. Each question will carry 8 marks.

Books recommended:

1. Hopkins, W.G. and Huner, N.P.A. (2009). Introduction to Plant Physiology. Wiley. 4th Ed.
2. Taiz, L.E., Zeiger, I.M., Muller and Murphy, A. (2015) Plant Physiology and Development. Sinauer Associates. 6th Ed.
3. Davies P.J. (2010) Plant Hormones Biosynthesis, Signal Transduction, Action. Kluwer Academic Publishers. 3rd Edition
4. Pareek, A., Sopory, S.K., Bohnert, H.J. and Govindjee (2010). Abiotic Stress Adaptation in Plants. Springer Netherlands.
5. Ashraf, M. Ozturk, M. Athar, Habib-ur-Rehman (2009). Salinity and Water Stress Improving Crop Efficiency. Springer Netherlands

Programme: M.A (English)

Course Title: British Drama-I

Course Code: Eng- 102

Credits-4

Total Marks:	**100**
University Examination:	**60**
Sessional Assessment:	**40**

Objective: *This course aims to acquaint the students with the growth and development ofEnglish Drama from the Medieval to the Jacobean Period. The students will study the important plays of these periods; focusing on the literary and historical perspectives.*

UNIT I

1. Christopher Marlowe: *Dr. Faustus* (Detailed Study)
2. Ben Jonson : *Volpone* (Non-Detailed Study)

UNIT II

3. William Shakespeare: *Hamlet* (Detailed Study)
4. William Shakespeare: *Twelfth Night* (Non-Detailed Study)

UNIT III

5. John Webster: *The Duchess of Malfi* (Detailed Study)
6. Thomas Kyd: *The Spanish Tragedy* (Non-Detailed Study)

UNIT IV

7. William Congreve: *The Way of The World* (Detailed Study)
8. George Etherege: *The Man of Mode* (Non-Detailed Study)

UNIT-V

Reference to the context from the detailed works prescribed in the syllabus.

Some Recommended texts (not for examination):

1. Christopher Marlowe: *The Jew of Malta*
2. Ben Jonson: *The Alchemist*
3. Ben Jonson: *Every Man in his Humour*
4. John Webster: *The White Devil*
5. William Congreve: *The Mourning Bride*

Programme: M.A (English)

Course Outcome:

By the end of the semester, the students will

1. **Read with comprehension and learn to critically analyze works in dramatic literature.**
2. **Learn to comprehend and analyze historical movements in dramatic literature.**
3. **Learn the importance of cooperation through collaboration.**
4. **Get acquainted with major dramatists of the different ages and their works.**
5. **Learn to interpret knowledge of the human condition, as reflected in British Drama in its diverse generic manifestations and from various theoretical perspectives.**

Suggested Readings:

1. Anne Barton. *Ben Jonson, Dramatist*. Cambridge: Cambridge University Press, 1984.
2. Bentley, G.E. Shakespeare and Jonson: Their Reputations in the Seventeenth Century Compared. Chicago: University of Chicago Press. 1945.
3. Bradley, A.C. *Shakespearean Tragedy: Lectures on Hamlet, Othello, King Lear and Macbeth.* London: Penguin,1991.
4. D .M Bevigton. *Twentieth Century Interpretations of Hamlet*. Princeton Hall.
5. Irving Ribner. *Jacobean Tragedy: The Quest for Moral Order*, Methuen &Co. Ltd, 1962.
6. Jonson, Ben, and Michael Jamieson. *Three Comedies: Volpone, the Alchemist BartholomewFair*. Baltimore: Penguin, 1966. Print.
7. Kinney, Arthur F. *A Companion to Renaissance Drama*. Oxford: Blackwell Pub., 2002. Print.
8. Kuriyama, Constance. *Christopher Marlowe: A Renaissance Life*. Cornell University Press, 2002.
9. Laurie E. Maguire. *Studying Shakespeare: A Guide to the Plays*. Blackwell, 2004.
10. Lawrence, Robert G. *Introduction to the Man of Mode: Restoration Plays*. London : JM Dent, 1994.
11. Lukas, Erne. Beyond the Spanish Tragedy: A Study of the works of Thomas Kyd, Manchester University Press, 2002.
12. Ralph Kaufman. ed. *Elizabethan Drama*. Oxford University Press, 1989.
13. R.V. Holsworth. ed. Webster: *The White Devil and The Dutchess of Malfi*. Macmillan Education Ltd, 1975.

Pattern of Examination:

The question paper will have two sections A&B. Section A will be compulsory and will include 10 objective type questions, each carrying one mark. Section B comprises 10 long answer type questions each carrying 10 marks, two from each unit and the student will be required to attempt one question from each unit.

Programme: M.A (English)

Course Title: British Novel –I **Total Marks: 100**
Course Code: Eng-104 **University Examination: 60**
Examination Duration: 03 hours **Sessional Assessment: 40**
Credits-4

Objective: *This course will deal with the rise of English Novel with special reference to the literary movements and forms in the 18th century fiction.*

UNIT-I

Background: Development of British Novel, Romance, Realism, Picaresque, Gothic, Historical Novel, Epistolary Novel.

UNIT-II

1. John Bunyan: *Pilgrim's Progress* (Detailed Study)
2. Samuel Richardson *Pamela or Virtue Rewarded* (Non- Detailed Study)

UNIT-III

1. Daniel Defoe: *Moll Flanders* (Detailed Study)
2. Daniel Defoe *Robinson Crusoe*(Non- Detailed Study)

UNIT-IV

1. Henry Fielding: *Joseph Andrews* (Detailed Study)
2. Henry Fielding: *The History of Tom Jones* (Non -Detailed Study)

UNIT-V

1. Jane Austen: *Pride & Prejudice* (Detailed Study)
2. Jane Austen *Emma* (Non -Detailed Study)

Some Recommended Texts (Not for examination):

1. Daniel Defoe's *A Journal of the Plague Year*
2. Lawrence Stern's *The Life and Opinions of TristramShandy*
3. Tobais Smollett's *Peregine Pickle*
4. Henry Mackenzie's *The Man of Feeling*
5. Jane Austen's *Northanger Abbey*

Course Outcomes: At the end of Semester students will learn about

1. The beginning of novel
2. The rise and growth of novel
3. **Major novelists of the age**
4. **Death of drama and the dominance of novel**
5. **Difference in plots of novel and drama**

Suggested Readings:

1. Arnold Kettle. *An Introduction to the English Novel Vol. I.* Nabu Press, 2013.
2. Austin Dobson. *Fielding*. Nabu Press, 2011.
3. Ian Watt. *The Rise of the Novel: Studies in Defoe, Richardson and Fielding.* Kessinger Publishing, 2007.
4. Andrew H. Wright. *Jane Austen's Novel* .Oxford University Press, 1954.
5. James E. Tobin. *Eighteenth Century Literature and its Cultural Background.* Franco Modigliani, 1971.
6. Walter Allen. *The English Novel: A Short Critical History.* Harmondworth, 1954.

Pattern of Examination:

The question paper will have two sections A&B. Section A will be compulsory and will include 10 objective type questions, each carrying one mark. Section B comprises 10 long answer type questions each carrying 10 marks, two from each unit and the student will be required to attempt one question from each unit.

Programme: M.A (English)

Course Title: British Drama-II
Course Code: Eng-202
Examination Duration: 03 hours
Credits-4

Total Marks: 100
University Examination: 60
Sessional Assessment: 40

Objective: *The purpose of the course is to familiarize the students with the development ofDrama from Restoration period to the twentieth century. The* ***sociological, philosophical and literary aspects of the prescribed plays will be studied.***

UNIT-I

1. G. B. Shaw: *Man and the Superman* (Detailed Study)
2. G. B. Shaw: *Saint Joan* (Non-Detailed Study)

UNIT-II

1. T.S.Eliot: *The Cocktail Party*(Detailed Study)
2. T.S.Eliot: *Murder in the Cathedral*(Non-Detailed Study)

UNIT-III

1. John Osborne: *Look Back in Anger*(Detailed Study)
2. Harold Pinter: *The Birthday Party*(Non-Detailed Study)

UNIT-IV

1. Samuel Beckett: *Waiting for Godot* (Detailed Study)
2. Edward Albee: *Who's Afraid of Virginia Woolf*? (Non-Detailed Study)

UNIT-V

Reference to context from the detailed works prescribed in the syllabus.

Some Recommended Texts (Not for examination):

1. G B Shaw's *Arms and Man*
2. G B Shaw's *Candida*.
3. Harold Pinter's *Home Coming*
4. Samuel Becket's *Endgame*
5. Edward Albee's *The Zoo Story*

Course Outcomes:

Programme: M.A (English)

By the end of the semester, the students will

1. **Be able to develop an ability to analyze and assess social, moral, ethical and aesthetic values.**
2. **Be able to process, understand, express and communicate past experiences.**
3. **Examine diverse plays from different periods and will consider the thematic dramaturgical handling and of the different cultures from which the drama emanated.**
4. **Analyze theoretical and critical arguments about drama and theatre.**
5. **Identify current and historical developments in studies of British drama.**

Books Prescribed:

1. Bergonzi Bernard. *Wartime and Aftermath: English Literature and Its Background, 1939-60*. U.K.: Oxford University Press, 1993.
2. BonamyDobree. *Restoration Comedy: 1660-1720*. New Delhi: Dutt Press, 2008.
3. Colin Chambers and Mike Prior: *Playwrights' Progress: Patterns of Post-war BritishDrama*. Oxford: Amber Lane Press, 1987.
4. Harold Bloom: *George Bernard Shaw: Modern Critical Views*. U.S.A.: Chelsea House Publishers, 1991.
5. Raymond Williams. *Drama from Ibsen to Brecht.* U.K.: Vintage Books, 1968.
6. T.S. Eliot. *Selected Essays.* U.S.A.: Houghton Mifflin Harcourt, 1950.
7. Thomas H. Fujimura. *The Restoration Comedy of Wit.* U.S.A.: Princeton University Press, 1952.

Pattern of Examination:

The question paper will have two sections A& B. Section A will be compulsory and will include 10 objective type questions, each carrying one mark. Section B comprises 10 long answer type questions each carrying 10 marks, two from each unit and the student will be required to attempt one question from each unit.

Programme: M.A (English)

Open Elective/Common Course

Course Title: Applied English
Course Code: Eng- 209
Examination Duration: 03 Hours
Credits-4

Total Marks: 100
University Examination: 60
Sessional Assessment: 40

Objective: The course is designed to acquaint the students with the basic tools essential for a systematic study of language; the principles and practices of effective communication and writing skills for academic and professional purposes.

UNIT-I (Oral Communication)
Concept of Transcription: Phonetic Symbols, Speech mechanism, Vowels and Consonants, Syllable Division. Word Stress, Accent and Intonation

UNIT-II (Developing Reading Comprehension)
From Prose and Poetry: Précis writing, Summarising of passage, Matching Tables, Graphs. Objectives and Short Answers.

UNIT-III (Developing Writing Skills)
Writing Techniques: Paragraph writing, Abstract writing, Formal letter writing, Notice, and Memorandum, SMS, Email writing, Advertisement.

UNIT –IV: (Basic Usage of English Grammar)
Noun, Pronoun, Verb, Adjectives, Adverbs, Preposition, Conjunction, Interjection, Phrases, Idioms Clause, Tenses, Articles and Narration.

UNIT-V (Developing Research Skills)
How to write a research paper, Plagiarism, Proof reading and Editing.

Some Recommended Texts (Not for examination) :

1. Unique English Grammar: Oxford University Text
2. Spoken English : A Self Learning Guide to Conversation Practice by V. Sasikumar and P. V Dhamija
3. Phonetics and Phonology by M. Aslam
4. Common Errors in Spoken English: Research Article Web

Course Outcome:
By the end of the examination the Students will learn about:

1. **Intelligible Communication**
2. **Pronunciation**
3. **Drafting skills**
4. **Formal Academic Skills in Written Format**
5. **Rectification of Grammatical Errors**
6. **Students will take interest in debating and discussion to solve the different problems**
7. **Students can enjoy Listening and Speaking Skills**

Suggested Readings:

1. Cambridge English Grammar. Cambridge: Cambridge University Press, 2010.Print.
2. Hornby, A.S.*Oxford Advanced Learner's Dictionary*.8th ed. New Delhi: Oxford University Press, 2016.Print.
3. Oxford English Grammar. New Delhi: Oxford University Press, 2016.Print.
4. Swan Micheal. *Practical English Usage*. Oxford: Oxford University press, 2005.Print.
5. Yule, George. *The study of Language*. 2nd ed. Cambridge: Cambridge University Press, 1997.Print.

Pattern of Examination:

The question paper will have two sections A&B. Section A will be compulsory and will include 10 objective type questions, each carrying one mark. Section B comprises 10 long answer type questions each carrying 10 marks, two from each unit and the student will be required to attempt one question from each unit.

Programme: M.A (English)

Course Title: British Novel –II **Total Marks: 100**
Course Code: Eng-304 **University Examination: 60**
Examination Duration: 03 hours **Sessional Assessment: 40**
Credits-4

Objective:*The purpose of this course is to acquaint the students with the development of novel from the late eighteenth century to the early twentieth century.*

UNIT-I
Charles Dickens: *Hard Times*
Charles Dickens: *A Tale of Two Cities (Non-Detailed Study)*

UNIT-II
Thomas Hardy: *The Mayor of Casterbridge*
Thomas Hardy: *Far From the Maddening Crowd (Non-Detailed Study)*

UNIT-III
George Eliot: *Mill on the Floss*
William Makepeace Thackeray: *Vanity Fair (Non-Detailed Study)*

UNIT-IV
Charlotte Bronte: *Wuthering Heights*
Henry James: *The Portrait of a Lady(Non-Detailed Study)*

Unit-V
James Joyce: *Portrait of a Youngman as an Artist*
Virginia Woolf: *Mrs. Dalloway(Non-Detailed Study)*

Some Recommended books for Reading: (Not for examination)

1. Charles Dickens's *Oliver Twist*
2. Thomas Hardy's *Tess of D'Urbervilles*
3. George Elliot's *Mill on the Floss*
4. D. H. Lawrence's *All My Sons*
5. Virginia Woolf's *Orlando*

Course Outcome:

1. **The students will come to know about the eighteenth century British society.**
2. **The students will become familiar with the literary trends of the eighteenth century British novel.**
3. **The cultural, historical and political aspects of the eighteenth century British society will be known to the students through the novels prescribed.**

Suggested Readings:

1. Arnold Kettle. *An Introduction to the English Novel - Volume Two: Henry James to The Present*. U.S.A.: Lightning Source Inc. Print.

2. Christensen, Nicole Jennifer. *Victorian Gender Roles and Female Identity: An Analysis of the Female Protagonists in Dickens' 'Dombey and Son' and Eliot's 'The Mill on the Floss' According to the Principles of the Other and the Wild Zone*. København: n.p., 2005. Print.
3. G.K.Chesterton. *Charles Dickens*. U.K.: House of Stratus, 2001. Print.
4. Georg Luckas. *The Historical Novel*. U.S.A.: University of Nabraska Press, 1983. Print.
5. Joseph Gold. *Charles Dickens: Radical Moralist*. U.S.A.: University of Minnesota Press, 1972. Print.
6. Raymond Williams. *Culture and Society: 1780-1950*. New York: Columbia University Press, 1958. Print.
7. Wayne C. Booth. *The Rhetoric of Fiction*. U.S.A.: University of Chicago Press, 1961. Print.

Pattern of Examination:

The question paper will have two sections A& B. Section A will be compulsory and will include 10 objective type questions, each carrying one mark. Section B comprises 10 long answer type questions each carrying 10 marks, two from each unit and the student will be required to attempt one question from each unit.

Total Marks: 100

Programme: M.A (English)

Course Title: Literary Theory and Criticism-III

Course Code: Eng- 401 **University Examination: 60**

Examination Duration: 03 hours **Sessional Assessment: 40**

Credits-4

Objective: The aim of the course is to acquaint the students with the modern trends in literarytheory. Beginning with new criticism, the students will study Structuralism, Deconstruction, Marxism, Feminism and Contemporary Postcolonial Theories.

Unit I (Structuralism and Deconstruction)

1. **Ferdinand de Saussare:** Course in general Linguistics
2. **Jacques Derrida:** Structure, Sign and Play in the discourse of the human sciences

Unit II (Post-Modernism)

1. **Jean-François Lyotard:** The Postmodem Condition : A Report on Knowledge
2. **Jean Baudillard:**Simulacra and Simulation

Unit III (Postcolonial theory)

1. **Edward Said:** Selections from Orientalism
2. **HomiBhaba:** Of Mimicry and Man: The Ambivalence of colonial discourse
3. **GayatriSpivak:** Can the Subaltern Speak?

Unit IV (Ecocriticism and Ecofeminism)

1. **Raymond Williams:** The country and the city
2. **CheryllGlotfelty**: The Ecocriticism Reader
3. **Vandana Shiva**: Staying Alive

Unit V (Practical Application)

Application of prescribed theory on the prescribed text in this Semester

Some Recommended Texts (Not for examination):

1. History and Principles of Literary Criticism
2. IGNOU blocks of MEG-5
3. Literary Theory and Criticism
4. Studies in Literary Theory

Course Outcome:

By the end of the semester the students will learn about:

1. **Development of Literary Comprehension**
2. **Practical utility of critical theories in write-ups**
3. **Expansion of Philosophical perspectives**
4. **Different modes of interpretation of a literary text**

Suggested Readings:-

1. Bill Ashcroft,Gareth Griffith and Helen Tiffins.ed The Empire Writes Back.London:Routledge,1989. Print.

2. Fredric Jameson .Marxism and Form:Twentieth Century Dialectical Theories of Literature. U.S.A: Princeton University Press, 1974. Print.
3. GayatriCharavortySpivak, "Can The Subaltern Speak?"Gary Nelson and Lawrence rossberg. ed. Marxism and the Interpretation of Culture.London: Macmillan, 1988. Print.
4. Geyh, Paula, Fred Leebron, and Andrew Levy. Postmodern American Fiction: A Norton Anthology. New York: W.W. Norton, 1998. Print.
5. HomiBhabha. The Location of Culture. London: Routledge, 1994. Harvey, Robert, and Lawrence R. Schehr. Jean- ran oisyotard: Time and Judgement. New Haven, CT: Yale UP, 2001. Print.
6. Jacques Derrida.Of Grammatology. U.S.A.: John Hopkins University Press, 1997. Print.
7. Lietch B. Vincent.The Norton Anthrology of Theory and Criticism, second Edition. London: Routledge, 2010. Print.
8. Linda Hutcheon. The Politics of Post Modernism.: Routledge, 2000.Print
9. MCCaan R. Carole, SEUNG-KYUNG KIM. Feminist Theory Reader, Fourth Edition.USA. Print.
10. Niall Lucy. Postmodern Literary Theory: An Introduction .Oxford :Blackwell Publishers Inc.,1998. Print.
11. Sumathy U. Ecocriticism in Practice.NewDelhi.Print
12. Roland Barthes. The Pleasure of the Text Trans. R. Millar .New York: Hill and Wang, 1975. Print.
13. Terry Eagleton. Literary Theory: An Introduction. London: University of Minnesota Press, 1983. Print.
14. ------. Marxism and Literary Criticism. California: University of California Press, 1976. Print.
15. Taylor, Victor E., and Gregg Lambert. Jean ran oisyotard: Critical Evaluations in Cultural Theory. London: Routledge, 2006. Print.

Note for Paper setter

The question paper will have two sections A & B. Section A will be compulsory and will include 10 objective type questions from all Units, each carrying one mark. Section B comprises 10 long answer type questions each carrying 10 marks, two from each Unit and the student will be required to attempt one question from each Unit.

Programme: M.A (English)

Course Title: American Literature-I **Total Marks: 100**
Course Code: Eng- 402 **University Examination: 60**
Examination Duration: 03 hours **Sessional Assessment: 40**
Credits-4

Objective: The objective of this course is to introduce students to the growth and development of various genres of American literature from the imitative phase of the 19th century to the 20th century modern American literature.

UNIT-I:

1. Walt Whitmam: Song of Myself: Sections: 1,5,16 ,21
2. Robert Frost: Mending Wall
3. Emily Dickinson: "I Taste a Liquor Never Brewed"
   "Hope Is the Thing With Feathers"
   "The Soul Selects her Own Society"

UNIT-II:

1. Mark Twain: *Huckleberry Finn*
2. John Steinbeck *Grapes of Wrath(Non-Detailed study)*

UNIT-III:

1. Arthur Miller: *Death of a Salesman*
2. Eugene O'Neil *Hairy Ape(Non-Detailed study)*

UNIT-IV

1. Ernest Hemmingway *A Farewell to Arms*
2. Herman Melville *Moby Dick(Non-Detailed study)*

UNIT-V:(Short Story)

1. E.A .Poe: "The Oval Portrait"
2. O'Henry "The Ransom of Red Chief"

Some Recommended Texts (Not for examination):

1. Tennessee William's *The Glass Menagerie*
2. Philip Roth's *American Pastoral*
3. F. S. Ftizgerald's*Great Gatsby*
4. William Faulkner's *The Sounds and the Fury*
5. Thomas Pynchon's *The Crying of Lot 49*

Programme: M.A (English)

Course Outcome: By the end of Semester the students will learn about:

1. **the American Literature**.
2. the American Dream and American Hero.
3. the representation of American Dream in literature.
4. **the influence of capitalism on American Society**.
5. the detective short stories.

Suggested Reading:

1. Brett Zimmerman. *A Catalogue of Selected Rhetorical Devices Used in the Works of E.A Poe. Style winter*, 1999. Print.
2. Donald Miles. *American Novel in the 2oth Century*. New York: Barnes Noble, 1978. Print.
3. Doyle John. R. Jr. *Poetry of Robert Frost: An Analysis.* Hallier, 1965. Print.
4. Emory, Hallway and Henry. S. Saunders. *Whitman in the Cambridge History of American Literature*. Vol II. ed. William P. Treat and others. New York: Putnam, 1918. Print.
5. Jonathan Arac. *A Review of Huckleberry Finn as Idol and Target: Comparative Literature*. Winter, 1999. Print.
6. Kenneth Stocks .*Emily Dickson and the Modern Consciousness: A Poet of a Time*. New York: St Martin's Press, 1988. Print.
7. R. W. B. Lewis. *The American Adam*. Chicago: University of Chicago Press, 1955. Print.

Note for Paper Setter

The question paper will have two sections A&B. Section A will be compulsory and will include 10 objective type questions from all Units, each carrying one mark. Section B comprises 10 long answer type questions each carrying 10 marks, two from each Unit and the student will be required to attempt one question from each Unit.

Programme: M.A (English)

Course Title: Literature and Gender
Course Code: Eng-452
Examination Duration: 03 Hours
Credits: 4

Total Marks: 100
University Examination: 60
Sessional Assessment: 40

Course Objective: The objective of this course is to study various political and ideological concerns of feminist theories from 18th century onwards. This course examines the idea of **gender and its social constructs**, the concept of gender, the difference between sex and gender, key concepts in gender studies and gender roles will be examined through this paper.

Unit I:

Rabindranath Tagore	"Nastanirh" (Charulata)
Rashid Jahan	*Behind the Veil* (A One Act Play)
IsmatChughtai	*My Friend My Enemy*

Unit II:

Kamala Das	"The Freaks"
	"The Sunshine Cat"
	"The Invitation"

Unit III:

Mahasweta Devi	"Draupadi"
PrajwalParajuly	"The Cleft" (from the collection *The Gurkha's Daughter*)
Mrinal Pandey	"Girls" (from the collection *Stepping Out*)

Unit IV:

Shashi Deshpande	*That Long Silence*
Chitra Banerjee Divakaruni	*The Palace of Illusions (Non-detailed Study)*

Unit V:

ManjulaPadmanabhan	*Lights Out*

Some Recommended Texts (Not for examination):

1. Judith Butler's *Undoing Gender*
2. Nancy Frazer's *Unruly Practices*
3. GaytariSpivak's*Selected Subaltern Studies*
4. Sara Ahmed's *Differences that Matter: Feminist Theory and Postmodernism*
5. Warren Farrel's*Why Men Are The Way They Are*

Course Outcomes:

By the end of semester students will learn about

1. **The gender studies**
2. **Famous critics of gender studies**
3. **Famous works by female authors**
4. **Role of gender studies in shaping the postmodern society.**
5. **Scope of gender studies in literature**

Programme: M.A (English)

Suggested Reading:

1. Virginia Woolf, *A Room of One's Own* (New York: Harcourt, 1957) chaps. 1 and 6. 2. Simone de Beauvoir, 'Introduction', in *The Second Sex*, tr. Constance Borde and ShielaMalovany-Chevallier (London: Vintage, 2010) pp. 3–18. 3.
2. KumkumSangari and SudeshVaid, eds., 'Introduction', in *Recasting Women: Essays in Colonial History* (New Delhi: Kali for Women, 1989) pp. 1–25. 4.
3. Chandra TalapadeMohanty, 'Under Western Eyes: Feminist Scholarship and Colonial Discourses', in *Contemporary Postcolonial Theory: A Reader*, ed. PadminiMongia (New York: Arnold, 1996) pp. 172–97.

Note for Paper Setter:
The question paper will have two sections A & B. Section A will be compulsory and will include 10 objective type questions from all Units, each carrying one mark. Section B comprises 10 long answer type questions each carrying 10 marks, two from each Unit and the student will be required to attempt one question from each Unit.

Programme: M.ED

Course Code: M.Ed-111 **Max. Marks: 100**

Course Title: Psychological Perspectives of Education **Internal: 40**

External: 60

Duration of Exam 03:00hrs

Unit I: **Nature of Educational Psychology**

i) Meaning and scope of Educational psychology.
ii) Classroom implications of Educational Psychology **10hrs**
iii) Main features and contribution of the following schools of psychology towards education:
- Behaviorism;
- Gestalt psychology; and
- Psycho-analysis.

Unit II: **Growth and Development**

i) Concept of Growth and Development; Principles and Sequential Stages of Development: Infancy, Childhood and Adolescence **10hrs**
ii) Characteristic features of Physical, Emotional and Intellectual Development
iii) Educational implications of physical, emotional & intellectual developmental stages.
iv) Theories of Development: Jean Piaget and Erickson

Unit III: Learning Process

i) Concept and Factors of Learning.
ii) Theories of Learning: Operant Conditioning Theory by B.F. Skinner.
iii) Hull's Theory of Learning **10 hrs**
iv) Gagne's Hierarchical Theory of Learning Theory of Learning
v) Vygotsky's Theory of Learning

Unit IV: Intelligence and its Measurement

i) Concept of Intelligence; Theories of intelligence: Thurston's Group Factor Theory, Guildford's Structure of Intellect and Howard Gardner's Multifactor Theory **10 hrs**
ii) Measurement: Concept of Measurement of Intelligence, Historical Background; Concept of Intelligence Tests and Concept of IQ (Intelligence Quotient)
iii) Tests of Intelligence: Simon-Binet Test, Cattell's Culture-Fair Intelligence Test, Bhatia's Performance Test of Intelligence

Unit V: **Personality and Adjustment**

Programme: M.ED

i) Concept of Personality

ii) Theories of Personality: Allport's Trait theory of Personality, Cattell's Factor Theory of Personality and Sigmund Freud' Psychoanalytic Theory of Personality.

iii) Assessment of Personality:

- Projective Techniques: Rorschach Inkblot test and Thematic Apperception Test

  10 hrs
- Subjective Techniques: Interview and Case study
- Objective Techniques: Cattell's 16 PF &MMPI

iv) Meaning of Adjustment and characteristics of well adjusted person, Maladjustment and Causes of maladjustment, Role of Defense Mechanisms in Adjustment.

Seminars, Special lectures, Tutorials, Term Papers and Practicum etc **10 hrs**

Note for paper setters

The question paper shall be divided into two sections. Section A will carry 10 compulsory, objective-cum-short answer type questions; two from each unit, each carrying 1 mark. Section B shall have 10 questions, two from each unit. The students shall attempt 1 question from each unit. Each question shall carry 10 marks.

COURSE OUTCOMES

CO1: to familiarize the students with the basic psychological principles connected with effective teaching learning process.
CO2: The course will enable the learners to understand how psychological knowledge and procedures given by various schools of psychology may be applied to the solution of educational problems.
CO3: It will further help them to understand some important learning theories and pursue their attempts to understand the intricacies of human personality and intelligence.
CO4: To analyse the implications of understanding human development and theories of learning for teachers.
CO5: To understand the concept of personality and intelligence

Recommended Books:

- Chauhan, S. S. (1989). "Advanced Educational Psychology" Vikas publishing House, Pvt. Ltd., New Delhi
- Dandapani, S. (2001). A Text book of advanced Educational Psychology, Anmol Publications, Pvt. Ltd., New Delhi.
- Gates, et.al; (1942). "Educational Psychology" Macmillam: New York.
- Skinner, C. E. (2003). Educational Psychology" Fourth Edition Prentice Hall of India, Pvt. Ltd.

Programme: M.ED

Course Code: M.Ed-150 **Max. Marks: 50**

Course Title: Self Development (Communication & Expository Writing) **Internal: 25** **External: 25**

Course Content:

i) Concept of communication, types and principles of communication; importance of communication, purpose of communication, communication media, effective communication skills (listening, managing stress, emotional awareness)

ii) Barriers to effective communication; Remedial measures to overcome the barriers of communication

iii) Technological advances in communication **10 hrs**

iv) Poster presentations: Concept and preparation

v) Preparation of a news paper article and book review; Writing a research paper: Essential components; Characteristics of a good research paper

Transactional Mode:

Through both theoretical and practical mode **10hrs**

Sessional work:

Writing a research paper, a news paper article and book review

Communication exercises

Seminars, Special lectures, Tutorials and Practicum **10 hrs**

Mode of Examination

Sessional Assignment: 25 marks will be awarded on the basis of daily attendance, performance in the practical components like assignments, poster presentations, news paper articles, book review etc.

University/External Examination: 25 marks will be awarded on the basis of power-point presentation/poster presentations before an expert (any one from the BGSB University) on different themes to be selected by students themselves. The panel for external examination shall be comprised of the head of the Department, concerned teacher who shall be the internal examiner and the external examiner nominated by the university.

Programme: M.ED

COURSE OUTCOMES

CO1: To enhance the ability of students to listen, converse, speak, present, explain and exposit ideas in groups and before an audience through group discussions, seminars and workshops.

CO2: The course will expose the learners towards writing of news paper articles, book reviews and research papers.
CO3: It will further enable them to write expository writing in the form of poster and power point presentations.
CO4: It will further enable to write the References and Bibliography.
CO5: It will enable them to face the different Interviews, Vivo-voce etc.

Programme: M.ED

Course Code: M.Ed-151 **Max. Marks:50**

Course Title: Computer Fundamentals and its Applications **Internal: 25**

External: 25

Unit I: **Basic Organization of Computer**

i) Characteristics of computers
ii) Components and peripherals
iii) Input devices **5hrs**
iv) Output devices
v) Memory or storage devices

Unit II: **Computer Networking**

i) Types of Networks
ii) Working with internet: Uses of Internet, World Wide Web (www), Internet Address, Web Browsers, URL, Domain names and searching Information via internet Email:
iii) Creating Email address **5hrs**
iv) Configuring email account
v) Receiving and sending email
vi) Sending attachment via email
vii) Maintaining address book of email

Unit III: Introduction to MS-Word

i) Starting word Processing
ii) Creating, saving and opening a document **5hrs**
iii) Text formation, bullets and numbers
iv) Inserting table and pictures
v) Copy, move and delete

Unit IV : **Introduction to MS-Excel and power point**

i) Introduction to Excel and power point
ii) Working with Cells **5hrs**
iii) Working with Formula Bar
iv) Creating and Designing slides
v) Working with hyperlinks & Animation

Seminars, Lab work, Special lectures, Tutorials, Term Papers and Practicum **10 hrs**

Mode of Examination

Sessional Assignment: 25 marks will be awarded on the basis of assignment/practical lab work viz, Creating a file in MS Word, maintaining a file, Creating and maintaining a file in MS Excel format,

Preparing a power point presentation, Browsing various search engines, Preparing graphical representations, Using the internet and creating an E-mail.

University/External Examination: 25 marks will be awarded on the basis of all the related practical's/lab work before an expert (any one from the BGSB University) on different components of the course mentioned in the syllabi.

COURSE OUTCOMES

CO1: The objective of the course is to acquaint students with the hardware and software approaches of micro-computer and train them to use computers for day-to- day working.
CO2: It will enable them to access the internet and use various search engines for searching the knowledge available on different websites.
CO3: It will also help the learners in calculating various numerical calculations by using MS Excel.
CO4: To provide a rich learning experience for student teachers through various ICT tools to enable them to engage diverse classroom contexts.
CO5: To help the student teachers to critically assess the quality and efficacy of resources and tools available

Recommended Books:

A. Text Books

- P. K. Sinha; "Computer Fundamentals" EDd. 2005. BPB, New Delhi.
- Peter Norton, "Introduction to computer", Sixth Edition, MC Graw Hills, New Delhi.

B. Reference Books

- Taxali, "Pc Software", 2005, Tata McGraw Hills, New Delhi.
- Suresh K. basandra, "computer today" 2005, Galgotia publications.
- Peter Norton, "Inside the pc, 2001", SAMS Tech Media.
- Sanjay Sexena, MS Office for Everyone", 2005, Vikas Publications

Programme: M.ED

Course Code: M.Ed-211 **Max. Marks: 100**

Course Title: Teacher Education **Internal: 40**

External: 60

Duration of Exam 03:00 hrs

Unit I: **Concept of Teacher Education**

i) Concept of Teacher Education
ii) Need and importance of Teacher Education. **10 hrs**
iii) Objectives of Teacher Education at:
- Elementary Level
- Secondary Level
- Higher level.

Unit II: Development of Teacher Education in India

i) Historical background of teacher education in India with special reference to the recommendations made by various committees and commissions – Kothari Commission (1964-66), Chattopadhayay Commission (1983-85), National Policy on Education (1986-1992).
ii) Recommendations of Justice Verma Commission on Teacher Education (JVC)
iii) Historical Development of Teacher Education in Jammu & Kashmir.
iv) National Curriculum Framework for Teacher education (2009).

Unit III: **Pre-service and In-service Teacher Education** **10 hrs**

i) Pre-service Teacher Training: Meaning, need, significance and objectives.
ii) In-service Teacher Training: Meaning, need, significance and objectives.
iii) Teacher training through distance and regular modes.
iv) Integrated Teacher Education courses run by RIEs.

Unit IV: Agencies and Techniques of Teacher Education **10 hrs**

i) Role of NCTE, NCERT, DIET, SIE/SCERT and UGC-HRDC (ASC)
ii) Role of National schemes of education- SSA, RMSA and RUSA
iii) Techniques for Higher Learning: Conference, Seminar, Workshop, Panel Discussion

Unit V: Teacher Effectiveness

i) Concept of Teacher Effectiveness and Characteristics (Cognitive and affective correlates of effective teacher: Intelligence, Skills, Personality, Values and Attitudes) **10 hrs**
ii) Quality control in teacher education with reference to NAAC Parameters.

iii) Accreditation of Teacher Education Institutions.

Seminars, Special lectures, Tutorials, Term Papers and Practicum **10 hrs**

Note for paper setters

The question paper shall be divided into two sections. Section A will carry 10 compulsory, objective-cum-short answer type questions; two from each unit, each carrying 1 mark. Section B shall have 10 questions, two from each unit. The students shall attempt 1 question from each unit. Each question shall carry 10 marks.

COURSE OUTCOMES

CO1: To enable the students to understand the meaning, need and importance of teacher education.
CO2: It will also help them to understand the aims, objectives and scope of teacher education; appreciate the historical development with special emphasis on different documents.
CO3: The paper will enable the learners to understand the structure, administrative agencies, curriculum methodology and evaluation of teacher education programmes in the country.
CO4: It will further help them to understand the evaluation procedure of pre-service and in-service teacher education programmes in India.
CO5: To understand the school functioning mechanisms

Books Recommended

- Chaurasia, G. (1976). New Era in Teacher Education, New Delhi.
- Devedi, Prabhakar (1980). Education a resource book, NCERT, New Delhi.
- Govt. of India (1992). Report of C.A.B.E committee, Department of Education, New Delhi.
- Govt. of India (1996). Education and National development, Report of Education Commissions, New Delhi.
- J. Millman, J., (1988). Handbook of Teacher Education, Boverly Hills, Sage Publishing.
- Khan, Mohd. Sharief (1983). Teacher Education in India and Abroad, Sheetal Printing Press, New Delhi.
- N.I.E.P.A (1984). Report on Status of Teachers, New Delhi.
- NCTE Publication (1998). Policy Perspective in Teacher Education: Critique a documentation, NCTE, New Delhi.
- Rao, D.B. (1988). Teacher Education in India, New Delhi, Discovery Publishing house.
- Saxena, N.R., Mishra, B.K. and Mohanty, R.K. (1998). Teacher Education, R. Lal Book Depot, Meerut.
- ShashiPrabha, Teacher education Principles, theories and practices, Kanishka Publication.
- Sheela, Mangal (2000). Teacher Education: Trends and strategies, Radha Publishers, New Delhi

Programme: M.ED

Course Code: Edu-210 **Max. Marks: 100**

Course Title: Higher Education **Internal: 40**

Duration of Exam 03:00 hrs **External: 60**

Unit I: **Higher Education in India** **10 hrs**

i) Higher Education: Meaning, Objectives and Functions
ii) Concept of a University; types of Universities in India
iii) Contemporary Indian Higher Education- An Overview
iv) Higher education and National Development
v) The Constitutional Provisions Regarding Indian Higher Education System

Unit II: **Policy perspectives in Higher Education** **10 hrs**

i) University Education commission (1948-49)
ii) Indian Education Commission (1964-66)
iii) National Policy on Education (1986)
iv) CABE Committee Report (2005)
v) National Knowledge Commission (2009)
vi) RashtriyaUchitharSikshaAbhiyan (RUSA 2012)

Unit III: **Regulatory Bodies of Higher Education** **10 hrs**

i) University Grants Commission (UGC)
ii) All India Council of Technical Education (AICTE)
iii) Indian Council of Social Science Research (ICSSR)
iv) Council of Scientific and Industrial Research (CSIR)
v) Medical council of India (MCI)
vi) National Council of Teacher Education (NCTE)
vii) National Assessment and Accreditation Council (NAAC)

(A brief Description about the nature and functions of the above mentioned regulatory bodies with the focus on mechanism of ensuring quality control in higher education)

Unit IV: **Globalization and Higher Education** **10 hrs**

i) Meaning and Nature of Globalization
ii) Impact of Globalization on Higher Education with special reference to:
- World Trade Organization (WTO)
- General Agreement on Trade and Services (GATs) in Higher Education

iii) Globalization and Challenge before Higher Education at different levels

Programme: M.ED

iv) Internationalization of Higher Education-issue of mobility, brain drain, brain gain and brain exchange

Unit V: Issues and Problems of Higher Education **10 hrs**

i) Autonomy and Quality in Higher Education
ii) Open and Distance Learning (ODL) at the Tertiary Level.
iii) University Governance
iv) Private initiatives in Higher Education
v) Private Public Partnership in Higher Education

Seminars, Special lectures, Tutorials, Term Papers and Practicum etc **10 hrs**

Note for paper setters

The question paper shall be divided into two sections. Section A will carry 10 compulsory, objective-cum-short answer type questions; two from each unit, each carrying 1 mark. Section B shall have 10 questions, two from each unit. The students shall attempt 1 question from each unit. Each question shall carry 10 marks.

COURSE OUTCOMES

CO1: To acquaint the students with the basic concepts of Indian Higher Education System.
CO2: It will enable the students to develop an understanding about the integration of higher education with the national development.
CO3: It will also lead the students to develop the critical perspective of the issues prevailing in the Higher education System in India particularly relating to Quality, Autonomy, Governance, Privatization and Internationalization.
CO4: It acquainted them with various regulatory bodies that govern the higher education system in the country.
CO5: It familiarizes the students regarding various issues that emerge as a result of migration of students, teachers and technician abroad

Books Recommended

- Agarwal, P. (2009), Indian higher education- envisioning the future, Sage publication.
- Kidwai, A.R. (2012), Higher education: Issues and Challenges, Viva books.
- Kohli V.K. Current Problem in Indian Education.
- Mohanty, J. (2002), Current trends in Higher education, Deep and Deep publisher
- Powar, K.B. (2003), Internationalization of Higher Education : Focus on India, Published by Amity University press and Amity Foundation for Higher Learning, New Delhi
- Powar, K.B. (Ed. 2002), Internationalization of higher education, Published by Association of Indian Universities, New Delhi
- Ramachandran, C.M. (1987), Problems of higher education in India, Mittal Publications.
- Rao, K.S. (1999), Management of autonomy in autonomous colleges, Vikas, New Delhi
- Rao, K.S. et. al (1999), Autonomous and Non- autonomous colleges: selected case studies, Vikas, New Delhi,

- Reddy, G.M. (1996), Higher education in India- conformity, crisis and innovation, Sterling Pub Private Ltd .
- Reddy, K.V. (1996), New directions in higher education in India, creative books.

Programme: M.ED

Course Code: M.Ed-312 **Max. Marks: 10**

Course Title: Guidance and Counselling **Internal: 40**

Duration of Exam 03:00 hrs **External: 60**

Unit I: **Guidance and its Types**

i) Meaning, need and importance of guidance
ii) Aims and principles of guidance
iii) Types of guidance; personal, educational, vocational **10 hrs**
iv) Guidance and curriculum; guidance and classroom learning and role of teacher in guidance and counseling

Unit II: **Organization of Guidance Services**

i) Vocational choice, factors affecting vocational choice. Vocational development; Vocationalization of secondary education. **10 hrs**
ii) Tools and techniques of guidance-Cumulative records, rating scales, interview and psychological tests. Use of tests in Guidance.
iii) Organization of guidance services, essentials of a guidance programme, guidance set up in a school system

Unit III: **Counselling**

i) Counselling; concept, scope and types (individual and group)
ii) Objectives of counseling (solution of problems, modification of behavior, promotion of mental health), counseling approaches-directive, non-directive and elective. **10 hrs**
iii) Relationship and difference between guidance and counseling
iv) Characteristics of good counselling and counselling for adjustment

Unit IV: **Techniques, Theories and Areas of Counseling**

i) Techniques in counseling; testing and non testing techniques, steps of counseling, qualities of an effective counsellor. **10 hrs**
ii) Theories of counseling –psychoanalytical theory (Freud) Self concept theory (Rogers) and Behaviouristic (Skinners)
iii) Areas of counseling; family counseling, parental counseling, counseling for adolescent girls

Unit V: **Theories of Career Development**

i) Meaning and importance of career development
ii) Strategies of Planning and Decision making **10 hrs**
iii) Theories of Career Development: Holland, Krumboltz and Super

Seminars, Special lectures, Tutorials, Term Papers and Practicum **10 hrs**

Programme: M.ED

Note for paper setters

The question paper shall be divided into two sections. Section A will carry 10 compulsory, objective-cum-short answer type questions; two from each unit, each carrying 1 markss. Section B shall have 10 questions, two from each unit. The students shall attempt 1 question from each unit. Each question shall carry 10 marks.

COURSE OUTCOMES

CO1: To enable the students to understand the meaning, nature and scope of guidance and counseling.
CO2: It will acquaint them to recognize the role of guidance in attaining the goals of education.
CO3: The course will further orient the students to analyze the relationship between guidance and counseling.
CO4: It will also help them to understand various theories of guidance and counseling advocated by different psychologists
CO5: It will also prepare the students for interviews and other face to face interactions.

Books Recommended

- Aggarwal, J.C. (1995). Educational and Vocational Guidance and Counselling, Doaba House, New Delhi
- Bhatnagar, A. and Gupta, N. (1999). Guidance and Counselling Vikas Publishing House Pvt. Ltd. New Delhi.
- Chauhan, S.S. (1982). Principles and Techniques of Guidance. Vikas Publishing House Pvt. Ltd. New Delhi.
- Gladding, S.T. (1996). Counselling: A comprehensive Profession, New Delhi, PHI Pvt. Ltd.
- Gibson, R.L. & Mitchell, M.H. (2005). Introduction to Counselling and Guidance. PHI Ltd., New Delhi.
- Joneja, G.K. (1997). Occupational information in Guidance. New Delhi: NCERT.
- Kochhar, S.K. (2005). Guidance and Counselling in colleges and Universities, Sterling Publishers Private Ltd. New Delhi.
- Rao, S.N. (1981). Counselling in Psychology. New Delhi: Tata Mc. Graw Hill.
- Saraswat, R.K. and Gaur, J.S. (1994). Manual for Guidance Counsellors. New Delhi, NCERT.

Programme: M.ED

Course Code: M.Ed-317 **Max. Marks: 100**

Course Title: Gender Studies **Internal: 40**

Duration of Exam 03:00 hrsExternal: 60

Unit I: **Gender Studies**

i) Concept, need and scope of gender studies
ii) Gender studies as an academic discipline **10 hrs**
iii) Gender, economy and work participation
iv) Gender, globalization and education

Unit II: **Issues of Indian women**

i) Family, caste, class, culture, religion related issues
ii) Co-education-its educational implications **10 hrs**
v) Literacy and non-formal education for women's development
vi) Education of Girl child in India: present status and challenges ahead

Unit III: **Women's Movements in India**

i) Pre-independent, post independent and current women movements
ii) National committees and Commissions for Women **10 hrs**
iii) Governmental and non-governmental organizations for women and child
iv) Constitutional provisions, policies, programmes for women in India

Unit IV: Women Education in India

v) Meaning, need and importance of women education
vi) Objectives of women education **10 hrs**
vii) Problems and remedial measures of women education
viii) Concept of women empowerment
ix) Role of education for women empowerment

Unit V: Programmes and Strategies for promoting Girls Education in India

i) Access, enrolment, retention of girls at school stages
ii) MahilaSamakshya**10 hrs**
iii) Kasturba Gandhi BalikaVidyalaya.
iv) Provisions of Girl's education in SSA, RMSA

Seminars, Special lectures, Tutorials, Term Papers and Practicum **10 hrs**

Note for paper setters

Programme: M.ED

The question paper shall be divided into two sections. Section A will carry 10 compulsory, objective-cum-short answer type questions; two from each unit, each carrying 1 marks. Section B shall have 10 questions, two from each unit. The students shall attempt 1 question from each unit. Each question shall carry 10 marks.

COURSE OUTCOMES

CO1: To familiarize the students with the meaning and scope of gender studies and develop a critical perspective on the gendered structure of the society.
CO2: It will also help them to analyze the status of education of girls in schools with special reference to access, enrolment and achievement.
CO3: The course will help the learners to understand the policy perspectives related to education of girls in India. CO4: It will orient them with the schemes and programmes meant for education of girls in the country.
CO5: The course will develop an understanding among the learners about the concept and importance of gender justice and equality.

Books Recommended

- Narasaiah. M.L. (2010). Women, Children and Poverty. New Delhi: Discover Publishing House
- Parvin, M.R. (2001). Empowerment of Women: Strategies and Systems for Gender Justice. New Delhi: Dominant Publishers
- Rao. D.B. (2011). Education for Women. New Delhi: Discover Publishing House
- Rao. D.B. (2011). International Encyclopedia of Women. New Delhi: Discover Publishing House
- Skelton, C. (2009). The SAGE Handbook of Gender and Education. New Delhi: Sage
- Weiner, G. (1994). Feminisms in Education: an Introduction. Buckingham: Open University Press

Programme: M.ED

Course Code: M.Ed-412 **Max. Marks:100**

Course Title: Inclusive Education **Internal: 40**

Duration of Exam 03:00 hrsExternal: 60

Unit I: **Inclusive Education** **10 hrs**

i) Concept and nature of inclusive education. Difference between inclusive education, special education and integrated education
ii) Advantages of inclusive education for the individual and society
iii) Recommendations of education commissions and committees on restructuring policies to respond to diversity in educational institutions (RCI & PWD Act)

Unit II: **Children with Diverse Needs**

i) Concept and meaning of diverse needs
ii) Gifted and Creative Children: Characteristics, Problems of Gifted and Creative children **10 hrs**
iii) Children with intellectual impairment: Characteristics & Categories, Problems of Children with intellectual impairment
iv) Delinquency:Concept and characteristics; problems and remedial measures of delinquent children

Unit III: **Utilization of Resources for Children with Diverse Needs**

i) Types of services approach, strategies, personal involvement and their special role and responsibilities. **10 hrs**
ii) Material resources and human resources, exploring and utilizing the services and resources available in the community
iii) Identifying the required resources for the children with varied special needs, Creating and sustaining inclusive practices.

Unit IV: **Curriculum Adaptation for Children with Diverse Needs**

Concept, meaning and needs for curriculum adaptation for children with:

i) Sensory (Hearing, Visual and Physically Challenged), Intellectual (Gifted, Talented/Creative and Mentally challenged) **10 hrs**
ii) Development disability (Autism, Learning disabled and Slow learners)
iii) Guidelines for adaptations for teaching of children with diverse needs

Unit V: **Supporting Services**

i) Role of different national and international agencies (Institutions/Universities) in promoting inclusive education. **10 hrs**

ii) NCF 2005 and NCFTE 2009 Curriculum for teacher preparation programmes in inclusive education

iii) Evaluation and follow up progammes for improvisation of teacher preparation programmes in inclusive education.

Seminars, Special lectures, Tutorials, Term Papers and Practicum 10 hrs

Note for paper setters

The question paper shall be divided into two sections. Section A will carry 10 compulsory, objective-cum-short answer type questions; two from each unit, each carrying 1 marks. Section B shall have 10 questions, two from each unit. The students shall attempt 1 question from each unit. Each question shall carry 10 marks.

COURSE OUTCOMES

CO1: To enable the students to understand the concept of inclusive education, special education and integrated education.
CO2: It will help them to develop a critical understanding about the recommendations of various commissions.
CO3: The course will also help the students to understand the needs and problems of children with diverse needs.
CO4: It will further enable them to identify the concept and needs for curriculum adaptations of children with special needs.
CO5: It will help them to develop a critical understanding aboutcommittees for promotion of inclusive education in the country

Books Recommended

- Ainscow, M. and Booth. T. (2003). The index for Inclusion: Development learning and Participation in Schools. Brostal: Centre for studies for Inclusive Education.
- Ahuja, A. and Jangira, N.K. (2002). Effective Teacher Training, Cooperative Learning Based Approach, National Publishing house, New Delhi.
- Jangira, N.K. and Mani M.N.G. (1990). Integrated Education for visually Handicapped, Academia Press, Gurgaon.
- Jha, M. (2002). Inclusive Education for all: Schools without walls, Heinemann Educational Publisher, Multivista Global Ltd., Chennai.
- Sharma, P.L. (1990). Teachers hand book on IED: Helping children with special needs, NCERT Publications.
- Sharma, P.L. (2003). Planners Inclusive Education in Small Schools, R.I.E. Mysore

Programme: M.ED

Course Code: Edu-414 **Max. Marks: 100**

Course Title: Peace Education **Internal: 40**

Duration of Exam 02:30 hrsExternal: 60

Unit-I: **Understanding Peace and Peace Education**

i) Meaning and Types of Peace **10 hrs**
ii) Different sources of peace: Philosophical, Religious, Social and Psychological
i) Concept of Peace Education
ii) Need and importance of Peace Education in present context

Unit-II: **Historical Perspective, Methods & Challenges**

i) Peace education –Historical Perspective, objectives and its relevance
ii) Methods for peace education, Challenges to peace - stresses, conflicts, crimes, terrorism, violence and wars **10 hrs**
iii) Role of community, school and family in the development of values for Peaceful coexistence.

Unit-III: Peace Education and Prominent Philosophers

i) Peace Education propagated by M.K Gandhi **10 hrs**
ii) Contribution of Aurbindo Ghosh for Peace Education
iii) Recommendations of Swami Vivekananda for Peace Education

Unit IV : **Transacting Peace Education**

i) Integration of Peace Education through curricular and co-curricular activities**10 hrs**
ii) Role of mass media in Peace Education
iii) Programmes for Promoting Peace Education
iv) Role of different organizations for peace education with special reference to UNESCO

Unit-V Content & Pedagogy

i) Content of Human Rights Education – Women Rights, Labour Rights, Consumer Rights etc. **10 hrs**
ii) Indian constitution and Human Rights, Right of vulnerable and disadvantaged group
iii) Pedagogy for Human Right Education, Suggestions for Strengthening Programmes for Human Rights Education

Seminars, Special lectures, Tutorials, Term Papers and Practicum **10 hrs**

Programme: M.ED

Note for paper setters

The question paper shall be divided into two sections. Section A will carry 10 compulsory, objective-cum-short answer type questions; two from each unit, each carrying 1 mark. Section B shall have 10 questions, two from each unit. The students shall attempt 1 question from each unit. Each question shall carry 10 marks.

COURSE OUTCOMES

CO1: To familiarize the students with the meaning, nature and classification of peace.
CO2: It will also enable them to know the historical perspective, objectives, scope, methods and challenges of peace education.
CO3: The course will further help the students to know the role of community, school, family and different organizations in peace education.
CO4: Besides, it will familiarize the learners with the concept, significance and types of human rights.
CO5: It will also enable them to understand the pedagogy for human rights education and human rights in Indian constitution

Books Recommended

- Aggarwal, J.C. (2005) Education for Values, Environment and Human Rights, Shipra publications, 115-A, Vikas Marg, Delhi
- Begum, S.M.(2000) Human Rights in India. Efficient Offset Printers, New Delhi
- Harris, I. M. and Morrison, M. L.(2003) Peace education, New York: McFarland
- Jagannath. M. (2000) Human Rights Education, New Delhi: Deep and Deep Pub.
- Manjot, K. (2008) Teaching of human rights, New Delhi: APH Publishing Corporation.
- Mishra, L.(2009) Peace Education Framework for Teachers, New Delhi: A.P.H Publishing Corporation.
- Paul, R.C. (2000) Protection of Human Rights, New Delhi: Commonwealth

Programme: M.ED

Course Code: M.Ed-415 **Max. Marks: 100**

Course Title: Early Childhood Care and Education (ECCE) **Internal: 40**

Duration of Exam 03:00 hrs **External: 60**

Unit I: **Concept and Methods of Early Childhood Care and Education (ECCE)**

i) Concept of Early Childhood Care and Education (ECCE)
ii) Objectives of ECCE **10 hrs**
iii) Need and Importance of ECCE
iv) Methods employed for child study: Observation, Case Study, Cross-sectional & Longitudinal Methods

Unit II: **Origin and Development of Early Childhood Care and Education (ECCE)**

i) Early Childhood Education Movement in India: Pre-Independence & Post Independence Initiatives **10 hrs**
ii) Emergence of Early Childhood Care and Education in UK
iii) Development of Early Childhood Care and Education in USA
iv) Development of ECCE Programmes in China

Unit III: **Growth and Development in Early Childhood**

i) Concept of Growth and Development: Meaning, Definition and Relationship between Growth and Development
ii) Principles of Growth and Development **10 hrs**
iii) Various aspects of Early Childhood Development: Physical, Motor, Cognitive, Language and Socio-emotional development.
iv) Educational Implications of various aspects of Early Childhood Development.

Unit IV: **Contribution of Educational Thinkers Towards ECCE**

i) Pestalozzi
ii) Froebel **10 hrs**
iii) Montessori
iv) Dewey

Unit V: **Recommendations, Programmes and Agencies**

i) Recommendations of NPE (1986), NCF (2005) and NCPCR (2007)
ii) ECCE Programme in India with special reference to ICDS **10 hrs**
iii) Agencies of Pre-school Management: Indian Council for Child Welfare, Social Welfare Boards and NGOs

Seminars, Special lectures, Tutorials, Term Papers and Practicum **10 hrs**

Programme: M.ED

Note for paper setters

The question paper shall be divided into two sections. Section A will carry 10 compulsory, objective-cum-short answer type questions; two from each unit, each carrying 1 marks. Section B shall have 10 questions, two from each unit. The students shall attempt 1 question from each unit. Each question shall carry 10 marks.

COURSE OUTCOMES

CO1: To enable the students to develop an understanding about early childhood care and education (ECCE) in terms of its concept, importance and the methods.
CO2: It will acquaint them with the different aspects of early childhood growth and development along with their educational implications.
CO3: The students may also get familiar with the works and contributions of important educational thinkers and psychologists in ECCE.
CO4: The course will enable the learners to achieve a comprehensive coverage and understanding of recommendations and programmes of various agencies working in the field of early childhood care and education.
CO5: It will further help them to compare various ECCE programmes being run in India, Australia, U.K. & China

Books Recommended

- Banta, T. (1966). Are these Really a Montessori Method? Columbus, Ohio: Ohio Psychological Association and Ohio Psychiatric Association.
- Bloom, B.S. (1964). Stability and Change in Human Characteristics. New York: John Wiley & Sons Inc.
- Brown, G. (1977). Child Development. London: Open Books, Central Advisory Board of Education (CABE). Pre-Primary Education (Chapter II). In Post-War Development in India-A Report, Govt. of India.
- Gilbert, A.R. (1976). Early Childhood Education. An International Perspective, New York:Academic Press.
- Gupta, M. S. (2009). Early Childhood Care and Education. Eastern Economy Edition. PHI Learning Private Limited, New Delhi.
- Roopnarine, L.J., & Johnson, E. J. (2005). Approaches to Early Childhood Education. PHI Learning Private Limited, New Delhi.

Programme: M.ED

Course Code: Edu-417 **Max. Marks: 100**

Course Title: Mental Health and Education **Internal: 40**

Duration of Exam 03:00 hrsExternal: 60

Unit I: **Concept of Mental Health**

i) Concept of Mental Health & Role of teacher in fostering mental health.
ii) Scope and Principles of Mental Health **10 hrs**
iii) Importance & Functions of Mental Health
iv) Theoretical Perspectives :Psychodynamic, Behavioral, Cognitive, Humanistic

Unit II: **Adjustment & Mal-Adjustment**

i) Concept and Process of adjustment and maladjustment
ii) Causes and indicators of maladjustment (with special reference to frustration, anxiety, phobias & manias) **10 hrs**
iii) Adjustment disorder: Causes and remedial measures
iv) Concept and causes of stress; stress management and coping strategies; role of yoga in stress management

Unit III: Adjustment Mechanism

i) Fantasy and compensation
ii) Identification & projection
iii) Rationalization, withdrawal & selective forgetting **10 hrs**
iv) Negativism, sublimation, displacement & regression

Unit-IV: Mental Illnesses and School Mental health

i) Common psychological disorders related to anxiety, mood and cognition
ii) Psychological disorders in childhood and adolescence **10 hrs**
iii) Relationship between teacher, classroom processes and mental health
iv) Place of mental health in school curriculum

Unit V: Treatment/Methods for the Preservation and Enhancement of Mental Health

i) Hypnosis & catharsis
ii) Hydrotherapy & shock-therapy **10 hrs**
iii) Psychotherapy

Seminars, Special lectures, Tutorials, Term Papers and Practicum **10 hrs**

Note for paper setters

The question paper shall be divided into two sections. Section A will carry 10 compulsory, objective-cum-short answer type questions; two from each unit, each carrying 1 marks. Section B shall have 10

questions, two from each unit. The students shall attempt 1 question from each unit. Each question shall carry 10 marks.

COURSE OUTCOMES

CO1: To enable the students to understand the fundamentals of mental health and hygiene.
CO2: It will help them to understand the principles and conditions conducive to good mental health.
CO3: It will also help the learners to develop a thorough understanding about the measures for fostering good mental health.
CO4: The course will further help the students to develop an understanding about the role of home, school and society in developing good mental health among the children.
CO5: To enable the students to understand the fundamentals of balanced diet and hygiene

Books Recommended

- Arkoff, A. (1988). Adjustment and Mental health, New York: McGrawHillCompany
- Akhilananda, S.(1992) Mental Health and Hindu Psychology, London: Alle and unwin
- Akhilananda (1998), Hindu Psychology, London: Routledge
- Bahadur, M. (1995) Mental in Theory and Practice, Hoshiarpur: V.V. R.I.
- Bernard, H.W. (1989). Mental Hygiene for class-room teachers, New York: McGraw Hill Book Co.
- Capuzzi, D. and Dougles, G.R (1995) Introduction to Counselling. London: Allyn and Bacon
- Caroll, H.A. (1999). Mental Hygiene: The Dynamics of Adjustment; New York: Prentice Hall
- Coleman, J.C. (1976). Abnormal Psychology and Modern Life, Bombay: D.B. Tara Porewala Sons & Co.
- Crow, L.D. & Crow, A. (1952). Mental Hygiene, New York: McGraw Hill Book Company

Programme: M.ScMathematics (Applied Mathematics)

Course Title: Computational Methods for ODE and PDE
Course Code: *MS-316*
Credits: *4*

Maximum Marks: 100
University Examination: 60
Sessional Assessment: 40
Duration of Exam: *3 hours*

Objectives

The objective of this course is to introduce students to numerical methods for solving ordinary and partial differential equation and their computer implementation.

Unit I

Numerical solutions of ordinary differential equations-I: Euler's method; Heun's method; Taylor's series method; Runge-Kutta methods; Adam- Bash forth- Moulton method; Milne-Simpson method; Hamming method.

Unit II

Numerical solutions of ordinary differential equations-II: Shooting method; finite difference methods; collocation method; BVPs; basic existence theorem for BVPs (statement only); numerical solutions of systems and higher order differential equations.

Unit III
Partial Differential equation of first order: Introduction; Formation of Partial Differential equation, Solution of Partial Differential equation of first order, Lagrange Linear Equation of the type Pp +Qq = R Partial Differential equation non linear in p & q, Charpit's Method, Cauchy problem for first order.

Unit IV
Partial Differential equation of 2^{nd} order: Classification of second orderPartial Differential equation, Laplace equation solution by the method of separation of variable, Dirichlet problem for a rectangular, Neumann problem for a rectangular solution of Laplace equation in Cylindrical & spherical coordinates.

Unit V
Heat & Wave equation: Heat equation solution by the method of separation of variables, Solution of heat equation in Cylindrical & spherical coordinates Wave equation solution by the method of separation of variables, solution of wave equation in spherical coordinates.

Course Oucomes:
After studying this course a student should be able to

1. *explain the methods of obtaining numerical solutions of differential equations by using different numerical methods such as , Euler's method, Heun's method, Taylors series method, RungeKutta methods, Adam Bashforth method, Adam Moulton method, Milne simpson method, Hamming method etc.*
2. explain the concept and existence of solutions of a BVPs.
3. *explain the methods of obtaining numerical solutions of BVPs by using different numerical methods such as, shooting method, Finite difference method etc. and their error analysis.*
4. *explain the method of formation of a partial differential equations and the methods of finding solutions of linear and non – linear(such as Charpit's method) of partial differential equations.*

5. explain various classes of second orderPartial Differential equations.
6. *explain Cauchy problem for first order.*
7. explain the methods of solutions of Heat and wave equations by the method of separation of variables
8. explain the methods of solutions of Heat and wave equations in Cylindrical and spherical coordinates.

Note for Paper Setting:

The question paper will be divided into two sections. ***Section A*** *will be compulsory and will contain 10 very short answer type questions eliciting answers not exceeding 20 words/ multiple choice questions/ fill in the blanks, each carrying one mark equally distributed from all units.* ***Section B*** *will contain 10 long answer type questions, two from each unit and the candidate will be required to answer one from each unit. Each question carries 10 marks.*

Books recommended:

TEXT BOOKS:

1. **Kharab, A. and Guenther, R. B., (2006),** An Introduction to Numerical Methods A MATLAB Approach, **Chapman and Hall/CRC.**
2. **Rao, K. Sankara,** Introduction to Partial Differential equation, PHI Learning Private limited 2013**.**
3. **Sneddon, I.N., Elements of** Partial Differential equation **,Mcgran Hill Book Company 1957**

REFERENCE BOOK:

1. **John, H. M. and Kurtis, D. F., (2007),** Numerical Methods using Matlab, 4th edition, **Prentice Hall of India Pvt. Limited, New Delhi.**
2. **Burden, R. L. and Faires, J. D.,(2009),** Numerical Analysis, 7th edition, **CENAGE Learning India (Pvt) Ltd.**
3. **Evans, G., Blackledge, J. M. and Yardley, P. ,(2000),** Numerical Methods for Partial Differential Equations, **Springer.**

Programme: M.ScMathematics (Applied Mathematics)

Course Title: Mathematical Finance
Course Code: *MS-320*
Credits: *4*

Maximum Marks: 100
University Examination: 60
Sessional Assessment: 40
Duration of Exam: *3 hours*

Objectives:

The objective of this course is to study applications of Mathematical methods to the world of finance.

Unit I

Option theory: Introduction to options and markets; European and American options; asset price random walks; a simple model for asset prices; Itô's lemma; elimination of randomness.

Unit II

Black-Scholes model-I: Arbitrage; option values; payoffs and strategies; put-call parity formula; the Black-Scholes analysis; the Black-Scholes equation; boundary and final conditions for European options; the Black-Scholes formulae for European options; hedging in practice; implied volatility.

Unit III

Black-Scholes model-II: The Black-Scholes formulae; similarity solutions; derivation of Black-Scholes formulae; binary options; risk neutrality; variations on Black-Scholes model – option on dividend-paying assets; time dependent parameters in the Black-Scholes equation.

Unit IV

American options-I: Introduction; the obstacle problem; American option as free boundary value problems; the American put; other American options; a linear complimentarily problem for the American put option; the American call with dividends.

Unit V
American options-II: Methods for American options- Introduction ;finite difference formulation; the constrained matrix problem; projected SOR; the time stepping algorithm; numerical examples; convergence of the method.

Course Outcomes

After studying this course we expect a student have understood

1. The concepts of options and markets.
2. the European and American Options, asset price random walk and Itô's lemma.
3. the concept of Arbitrage, the put call parity formula and binary options.
4. the Black-Scholes formulae and their derivation.
5. the obstacle problem.

6. American option as free boundary value problems, the Americal put and American call.
7. the concept of linear complementarily problem for the American put option.
8. Some numerical methods for American options such as finite difference methods, projected SOR method, the time stepping algorithm and their convergence issues.

Note for Paper Setting:

The question paper will be divided into two sections. ***Section A*** *will be compulsory and will contain 10 very short answer type questions eliciting answers not exceeding 20 words/ multiple choice questions/ fill in the blanks, each carrying one mark equally distributed from all units.* ***Section B*** *will contain 10 long answer type questions, two from each unit and the candidate will be required to answer one from each unit. Each question carries 10 marks.*

Books Recommended:

TEXT BOOKS:

1. **Wilmott,P., Howison, S. and Dewynne**, **J., (1995),**The Mathematics of Financial Derivatives-A student Introduction, **Cambridge University Press.**

REFERENCE BOOKS:

1. **Duffie, D., (2001),**Dynamic Asset Pricing Theory, 3rd edition, **Princeton.**
2. **Hull,J., (1993),**Options, Futures and other Derivative Securities,2nd edition, **Prentice-Hall.**
3. **Siddiqi, A. H., Manchanda, P. and Kocvara**, **M., (2007)** An Iterative two Step Algorithm for American Option Pricing, **IMA Journal of Mathematics Applied to Business and Industry.**
4. **Wilmot, P., Dewynne, J.N. and Howison**, **S. D., (1993),**Option Pricing Mathematical Models and Computation, **Oxford Financial Press.**

Programme: M.ScMathematics (Applied Mathematics)

Course Title: Mathematical Programming
Course Code: *MS-324*
Credits: *4*

Maximum Marks: 100
University Examination: 60
Sessional Assessment: 40
Duration of Exam: *3 hours*

Objectives:

The objective of this course is to study various types of Programmingand their applications to real world problems.

Unit I

Linear programming: Definition of operation research; simplex method; degenerate solution ; basic feasible solution; reduction of a feasible solution to a basic feasible solution; two phase method; big-M method; inverting a matrix using simplex method; applications of simplex method; duality in linear programming; duality and simplex method; dual simplex method.

Unit II

Integer programming: Introduction; fractional cut method; applications of integer programming; transportation problem-general transportation problem; duality in transportation problem; loops in transportation; stepping stone solution method; LP formulation of the transportation problem.

Unit III

Dynamic programming: Introduction; Bellman's principle of optimality; characteristics of dynamic programming; applications of dynamic programming; finding solutions of linear programming problems by dynamic programming.

Unit IV

Network analysis: Introduction; network and basic components; rules of network construction; critical path method (CPM); probability consideration in PERT; distinction between PERT and CPM.

Unit V

Non linear programming: General nonlinear programming problem; necessary and sufficient conditions for a general non linear programming problem; Kuhn Tucker condition of non linear programming problem; saddle points problem; quadratic programming-general quadratic programming; Kuhn Tucker conditions of quadratic programming problem; example based on Wolfe's method and Beale's method.

Course Outcomes

After studying this course we expect a student have understood

1. the concept of linear programming, feasible solution, basic feasible solution and reduction of feasible solution to a basic feasible solution.

2. how to find feasible solution of linear programming problem by different methods such as simplex method, dual simplex method, two phase method and Big-M method
3. the concept of Integer programming and its applications.
4. the concept of transportation problem and related ideas such as duality and loops and the stepping stone solution method.
5. the concept of networking Analysis and various rules of network construction.
6. the critical path method (CPM), probability consideration in PERT and distinction between PERT and CPM.
7. the concept of nonlinear programming, the quadratic programming saddle points and Kuhn Tucker conditions.
8. How to solve the problems based on Wolfe's method and Beale's method.

Note for Paper Setting:

The question paper will be divided into two sections. ***Section A*** *will be compulsory and will contain 10 very short answer type questions eliciting answers not exceeding 20 words/ multiple choice questions/ fill in the blanks, each carrying one mark equally distributed from all units.* ***Section B*** *will contain 10 long answer type questions, two from each unit and the candidate will be required to answer one from each unit. Each question carries 10 marks.*

Books Recommended:

TEXT BOOKS:

1. **Sharma, S. D., (2006),** Operation Research**, KedarNath Ram Nath and co.**

REFERENCE BOOKS:

1. **Hamady, T., (1995),** Operation Research, **Mac Milan Co**
2. **Kanti S., Gupta, P. K. and Manmohan, (2008),** Operation Research, 4thedition,**S. Chandand Co.**

Programme: M.ScMathematics (Applied Mathematics)

Course Title: Technical Communication
Course Code: *MS-417*
Credits: 2

Maximum Marks: 50
University Examination: 30
Sessional Assessment: 20
Duration of Exam: 2 *hours*

Objectives:

The objective of teaching English to the students of Mathematics is to make them acquainted with English language which is now considered a global language. Acquaintance with English language will increase their prospects of employability and increase their communication skill as well.

Unit I

Communication-I: Scope and importance of communication; barriers to communication; verbal, non-verbal, oral and written communication; techniques to improve communication; presentation skills -effective use of presentation software and overhead, practical sessions.

Unit II

Communication-II: Parts of speech; words frequently miss pelt; formation of words; tenses; one word substitutions; use of preposition; précis writing; narration; change of voices; paragraph writing; punctuation.

Unit III
Writing skills, group discussion and interview: Rules of good writing; principles of letter writing - structure and layout; curriculum vitae; letter of acceptance; letter of resignation; application / letters with bio-data; notice; agenda; minutes; *group discussion* -definition, methodology, helpful expression and evaluation with practical sessions; *interview* -types of interview and interview skills with practical session.

Course Outcomes:
After completing this course we expect a student should

1. be able to explain the importance of good communication skills in verbal, non-verbal, oral and written communication.
2. be able to explain the techniques to improve communication and presentation skills.
3. be able to write reports etc in a precise and correct way.
4. be able to explain the basic principles of good writing.
5. be able to explain the method of presenting one's curriculum vitae.
6. be able to write various official and unofficial letters, notices, agendas, minutes of meetings etc.
7. know how to behave in a group discussion with better expressions.
8. know how to behave in an interview with better expressions.

Note for Paper Setting:

*The question paper will be divided into two sections. **Section A** will be compulsory and will contain 06 very short answer type questions eliciting answers not exceeding 20 words/ multiple choice questions/ fill in the blanks, each carrying one mark equally distributed from all units. **Section B** will contain 06 long answer type questions, two*

from each unit and the candidate will be required to answer one from each unit. Each question carries 08 marks.

Books Recommended:

TEXT BOOKS:

1. **Balasubramanian, T., (1981),**A Textbook of English Phonetics for Indian students**, MacMillan India Ltd.**
2. **Eastwood, J., (1999),**Oxford Practice Grammar, **Oxford University Press.**
3. **Jones, L.,(1998),** Cambridge Advanced English, **Cambridge University Press.**

REFERENCE BOOKS:

1. **Lesikar, R. V. and Pettir, Jr., (2004),** Business Communication Theory and Applications, 6th edition, **A. I. T. B. S, New Delhi.**
2. **Thakar, P. K., Desai, S.D. and Purani, J. J., (1998),** Developing English Skills, **Oxford University Press.**

Programme: M.A (Arabic)

Course Title: Classical Arabic Prose-I
Course Code: MAR-141
Credits: 4
Duration of Examination: 3 Hours

Maximum Marks: 100
University Examination: 60
Sessional Assessments: 40
Minimum Marks: 24

الوحدة الأولى:

- خطبة : قس بن ساعدة الإيادي
- خطبة : سحبان وائل

الوحدة الثانية:

- سورة الحجرات : القرآن الكريم
- خطبة حجة الوداع : الرسول صلى الله عليه وسلم

الوحدة الثالثة:

- صلح الحديبية : عن المسور بن مخرمة
- شقاوة الملوك : أبو بكر الصديق

الوحدة الرابعة:

- منشور القضاء : عمر بن الخطاب
- الإخوان الذاهبون : على بن أبي طالب

الوحدة الخامسة:

- خطبة : حجاج بن يوسف
- فتح الأندلس : طارق بن زياد

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

CO 1	Introducing the students to classical Arabic prose of the distinguished writers of Pre- Islamic, Islamic and Umayyad periods
CO 2	To develop a taste for appreciating masterpieces of Arabic language
CO 3	To enrich with vocabulary
CO 4	To acquaint with different literary styles
CO 5	To enhance writing and speaking skills

Prescribed Book:

- MaulanaAbulHasan Ali Nadwi :Mukhtarat min Adab-al Arab (Vols. I & II) Majlis al Sahafawa al Nashr, Lucknow
- **Books Recommended**:
- Abdul HaleemNadwi, ArabiAdab Ki Tareekh, NCPUL, New Delhi, 2004
- Ahmed Hasan al-Zayyat, Tarikh –al-Adab –al-Arabi, KutubKhanaRashidia. Delhi
- JurjiZaidan, Tarikh – Aadab al loghah al Arabiyyah, Dar al Hilal, Cairo.
- ShauqiZaif, Tarikh – al -Adab –al-Arabi, Dar al Ma'arif, Misr, 1960
- Shah MueenuddinNadvi, Tareekh –e- Islam (Vol. I, II & III)

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Programme: M.A (Arabic)

SEMESTER II

Course Title: Classical Arabic Prose-II
Course Code: MAR-241
Credit: 4
Duration of Examination: 3 Hours

Maximum Marks: 100
University Examination: 60
Sessional Assessments: 40
Minimum Marks: 24

الوحدة الأولى:

- إخوان الصفا : ابن المقفع
- بين قاض وقور وذباب جسور : أبو عثمان عمرو بن بحر الجاحظ

الوحدة الثانية:

- القميص الأحمر : ابن عبد ربه
- أطيب طعام وأشعر بيت : أبو الفرج الأصفهاني

الوحدة الثالثة:

- كتاب ينوب عن كتائب : ابن العميد
- البحر : الصاحب بن عباد

الوحدة الرابعة:

- المقامة المضيرية : بديع الزمان الهمذاني
- المقامة الزبيدية : أبو القاسم الحريري

الوحدة الخامسة:

- عتاب وتأنيب : القاضي الفاضل
- حال بيت المقدس : ابن خلدون

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objectives – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

CO 1	Introducing the students to classical Arabic prose of the distinguished writers of Umayyad , Abbasid and later periods.
CO 2	To develop a taste for appreciating good writings of Arabic language
CO 3	To enrich vocabulary stock of the students
CO 4	To acquaint them with different literary styles
CO 5	To improve further their writing and speaking skills

Prescribed Book:

1. Mukhtara'tMin Adab al-Aab (Vol. I & II), Abul Hassan Ali Nadwi, Majlis al Sahafawa al Nashr, Lucknow

Recommended Books:

1. Abdul HaleemNadwi, ArabiAdab Ki Tareekh, NCPUL, New Delhi, 2004
2. Ahmed Hassan al-Zayyat, Tarikh al -Adab –al-Arabi,KutubKhanaRashidia. Delhi
3. JurjiZaidan, Tarikhaadab al loghah al Arabiyyah, Dar al Hilal, Cairo.
4. ShamsKamalAnjum "ArabiNas'rkaFanniIrteqa" Urdu Translation of Al FannwaMazahibhu fi alNasr Al Arabi. Al Kitab International New Delhi 2012
5. ShaoqiZaif, Al FannwaMazahib'hu fi al Nasr al Arabi,Dar al Ma'arif, Misr, 2003
6. ShauqiZaif, Tarikh al-Adab –al-Arabi, Dar al Maarif, Cairo, 1960
7. Umar Farrookh, Tarikh al-Adab –al-Arabi, Dar al IlmLilMalaayeen, Bairut, 2006

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Programme: M.A (Arabic)

SEMESTER III

Course Title: Modern Arabic Prose-I
Course Code: MAR-341
Credits: 4
Duration of Examination: 3 Hours

Maximum Marks: 100
University Examination. : 60
Sessional Assessment: 40
Minimum Marks: 24

الوحدة الأولى:

- نظرة على تطور النثر العربي الحديث
- اللغة العربية بلا معلّم ،لعبد القادر المازني

الوحدة الثانية:

- يوم في نيويورك : محمود تيمور
- كنز مصر في القلب : توفيق الحكيم

الوحدة الثالثة:

- جيلنا وجيلكم : أحمد أمين
- قرآن الفجر : مصطفى صادق الرافعي

الوحدة الرابعة:

- الأرملة وابنها : جبران خليل جبران
- اسماعيل والناموس : سهير القلماوي

الوحدة الخامسة:

- بعض الأدباء الذين عرفتهم : سلامة موسى
- غرفة الأحزان : المنفلوطي

Note for Paper Setting:
The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

Prescribed Books:

1. Farhat J. Ziadeh, A Reader in Modern Literary Arabic, University of Washington Press,London, 1981
2- Abul Hassan Ali Nadwi :Mukhtarat min Adab al-Arab, MajliseSahafatoNashriyat, Lucknow

Recommended Books:

1. Ahmed al-Dasuqi, Tarikh al-Shi'ar al Arabi al-Hadith
2. Hanna al Fakhoori, Tarikh al Adab al Arabi (al Adab al Arabi al Hadith) Dar al Jeel, Bairut, 1986
3. ShauqiZaif, Al-Adab al-Arabi al-Muasir Fi Misr, Dar Al Maa'rif, Misr, 2004
4. Shams Kamal Anjum, JadeedArabiAdab (Urdu Translation of Al-Adab al-Arabi al-Muasir Fi Misr) al Kitab International, New Delhi, 2005

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Programme: M.A (Arabic)

Course Title: Modern Arabic Prose-II | **Maximum Marks: 100**
Course Code: MAR-441 | **University Examination: 60**
Credits: 4 | **Sessional Assessments: 40**
Duration of Examination. : 3 Hours | **Minimum Marks: 24**

الوحدة الأولى:

- في الأزهر : طه حسين
- ذكرى المولد : أحمد حسن الزيات

الوحدة الثانية:

- غرفة المحامين : محمود كامل
- لقب أسرتنا : محمد كرد علي

الوحدة الثالثة:

- أمين الريحاني : سامي الكيالي
- أبو بطة : ميخائيل نعيمة

الوحدة الرابعة

- عبودية المرأة : قاسم أمين
- مشاكل المرأة المسلمة : أمينه السعيد

الوحدة الخامسة

- الشريك : أمين الريحانى
- الكوخ والقصر : مطفى لطفى المنفلوطي

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

Prescribed Books:

1. AbulHassanAliNadwi, Mukhtarat min Adabil Arab Vol. I & II, MajliseSahafatoNashriyat,Lucknow
2. Farhat J. Ziadeh, A Reader in Modern Literary Arabic University, Washington Press, London , 1964

Recommended Books:

1. Anis al Maqdisi, Al Fonoon al AdabiyyahwaA'laamoha, Dar al IlmLilMalayeen, Bairut 2000
2. Hanna al Fakhoori, Tarikh al Adab al Arabi (al Adab al Arabi al Hadith) Dar al Jeel,
3. Bairut, 1986
4. ShauqiZaif, Al-Adab al-Arabi al-Muasir Fi Misr. Dar al Ma'arif, Misr, 2004
5. Shams Kamal Anjum, JadeedArabiAdab(Urdu Translation of Al-Adab al-Arabi al-Muasir Fi Misr) Al Kitab International, New Delhi, 2005

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Course Title: Translation and Composition-I | **Maximum Marks: 100**

Programme: M.A (Arabic)

Course Code: MAR-343 **University Examination: 60**
Credits: 4 **Sessional Assessment: 40**
Duration of Examination: 3 Hours **Minimum Marks: 24**

الوحدة الأولى: ترجمة الكلمات الفنّية (الطبية، الدبلوماسية، الدفاعية وغيرها) التالية إلى الإنجليزية :

مجلس الشعب، رئيس الجمهورية، رئيس الوزراء، كبير الوزراء ، وزير الشؤون الداخلية/ الخارجية، وزير المالية ، وزير الدفاع ، المحكمة العظمى ، المحكمة العليا، ، مجلس الشيوخ ، رئيس البرلمان ، رئيس هيئة الانتخابات، وفد برلماني ، إجراء انتخابات عامة،تشكيل حكومة مركزية / محلية ، تعديل وزاري ، الحزب الحاكم، الأحزاب المعارضة، استقالة الوزير، إقالة الوزير ، سياسة الحكومة، علاقات ثنائية ، علاقات ودية .

الوضع الأمني ، الرهينة /رهائن ، المتطرف، انسجام طائفي، مجزرة، إضراب عام، عنف طائفي، الاغتيال ، انفجار القنبلة، إطلاق النار، مفتش الشرطة،حالة الطوارئ، تجربة نووية ، قتال ضار ، صاروخ بالستي/ غابر، أسلحة كيماوية، حرب باردة، قائد سلاح الجو ، رئيس أركان الجيش، تكنالوجيا الصواريخ، انسحاب القوات.

طيران مدني ، مطار دولي، إعلانات ، الخطوط الجوية الهندية ، البنك الوطني / الأهلي، ميزانية جديدة ، شركات خاصة ، العملة الصعبة، الصادرات ، الواردات، ديون دولية، سوق حرة، إصلاحات زراعية، قطاع خاص، قطاع عام ، بلاد راقية ، بلاد نامية ، بلاد صناعية، البورصة الهندية ، ضرائب ، شركة التأمين ، زراعة التفاح، عولمة الاقتصاد، سعر النفط، إنتاج الأسمنت، ضريبة المبيعات ، تجارة المخدرات

السلك الدبلوماسي ،القنصلية، جواز السفر، صالح للغاية، انتهاء المدة ، بدرجة رجل أعمال، الرحلة ، الطائرة الخاصة، الإقلاع عن، الهبوط، تأشيرة المرور، تأشيرة الدخول ،مكتب الهجرة والجوازات ، قضايا ذات الاهتمام المشترك، سرير، غرفة الجراحة، الأمراض المعدية، معدل الوفيات، التطعيم ، أعراض، التدابير الوقائية، انفلونزا الخنازير،الإسعاف الأولي، وصفة، صيدلة، نفاثة،غواصة، طائرة بدون طيار، صاروخ أرض-أرض، معاهدة الحظرالشامل للتجارب النووية، معاهدة عدم الانتشار النووي ، الرشاش، وقود، كتيبة ، ذخيرة، الاستجواب، اللواء، العميد الركن، الأمن الوطني ، سباق التسلح، نزع السلاح، وكالة الطاقة النووية

الوحدة الثانية: ترجمة الكلمات (الفنية ,الطبية، الدبلوماسية، الدفاعية وغيرها) التالية إلى العربية:

UNO, Peace Process, Political Crisis, Veto Power, Iraq Occupation, Resumption of Negotiation, the Third World, Right to self-determination, Imposition of Sanctions, Lifting of Sanctions, Security Forces, Armed Forces, to conduct Talks, World Peace.

Chancellor, Vice-Chancellor, Registrar, Dean of the Faculty, Head of the Department, Regular Student, Syllabus, B A Course, Distance Education, Librarian.

Expert Doctor, Medical Check-up, Heart Attack, Private Hospital, Govt. Dispensary, Private Clinic, Chest Cancer, Human Cloning, Dentist, Blood Group, Weight Loss, Maternity Hospital.

TV Channel, Cinema Director, Film Festival, World Fair, Colored Photograph, Silver Screen, Interesting Serial, Folk-lores, Film Shooting, Five Star Hotel, Children Park.

Sports and Games, Team, Champion, Physical Fitness, First Round, Match, Gold Medal, National Stadium, Training Camp, Asia Cup, World Cup Final, Goal Keeper, Wicket Keeper, Boxing, Wrestling Team, Weight Lifting

Ambassador, chancellery, High commission, Consular, attaché, first secretary, diplomatic bag, normalization of relations, recognize, Summon.

Fever, typhoid, dysentery, bird flu, blood transfusion, mineral water, blood test, x-rays, ultra-sound, delivery, bandage, diagnosis, syrup, capsule, tablet, injection, ward, ICU, high blood pressure, sugar.

BSF, Army helicopter, long range missile, nuclear installations, uranium enrichment centre, UN monitors, hand grenade, RDX, nuclear test, No fly zone, military operation.

الوحدة الثالثة:

- صياغة الجمل البسيطة للمبتدأ والخبر
- صياغة الجمل البسيطة للفعل والفاعل والمفعولوالعدد والمعدود

الوحدة الرابعة

- الترجمة من العربية إلى الإنجليزية مستخدما الكلمات الواردة في الوحدة الأولى.
- الترجمة من الإنجليزية إلى العربية مستخدما الكلمات الواردة في الوحدة الثانية

الوحدة الخامسة:

- تدريب الطلاب على كتابة المقال بالعربية حول المواضع التالية:
  أ. اللعة العربية، البترول في العالم العربي، دور التلفزيون والجوال في الحياة المعاصرة
  ب. كشمير منطقة سياحية، أديب/ شاعر عربي أعجبك
- تدريب الطلاب على كتابة الرسائل (خمسة أنواع)

Programme: M.A (Arabic)

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

Course Outcome:

This paper is introduced with the following purposes:

CO 1	Enriching the vocabularies of students
CO 2	Assisting them in mastering both Arabic and English languages
CO 3	Enabling them to translate different kind of passages
CO 4	Teaching them how to compose articles
CO 5	Teaching them how to draft different kind of letters and applications

Recommended Books:

1. Abdul Majid Nadwi, Muallimul-Insha, Majslis e Sahafat oNashryat, Lucknow, 2002
2. HabibullahKhan, Fi al Tarjama al Sohfiyyah, Dar Salaman, New Delhi, 2007
3. Manzoor Ahmed Khan, Nahwal-Inshawa al-Tarjamah, MoassasaFarhana Li al Tiba't e wa al Nashr,
   Sri Nagar 200
4. M. IjtibaNadawi, AttabeerwalMuhadisahfil-Lughatil-Arabiah
5. Muenuddin al-Azami, At-Tarjamah : ManahijuhawaUsuluha

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Course Title: Translation and Composition - II **Maximum Marks: 100**

Programme: M.A (Arabic)

Course Code: MAR-443 **University Examination: 60**
Credits: 4 **Sessional Assessment:**
40Duration of Examination: 3 Hours **Minimum Marks: 24**

الوحدة الأولى:ترجمة الكلمات العربية الفنية (المحلية، القومية والمنظمة الدولية) التالية إلى الإنجليزية:
جامعة الدول العربية، منظمة المؤتمر الإسلامي، الندوة العالمية للشباب الاسلامي، خادم الحرمين الشريفين، مجلس التعاون لدول الخليج، اللجنة الاستشارية القانونية الآسيوية –الأفريقية، قوات الردع العربية (في لبنان)، منظمة الوحدة الأفريقية، ، جمعية الصليب الأحمر الدولية ، الهلال الأحمر القطري ، بنك التنمية الإسلامي، حركة عدم الانحياز ، خط الرقابة أو خط الفصل، السلطة الفلسطينية ، قطاع غزة ، الضفة الغربية،اللجنة الرباعية، خارطة الطريق، مشروع قانون الحجز للمرأة، احياء التراث الإسلامي ، ساعة الصفر، دليل سنوي، برنامج الغذاء العالمي، الاحتباس الحراري ، غاز الدفيئة ، دول مارقة ، أوراق الاعتماد، خطوات بناء الثقة.

الوحدة الثانية:ترجمة الكلمات الإنجليزية الفنية (المحلية، القومية والمنظمة الدولية) التالية إلى العربية:

UNO, AIR, BBC, CIA, FBI, ISI, RAW, CBI, International Court of Justice, International labour Organization, International Monetary Fund, UNIESCO, USSR, WHO, WTO, All India Muslim Personal Law Board, ASEAN, CBSE, CRPF, Indian Council for cultural relations, Indian national congress, JKLF, HRD Ministry, NASA, ISRO, SAARC, NATO, NRI, PIO, National Security Council, Reserve bank of India, Uniform civil code, UGC, USSR, European Union, Amnesty International

الوحدة الثالثة

- الترجمة من العربية إلى الإنجليزيةمستخدما الكلمات الواردة في الوحدة الأولى
- ترجمة الجمل البسيطة في موضوعات تعليمية وسياسية.

الوحدة الرابعة

- الترجمة من الإنجليزية إلى العربية مستخدما الكلمات الواردة في الوحدة الثانية
- ترجمة الجمل البسيطة في موضوعات تعليمية وسياسية.

الوحدة الخامسة

- تدريب الطلاب على كتابة الطلبات بالعربية
- تدريب الطلاب على كتابة المقال بالعربية حول المواضيع التالية: العلاقات الهندية العربية (العلاقة الهندية والسعودية)
- تدريب الطلاب على كتابة المقال حول أديب : طه حسين ، توفيق الحكيم
- تدريب الطلاب على كتابة المقال حول شاعر:أحمد شوقي ، نازك الملائكة
- تدريب الطلاب على كتابة المقال على أديب أعجبهم.

Note for Paper Setting:

The question paper will be divided into two sections. Section A will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 1 mark. Section B will have 10 questions, two from each unit. The student will attempt 1 question from each unit. Each question will carry 10 marks (10+50=60).

Course Outcome:

The course outcome of this paper is as follows:

CO 1	Enriching the vocabularies of students
CO 2	Assisting them in mastering both Arabic and English languages
CO 3	Enabling them to translate different kind of passages
CO 4	Teaching them how to compose articles
CO 5	Teaching them how to draft different kind of letters and applications

Recommended Books:

1. Abdul Majid Nadwi, Muallimul-Insha, Majlis e Tahqeeqat o Nashryat, Lucknow, 2002
2. M. IjtibaNadawi, AttabeerwalMuhadisahfil-Lughatil-Arabiah
3. Manzoor Ahmed Khan, Nahwal-Inshawaattarjamah, MoassasaFarhana, Sri Nagar, 2000
4. Muenuddin al-Azami, At-Tarjamah : ManahijuhawaUsuluha

Programme: B. A. (Hons) Arabic

Semester I

Course Code: BAR-112 **Course Title: Arabic Grammar (Syntax & Morphology) I** **Credit: 4** **Duration of Examination:3 Hours**	**Maximum Marks : 100** **University Examination: 60** **Sessional Assessment: 40** **Minimum Pass Marks: 24**

علم النحو

الوحدة الأولى:

1- حروف الهجاء

2- تعريف الكلمة وأقسامها(الأسم والفعل والحرف)

الوحدة الثانية:

1- المعرفة والنكرة

2- العلم، الضمير، اسم الإشارة، المعرف بأل، الاسم الموصول

الوحدة الثالثة:

1- تقسيم الاسم من حيث الإفراد والتثنية والجمع

2- جمع المذكر السالم ، جمع المؤنث السالم وجمع التكسير

علم الصرف

الوحدة الرابعة:

1- الفعل وأقسامه

2-تصاريف الافعال : الفعل الماضي المعروف والمجهول من باب فتح ، نصر ، ضرب، سمع ، كرم، حسب

الوحدة الخامسة:

1- تصاريف الافعال: الفعل المضارع المعروف والمجهول من باب فتح، نصر، ضرب، سمع، كرم وحسب

2- تصاريف الافعال:الفعل الأمر والنهى وإسم الفاعل والمفعول

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective–cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

Course Outcome:

CO 1	Students will get introduced to the alphabets of Arabic language
CO 2	They will know the basics of Arabic syntax and morphology
CO 3	Make them read, write and speak the language correctly
CO 4	They gain an elementary understanding of Arabic sentence construction
CO 5	Develop a reasonable standard of pronunciation

الكتب المقترحة

1. النحوالواضح ، علي الجارم، دانش بك دبو ، متيا محل دهلي
2. كتاب النحو وكتاب الصرف: عبد الرحمن الأمرتسري، دانش بك دبو ، متيا محل دهلي
3. تحفة النحوو تحفة الصرف(من الجزء الاول الى الجزء الثالث): سراج الدين الندوي، مركزي مكتبه اسلامي ، دهلي
4. أمين النحو وأمين الصرف: أبو عبيده
5. ما يلزم من العربية: رفيع العماد فينان غود ورد بوكس ، نيو دلهي 1999م

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Programme: B. A. (Hons) Arabic

Semester II

Course Code: BAR-212	**Maximum Marks : 100**
Course Title: Arabic Grammar (Syntax & Morphology) II	**University Examination: 60**
Credits: 4	**Sessional Assessment: 40**
Duration of Examination : 3Hours	**Minimum Pass Marks: 24**

علم النحو

الوحدة الأولى:

1- الجملة المفيدة وغير المفيدة

2- الموصوف والصفة ، المضاف والمضاف اليه

الوحدة الثانية:

1- الجملة الإسمية(المبتدا والخبر)

2- الجملة الفعلية (الفعل والفاعل والمفعول به)

الوحدة الثالثة:

1- الفعل اللازم والفعل المتعدي

2- المفعو ل المطلق والمفعول فيه والمفعول لإجله والمفعول معه.

علم الصرف

الوحدة الرابعة:

1- تصاريف أفعال الثلاثي المزيد فيه (ستة أبواب) الأفعال الصحيحة ، ماضي ، مضارع ، أمر ، نهي ، اسم الفاعل، اسم المفعول.

2- تصاريف أفعال الثلاثي المزيدفيه (ستة أبواب) الأفعال الصحيحة ، ماضي ، مضارع ، أمر ، نهي ، اسم الفاعل، اسم المفعول.

الوحدة الخامسة:

1- تصاريف افعال الرباعى المجرد والمزيد (الأفعال الصحيحة)،ماضي ، مضارع ، أمر ، نهي ، اسم الفاعل ، اسم المفعول

2- تصاريف جوازم الفعل المضارع ونواصب الفعل المضارع ، ماضي ، مضارع ، أمر ، نهي ، اسم الفاعل ، اسم المفعول)

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

Course Outcome:

CO 1	Introducing the students to the alphabets of Arabic language
CO 2	Introducing students to the basics of Arabic syntax and morphology
CO 3	Making them read, write and speak the language correctly
CO 4	Making them able to gain an elementary understanding of Arabic sentence construction
CO 5	Developing a reasonable standard of pronunciation

الكتب المقترحة:

1. تحفة النحو(من الجزء الاول الى الجزء الثالث): سراج الدين الندوي، مركزي مكتبه اسلامي ، نيو دلهي
2. تحفة الصرف (من الجزء الاول الى الجزء الثالث): سراج الدين الندوي، مركزي مكتبه اسلامي نيو دلهي
3. جامع الدروس العربية: مصطفى العلايني ، مطبعة المصباح بيروت
4. شذا العرف: أحمد الحملاوي ، شركة ومطبعة مصطفى البابي الحلبي 1940م
5. ما يلزم من العربية: رفيع العماد فينان، غود وردبوكس نيو دلهي 1999م
6. النحوالواضح: علي الجارم ، دانش بك دبو ، متيا محل دلهي

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Programme: B. A. (Hons) Arabic

Semester III

Course Code: BAR-312 **Course Title: Arabic Grammar -III (Syntax & Morphology)** **Credits: 4** **Duration of Examination: 3 Hours**	**Maximum Marks : 100** **University Examination: 60** **Sessional Assessment: 40** **Minimum Pass Marks: 24**

علم النحو

الوحدة الأولى:

1- المفعول المطلق والمفعول فيه

2- المفعول لأجله والمفعول معه والحال

الوحدة الثانية:

1- إن وأخواتها

2- كان وأخواتها وأفعال المقاربة

الوحدة الثالثة:

1- التمييز

2- العدد والمعدود من حيث التذكير والتانيث والإعراب

علم الصرف

الوحدة الرابعة:

1- تصاريف أفعال المهموز من أبواب الثلاثي المجرد (ستة أبواب) ماضي ، مضارع ، أمر ، نهي ، اسم الفاعل ، اسم المفعول)

2- تصاريف أفعال المضاعف من أبواب الثلاثي المجرد (ستة أبواب) ماضي ، مضارع ، أمر ، نهي ، اسم الفاعل ، اسم المفعول)

الوحدة الخامسة:

1- تصاريف أفعال المهموز من أبواب الثلاثي المزيد (اثنا عشر بابا) ماضي ، مضارع ، أمر ، نهي ، اسم الفاعل ، اسم المفعول)

2- تصاريف أفعال المضاعف من أبواب الثلاثي المزيد (اثنا عشر بابا) ماضي ، مضارع ، أمر ، نهي ، اسم الفاعل ، اسم المفعول)

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

Course Outcome:

CO 1	Introducing the students to the alphabets of Arabic language
CO 2	Introducing students to the basics of Arabic syntax and morphology
CO 3	Making them read, write and speak the language correctly
CO 4	Making them able to gain an elementary understanding of Arabic sentence construction
CO 5	Developing a reasonable standard of pronunciation

الكتب المقترحة:

1. النحوالواضح: علي الجارم، دانش بك دبو متيا محل دلهي
2. جامع الدروس العربية: مصطفى العلايني، مطبعة السعادة ، بيروت
3. تحفة النحو و الصرف(من الجزء الاول الى الجزء الثالث) : سراج الدين الندوي، مركزي مكتبه اسلامي ، نيودلهي
4. شذا العرف : أحمد الحملاوي ، شركة ومطبعة مصطفى البابي الحلبي 1940م
5. ما يلزم من العربية : رفيع العماد فينان، غود ورد بوكس نيو دلهي 1999م

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Programme: B. A. (Hons) Arabic

Semester IV

Course Code: BAR- 412	**Maximum Marks : 100**
Course Title: Arabic Grammar IV (Syntax & Morphology)	**University Examination: 60**
Credits: 4	**Sessional Assessment: 40**
Duration of Examination: 3 Hours	**Minimum Pass Marks: 24**

الوحدة الأولى

- المثنى والمستثنى منه
- الممنوع من الصرف

الوحدة الثانية

- اسم التفضيل
- أفعال التعجب

الوحدة الثالثة:

المعتل واقسامه :

- المثال (تصارف من باب فتح نصر ضرب)
- الأجوف (تصارف من باب نصر ضرب سمع)
- الناقص (تصارف من باب نصر ضرب سمع)

تصارف أفعال المعتل من أبواب الثلاثى المزيد :

- المثال (افعال ، تفعيل ، مفاعلة ، افتعال)
- الأجوف (افعال تفعيل مفاعلة افتعال)
- الناقص (افعال تفعيل مفاعلة افتعال)

الواحدة الرابعة :

- أوزان إسم الصفة والتفضيل
- أوزان المبالغة
- أوزان اسم الظرف
- أوزان اسم الآلة .

الوحدة الخامسة:

- خصائص الأبواب الثلاثى المجرد (فتح نصر ضرب)
- خصائص الأبواب الثلاثى المجرد (سمع حسب كرم)

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

Course Outcome:

CO 1	Introducing the students to the alphabets of Arabic language
CO 2	Introducing students to the basics of Arabic syntax and morphology
CO 3	Making them read, write and speak the language correctly
CO 4	Making them able to gain an elementary understanding of Arabic sentence construction

الكتب المقترحة

- النحوالواضح: علي الجارم ، دانش بك دبو ، دلهي
- جامع الدروس العربية:مصطفى العلايني ، مطبعة السعادة ، بيروت
- تحفة النحو و تحفة الصرف(من الجزء الاول الى الجزء الثالث): سراج الدين الندوي، مركزي مكتبه اسلامي ، نيودلهي
- شذا العرف في فن الصرفأحمد الحملاوي ، شركة ومطبعة مصطفى البابي الحلبي ، 1040
- ما يلزم من العربية: رفيع العماد فينان:غود ورد بوكس ، نيو دلهي

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Programme: B. A. (Hons) Arabic

Semester V

Course Code: BAR- 512	**Maximum Marks : 100**
Course Title: Translation (Arabic-English & Vice Versa)	**University Examination: 60**
Credits: 4	**Sessional Assessment: 40**
Duration of Examination:3Hours	**Minimum Pass Marks: 24**

الوحدةالأولى: معاني المفردات الآتية واستخدامها في الجمل البسيطة:

التعليم, استمارة الطلب، القبول, تخصص البكالوريوس، قاعة الدرس, ، استاذ المادة, رئيس القسم, عميد الشؤون الأكاديمية، المسجل, مدير الجامعة, مراقب الامتحانات, دفع الرسوم, الحوالة المصرفية, أمين المكتبة, الصحيفةاليومية, المجلة, الدوريات, استعارة الكتب, إعادة الكتب, الغرامة ,الطالب النظامي، ولي الأمر, تقرير تعليمي, كشف الدرجات , الشهادة، السنة الدراسية ، الزميل في الصف، المدرسة ، الكلية ، الجامعة .

الفواكه، التمر، العنب، الرمان، البرتقال، التفاح، الجوز، الطبيب، المريض، الممرضة، المستشفى ، الجناح، العيادة، الصيدلة ، الصيدلي، وصفة.

الحافلة، سيارة الأجرة، الدراجة النارية، موقف السيارات، محطة القطار، المطار، الملعب، المنتخب، المباراة، كأس العالم، الفيلم، الممثل، الممثلة، فيلم وثائقي.

رئيس الجمهورية ، رئيس الوزراء، كبير الوزراء، وزير الخارجية، وزير المالية، وزير التعليم، انتخابات عامة، البرلمان ، مجلس الشعب ، مجلس الشيوخ، مجلس الوزراء.

درس يدرس، حفظ يحفظ، حضر يحضر، جلس يجلس، فتح يفتح، رجع يرجع، سكت يسكت، صرخ يصرخ، ضحك يضحك، سمع يسمع، شرب يشرب، نظر ينظر، عرف يعرف، غسل يغسل، لعب يلعب، لبس يلبس، خلع يخلع، نجح ينجح، رسب يرسب. أخذ يأخذ، أكل يأكل، سأل يسأل، قرأ يقرأ، ملأ يملأ. وجد يجد، وصف يصف، وجب يجب، قام يقوم، زار يزور، قال يقول، صام يصوم، باع يبيع، خاف يخاف، نام ينام، ضاع يضيع. دعا يدعو، هدى يهدي، بكى يبكي، جرى يجري، لقى يلقى.

الوحدةالثانية: ترجمة الكلمات الآتية إلى اللغة العربية:

Student, application, diary, notebook, registration no., Identity card, library card, member-ship no., vacancy, designation.

Telephone, mobile, computer, laptop, open, shut down, cancel, ok, write, edit, cut, paste, save, file, folder, internet, browsing, web site, email address, user name, pass-word.

Passenger, tourist, guide, hotel, restaurant, guest house, coffee house, meal, menu, stay.

Bank, pass-book, account, ATM card, Demand Draft, withdrawal form, income, expense, pocket-money. Salary, inflation, deficit, GDP.

To contact, to talk, to reply, to proceed, to agree, to enclose, to love, to hate, to watch, to celebrate, to protest, to force, to occupy, to choose, to kidnap, to fail, to hide, to evacuate, to hospitalize, to vote, to lead, to take rest, to get up, to carry out, to send, to receive, to increase, to hire, to seek permission, to take bath, to use, to reject, to accept, to call , to consult, to borrow, to seek help, to get ready, to buy, to sell, to win, to loose, to give, to take, to announce.

الوحدةالثالثة: معاني التراكيب الآتية واستخدامها في الجمل البسيطة:

وسائل النقل ، تربية المواشي ، واسع النطاق ، محدود النطاق ، فلزة كبده ، نزعة سلبية ، أشار إلى ، سلوك تفرجى ، جامعة اندراغاندى المفتوحة الوطنية ، اجتماعات عامة ، يوما بعد يوم ، بيان رسمي ، سار فى خطاه ، حملة انتخابية ، طبقات سفلى ، تغيير اجتماعى ، فى غضون ، المواصلات العامة ، وسائل المواصلات ، أيام راهنة ، أحوال العالم ، مهما يكن من الأمر ، أساء الحكم ، مستقبل باهر ، قدر المستطاع ، إعلام طباعى ، إعلام الكترونى ، على سبيل المثال ، بنك الأصوات ، مرارا وتكرارا ، صغيرة المدى ، اكتفاء ذاتى ، حقوق أساسية ، حق المساواة ، حق الحرية ، جدير بالذكر ، ما ملك مشاعره ، دور قبل النهائى ، مستوى المديرية .

تقرير إحصائي ، قسم البستنة ، أكلة شهية ، بالمقارنة إلى ، مناطق جبلية ، قيمة طبية ، على مدى واسع ، منتصف الخمسينات ، مواد مبيد للحشرات ، الاتحاد الهندي ، عمال مهرة ، سلسلة هملائية ، السواد الأعظم ، وكيل السفر ، أصحاب الجياد ، متعدد الجوانب ، فرص الاشتغال ، أداة كهربائية .

ذوق جمالي ، روعة مرئية ، لا بأس ، قارب منزلي ، نقابة النقل البرى الولائى ، ناطح السحاب ، وخيم العاقبة ، حفلة الرقص ، ومما لا شك فيه ، على هذا النحو ، على وجه التقريب ، لغة رسمية ، لغة الأم ، زعماء الحزب ، بنك الأصوات للمسلمين ، صراع الحضارات ، بنك الأصوات ، الموتمر الوطنى الهندى ، سارى المفعول ، حافات الطرق.

الوحدة الرابعة: تدريب الطلاب على كتابة الرسائل (إلى الأب ، إلى صديق) والطلبات (إلى مدير الجامعة للقبول في أحدى الكليات ، إلى رئيس القسم للاجازة، إلى مسجل الجامعة)

الوحدة الخامسة :

تدريب الطلاب على كتابة المقال حول الموضوعات التالية:

تاج محل ، منارة قطب ، جامعة باباغلام شاه بادشاه ، اللغة العربية وأهميتها ، النزهة في وادي كشمير

Programme: B. A. (Hons) Arabic

Note for Paper Setting:

The question paper will be divided into two sections. **Section A** will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. **Section B** will have **10 questions**, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks **(10+50=60).**

Course Outcome:

CO 1	Enriching the vocabularies of students
CO 2	Assisting them in mastering both Arabic and English languages
CO 3	Enabling them to translate different kind of passages
CO 4	Teaching them how to compose articles

الكتب المقترحة:

1. تعليم اللغة العربية : طريقة علمية ، دكتور ولي أختر الندوي ، دار الأمان ،نيو دلهي 2004
2. نحو الإنشاء والترجمة : دكتور منظور أحمد خان ، مؤسسة فرحانه للطباعة والنشر ،سري نغار
3. كيف تكتب مقالا في صحيفتك المدرسية ، علي إمبابي ،العلم والإيمان للنشر والتوزيع ، 2007
4. معلم الإنشاء ، عبد الماجد ندوي ،مجلس صحافت ونشريات لكناؤ

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Programme: B. A. (Hons) Arabic

Semester VI

Course Code: BAR-612 **Course Title: Oral Expression in Arabic** **Credits: 4**	**Maximum Marks : 100** **University Examination: 60** **Sessional Assessment: 40** **Minimum Pass Marks: 24**

الوحدة الأولى:

- التحيات و التعارف
- التعارف باستخدام الضمائر و أسماء الإشارة

الوحدة الثانية:

- حوار بين الطلاب باستخدام ادوات الاستفهام من و كيف و اين و من اين و كم و ما إلى ذلك
- بيتي، أبواي، إخوتي و أخواتي، صديقي و صديقتي

الوحدة الثالثة:

- مدرستي، جامعتي، فصلي، مكتبتي
- في السوق، في المستشفى، على موقف السيارات

الوحدة الرابعة:

- التلفزيون، الجوال، الكمبيوتر
- زيارة مكان تاريخي، أو سياحي

الوحدة الخامسة:

- اللغة العربية، القرآن الكريم، عيد الفطر
- اسماء الأيام و الشهور، طريقة معرفة الوقت

Course Outcome:

CO 1	Acquainting the students with the importance of communication into Arabic
CO 2	Introducing them to the basic grammar and simple sentences of Arabic
CO 3	Improving their vocabulary stock
CO 4	Enabling them to communicate and express themselves fluently in Arabic
CO 5	Preparing them for jobs abroad specially in Arab countries

Note: For this course a comprehensive viva-voce shall be held by an the departmental Faculty.

Recommended Books:

1. Al-Sami MahmoodIsmaeel& others: *Al-Arabiayyahlil-Hayat*, Vol. I & II,MaktabaTarrorNighadi, Kerala
2. AbdurRaheem , V, *DurusulLugha al-Arabiyyah* (Vol. I , II & III) Islamic Book Trust, Chennai.1999
3. FArooqi , Z A & others: *Teach Yourself Arabic*, Sterling Publishers,Pvt. Ltd. New Delhi, 1998
4. GharibJaodah M, Mausuat , *al Safar wa Al Sayaha*, Dar al Talaae' Cairo,

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Programme: MBA (HTM)

Course Title: Statistical Methods
Course Code: MBAHTM-103
Credit Value: 4
Examination Duration: 3 Hours

Maximum Marks:100
University Examination:60
Sessional Assessment:40

Objective: To make students understand the various statistical methods and their relevance & application with special reference to hospitality & tourism.

Unit-1:Measures of central tendency: Mean, Mode, Median (for grouped and ungrouped data), Geometric Mean, Weighted Average; **Measures of Dispersion**: Range, Mean Deviation, Quartile Deviation, Variance, Standard Deviation, coefficient of variation;

Unit-2:Correlation Analysis: concept of coefficient of correlation, Methods of finding correlation coefficient: scattered method, Karl Pearson's coefficient of correlation, Spearman's rank coefficient of correlation. **Regression Analysis:** concept of regression analysis and estimating line, estimation of regression equation Y on X, Interpretation & properties of regression coefficients.

Unit-3: Sampling: Concept of sampling & census, Probability & non probability methods of sampling; Hypothesis: concept, types, types of errors: type –I & type –II. Sources of data collection: Primary & Secondary; Sample size and standard error.

Unit-4:Chi Square: Chi--square as test of independence and test of goodness of fit. **Analysis of Variance:** basic concepts, calculating variance among sample means & within samples (One way only), F-distribution and F-tests.

Unit-5: Time Series and Forecasting: introduction, variations in time series, trend analysis, cyclical, variations, seasonal variations, irregular variations, time series analysis in forecasting. **Index Numbers:**un--weighted aggregate index, weighted aggregate index, average of relative methods, quantity and value indices, issues in constructing and using index numbers.

COURSE OUTCOMES:

CO1: To make students able to understand the meaning of central tendencies & dispersion and to make them capable of finding the various measures of central tendencies & dispersion.
CO2: To make students able to understand the concept of correlation & regression analysis for finding the relationship between the variables to predict the future values of one variable on the basis of the past information available on the two variable.
CO3: Know about the concept of sampling, its methods, applications and various data sources. Understand the concept of hypothesis and errors involved in hypothesis testing.
CO4: test the dependencies of variables through Chi-Square test and to test the significance of differences among the means of the three or more than three samples.
CO5: Understand the concept of time series analysis and index numbers and how they can be used.

Programme: MBA (HTM)

Course Title: Computer Applications in Hospitality and Tourism Industry

Course Code: MBAHTM-105 **Total Marks:** 100 **Duration of Examination:** 3 Hours

Sessional Assessments: 40

Credit Value: 4 **University Examination:** 60

Objective: The objective of this course is to make students understand the applications and tools of computer and information technology for improving Hospitality and Tourism Sector.

Unit IEssential of computer systems: input/output units, Keyboards, Touch screen terminals, Other Input devices, Monitors, Printers, Common I/O units in the hospitality industry, The central processing unit, Read Only Memory (ROM), Random access Memory (RAM), External storage devices , Magnetic tapes, floppy disks , hard Drives, Compact Disc technology.

Unit IIAutomation in the Hospitality Industry: Data processing, Electronic data processing, Advantages of electronic data processing, types of data, types of computers, Mainframe computers, minicomputer, Portable computers, Computer & its application in the hospitality industry, The internet & the hospitality industry, internet application, world wide web, Networks & networked computers.

Unit IIIInformation Technology and Tourism- Introduction, Information Technology and the tourism industry components: Travel Services and Computers like Car Rental, Railways and Airlines-Tour Services and Computers such as online development of packaged tours-Hotel Services and Computers like Reservations, Food and Beverages services, Computer Reservation System(CRS)- GIS Applications in Tourism Planning.

Unit IVMedia: An Information Tool for Tourism-Television, Print Media, Others such as MICE, Virtual Media-2G and 3G connectivity, Role of websites and Internet in promoting Tourism, Importance of Internet-E Business models and programs-E marketing and new methods of accessing the information-Use of ICT in Destination Management System.

Unit VTypologies of E-tourism: Business models - Business to Business (B2B) - Business to Consumer (B2C) - Consumer to Business (C2B) - Consumer to consumer (C2C) - Business to Employees (B2E) - & Business to Government (B2G). Payment Systems in E-tourism - Payment Gateway - Billing and Settlement Plan (BSP) - Security Issues and Certification -Future of E-tourism.

COURSE OUTCOMES

CO1: Understand the basic organization of computer, its components and will gain knowledge of functionalities of different devices in context with the terminals and other hardware elements.
CO2: Analyze the concept of automation in hospitality industry byIncorporating the knowledge of computer applications and worldwide web.
CO3: Examine the role of Information Technology in Tourism and travel Services like car rentals, railways and airlines.
CO4: Understand the importance of promotion of tourism through mediaComponents and use of ICT in various tourism services.
CO5: Analyze different topologies of E-Tourism, understand various billingand settlement plans and payment systems included in different E-Tourism Applications.

Programme: MBA (HTM)

Course Title: Marketing for Hospitality and Tourism **Total Marks**: 100
Course Code: MBAHTM-221 **Internal Marks**: 40
Duration: 03 Hours **External Examination:** 60
Credit Value: 4

Objective: The objective of this course is to make students familiar with the processes and tools of marketing in Hospitality and Tourism sector.

Unit I: Understanding of Marketing: Concept and definition of marketing, significance of marketing in tourism industry , Basic concept of need and want; demand, product, service, market and sales, Significance of service and characteristics of service marketing, differentiation of product marketing and service marketing, Analysis of Marketing environment, components of marketing environment.

Unit II: Market Research: Understanding of marketing research, Concept of primary data, secondary data, qualitative and quantitative data and marketing information system (MIS) and its function , Consumer and consumer behaviour, Factors influencing the buying behaviour of consumers, Market segmentation and bases for segmenting consumers markets, targeting and positioning and market strategies.

Unit III: Marketing strategies–I: Concept of Marketing Mix and its 7p's framework in tourism- product, Place, Price, Promotion, people, Process, Physical evidence, Product related strategies- New Product development, Product life cycle; Branding; Product mix Strategies; Tourism Packaging, Place related strategies –Distribution in Tourism, middlemen and their function, Pricing strategies- Concept of price and factors affecting pricing; Pricing strategies.

Unit IV: Marketing strategies–II: Promotion strategies–Promotion mix; Integrated marketing communication; Devising the promotional plan Strategies- Role of employees in tourism service delivery, Internal Marketing Customer Satisfaction and Customer Relationship Marketing Process strategies- modes of delivery of tourism services; Balancing supply and demand; Online delivery of tourism services.

Unit V: Destination Marketing: Necessary attributes for an ideal tourist destination, Destination life cycle, Marketing strategy for promotion and development of a tourist destination, Constraints in creating ideal destination, Managing Tourist Destination, Planning for the development of a tourist destination Impacts of unplanned tourism development on a tourist destination, Preparation of brochure of a native tourist destination.

COURSE OUTCOMES:

CO1: To familiarize students with marketing Environment.

CO2: To familiarize students with the techniques of marketing Research.

CO3: To familiarize students with basic marketing strategies.

CO4: To familiarize students with basic marketing strategies specific to Tourism and Hospitality.

CO5: To familiarize students with basics of Destination marketing Strategies.

Programme: MBA (HTM)

Course Title: Financial Management and Accounting **Maximum Marks: 100**

Course Code: MBAHTM-222 **Sessional Assessment: 40**

University Examination: 60 **Examination Duration: 3 Hours**

Credit Value: 4

Objective: This course aims at helping students to understand the conceptual framework of financial management and its application under the various environment constraints.

Unit-I: Introduction to Financial Management: Meaning of Finance, Finance Function and scope of financial management. Role of financial manager in tourism Sector, objective of financial management. Time value of money: Discounting and compounding technique.

Unit – II: Working capital Management: Working capital Management- importance of working capital management, concept and types of working capital, Determinants of Working capital, working capital financing. Inventory management: meaning and tools of inventory management.

Unit –III: Sources of Funds and cost: Concept of raising funds: sources of funds, managing the overall cost of capital, levels of a firm borrowing, cost of a debt, capital structure, Cost management in Hospitality industry Classification of cost, importance of control.

Unit –IV: Capital Budgeting: Capital budgeting - Meaning and importance of capital budgeting, tools of capital budgeting: payback period, Accounting Method, Net Present Value, Internal rate of return, Profitability Index Method.

Unit – V: Introduction to Accounting: Accounting – concept, importance and scope, accounting principles and conventions, journal, ledger, trial balance, preparation of final accounts (without adjustments). Budgetary control: Meaning need and types of budget.

COURSE OUTCOMES

CO1: the objective of this unit is to give students an Introduction to Financial Management, it meaning, scope and importance.

CO2: the objective of this unit is to give students an insight about working capital management, its role and importance.

CO3: the objective of this unit is to give students an insight about sources of capital and the various costs associated with raising the capital.

CO4: the objective of this unit is to give students an insight about capital budgeting, its techniques and usage.

CO5: the objective of this unit is to give students an insight about the accounting techniques and principle

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Programme: MBA (HTM)

Course Code: MBAHTM-223
Course Title: Human Resource Management
Credit Value: 4

Maximum Marks:100
University Examination:60
Sessional Assessment:40
Examination Duration: 3 Hours

Objective: The objective of this course is to make students aware about the various concepts of managing human resources in the organizations.

UNIT I: Human Resource Function: Human Resource Philosophy – Changing environments of HRM – Strategic human resource management – Using HRM to attain competitive advantage – Trends in HRM – Organization of HR departments – Line and staff functions – Role of HR Managers.

UNIT II: Recruitment & Placement: Job analysis : Methods - IT and computerized skill inventory - Writing job specification - HR and the responsive organization. Recruitment and selection process : Employment planning and forecasting - Building employee commitment : Promotion from within - Sources, Developing and Using application forms - IT and recruiting on the internet. Employee Testing & selection : Selection process, basic testing concepts, types of test, work samples & simulation, selection techniques, interview, common interviewing mistakes, Designing & conducting the effective interview, small business applications, computer aided interview

UNIT III: Training & Development: Orientation & Training: Orienting the employees, the training process, need analysis, Training techniques, special purpose training, Training via the internet. Developing Managers: Management Development - The responsive managers - On-the-job and off-the-job Development techniques using HR to build a responsive organisation. Management Developments and CD-Roms - Key factor for success. Performance appraisal: Methods - Problem and solutions - MBO approach - The appraisal interviews - Performance appraisal in practice. Managing careers: Career planning and development - Managing promotions and transfers.

UNIT IV: Compensation & Managing Quality: Establishing Pay plans : Basics of compensation - factors determining pay rate - Current trends in compensation - Job evaluation - pricing managerial and professional jobs - Computerised job evaluation. Pay for performance and Financial incentives : Money and motivation - incentives for operations employees and executives - Organisation wide incentive plans - Practices in Indian organisations. Benefits and services : Statutory benefits - non-statutory (voluntary) benefits - Insurance benefits - retirement benefits and other welfare measures to build employee commitment.

UNIT V: Labour relations and employee security: Industrial relation and collective bargaining : Trade unions - Collective bargaining - future of trade unionism. Discipline administration - grievances handling - managing dismissals and separation. LabourWelfare : Importance & Implications of labour legislations - Employee health - Auditing HR functions, Future of HRM function.

COURSE OUTCOMES

CO1: Understand the role of Hr practices in the global scenario and to have a strong theoretical understanding of it evolution.
CO2: Contribute to the development, implementation and evaluation of employee's recruitment, selection and retention plans and policies.
CO3: understand the organisational, societal and individual costs and benefits of training and development. Develop analysis and apply advanced strategies and specifications for the delivery of training programmes.
CO4: understand the significance of employee benefits to both employers and employees. Understand the administrative complexities of providing a full array of benefits to employees and the ways and means of delivering these benefits.

CO5: Asses the manner in which good employee relations can contribute to business goals and how employee assistance programs can help resolve personal problems that usually interfere with job performance.

Programme: MBA (HTM)

Course Code: MBAHTM-224 **Maximum Marks:100**
Course Title: Research Methodology and Paper Presentation Skills. **University Examination:60**
Credit Value: 4 **Sessional**
Assessment:40Examination Duration: 3 Hours

Objective: To equip the student with basic understanding of methodology used to solve business problems and its application in the real business world.

Unit I: Introduction: Meaning, objectives and significance of research, types of research, research process. Social science Research: Meaning, scope and objectivity of social science Research, Ethics in social science research. Tourism research: Major Areas for research in hospitality travel and Tourism, Challenges and status of Hospitality and Tourism research in India.

Unit II: Research Design: Meaning, need and important features, & steps. Types of research design, selection and formulation of research problem, identifying objectives, establishing operational definitions and identifying variables. Hypothesis: Nature & its role in hospitality and tourism management, characteristics and types of hypothesis.

Unit III: Measurement and scaling techniques: Measurement in research, measurement scales, tests of sound measurement, techniques of developing measurement tools, scaling, meaning, classification, and its techniques. Validity and reliability of research instruments.

Unit IV: Sampling design: Census and sample survey, sampling Techniques, sample design and choice of sampling techniques, sample size, , sampling & non-sampling errors., Data collection: Sources of data required, methods of colleting primary data, observation, interviews method, the questionnaire, mail survey, projective techniques simulation Vs. experimentation.

Unit V: Data processing: Introduction, editing of data, classification and coding of data, transcription, tabulation, graphical presentation of data. Statistical interpretations: hypothesis testing Chi-square test, analysis of variance (ANOVA) Report writing and presentation: constituent and formats and presentation of reports. Computer Applications in Research SPSS, Minitab etc.

COURSE OUTCOMES:

CO1: to develop & understanding of the basic framework of research process..

CO2: to develop & understanding of various research design and techniques.

CO3: to identify various sources of information for literature review and data collection.

CO4: to develop and understanding of the ethical dimensions of conducting of applied research.

CO5: Appreciate the components of scholarly writing and evaluate its quality by using various statistical softwares like SPSS

Programme: MBA (HTM)

Course Title: Strategic Management. **Total Marks:100**
Course Code: MBAHTM-30 **University Examination:60**
Duration of Examination: 3 Hours **Sessional Assessment:40**
Credit Value = 4

COURSE OBJECTIVE

To provide knowledge & understanding of the concepts and process of strategic management for employment in the hospitality and tourism industry. The course further extends support in respect of imparting students with the knowledge so as to various strategies applied to the field while managing the business.

UNIT I Introduction to strategic hospitality management : Strategic Management– Concept, Origin and evolution, Scope and Process; levels at which strategy operates, Strategic Thinking; Global competitiveness; Strategists and their role in hospitality and tourism, Key Players in Indian Hospitality and Tourism Industry, strategic and conventional decision making in hospitality and tourism.

UNIT II Micro and macro strategic environment: The Environment and External Stakeholders- Assessment of the Broad Environment, Analysis of External Stakeholders and the Operating Environment, Managing the Operating Environment; Organizational Resources and Competitive Advantage- Internal Analysis and Competitive Advantage, Value-adding Activities, Tangible and Intangible Resources, Financial Resources, Physical Resources, Human-Based Resources, Organization Structure and Culture, Knowledge-Based Resources, General Organizational Resources.

UNIT III Strategic direction & formulating basic stratigies: Strategic Direction-Creating a Strategic Direction, Mission Statements, Organizational Vision, Organizational Values; Strategy Formulation at the Business-Unit Level-Generic Business Strategies, Competitive Dynamics, Strategic Group Mapping; Corporate-Level Strategy andRestructuring - Concentration Strategies, Vertical Integration Strategies, Diversification Strategies, Mergers and Acquisitions, Strategic Restructuring, Portfolio Management.

UNIT IV Implementing strategies and establishing control systems: Interrelationship between formulation and implementation of strategies, Inter-organizational Relationships and the Tourism Cluster; Functional-Level Resource Management; Organizational Design and Control- types of designs, Organizational Structures design,Organizational Control, power and politics, role of behavioral implementation in tourism.

UNIT V Strategies for hospitality entrepreneurship: Strategies for Entrepreneurship and Innovation - Entrepreneurial Start-ups, Innovation and Corporate Entrepreneurship;Global Strategic Management and the Future-Global Strategies, International Market Selection, Global Stakeholders, Emerging Trends; Strategic issues in not-for-profit organization and Small & Medium Size Enterprises.

COURSE OUTCOMES:

CO1: To familiarize students with the concepts of Strategic Management.

CO2: To familiarize students with the micro and Macro Strategic Environment.

CO3: To familiarize students with the formulation of strategies.

CO4: To familiarize students with the implementation of strategies.

CO5: To familiarize students with the strategies specific to Entrepreneurship

Programme: MBA (HTM)

Course Code: MBAHTM-304
Course Title: Front Office
Credit Value: 4
Examination Duration: 3 Hours

Maximum Marks:100
University Examination:60
Sessional Assessment:40

Objective: The course has been conceived to make the students understand the functions and importance of front office management and their operations and familiarise them with its operations.

Unit-1:Introduction to the hotel world and tourism industry. Classification of hotels and numbering of rooms. Front Office organisation, layout, planning, furniture and equipment, staffing pattern-according to sizes and types, rules of the house for Front Office staff, duties and attributes of different level of staff, basic terminology used in the front office of a hotel, coordination and communication between the Front Office and the other departments.

Unit-2:Reservation – Basic definition, modes of room reservation and source of hotel bookings, system of room reservation, conventional density, different records, diaries, forms, etc. used for recording room reservation, filling system for reservations-whitney, introduction to computerised reservation system.

Unit-3:Reception – Receiving, registration and rooming of the guest on arrival. Rooming of VIP and VVIP guests and group arrivals, contractual terms between hotel and guests, record registers, forms, etc. required in the reception office, functions and operation of the room rack and other equipment at the reception counter, dealing with walk-in guests with scanty baggage, procedure of crew arrival and lay over passengers, change of guest rooms, handling of guest, staff and hotel mail, maintenance of books, key handling and control, use and function of the key rack, handling of messages and enquiries for the guest,

Unit-4 :Information about the hotel and city postal regulation: important modes of travel and allied information like wild life, shopping, monuments, festivals etc, function of the IWDC, name and addresses of important travel agents and airlines offices, reading of train and air time schedules, currencies-names and equivalent values, passports, types of visas, preparation of itinerary.

Unit-5:Cash billings – departure procedure, credit and discounts in hotels, handling of credit cards, traveller's cheques, travel agents coupons and airline vouchers, foreign exchange regulations in the hotels regarding payment of hotel bills by foreigners and NRIs and handling of guest valuables.

COURSE OUTCOMES:

CO1: Understand the development of hotel and basic introduction to the tourism industry. Introduction to the front office department of hotel.

CO2: Understand modes and sources of reservations, bookings, and computer based reservation system.

CO3: Analyse interpersonal skills, interacting with the guests, and knowledge of reception section of hotels.

CO4: Handle different unusual situations and the procedures by hotel employs.

CO5: Handle accounts in front office section, knowledge of basics of accounts and introduction to different types of transactions that occur between hotels and guests.

Programme: MBA (HTM)

Course Title: Basics of Event Management **Total Marks:100**
Course Code: MBAHTM-305 **University Examination:60**
Duration of Examination: 3 Hours **Sessional Assessment:40**
Credit Value =4

Course Objective:
The course aims at imparting in depth knowledge about the specialized field of "Event Management" specifically management techniques and strategies required for successful planning, promotion, and conduct of special events.

Unit I
Conceptual foundations of events; Major characteristics; Five C's of event management Conceptualization, Costing, Canvassing, Customization, Carrying out; Advantages of events- to the Organizer, Event Planner, Participants, Economy and Society; Broad classification of Events.

Unit II
Introduction to MICE: Evolution of MICE industry; Components of MICE; Economic and social significance of MICE. Introduction to professional meeting planning- definition, types and roles; associate, corporate & independent meeting planners; TA's and TO's as meeting planners; Convention visitor Bureaus – functions, structure and funding sources.

Unit III
Event venues: concept and types; Conference venues- facilities, check-in and check-out procedures, requirements; conference room lay-outs; Convention manager; inter-related venues; project planning and development. Introduction to conference facilities in India. Role and functions of ICPB and ICCA.

Unit IV
Trade shows and exhibitions/expositions: types of shows, benefits of exhibitions, participant decision-making process. Contract negotiations– principles; negotiation with hotels, airlines and ground handlers.

Unit V
Incentive tour- characteristics, its organizing and special requirements. Latest meeting technologies - Video conferencing and Information Communication Technology (ICT). Factors including ICT affecting future of Events business. Human resource requirements.

COURSE OUTCOMES:

CO1: Apply systematic approach to design, planning, implementation and evaluation of various types of events

CO2: Understand various components of MICE and its importance in the tourism industry. It will further help students to apply principles of marketing to the process of event production.

CO3: Provide Knowledge about the managing of conferences and the viability of an event during the early stages of planning.

CO4: Provide knowledge about the strategies used to raise funds and generate event revenue.

CO5: Provide knowledge about application of ICT in event planning and how to coordinate sound human resource management techniques in order to organise and motivate staff.

Course Code: MBAHTM-306 **Maximum Marks:100**
Course Title: Tour Guiding & Escorting Skills **University Examination:60**
Credit Value: 4 **Sessional Assessment:40**

Programme: MBA (HTM)

Examination Duration: 03 Hours

Objective: This course has been designed to inculcate among students tour guiding & escorting skills and prepare them to offer best services to tourists- our honoured guests.

Unit I

The tour Guide- Meaning and classification, qualities of ideal tour guide, Personal Hygiene role of tour guide, the business of guiding, organizing a guiding business.

Unit II

Guiding techniques- leadership and social skills, presentation and oral communication skills, Guide's personality, moments of truth, the seven sins of guide, the service cycle, working with different age groups, working under difficult circumstances.

Unit III

The role of guide and interpretation: Are guiding and interpretation synonym? Creating memorable interpretations, interpreting different themes- nature, history, Art and architecture and incidental interpretations, Responsibilities towards locals and Society.

Unit IV

Conducting tours: Pre tour planning, modes of transportation, types of tours, traveler with special needs, guidelines for working with disabled people, relationship with fellow guides, motor / car operators and companies.

Unit-V: A case study of a tour.

COURSE OUTCOMES

CO1: understand the various concepts related to tours and tour guiding, tour guiding as an emerging business and role and importance of hygiene in conducting operations as a tour guide.

CO2: Various techniques used by the tour operators during conduct of the tours and how can he emerge as a leader in the process.

CO3: Understand the social responsibilities and their importance in various tour operations.

CO4: Understand the various procedures to be carried out for conducting successful tour, planning and organising of tours.

CO5: Have an in-depth and practical knowledge about the tour escorting and guiding through exposure to various case studies.

Programme: MBA (HTM)

Course Code- MBAHTM-307 Maximum Marks: 100
Course Title: Geography of Tourism and Destination Development. University Examination: 60 Credit
Value: 4 Sessional Assessment: 40 Examination
Duration: 3 Hours

Course Objective: This course introduces students to geographical locations of tourist places, their weather climate and distances, convenient routes to reach them and their characteristics.

Unit I:

Geography of Tourism: Definition, scope and contents of Geography of Tourism. Approaches, Methodology and Techniques. Analyses in Geography of Tourism. Importance of Geography of Tourism. Natural and climatic regions of the world in brief. How to read a map.

Unit II:

Latitude, Longitude, International Date Line, time zones and calculation of time. Time differences, GMT variations, concepts of elapsed time, flying time, ground time. Standard time and summer time (day light saving time). Conceptual Framework of Models in Geography of Tourism and spatial perspectives in Analysis and Developmental strategy. Types, forms, patterns and linkages in Tourism.

Unit III:

Impact of weather and climate on Tourist destinations. Geographical Determinants: Diversities and disparities. Typology of area and Linkages flows and orientation.

Unit IV:

Indian Geography: Physical and political features of Indian subcontinent. Climatic conditions prevailing in India. Tourism attractions in different states and territories of India.

Unit V: Destination Management: Role and importance of Destination Management , Destination Planning, and Concepts, Destination Life Cycles, Destination Master Plan, Destination Feasilbility Study, Carrying Capacity, Sustainability, Environment Impact Analysis, Porters five force model and its application to destination .

COURSE OUTCOMES

CO1: To study the scope, approaches and methodology of tourism geography.

CO2: To understand the different physical dimensions of earth and its need in geography of tourism.

CO3: Discuss the changes in climatic and weather condition of the world and its impact on tourist destination.

CO4: To study the different physical and political features of Indian subcontinent.

CO5: Imparting knowledge among the students about the role, importance and need of Destination management.

Programme: MBA (HTM)

Course Code- MBAHTM-402 Maximum Marks: 100
Course Title: Travel Agency and Tour Operations University Examination: 60 Credit Value: 4
Sessional Assessment: 40 Examination Duration: 3 Hours

Course objective: The course aims at imparting basic knowledge about travel industry to students with the skills to deal with travel agencies and travel operations.

Unit-1Conceptual Framework of Travel Agency & Tour Operators: Definition of Travel agency, and tour operators, difference between the travel agency and tour operators, types of travel agencies and tour operators, Growth and development of travel agencies and tour operators in India and worldwide, role and contribution of travel agencies in the growth and development of tourism industry.

Unit-2Setting up and approval of Travel Agency Business: Procedure for the setting up of travel agency and tour operators business, procedure for the approval of travel agency and tour operators business from Department of Tourism, Government of J&K, Department of Tourism- Government of India and international Air Transport Association (IATA). Various Types of incentives available to travel agencies and Tour operators in India.

Unit-3 Functions of Travel Agency & Tour Operators Business: Travel information and counseling to tourists, itinerary development and preparation, Airline ticketing and Reservations, Tour packaging, Reservations, handling tour file, tour documentation, Sources of income for travel Agency & Tour Operators Business.

Unit-4Travel Agents and Tour operators organization: Role and contribution of various national and international organizations in the development of tourism industry- Indian Association of Tour operators (IATO), Travel Agents Association of India (TAAI), international Air Transport Association (IATA), Pacific Asia Travel Agents Association (PATA), American Association of Travel Agent Association (ASTA), Universal Federation of Travel Agent Association (UFTA)

Unit -5Linkages and Arrangements: Linkages and arrangements with hotels, Airlines, Transport organizations, Ancillary tourism organizations. Organization structure of medium and large scale travel agencies and tour operators business, Present status and future prospects of travel agency and tour operators business in India.

COURSE OUTCOMES:

CO1: knowledge and skills on the operations and management of tour and travel segments of tourism industry including trends and contemporary issues in the travel industry.

CO2: knowledge about the various factors influencing the tour operator industry including setting up of travel agencies and legal aspects in travel and tour operations.

CO3: knowledge and skills of tour operator's products which includes travel, transfer and accommodation planning.

CO4: knowledge about the various active organisations involved in the active development of the travel and tour operations across the globe.

CO5: Equip then with skills of how to manage tour and travel related procedures and activities enabling them to become effective managers.

Programme: MBA (HTM)

Course Title: Tour Policy, Planning & Development **Total Marks:100**
Course Code: MBAHTM-403 **University Examination:60**
Credit Value = 4 **Sessional Assessment:40**
Duration of Examination: 3 Hours

Objectives: The course will expose students to the Tourism policy of India, and those of a few famous Indian states.

Unit – I Introduction: Concept and formulation of tourism policy, Role of government, public and private sectors, Role of international, multinational, state and local tourism organizations in carrying out tourism policies.

Unit – II Tourism Policy: National Tourism Policy 1982 and 2002, National Action Plan on Tourism, 1992: Special Tourism Area Development Programme. The concept of National Tourism Board, National Committee on Tourism, Case studies of tourism policies (Jammu and Kashmir, Rajasthan and Kerala,). Investment opportunities and government policy for investment in hotel/tourism industry. Sources of funding.

Unit – III Understanding Tourism Planning: Conceptual meaning of Tourism Planning, Evolution of Tourism Planning, General Concepts of Planning, Levels and Types of Tourism Planning, Background Approach and planning scale. Role of Public and Private sectors in Tourism Development. Analysis of an individual Tourism Project (Development of the Buddhist circuit)

Unit – IV International Agreements: Chicago Convention, Warsaw Convention, Open Sky Policy, Bermuda Convention, Euro Agreement, Schengen Agreement.

Unit – V Public Private partnership in Tourism Sector, concept , scope and importance. Tourism Policy of India 2015, Tourism Policy of Jammu and Kashmir.

COURSE OUTCOMES

CO1: Expose the students how to formulate the tourism policy.

CO2: Discuss the different phases of Indian tourism policy making journey.

CO3: Provide Knowledge of making plans and steps of planning for tourism development.

CO4: To make the students understand the nature of international tourism agreements.

CO5: To critical examine the role and need of public, private partnership in tourism sector.

Programme: MBA (HTM)

Course Title: Entrepreneurship Development in Hospitality and Tourism **Total Marks:100**
Course Code: MBAHTM-405 **University Examination:60**
Credit Value = 4 **Sessional Assessment:40**
Duration of Examination: 3 Hours

Objective: The aim of this course is to enrich students with entrepreneurial styles and challenges in Hospitality & Tourism

Unit I: Entrepreneur & Entrepreneurship – definition-concepts- characteristics and functions. Distinction between entrepreneur and manager, entrepreneur and entrepreneur, entrepreneur and entrepreneurship- traits and motivation; theories of motivation. Role of entrepreneur in economic development- factors affecting entrepreneurial growth. Tourism as an industry, basic needs of a tourism entrepreneur. Schumpeter's concept of an entrepreneur. Risk and uncertainty in entrepreneurship with particular reference to tourism and hospitality. Entrepreneurial competencies.

Unit II: Types of entrepreneurs: The entrepreneurs on various aspects like, objectives, behavior, business technology, motivation, growth, stages of development, scale of operations. Factors affecting entrepreneurial growth in general and in particular to tourism and hospitality. Women entrepreneur; need, scope and problems. Tourism and women entrepreneurs-emerging challenges, women empowerment and entrepreneurship. Use of manpower in tourism.

Unit III: E D P: meaning and objectives. Reasons for starting an enterprise-importance of training- target group-contents of training programme-special agencies for entrepreneurial development and training- banks, public and private, T C O's NIESBUD, EDII XISS, NABARD, NISIET etc, problems in the conduct of E D P's-steps to make EDP successful –factors affecting tourism entrepreneurial growth-economic ,social, psychological , governmental attitude, competitive factors & opportunity analysis.

Unit IV:Venture promotion: Venture promotion steps- searching for prospective business ideas or opportunities; processing of these ideas and selecting the best idea; collecting the required resources and setting up the enterprise. Forms of ownership, problems faced by a new entrepreneur. The pre requisites to start an enterprise- registration-different types of license and other requirements. Small scale business. Tourism marketing mix for entrepreneurs-travel firms (tour operators, travel agencies) SME's- Hospitality-(hotels, supplementary units)

Unit V:Project: meaning, features & classification. Detailed study of the phases of project, project identification, project formulation, project appraisal, project selection, project implementation & management. Format of feasibility report. Role and responsibilities of a project manager. Comparative study of PERT and CPM. Distinguish between administration and management. TQM. Foreign language as a tourism product, SWOT analysis. Subsidies and incentives: role in tourism industry.

COURSE OUTCOMES

CO1: understand basic concepts, characteristics and functions of entrepreneurship and need of tourism entrepreneurship.
CO2: know about various types of entrepreneurship, various factors that affect growth of entrepreneurship.
CO3: understand various governmental and non-governmental organisations working for entrepreneurship.
CO4: introduce start-ups, venture promoting, idea generation for prosperous business.
CO5: have an empirical knowledge of project development and detailed knowledge about projects, understand project management techniques like PERT, CPM, SWOT analysis.

Programme: MBA (HTM)

Course Title: Food & Beverage Management | **Total Marks:100**
Course Code: MBAHTM-406 | **University Examination:60**
Duration of Examination: 3 Hour | **Sessional Assessment:40**
Credit Value : 04

COURSE OBJECTIVE:

The course objective is to impart empirical foundations and professional orientation towards the practice of food and beverage management as it applies to business, culinary arts and hospitality to the students. The course will make students understand principles of food preparation, cooking techniques, material handling, heat transfer and professionalism.

UNIT I: Kitchenmanagementjobdescription: Hierarchy, Attitude and behaviour; Food premises, Kitchen planning, Basic Preparation and operations, Basic principles of food production, Equipments, Fuels and coordination with other departments.

UNIT II: Menu Types of menu – menu planning, Beverage menu, Menu designing, menu merchandising, menu balancing, wine and food pairing.

UNIT III: Pre - production Purchasing procedure, price and quality performance, Purchase specification, receiving, storing and issuing, methods of storage and stock taking.

UNIT IV: Food and beverage production: Food production methods, Beverage production methods, F & B Service areas, Food and beverage service methods, specialized services.

UNIT V: Catering management: Types of catering: fast-food and popular catering, hotels and quality restaurants, industrial catering, hospital catering, basic policies, financial marketing and catering, control and performance management

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COURSE OUTCOMES:

CO1: Understand basics concepts of kitchen planning and operations, role and responsibilities of Kitchen staff in catering industry.

CO2: understand various concepts of Menu-planning, designing and merchandising in various catering types of outlets.

CO3: Understand about the procedure of food purchasing and storage and stocking methods.

CO4: Evaluate various types of services, roles and responsibilities of staff in F&B department. And special service methods.

CO5: understand basics and various types of catering establishments: control and performance management

Programme: MBA (HTM)

Course Title: Accommodation Management **Total Marks:100**
Course Code: MBAHTM-407 **University Examination:60**
Duration of Examination: 3 Hours **Sessional Assessment:40**
Credit Value : 4

COURSE OBJECTIVE

The course has been conceived to make students aware about the hotel industry & its various departments. The course further tries to provide students better understanding on the various aspects of hotels.

COURSE OUTCOME

The course will prepare students for handling Accommodation management processes and procedures in hospitality Industry.

UNIT I: Introduction: Accommodation: concept, types & Typologies, Linkage & Significance with relation to tourism. Emerging dimensions of Accommodation Industry: Heritage hotels, motels & Resort properties & time share establishments; Hotel: Origin, growth & diversification, various departments of a standard hotel. Classification / Categorization of hotels.

UNIT II: Hotel industry in india Leading multinational hotel chains operating in India, public sector in hotelieringbusiness: role, contribution & performance. Duties & Responsibilities of Housekeeping department: Executive Housekeeper, Asst Executive Housekeeper-Middle level Management-Skill based employee's responsibilities-Communication responsibilities-Total quality innovations-tariffs

UNIT III:Infrastructure management: Interior decoration & design: Elements and Purpose-Fixtures & Furniture's-Carpets & Floor-Lighting &Colours-Managing Inventories:-Linen & Uniforms-Cleaning equipments& Agents-Budget Process-Safety & Security-pest control-Safety and security, types of Linen used in restaurants.

UNIT IV: Hospitality personnel management Managing Human Resources:-Induction and Training-Recruiting, Selecting-Skill Training & Coordination-Motivation & Employee Discipline. HRD perspective with special reference to India, Fiscal & non fiscal incentive available to hotel industry in India: Ethical, legal & regulatory aspects.

UNIT V: Green hospitality Eco housekeeping-Horticulture-Contemperorary spas-Conservation practices and methods- Eco hotels and recent trends- Emerging trends- Practices at private and public sector.

COURSE OUTCOMES

CO1: Understand the basic conception of accomodation industry.

CO2: Analyse concept of hotel industry in India and also understand the duties and responsibilities of housekeeping department.

CO3: Understand the concept of interior decoration and design as well as operations involved in uniform.

CO4: Acquaint with the basic components of managing human resources in hospitality industry.

CO5: Evaluate about the emerging trend of the subject of Green hospitality.

Programme: M.A. ISLAMIC STUDIES

COURSECODE:MIS-103
COURSE TITLE:IslamicReligiousSciences-I(Study ofQuran)

MaximumMarks:100 **UniversityExamination:60**
Credits:4 **SessionalAssessments:40**
DurationofExamination:3Hours **Minimum Marks:24**

Syllabus

Unit-I TheHolyQuran:Terminology&Concepts
- *Wahi* (Revelations):Definition, typesandpreservation
- CompilationofQuran
- Differenttypesofverses:*Nasikh*and *Mansukh*,*Muhkamat*and*Mutashabihat*
- ClassificationofSurahs;*Makki,Madani, Tiwaal, Qisaar,Awsat*

Unit-II: *AhkamalQuran*(BroaderTeachingsofthe Quran)
- Basic Teachings ofQuran
- Social TeachingsofQuran
- Political TeachingsofQuran
- EconomicTeachings ofQuran

Unit-III: Study of Classical*Tafsir* Literature:
- Originanddevelopmentof*Ilmal-Tafsir*, Typesof*Tafasir*
- A brief introductionofclassical*Tafsir*Scholars andtheir*Tafasir*
  a. Imam Tabri and*Tafsir-iTabari*(Jamiahal-Bayan)
  b. AllamaZamakhshariandhis*Tafsir*(*Al-Kashshaf*)
  c. AllamaQurtubi and*Tafsir-i Qurtubi*(*Jamiahal-Ahkam*)
  d. ImamIbn-i Kathir and*TafsirIbn-i Kathir*(*TafsiralQuranal-Azeem*)

Unit-IV:Developmentof Urdutranslationsand*Tafsirs*
- **AbriefintroductiontoUrdu*Tafsirs***
  a. *Bayanul Quran*(Maulana Ashraf AliThanwi)
  b. *Tafsir-iSanayi*(Maulana SanaullahAmratsari) c. *Tarjumanul Quran*(Maulana Abul KalamAzad) d. *TafhimulQuran*(MaulanaAbul AalaMawdudi)

Unit-V *Tafsir* LiteratureinEnglish
- TranslationandCommentary ofHolyQuran(AbdullahYusufAli)
- TheMessageofQuran(MuhammadAsad)
- *Tafsirul Quran*(Abdul Majid Daryabadi)
- Noble Quran(Dr. Hilali&MuhammadMohsinKhan)

Note forPaperSetting:
Thequestionpaperwillbedividedintotwosections.**SectionA**willcarry10compulsory,objective–cum–shortanswertypequestions,twofromeachUnit,eachcarrying01mark.**SectionB**willhave **10questions**,two from each unit.The studentwill attempt01 questionfromeach unit. Each questionwillcarry10marks.

BooksRecommended:
1. TaqiUthmani, Ulumal-Quran
2. AhmedvonDenferUlumal-Quran
3. Sabhi Salah, UlumalQuran

4. Bilal Philips:Usul alTafsir
5. AbulKalamAzad, Basic ConceptsofQuran
6. Dr. Rafeeq Ahmed, IntroductiontoQuran
7. Abdul MaajidDaryabadi Tafsirul Quran
8. MuhammadMohsinKhan,NobleQuran
9. MuhammadAsad,TheMessage ofQuran

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Programme: M.A. ISLAMIC STUDIES

COURSECODE: MIS-104

COURSE TITLE:IslamicReligiousSciences-II(Study ofHadith)

MaximumMarks:100 University Examination:60

Credits:4 SessionalAssessments:40

Duration ofExamination:3 Hours MinimumMarks: 24

Syllabus

Unit-I (IntroductiontoHadith)

- *Hadith*: Meaningand concept
- *Hadith* and*Sunnah*
- Typesof*Hadith.*

UnitII (**Compilation of*Hadith*)**

- PreservationofHadithduring theperiod ofProphet Muhammad .
- Compilationof HadithunderUmar ibnAbdulAziz
- PlaceofHadith inIslam

UnitIII- Hadithand itsAnalysis

- Principlesof HadithAnalysis
- Scienceof*Asma al Rijal*;ABriefIntroduction
- *JarhwaTa'dil*

Unit IV- ImportantHadithCollections:ABrief Overview

- *SahihBukhari*and*SahiMuslim*
- *SunanAbuDawud*and*SunanIbnMajah*
- *SunanNisai* and *JamiahTirmidhi*

UnitV HadithLiteratureinContemporaryWorld

- ContributionofNasiruddinAlbani toHadithliterature
- ContributionofIndianscholars toHadithLiterature:
  a. Mustafa Aizmi andMaulana Habibur RahmanAizmi
  b. Sheikh YaqoobSarfiandAnwar ShahKashmiri

Note forPaperSetting:

Thequestionpaperwillbedividedintotwosections.**SectionA**willcarry10compulsory,objective–cum–shortanswertypequestions,twofromeachUnit,eachcarrying01mark.**SectionB**willhave **10questions**,two from each unit.The studentwill attempt01 questionfromeach unit. Each questionwillcarry10marks.

BooksRecommended:

1. TaqiUthmani, Ulumal-Quran
2. AhmedvonDenferUlumal-Quran
3. Sabhi Salah, UlumalQuran
4. Bilal Philips:Usul alTafsir
5. JohnBurton,AnIntroductionto theHadith
6. Sabhi Salah, MustalhatalHadith

7. M.ZubairSiddiqi, HadithLiterature
8. M.M. Azmi, Studyin HadithMethodologyandLiterature
9. SubhiSalihUlumal- Hadith
10. RafeeqAhmed, IntroductiontoHadith

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Programme: M.A. ISLAMIC STUDIES

COURSECODE: MIS-105
COURSE TITLE:Proficiency inArabic- I

Credits:2 MaximumMarks:50 MinimumMarks: 12
UniversityExamination:30 SessionalAssessments:20
Duration ofExamination:2Hours

Syllabus

Unit-I Durus Al Lugha Al ArabiyyahLi Ghairal Natiqina BihaPart-I

- Lesson 01-04includingallexercise
- Lesson 05-08includingallexercise

Unit-IIDurus AlLugha Al ArabiyyahLi Ghairal Natiqina Biha Part-I

- Lesson9-12includingallexercises
- Lesson 13-16includingall exercises

Unit-IIIGrammar

- *Kalima* anditskinds,*Horoofi Shamsi*and *Qamari*,*Marfia* and*Nakera*,
- *MubtadaandKhabar, Al Maosoofwa alSifa,Al Asmaul Mausoola, AlZamaer,*
- *Horoofal Jar,Muzaf andMuzaf Ilaih, Al muzakkar walMoannas,Jama Muzakkar al Salim,JamMuannasSalim,Jama al-Takseer,Asma ulIstifham*

Note forPaperSetting:

Thequestionpaperwillbedividedintotwosections. SectionAwillcarry6compulsory, objective– cum–shortanswertypequestions,twofromeachUnit,eachcarrying1 mark.SectionBwillhave 6 questions,twofromeachunit.Thestudentwillattempt1questionfromeachunit.Eachquestion willcarry8marks(06+24=30).

PrescribedBook:

1. Duroosullugha al Arabiyyah, Dr. V Abdur Rahim, IslamicFoundation Cheeanai.

RecommendedBooks:

2. AlNahwulWadeh, Ali alJarim,DanishBookdepo, MatiaMahal,Delhi
3. KitabuNahw,AbdurrahmanAmratsari,DanishBookdepo,MatiaMahal,Delhi
4. KitabusSarf, AbdurrahmanAmratsari, DanishBookdepo,MatiaMahal, Delhi
5. Tohfatunnahw,tohfatussarf, SirajuddinNadvi, MarkaziMaktabaIslami,NewDelhi

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Programme: M.A. ISLAMIC STUDIES

COURSECODE: MIS-202

COURSE TITLE:IslamicReligiousSciences-III(Fiqh)

MaximumMarks:100	UniversityExamination:60
Credits:4	SessionalAssessments:40
Duration ofExamination:3 Hours	MinimumMarks: 24

SyllabuS

Unit–I:

- *Fiqh*: DefinitionandScope
- OriginandDevelopment

- SignificanceandPrincipals(*Usul-al-Fiqh*)

Unit- II:Sourceof Islamic Law

- NatureandImportanceof IslamicLaw
- PrimarySourcesofIslamicLaw:*Qur'an andHadith*
- SecondarySources:*Istihsan, Masalaha, Istidlal,Urf*etc.

Unit-III:Important Schoolsof*Fiqh*:Maincharacteristics

- Hanafi andMalikiSchools
- Shafi'i and HanbaliSchools
- Jafari School

Unit-IV:Ijtihadand*Taqlid*

- *Ijtihad*:Meaningtypes andPrerequisites
- *Taqlid*:Meaning, earlydevelopment andscope
- *Ijtihad* inModern TimesScopeandSignificance

Unit-V:MainCharacteristics of IslamicLaw

- FamilyLaw
- CriminalLaw
- Constitutional&InternationalLaw

Note forPaperSetting:

Thequestionpaperwillbedivided intotwosections.**SectionA**willcarry10compulsory,objectives–cum–shortanswertypequestions,twofromeachUnit,eachcarrying01mark.**SectionB**willhave **10questions**,two from each unit.The studentwill attempt01 questionfromeach unit. Each questionwillcarry10marks**.**

BooksRecommended:

- AhmadHasan, EarlyDevelopmentof IslamicJurisprudence
- J. Schacht, OriginofMohammadanJurisprudence
- Abdur Rahim,MohammadanJurisprudence
- H.H. Hassan:AnIntroductiontoIslamicLaw
- N.J. Coulson, A Historyof IslamicLaw
- M. Hamidullah,TheSchools of IslamicJurisprudence

Programme: M.A. ISLAMIC STUDIES

COURSECODE: MIS-204

COURSE TITLE:Proficiency inArabic- II

Credits:2 MaximumMarks:50 MinimumMarks:12
UniversityExamination:30 SessionalAssessments:20
Duration ofExamination:2 Hours

Syllabus

Unit-I Grammarfrom*Al-Qiratul Wadiha*Part-II

- **LessonNo01-13**
- **LessonNo14-27**
- **LessonNo28-41**

Unit-II TranslationandExplanationof TextFrom:*QasasunNabiyeen*Part–I

- **LessonNo17-24**
- **LessonNo25-32**
- **LessonNo33-41**

Unit-III MemorizationandTranslationofthe following*Surahs*:

Note forPaperSetting:

Thequestionpaperwillbedividedintotwosections. SectionAwillcarry6compulsory, objective– cum–shortanswertypequestions,twofromeachUnit,eachcarrying1 mark.SectionBwillhave 6 questions,twofromeachunit.Thestudentwillattempt1questionfromeachunit.Eachquestion willcarry8marks(06+24=30).

PrescribedBook:

6. Al-qiratul Wadeha,byWahiduzZamanKairanavi,PartII
7. QasasunNabiyeen, byMaulana Abul HasanAli AnNadvi,PartI

RecommendedBooks:

- Duroosullugha al Arabiyyah, Dr. V Abdur Rahim, IslamicFoundation Cheeanai.
- AlNahwul Wadeh, Alial Jarim,DanishBookdepo,MatiaMahal,Delhi
- KitabuNahw,AbdurrahmanAmratsari, DanishBookdepo,MatiaMahal,Delhi
- *Kitabus*Sarf, AbdurrahmanAmratsari,DanishBookdepo,MatiaMahal,Delhi
- *Tohfatunnahw*,*tohfatussarf*, SirajuddinNadvi, MarkaziMaktaba Islami, New Delhi

Programme: M.A. ISLAMIC STUDIES

COURSECODE: MIS-302

COURSE TITLE:Islam inthe ModernWorld: WestAsia andAfrica

(Thinkers,Trends &Movements**)**

MaximumMarks:100 University Examination:60
Credits:4 SessionalAssessments: 40
Duration ofExamination:3 Hours MinimumMarks: 24

Syllabus

UnitI-RevivalandReform –I

- Basic Concepts:*Islah,Tajdid, Nahdah, Intifadah*, Islamic Order andDivergenceand Convergence, *Tawatur*andChange
- MuhammadbinAbdul Wahab –ThoughtandMovement
- Sheikh Ali al-Sanusi- MovementandCharacteristics

UnitII-RevivalandReform–II

- Jamal udDinAfgani- ThoughtandImpact
- Sheikh MuhammadAbduh- ReformistandEducationalThought
- RashidRida- Thoughtand contribution

UnitIII- ModernThinkers andTrends-I

- Sheikh Hasanal Banna-ThoughtandMovement
- SyedQutb- Contributions
- NamikKamal andZiaGoklap

Unit IV- ModernThinkers andTrends-II

- *Jadidi* Movement
- Badi UzZamanSaedNursi
- Abdullahal Harari- ContributiontoHadithLiterature

UnitV- ModernThoughtinIran

- Ali Sharaiti- ContributiontosocialThought
- MurtadhaMutahari-Thought
- Imam Khomeini andIranianRevolution1979

Note forPaperSetting:

Thequestionpaperwillbedividedintotwosections.**SectionA**willcarry10compulsory,objective–cum–shortanswertypequestions,twofromeachUnit,eachcarrying01mark.**SectionB**willhave **10questions**,two from each unit.The studentwill attempt01 questionfromeach unit. Each questionwillcarry10marks**(10+50=60).**

BooksRecommended:

- H.A.R. Gibb, Modern Trends inIslam
- Adams Charles, Islamic ModernisminEgypt
- J.L. Esposito,ResurgentVoicesinIslam
- MazharuddinSiddiqui, Modern reformistThoughtinthe MuslimWorld
- M. Mutahhri, IslamicMovementin 20th Century
- Hunter, ShirinT. (Ed.)'Reformist VoicesofIslam'
- W.C.Smith,IslaminModernHistory
- Fazlur-Rehman, Revival andReforminIslam

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Programme: M.A. ISLAMIC STUDIES

COURSECODE: MIS-303

COURSE TITLE: *Tasawwuf*

MaximumMarks:100	University Examination:60
Credits:4	SessionalAssessments:40
Duration ofExamination:3 Hours	MinimumMarks: 24

Syllabus

Unit I-OriginandDevelopment

- Basic Concepts-

- *Iman, Ikhlkas,Taqwa, Zuhd, Tazkiyyah, Ihsan, Tauba,Sabr,Shukr*

- Meaningandconceptof*Tasawwuf*
- EarlyDevelopmentof*Tasawwuf*

UnitII-EarlyTrendsin*Tasawwuf*

- HasanBasari:LifeandTeachings
- Rabiyah Basari: LifeandTeachings
- JunaidBaghdadi: Life andTeachings

UnitIII- *SufiSilsilahs*(Orders).

- Emergenceof*Sufi* Orders(*silsilahs*)
- Chief CharacteristicsofMajor*Sufi*Orders
- Doctrineof*Wahdatal Wajud*and *WahdatalShuhud*

Unit IV-LaterTrendsin*Tasawwuf*

- MajorTextsof *Tasawwuf*:*Kashf al Mahjub*and *Awarif ulMa'arif*
- Sheikh Abdul Qadir Jilani andKhawaja MoinudDinChisti
- Sheikh ShihabudDinSuharwardiandSheikh BahauddinNaqashbandi

UnitV- SpiritualityinIslam

- Spirituality:Meaning& Concept
- *Auliaullah* inthelight ofPrimaryIslamicTexts
- Conceptof*Al-Riqaq* in *Hadith*Literature

Note forPaperSetting:

Thequestionpaperwillbedividedintotwosections.**SectionA**willcarry10compulsory,objective–cum–shortanswertypequestions,twofromeachUnit,eachcarrying01mark.**SectionB**willhave **10questions**,two from each unit.The studentwill attempt01 questionfromeach unit. Each questionwillcarry10marks**(10+50=60).**

BooksRecommended:

- A.J. Arberry, Sufism
- R.A. Nicholson,TheMystics ofIslam
- R.A. Nicholson,Studies in IslamicMysticism
- J.S. Trimingham,TheSufiOrdersinIslam
- Abdul HaqAnsari, Tasawwuf andShariah(Urdu)
- SayyidHusaynNasr, Ed. IslamicSpirituality
- Farida Khanam:"A SimpleGuidetoSufism"
- Ibn Taimya,"Al-FurqanBaina Aulia ul RehmanwaAulia ulShaitan"
- ImamGhazali,"MakashfatulQulub"
- SayyidAhmed Shahid,"Abkaat"

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Programme: M.A. ISLAMIC STUDIES

COURSECODE: MIS-304
COURSE TITLE:Proficiency inArabic- III

Credits:2 MaximumMarks:50 MinimumMarks: 12
UniversityExamination:30 SessionalAssessments:20
Duration ofExamination:2Hours

Unit-I Grammarfrom*Al-Qiratul Wadeha*Part-III

- **LessonNo01 -10**
- **LessonNo11-20**
- **LessonNo21-30**

Unit-II TranslationandExplanationof TextFrom:*QasasunNabiyeen*Part–II

- **LessonNo 1-07**
- **LessonNo08-14**
- **LessonNo15-22**

Unit-III MemorizationandTranslationofthe following*Surahs*:

Note forPaperSetting:
Thequestionpaperwillbedividedintotwosections. SectionAwillcarry6compulsory, objective– cum–shortanswertypequestions,twofromeachUnit,eachcarrying1 mark.SectionBwillhave 6 questions,twofromeachunit.Thestudentwillattempt1questionfromeachunit.Eachquestion willcarry8marks(06+24=30).

PrescribedBook
:

8. Al-qiratul Wadeha,byWahiduzZamanKairanavi,PartIII
9. QasasunNabiyeen, byMaulana Abul HasanAli AnNadvi,PartII

RecommendedBooks
:

- Duroosullugha al Arabiyyah, Dr. V Abdur Rahim, IslamicFoundation Cheeanai.
- AlNahwul Wadeh, Alial Jarim,DanishBookdepo,Matia Mahal,Delhi
- KitabuNahw,AbdurrahmanAmratsari, DanishBookdepo,MatiaMahal,Delhi
- Kitabus Sarf, AbdurrahmanAmratsari,Danish Bookdepo,MatiaMahal,Delhi
- Tohfatunnahw,tohfatussarf, SirajuddinNadvi, MarkaziMaktaba Islami, NewDelhi

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Programme: M.A. ISLAMIC STUDIES

COURSECODE:MIS-306

TITLE:IslamicEconomics andFinance

MaximumMarks:100 University Examination:60
Credits:4 SessionalAssessments: 40
Duration ofExamination:3 Hours MinimumMarks: 24

UnitI-Islamic Economic System-ConceptsandComponents

i. Basic Concepts:*Bai'ah,Tijarah, Riba', Rahn, Iktisab,Infaq*
ii. Ownershipin Islam-PrivateandPublic
iii. ProductionandDistribution- IslamicPerspective

UnitII-FinancialLawandFinancialContracts

i. Islamic FinancialLaw-SourcesandRelevance ii. PartnershipbasedContracts:
   A) *Wakalah*
   B) *Kafalah*
   C) *Wadi'ah*
iii. Approved Formsof*Bai'ah*-FinanceandInvestment

UnitIII-IslamicBanking

i. BankinganditsEarlyDevelopment ii. Featuresof IslamicBanking
iii. Monetary Policyunder*Riba'*FreeSystem

Unit IV- MajorIslamicFinancialInstitutes-I

i. IslamicDevelopment BankSaudiArabia
ii. *AlAmeen*FinanceandInvestment CorporationIndia iii. Islamic Investment BankPakistan

UnitV- Major IslamicFinancial Institutes-II

i. *Amanah*MutualFunds TrustU.S.A
ii. *Grameen*BankBangladesh
iii. ContemporaryMuslimWorld- SocioEconomicChallenges.

Note forPaperSetting:

Thequestionpaperwillbedividedintotwosections.**SectionA**willcarry10compulsory,objective–cum–shortanswertypequestions,twofromeachUnit,eachcarrying01mark.**SectionB**willhave **10questions**,two from each unit.The studentwill attempt01 questionfromeach unit. Each questionwillcarry10marks**(10+50=60).**

RecommendedBooks:

1. Lockkgard,F, IslamicTaxationin theClassicalPeriod, Copanhengan,1950
2. Manzoor, N, IslamicEconomics:AWelfareApproach,AdamPublishers,Delhi
3. Muslihudin, M, BankingandIslamicLaw, Adam Pub.Delhi
4. Mansuri,M.T, IslamicLawof ContractsandBusinessTransactions,Delhi,2006
5. Qureshi, A.I. IslamandTheTheoryof Interest,Kitabbhavan,Delhi
6. Roberts, RTheSocialLawsof Quran,Leiden,1980
7. Tuma,E.H. EarlyArabEconomicsPolicies,Karachi,1965
8. Yousuf, S.M, JusticeinIslam,Kitabbhavan,Delhi

Programme: M.A. ISLAMIC STUDIES

COURSECODE:MIS-308 (Elective)

COURSE TITLE:Islam andGenderStudies

MaximumMarks:100 University Examination:60

Credits:4 SessionalAssessments:40

Duration ofExamination:3 Hours MinimumMarks: 24

Syllabus

UnitI- WomeninIslam

- ConceptofGenderinIslam
- Status ofWomen inIslam
- Women inEarlyIslamicSociety

UnitII-Role of WomeninIslam

- Social andPolitical RoleofWomen
- EducationalRole ofWomen
- EconomicRoleofWomen

UnitIII- Social Institutes

- InstitutionofMarriage,ItsSanctityandImportance
- Rights ofMen and Womentowards eachother
- DutiesofMenand Womentowards eachother

Unit IV- WomeninContemporaryMuslimWorld

- Muslim Women inthe West
- Muslim Women inIndia,Pakistan andIran
- Muslim Women inSaudi Arabia andTurkey

UnitV- FeminisminWest

- Backgroundof theemergence ofFeministDiscourseinthe West
- SomeProminentFeministMovements
- MuslimResponsetoFeminism:

a) MaryamJameela b)

SurayaBatoolAlvi c)

ZainabalAlwani

Note forPaperSetting:

Thequestionpaperwillbedividedintotwosections.**SectionA**willcarry10compulsory,objective–cum–shortanswertypequestions,twofromeachUnit,eachcarrying01mark.**SectionB**willhave **10questions**,two from each unit.The studentwill attempt01 questionfromeach unit. Each questionwillcarry10marks**(10+50=60)**

RecommendedBooks:

- Ahmad, Anees, Women andSocial Justice
- Ahmad, profKhurshid, Family LifeinIslam
- Asmai, SarwatJamal,Aurat, MagribAurIslam
- Jameela, Maryam, IslamandWesternSociety
- Maududi, S Abul Ala, TheLawsofMarriageandDivorceinIslam
- Siddique, M.M, Women inIslam
- Umari, SJalaluddin, RightsofMuslim Women:ACritique oftheObjections

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Programme: M.A. ISLAMIC STUDIES

COURSECODE: MIS-402

COURSE TITLE:Islam inthe ModernWorld:South Asia

(Thinkers,Trends &Movements)

MaximumMarks:100 University Examination:60

Credits:4 SessionalAssessments:40

Duration ofExamination:3 Hours MinimumMarks: 24

UnitI-IslamandModernism

- ConceptofModernityin WesternThought
- IslamicRevivalismandModernism
- Contemporary MuslimDiscourse

UnitII-ReformMovements

- ShahWaliUllah
- *Ahli Hadith*Movement
- *Barelvi*Movementof AhmadRazaKhan

UnitIII- NewTrendsinIslamic Thought

- AligarhMuslimUniversityandJamiaMilliaIslamia
- *Darul Uloom* Deoband
- *Nadwatul-Ulama*

Unit IV-ThoughtsandMovementsof 20th Century-I

- Sir MuhammadIqbal
- ShibliNaumani
- Maulana Abul KalamAzad

UnitV-ThoughtsandMovementsof 20th Century-II

- *Tablighi* Movement-
- *Jamat-i Islami*
- Roleof*Ulama*sinFreedomStruggle

Note forPaperSetting:

Thequestionpaperwillbedividedintotwosections.**SectionA**willcarry10compulsory,objective–cum–shortanswertypequestions,twofromeachUnit,eachcarrying01mark.**SectionB**willhave **10questions**,two from each unit.The studentwill attempt01 questionfromeach unit. Each questionwillcarry10marks**(10+50=60)**

BooksRecommended:

- G.N. Jalbani, Teachingof ShahWaliullahDehlawi
- AzizAhmed ,IslamicModernismin India andPakistan
- W.C.Smith,Modern IslaminIndia
- Dr.S.M. Iqbal ,ReconstructionofReligious ThoughtsinIslam
- S.A.A Mawdudi, Muslmanaur MawjudaSiyasiKashmakash

Programme: M.A. ISLAMIC STUDIES

COURSECODE: MIS-403

COURSE TITLE: Human Rights in Islam

MaximumMarks:100 University Examination:60
Credits:4 SessionalAssessments: 40
Duration ofExamination:3Hours MinimumMarks: 24

Syllabus

Unit–I HumanRightsinGeneralContext

- MeaningandImportance
- Origin, Development, Nature andScope
- TheUniversalDeclarationof HumanRights(1948)

Unit-II HumanRights:An IslamicPerspective-I

- RighttoLife, HumanDignityandPrivacy
- RighttoFreedomof Conscience,ThoughtandExpression
- Rightto Legal Defense, MutualRespectforPacts andTreaties andRightsofMinorities

Unit–III HumanRights:An IslamicPerspective-II

- RighttoEqualityandJustice
- RighttoReligionandRighttoProperty
- RightsandDutiesofChildren

Unit- IV Statusof Women intheWorld

- ConditionofWomen duringJahaliyyahArabia
- Status ofWomen inMajorWorldReligions
- Women inthePhilosophical TraditionsoftheWorld, FeminismanditsFeatures

Unit- V Statusof WomeninIslam

- Status ofwomen inIslamicReligiousTexts
- Socio-Politico-Economic Status ofWomen
- MuslimResponsetotheModern Challenges faced byWomen

Note forPaperSetting:

Thequestionpaperwillbedividedintotwosections.**SectionA**willcarry10compulsory,objective–cum–shortanswertypequestions,twofromeachUnit,eachcarrying01mark.**SectionB**willhave **10questions**,two from each unit.The studentwill attempt01 questionfromeach unit. Each questionwillcarry10marks**(10+50=60)**

BooksRecommended:

- Sheikh ShowkatHussain,HumanRightsinIslam
- Dr. NaseemGul,Dialogue:A MuslimPerspective
- Dr. NaseemGul, Towards AMoreHumaneFuture
- Maududi, Abul Ala, HumanRightsinIslam

- Ghazi MahmoodAhmad,Islamka Qanun-i-Baynal-Mumalik
- Umri, Syed Jalaluddin,Ghair MuslimoseTaluqataur unkeHaqooq

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Programme: M.A. ISLAMIC STUDIES

COURSECODE: MIS-404

COURSE TITLE:MajorWorld Religions

MaximumMarks:100 University Examination:60
Credits: 4 Sessional Assessments:40
Duration of Examination:3 Hours Minimum Marks: 24

UnitI-Approaches to Religion •Religion: MeaningandImportance
•ApproachesandMethods for theStudyofWesternReligions
•Islamic Approachtothe Study ofReligion

UnitII-AryanReligions-I
•Hinduism
•Buddhism
•Jainism

UnitIII- AryanReligions-II
•Zoroastrianism
•Sikhism
•Baha'ism

Unit IV- Semitic/Abrahamic Religions
•CommonDenominationsof AbrahamicLegacy
•Judaism-HistoricalDevelopment andBasicTeachings
•Christianity- Historical Development andMainFeatures

UnitV- Dialogue
•ConceptandImportanceofInterfaithDialogue:AnIslamicPerspective
•InterfaithDialoguein MuslimHistory
•NeedandPracticalImplicationsof Interfaith DialogueinPresentTimes

Note forPaperSetting:
Thequestionpaperwillbedividedintotwosections.**SectionA**willcarry10compulsory,objective–cum–shortanswertypequestions,twofromeachUnit,eachcarrying01mark.**SectionB**willhave **10questions**,two from each unit.The studentwill attempt01 questionfromeach unit. Each questionwillcarry10marks**(10+50=60)**

BooksRecommended:

•A.R. Mohapatra,Phiolosophy ofReligions
•MoinuddinAhmed, Religions of AllMankind
•MaryamJameela, IslamVsAhl IKitab
•R.C.Zaehner, Hinduism
•Nigosian, WorldReligions
•Dr. NaseemGul,Dialogue:A MuslimPerspective
•Dr. NaseemGul, Towards AMoreHumaneFuture
•E. Zuhehar,Buddism
•Sikhism(PublishedbyPunjabUniversity)
•WorldReligionReader
•Encyclopediaof ReligionandEthics(Relevantportions)ed.JamesHostings
•Rafiabadi, HamidNaseem,WorldReligionsandIslam
•Farida Khanam,"A studyofMajorworldreligions".

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Programme: M.A. ISLAMIC STUDIES

COURSECODE: MIS-405

COURSE TITLE:Proficiency inArabic- IV

MaximumMarks:50 Credits:2 MinimumMarks: 12
UniversityExamination:30 SessionalAssessments:20

Duration ofExamination: 2Hours

Syllabus

Unit-I Grammarfrom ***Al-QiratulWadiha* Part-III**

- **LessonNo 31-40**
- **LessonNo41-50**
- **LessonNo51-60**

Unit-II TranslationandExplanationof TextFrom:***QasasunNabiyeen* Part–II**

- **LessonNo23-30**
- **LessonNo31-38**
- **LessonNo39-46**

Unit-III MemorizationandTranslationofthe following***Surahs***:

Note forPaperSetting:

Thequestionpaperwillbedividedintotwosections. SectionAwillcarry6compulsory, objective– cum–shortanswertypequestions,twofromeachUnit,eachcarrying1 mark.SectionBwillhave 6 questions,twofromeachunit.Thestudentwillattempt1questionfromeachunit.Eachquestion willcarry8marks(06+24=30)

PrescribedBook:

10.Al-qiratul Wadeha,byWahiduzZamanKairanavi,PartIII
11.QasasunNabiyeen, byMaulana Abul HasanAli AnNadvi,PartII

RecommendedBooks:

- Duroosullugha al Arabiyyah, Dr. V Abdur Rahim, IslamicFoundation Cheeanai.
- AlNahwul Wadeh, Alial Jarim,DanishBookdepo, Matia Mahal,Delhi
- KitabuNahw,AbdurrahmanAmratsari, DanishBookdepo,MatiaMahal,Delhi
- Kitabus Sarf, AbdurrahmanAmratsari,DanishBookdepo,MatiaMahal,Delhi
- Tohfatunnahw,tohfatussarf, SirajuddinNadvi, MarkaziMaktaba Islami, NewDelhi

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Programme: M.Sc (Mathematics)
Course Title: *Lab course on* LATEX
Course Code: *MS-305*
Credits: 2

Maximum Marks: 50
University Examination: 25
Sessional Assessment: 25
Duration of Exam: 3 *hours*

Objectives:
The objectives of this course is to train he students in LATEX.

Each student is required to maintain a practical record book .

The course carries 50 marks. Two practical tests, one Internal and one External, are to be conducted, each carrying 25 marks. The marks in practical test will be divided into 4 parts, program code, program execution , Viva-Voce and practical record book as per the choice of examiner. The student has to pass both internal and external practical test separately scoring a minimum of 10 marks for each test.

Course Outcomes

After studying this course, we expect a student have understood

1. Typeset mathematical formulae using latex.
2. Use the preamble of Latex file to define document class and layout options.
3. Use nested list and enumerate environment within a document.
4. Use tabular and array environment within latex document.
5. Use various methods to either create or import graphics into a Latex document.

Programme: M.Sc (Mathematics)
Course Title: Lab course on SPSS
Course Code: *MS-403*
Credits: 02

Maximum Marks: 50
University Examination: 25
Sessional Assessment: 25
Duration of Exam: 3 *hours*

Objectives:

The objective of this course is to introduce the basic working of the SPSS software.

Each student is required to maintain a practical record book .

The course carries 50 marks. Two practical tests, one Internal and one External, are to be conducted, each carrying 25 marks. The student has to pass both internal and external practical test separately scoring a minimum of 10 marks for each test.

Course Outcomes

After studying this course, we expect a student

1. would be able to perform a wide range of data management tasks in SPSS application.

2. have understood the basic working of SPSS and performing of basic statistical analysis.

3. would be able to perform database management tasks, descriptive statistical tasks, graphic tasks and basic inferential statistical tasks for comparisons and correlations.

4. To perform advanced analysis in SPSS.

Programme: Physics

Course Title :BIOMEDINSTRUMENTATION

Maximum Marks: 100

Course Code: MPH-332 **University Examination: 60**

Credits: 4 **Sessional Assessment: 40**

Objective

- To understand the biomedical instrumentation techniques.
- To know the importance methods, instruments available for biomedical field.
- To analyse the biomedical instrumentation systems, and the application specific biomedical sensor and instrumentation design

UNIT-I

Human Physiological Systems : Cells and their structure – Nature of Cancer cells – Transport of ions through the cell membrane – Resting and action potentials – Bio-electric potentials – Nerve tissues and organs – Different systems of human body. Biopotential Electrodes and Transducers Design of Medical instruments – components of the biomedical instrument system – Electrodes – Transducers.

UNIT-II **12**

Biosignal Acquisition : Physiological signal amplifiers – Isolation amplifiers – Medical preamplifier design – Bridge amplifiers – Line driving amplifier – Current amplifier – Chopper amplifier – Biosignal analysis – Signal recovery and data acquistion – Drift Compensation in operational amplifier – Pattern recognition – Physiological Assist Devices. Pacemakers – Pacemakers batteries – Artificial heart valves – Defibrillators – nerve and muscle stimulators Heart – Lung machine – Kidney machine.

UNIT-III **12**

Biopotential Recorders : Characteristics of the recording system – Electrocardiography (ECG) – Electroencephalography (EEG) – Electromyography (EMG) – Electroethinogrphy (ERG) and Electroculography (EOG) – Recorders with high accuracy – recorders for OFF line analysis.

UNIT-IV **12**

Operation Theatre Equipment: Surgical diathermy- shortwave diathermy – Microwave diathermy – Ultrasonic disathermy – Therapeutic effect of heat – Range and area of irritation of different techniques – Ventilators – Anesthesia machine – Blood flowmeter – Cardiac Output measurements – Pulmonary function analysers – Gas analysers – Blood gas analysers – Oxymeters – Elements of intensive care monitoring.

UNIT-V
12

Specialised Medical Equipments: Blood Cell counter – Electron microscope – Radiation detectors – Photometers and colorimeters – digital thermometer – audiometers – X-rays tube – X-ray machine – image intensifiers – Angiography – Application of X-ray examination. Safety instrumentation: Radiation safety instrumentation –

Physiological effects due to 50Hz current passage – Microshock and macroshock – electrical accident Hospitals – Devices to protect against electrical hazards – Hospitals architecture.

12

Note For Paper Setter

The question paper will be divided into two sections. Section A will be compulsory and will contain 10 very short answer type questions eliciting answers not exceeding 20 words / multiple choice questions / fill in the blanks, each carrying one mark equally distributed from all units. Section B will be contain 10 long answer type questions, two from each unit and the candidate will be required to answer one from each unit. Each question carries 10 marks.

References

1. Arumugam M., Biomedical Instrumentaion, Anurada Agencies Publishers, 1992.
2. Khandpur R.S., Handbook of Biomedical Instrumentation, Second Edition, Tata McGraw-Hill Education, 2003.
3. Shakti Chatterjee and Aubert Miller, Biomedical Instrumentation Systems, Cengage Learning Publisher, 2010.
4. Gromwell L., Fred J. Weibell, Erich A. Pfeiffer, Biomedical Instrumentation and Measurements, Second Edition, Prentice Hall, 1980.

Outcome

At the end of the course, the students will be able to understand the

- Different biomedical instruments involved in medicine field.
- Various methods available in the use of new modern techniques in biomedicine.

Programme: Physics

Course Title: RADIATION PHYSICS **Maximum Marks: 100**
Course Code: MPH-338 **University Examination: 60**
Credits: 4 **Sessional Assessment: 40**

Objective

- To understand the theory of electromagnetic radiation
- To know the difference between natural and artificial radioactivity
- To study the interaction of radiation with matter and its effects.

UNIT-I

Electromagnetic Radiation : Wave model – Quantum Model– visible light and fluorescence particulate radiation – inverse square law.

UNIT-II **12**

Natural And Artificial Radioactivity : Radioactivity – General properties of alpha, beta and gamma rays – Laws Of radioactive disintegration – Radioactive decay constant – Half-life period – average life – Isotopes, Isobars, Isomers – Isotones and Isodiapheres – Natural radioactive series – Radioactive equilibrium –Radioactive decay - α particle decay – β particle decay – Theory of beta decay – Gamma emission – Electron capture – Internal conversion – Nuclear isomerism – Artificial radioactivity - Nuclear reactions –α, p reaction - α, n reaction- Proton bombardment – deuteron bombardment- neutron bombardment – photo disintegration – Activation of nuclides - Elementary ideas of fission, fusion and nuclear reactors.

UNIT-III **12**

Radiation Quantities: Quantities to describe a radiation beam- particle flux and fluence- Photon flux and fluence- cross section- linear and mass absorption coefficient-stopping power and LET Activity – Curie – Becquerel. Exposure and its measurements – Roentgen, Radiation absorbed Dose- Gray - kerma- kerma rate constantElectronic equilibrium - relationship between kerma, exposure and absorbed dose–Relative biological effectiveness (RBE)- radiation weighting factors.

UNIT-IV **12**

Interaction Of Radiation With Matter: Interaction of electromagnetic radiation with matter: Ionization – Photon beam exponential attenuation – Rayleigh scattering – Photoelectric effect – Compton effect - energy absorption – Pair production – Attenuation, energy transfer and mass energy absorption coefficients – Relative importance of various types of interactions.

UNIT-V

12

Interaction Of Charged Particles With Matter : Classical theory of inelastic collisions with atomic electrons – Energy loss per ion pair by primary and secondary ionization – Dependence of collision energy losses on the physical and chemical state of the absorber – Cerenkov radiation – Electron absorption process – scattering

excitation and ionization – Radiative collision – Bremmstrahlung – Range energy relation – Continuous slowing down approximation (CSDA) – straight ahead approximation and detour factors – transmission and depth dependence methods for determination of particle penetration - empirical relations between range and energy – Back scattering.

12

Note For Paper Setter

The question paper will be divided into two sections. Section A will be compulsory and will contain 10 very short answer type questions eliciting answers not exceeding 20 words/ multiple choice questions/ fill in the blanks, each carrying one mark equally distributed from all units. Section B will be contain 10 long answer type questions, two from each unit and the candidate will be required to answer one from each unit. Each question carries 10 marks.

References

1. Segre E., Experimental Nuclear Physics, Vol 3, John Wiley, 1959.
2. Theraja B.L., Modern Physics, S.Chand Company, 1995.
3. Faiz M Khan , The Physics of Radiation Therapy, Lippincott Williams & Wilkins Publishers, 2010.
4. Oliver R., Radiation Physics in Radiology, Blackwell Scientific Publication, 1974.
5. Frank Herbert Attix, Introduction to Radiological Physics and Radiation Dosimetry, Wiley-VCH Publishers, 1991.

Outcome

At the end of course, students will be made to understand :

- Concepts of electromagnetic radiation
- Theory of artificial and natural radioactivity
- Interaction of radiation with matter.

Programme: Physics
Course Title: SIGNAL PROCESSING AND COMMUNICATION **Maximum Marks: 100**
Course Code: MPH-333 **University Examination: 60**
Credits: 4 **Sessional Assessment: 40**

Objectives

- To use signal processing to contribute towards the development of innovative algorithms, performance analysis.
- To understand the theory and applications of digital signal processing and modern communications technology.

UNIT-I

Signals: Signals, classification of signals, basic operation on signals, elementary signals, systems, properties of systems, linear time invariant systems and their properties.

UNIT-II **12**

Fourier Representation: Fourier representation for four classes of signals, discrete – time periodic signals, discrete time Fourier series, continuous time periodic signals and the Fourier series, discrete time no periodic signals, and the discrete time Fourier transform, continuous time no periodic signals and the Fourier transform.

UNIT-III **12**

Properties Of Fourier Representation: Linearity and symmetry property, convolution property, differentiation and integration, time and frequency shift property, Parseval relationship, Time Bandwidth product, Duality.

UNIT-IV **12**

Sampling: Sampling continuous time signals, sampling a sinusoid, aliasing, sub sampling, sampling theorem, ideal reconstruction and practical reconstruction: zero order hold.

UNIT-V

12

Communication: Types of modulation, full amplitude modulation, generation, frequency domain representation of amplitude modulation, spectral overlap and demodulation.

12

Note For Paper Setter

The question paper will be divided into two sections. Section A will be compulsory and will contain 10 very short answer type questions eliciting answers not exceeding 20 words/ multiple choice questions/ fill in the blanks, each carrying one mark equally distributed from all units. Section B will be contain 10 long answer type questions, two from each unit and the candidate will be required to answer one from each unit. Each question carries 10 marks.

References

1. Haykin S. and Van Veen B., Signals and Systems, II edition, Wiley Student Edition, 2002.
2. Lathi B.P., Signal processing and linear systems, Oxford University Press Inc., USA, 2003.
3. Paolo Prandoni and Martin Vetterli, Signal Processing for Communications, CRC Press, 2008.
4. Denbigh P.N., System analysis and signal processing, Addison Wesley, 1998.

Outcome

At the end of the course, the students will be able to understand
The concepts of

Programme: Physics

Course Title: ADVANCED OPTICS AND LASER TECHNOLOGY **Maximum Marks: 100**
Course Code: MPH-445 **University Examination: 60**
Credits: 4 **Sessional Assessment: 40**

Objective

- To know the role of advanced optics in laser technology
- To understand the various mechanisms involving operation of laser.

UNIT-I **12**

Theory of Diffraction: Kirchhoff's theorem - Fresnel–Kirchoff integral formula and its application to diffraction problems - Wave propagation in free space - Fraunhofer and Fresnel diffraction, Fraunhofer diffraction by a single slit, double slit, diffraction grating, circular aperture - Fresnel diffraction, Fresnel zones, Fresnel integrals.

12

UNIT-II

Ourier Optics: Concept of spatial Frequencies, Impulse response and transfer functions- Fourier Transform properties of lens - spatial filtering - theory of imaging (Focussed and non-focussed) - Pupil functions - Abbe's principle.

UNIT-III

Laser Systems : Laser systems – General description-Laser structure-excitation mechanism-Different laser systems- He-Ne laser, Argon-ion laser, Nitrogen laser, Carbon-dioxide laser - Excimer laser - X-ray laser - Free electron laser, Nd:YAG; Nd:Glass, Alexandrite laser - Ti-Sapphire laser – Diode pumped solid state laser, Pulsed-CW dye laser.

12

UNIT-IV

Laser:Q-Switching, Mode Locking And Coherence Of: Theory of Q-switching and experimental methods - cavity dumping -Theory of Mode locking and experimental methods - Spatial and Temporal coherence - Methods of detection and measurement of ultrashort pulses.

12

UNIT-V

Non Linear Optics : Wave propagation in an anisotropic crystal – Polarization response of materials to light – Harmonic generation – Second harmonic generation – Sum and difference frequency generation – Phase matching – Third harmonic generation – bistability – self focusing

12

Note for Paper Setter

The question paper will be divided into two sections. Section A will be compulsory and will contain 10 very short answer type questions eliciting answers not exceeding 20 words/ multiple choice questions/ fill in the blanks, each carrying one mark equally distributed from all units. Section B will be contain 10 long answer type questions, two from each unit and the candidate will be required to answer one from each unit. Each question carries 10 marks.

Text Books:

1. Träger**,** Frank**,** Handbook of Lasers and Optics, Springer, 2012.

References

1. Born and Wolf, Principles of Optics, Cambridge University press, 1999.
2. Saleh and Tiech, Fundamentals of photonics, Wiley-Interscience Publishers,, 2007.
3. Guenther. R. D., Modern Optics, John Wiley Publishers, 1990.
4. William T. Silfvast, Laser Fundamentals, Cambridge University press, 1996.
5. Robert Boyd. W, Non Linear Optics, 3rd edition, Academic Press, 2008.

Outcome

At the end of the course, the students will be able to understand the

- Characteristics of the laser systems.
- Various types of laser systems.

Programme: Urdu

COURSE CODE: MUR-202
COURSE TITLE: Jadeed Urdu Nazam

Maximum Marks: 100 | University Examination: 60
Credits: 4 | Sessional Assessments: 40
Duration of Examination: 3 Hours | Minimum Marks: 24

The paper is included in the syllabus in order to achieve the following objectives:

Course Objectives (Cos)

CO 1	It helps the students to achieve moral and spiritual values.
CO 2	It aims to introduce the poetry of poets as Mohd Hussain Azad, Hali, Khaki, Faiz Ahmad Faiz etc.
CO 3	To help the students to know the poets perspectives and its alignment with their own lives.
CO 4	To enable the students to broaden their imagination and visualize the things with references to modern Urdu poetry.
CO 5	The main objective of this course is to give a complete knowledge about Jadeed Nazm and Jadeed Nazamnigaar.

Syllabus

Unit I

اردو نظم کی صنفی شناخت۔روایت،(غزل اور نظم کا فرق)

نظمِ جدید میں قومی اور وطنی مسائل

محمد حسین آزادؔ اور حالیؔ کی مندرجہ ذیل نظموں کی تدریس:

(۱) شب قدر (۲) برکھارُت

Unit II

جدوجہد آزادی میں اردو نظم کا رول

نئی نظم کی فکری اور فنی خصوصیات

نظم ''صباویراں'' (ن۔م۔راشد) کی متنی تدریس

Unit III

جدید نظم پر مغربی اثرات

نظیر اکبر آبادی کی نظم نگاری کا تنقیدی جائزہ

مندرجہ ذیل نظموں کی متنی تدریس :

'' (ہم جو تاریک راہوں میں مارے گے'' (فیضؔ)

'' (خضرراہ'' (اقبالؔ)

Unit IV

اردو نظم میں ہیئت کے تجربے۔ موضوعاتی نظم، نظم معریٰ، آزاد نظم اور نثری نظم

اختر الایمان کی نظموں کا عمومی جائزہ

مندرجہ ذیل نظم کی متنی تدریس: '' ایک لڑکا'' (اختر الایمان)

Unit V

فیضؔ کی نظم نگاری کی خصوصیات

محرومؔ کی نظم نگاری کا جائزہ

نظم ''نور جہاں کا مزار،، (محروم) ایک مطالعہ

Note for Paper Setting:
The question paper will be divided into two sections. Section A will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. Section B will have 10 questions, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks (10+50=60).

کتب برائے مطالعہ :

۱۔ جدید شاعری۔ عبادت بریلوی

۲۔ جدید اردو شاعری۔ عبدالقادر سروری

۳۔ نظم معریٰ و آزاد نظم۔ حنیف کیفی

۴۔ جدید نظم کی کروٹیں۔ وزیر آغا

۵۔ جدید اردو نظم پر یورپی اثرات۔ حامدی کاشمیری

۶۔ اردو میں ترقی پسند ادبی تحریک۔ خلیل الرحمٰن اعظمی

۷۔ اردو شاعری کا مزاج۔ وزیر آغاؔ

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Programme: Urdu

COURSE CODE: MUR-203
COURSE TITLE: Urdu Novel

Maximum Marks: 100 | University Examination: 60
Credits: 4 | Sessional Assessments: 40
Duration of Examination: 3 Hours | Minimum Marks: 24

The paper is included in the syllabus in order to achieve the following objectives:

Course Objectives (Cos)

CO 1	To help the students to understand the novel as it represents the social, political, economical, psychological, cultural aspects of life.
CO 2	To help the students to understand the novel in all its aspects
CO 3	To introduce the students to the novel writing of such great novelists as Prem Chand, Aziz Ahmad, Krishan Chander, etc
CO 4	To train the students for novel writing.
CO 5	The students should have a skill to write Urdu Novel and to aware themabout the social economical and historical background of Urdu Novel.

Syllabus

Unit I

ناول کی تعریف اور فنی لوازمات

ناول نگاری کا ابتدائی دور (نذیر احمد اور رتن ناتھ سرشار کے حوالے سے)

ناول کا ارتقائی دور "امراؤ جان ادا" کا تنقیدی جائزہ

Unit II

ترقی پسند تحریک اور اردو ناول

ناول ''گودان'' کا تنقیدی جائزہ

عزیز احمد کے ناول ''گریز،، کا تنقیدی جائزہ

Unit III

اردو ناول کے ارتقاء میں کرشن چندر کا مقام

ناول '' شکست '' کے کرداروں کا سماجی و سیاسی پس منظر

جوگندر پال کا ناول '' بازدید،، کا تنقیدی جائزہ

Unit IV

قرۃ العین حیدر کی ناول نگاری کا جائزہ

جدید اردو ناول موضوعات، ہیئت اور تکنیک کے تجربے

ناول ''آگ کا دریا'' کا عمومی جائزہ

Unit V

آگ کا دریا'' کی ہیامبر،، کا کردار

ناول ''آگ کا دریا،، کا پلاٹ، کردار نگاری اور اسلوب

ناول کے ارتقا میں نذیر احمد اور رتن ناتھ سرشار کی خدمات

Note for Paper Setting:
The question paper will be divided into two sections. Section A will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. Section B will have 10 questions, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks (10+50=60).

کتب برائے مطالعہ:

۱۔ اردو کے پندرہ ناول۔ اسلوب احمد انصاری

۲۔ بیسویں صدی میں اردو ناول۔ یوسف سرمست

۳۔ اردو ناول کی تاریخ و تنقید۔ علی عباس حسینی

۴ ۔ اردو ادب کی تاریخ و تنقید۔ احسن فاروقی

۵ ۔ ناول کا فن۔ نور الحسن ہاشمی

۶۔ اردو فکشن۔ مرتبہ: شعبہ اردو علی گڑھ مسلم یونیورسٹی

۷ ۔ تقسیم کے بعد اردو ناول میں تہذیبی بحران۔ ڈاکٹر مشتاق احمد وانی

۸۔ برصغیر میں اردو ناول۔ ڈاکٹر خالد اشرف

۹۔ اردو فکشن کی تنقید۔ پروفیسر ارتضیٰ کریم

۱۰۔ ناول کا فن۔ ابوالکلام قاسمی

۱۱۔ داستان سے افسانے تک۔ وقار عظیم

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Programme: Urdu
COURSE CODE: MUR-303
COURSE TITLE: Urdu Drama

Maximum Marks: 100 | University Examination: 60
Credits: 4 | Sessional Assessments: 40
Duration of Examination: 3 Hours | Minimum Marks: 24

The paper is included in the syllabus in order to achieve the following objectives:

Course Objectives (Cos)

CO 1	It enables the students to have a thorough understanding of dramatic art and its technical aspects.
CO 2	The student should be able to understand the most famous dramatists of urdu literature as Imtiyaz Ali Taj, Habib Tanvir, etc.
CO 3	It aims to acquaint the students the importance of these dramatists and their valuable contribution in urdu literature.
CO 4	It aims to understand the students their role and responsibility in the social sphere of life.
CO 5	In this course the students should have the knowledge about Urdu Drama and after this competition of this course the student will be able to write a drama by himself.

Syllabus

Unit I

اردو ڈرامے کا آغاز و ارتقاء

ڈرامے کا فن

ڈرامے کی اقسام۔ المیہ اور طربیہ

Unit II

امتیاز علی تاج کی حیات اور ڈراما نگاری کا جائزہ

اردو ڈرامے میں نئے رجحانات کی پیش کش

ڈراما ''انار کلی'' کا عمومی جائزہ

Unit III

۱۸۸۰ء کے بعد اردو ڈراما نگاری، ایک جائزہ

حبیب تنویر کی حیات اور ان کی ڈراما نگاری، ایک مطالعہ

ڈراما ''آگرہ بازار'' (حبیب تنویر) کا تفصیلی جائزہ

Unit IV

ریڈیائی ڈرامے کا فن۔ تحریر اور پیش کش

ریڈیو اور اسٹیج ڈرامے میں فرق

ڈراما'' مٹی کا بلاوا'' (شمیم حنفی) ایک تفصیلی مطالعہ

Unit V

آغا حشر کاشمیری کی ڈرامائی خدمات

''اندر سبھا،، ایک جائزہ

ٹی وی ڈرامے کا فن

Note for Paper Setting:

The question paper will be divided into two sections. Section A will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. Section B will have 10 questions, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks (10+50=60).

کتب برائے مطالعہ :

۱۔ "اندر سبھا" کی روایت۔ سید شاہد حسین

۲۔ آغا حشر اور اردو ڈراما۔ انجمن آراء

۳۔ انار کلی۔ امتیاز علی تاج

۴۔ اردو ڈرامے کا ارتقاء۔ عشرت رحمانی

۵۔ ریڈیو ڈرامے کا فن۔ ڈاکٹر اخلاق اثر

۶۔ اردو ڈراما فن اور منزلیں۔ وقار عظیم

۷۔ اردو ڈراما تاریخ اور تنقید۔ عشرت رحمانی

۹۔ اردو ڈراما اور اسٹیج۔ مسعود حسن رضوی ادیب

۱۰۔ ڈراما فن اور تکنیک۔ ظہیر انور

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Programme: Urdu
COURSE CODE: MUR-403
COURSE TITLE: Feminism in Urdu Literature

Maximum Marks: 100 | University Examination: 60
Credits: 4 | Sessional Assessments: 40
Duration of Examination: 3 Hours | Minimum Marks: 24

The paper is included in the syllabus in order to achieve the following objectives:

Course Objectives (Cos)

CO 1	It enables the students to acquire the knowledge regarding Taneesi Adab in Urdu
CO 2	It may enable the students to study in detail about Taneesi Adab with special reference to its historical, political and social background in order to encourage the students especially girl students towards progress, and self-respect cum honor.
CO 3	To help the female students to develop a sense of achievement and empowerment so that they may be able to add the valuable contributions in Taneesi Adab
CO 4	It aims to develop an awareness among women about the most valuable contributions of women writers and poets like Qurat-ul-Ain Haider, Azmat Chugtai, Parveen Shakir and the likes
CO 5	The main objective of this course is to provide the knowledge about Feminism, Feminist Writers and the moment of feminism in different countries of the world.

Syllabus

Unit I

۱۔ تانیثیت: تعریف اور تحریک

۲۔ ساختیات پس ساختیات

۳۔ ردِ تشکیل

Unit II

۱۔ تانیثیت کی علمبردار خواتین فکشن نگار

۲۔ تانیثیت کی ترجمان شاعرات

۳۔ خواتین اہلِ قلم کے یہاں لب و لہجے کی انفرادیت

Unit III

انفرادی مطالعہ :

۱۔ عصمت چغتائی: بحیثیت افسانہ نگار

۲۔ قرۃ العین حیدر: بحیثیت ناول نگار

۳۔ عصمت چغتائی اور قرۃ العین حیدر کی اردو فکشن میں نسائی مسائل کی ترجمانی

Unit IV

۱۔ شفیق فاطمہ شعریٰ بحیثیتِ غزل گو

۲۔ پروین شاکر بحیثیت غزل گو

کشور ناہید بحیثیت نظم نگار

Unit V

۱۔ فہمیدہ ریاض کے شعری سروکار

۲۔ ترنم ریاض کا افسانہ ''باپ،،

۔ نسائیت ۳ور تا ، ید ش یب میں فرق

Note for Paper Setting:

The question paper will be divided into two sections. Section A will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. Section B will have 10 questions, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks (10+50=60).

کتب برائے مطالعہ

۱۔ بیسویں صدی میں خواتین اردو ادب۔ مرتبہ: عتیق اللہ

۔ فی ۲ .. مرم: تاریخ و تنقید۔ شہناز نبی

۳۔ شناخت۔ ش۔ اختر

۴۔ قرۃ العین حیدر کی ناول نگاری۔ اسلم آزاد

۵۔ اردو کی معروف خواتین افسانہ نگار اور ان کی خدمات۔ نعیم انیس

۶۔ اردو ادب میں خواتین کا حصہ۔ ترنم ریاض

۔ اردو ادب میں تا ، ید ش یب۔ ڈاکٹر مشتاق احمد وانی

8. متن، معنی اور کھیوری، قدوس جاوید •

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Programme: Urdu

COURSE CODE: MUR-404

COURSE TITLE: Zaraye Tarseel-o-Iblagh

Maximum Marks: 100 University Examination: 60
Credits: 4 Sessional Assessments: 40
Duration of Examination: 3 Hours Minimum Marks: 24

The paper is included in the syllabus in order to achieve the following objectives:

Course Objectives (Cos)

As it appears impossible to be a well-informed student of the Humanities and Social Sciences without a study of religion; the paper has been incorporated for:

CO 1	To develop the professional skills among the students as the paper is directly connected/ aligned with the professional coaching/training with reference to Urdu language
CO 2	To provide the students the thorough knowledge about subjects as internet, websites, television, radio, journalism, motion pictures, etc.
CO 3	To create a platform for the students to prove their mettle in the research program as M.Phil and Ph.D.
CO 4	To provide the knowledge and information about Information Technology through translation and history of translation from one language to another.
CO 5	The main objective of this course is to provide the knowledge about the computer skill and its importance in daily life.

Syllabus

Unit I

ذرائع ترسیل وابلاغ: تعریف اور تعارف

ضرورت، اہمیت، افادیت اور اقسام

اردو ذرائع ابلاغ اور ترسیل کے جدید وسائل (نیٹ، انٹرنیٹ، ویب سائٹ وغیرہ کی سہولتیں)

Unit-II

ٹیلی ویژن (فوائد اور امکانات)

ریڈیو (ایضاً)

فلم (ایضاً)

Unit III

ہندوستان میں اردو صحافت: ابتدا اور ارتقاء

خبر نگاری، اداریہ نگاری، اشتہار نگاری

فیچر نگاری، مضمون نگاری، تبصرہ نگاری

Unit IV

ترجمہ نگاری۔ معنی و مفہوم، آغاز و ارتقاء، اقسام، ضرورت اور مسائل

اردو میں ترجمہ نگاری کا عصری منظر نامہ

عملی ترجمہ۔۔ انگریزی سے اردو اور اردو سے انگریزی

Unit V

کمپیوٹر کی اہمیت

اردو بطور ذریعہء معاش

عصر حاضر میں پرینٹ میڈیا اور الیکٹرانک میڈیا کی اہمیت

Note for Paper Setting:
The question paper will be divided into two sections. Section A will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. Section B will have 10 questions, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks (10+50=60).

کتب برائے مطالعہ:

۱۔ رہبر اخبار نویسی۔ سید اقبال قادری

۲۔ اردو صحافت کی تاریخ۔ امداد صابری

۳۔ اردو ذرائع ابلاغ۔ قیصر شمیم

۴۔ اردو صحافت۔ انور علی دہلوی

۵۔ صحافتی زبان۔ سہیل وحید

۔ہ۔ق صحافت۔ مُصطفٰی علی سروری

۷۔ جدید صحافت۔ احتشام احمد خان

8. آداب صحافت، جان محمد آزاد

9. اردو صحافت، گربچن چندن

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Programme: Urdu

COURSE CODE: MUR-204

COURSE TITLE: Urdu Afsana

Credits: 2 Maximum Marks: 50 Minimum Marks: 12
University Examination: 30 Sessional Assessments: 20
Duration of Examination: 2 Hours

The paper is included in the syllabus in order to achieve the following objectives:

Course Objectives (Cos)

CO 1	It enables the students to understand sensational and emotional aspects of human beings.
CO 2	To help the students to understand the artistic and technical aspects of Urdu Afsana.
CO 3	To enable the students to study about the most prominent and famous novelists.
CO 4	To help the students to generate the taste for artistic activities.
CO 5	The main objective of this course is to enable the students for creativity that they can write short stories by himself.

Syllabus

Unit I

افسانے کی تعریف، اجزائے ترکیبی

اردو افسانے کی فنی خصوصیات کا جائزہ

مندرجہ ذیل افسانوں کا تفصیلی مطالعہ:

نصیر اور خدیجہ،، (راشد الخیری) "آخری آدمی" (انتظار حسین

Unit II

ترقی پسند تحریک اور اردو افسانہ "انگارے" کے حوالے سے

جدیدیت اور اردو افسانہ۔ موضوعات ہیئت اور تکنیک

مندرجہ ذیل افسانوں کا تفصیلی مطالعہ اور ان کا تنقیدی جائزہ :

کفن،، (پریم چند)

ٹوبہ ٹیک سنگھ "(سعادت حسن منٹو)

لاجونتی،، (راجندر سنگھ بیدی)

Unit III

افسانے میں نئے رجحانات اور فکری میلانات

قرۃ العین حیدر کی حیات اور افسانہ نگاری

مندرجہ ذیل افسانوں کا تفصیلی مطالعہ

یہ غازی یہ تیرے پُر اسرار بندے،،(قرۃ العین حیدر) انجام کار'' (سلام بن رزاق)

Unit IV

کرشن چندر حیات اور افسانہ نگاری

جموں وکشمیر میں اردو افسانہ نگاری، آغاز وارتقا۔(محمد الدین فوق سے عصر حاضر تک)

افسانہ'' سفر زندگی کا'' (نور شاہ)

Unit V

پریم چند کی حیات اور افسانہ نگاری کا مختصر جائزہ

منٹو کی حیات اور افسانہ نگاری کا جائزہ

افسانہ ''شہر افسوس،، کی متنی تدریس

Note for Paper Setting:
The question paper will be divided into two sections. Section A will carry 10 compulsory, objective – cum – short answer type questions, two from each Unit, each carrying 01 mark. Section B will have 10 questions, two from each unit. The student will attempt 01 question from each unit. Each question will carry 10 marks (10+50=60).

: کتب برائے مطالعہ

۱۔ اردو فکشن۔ مرتبہ: شعبہء اردو علی گڑھ مسلم یونیورسٹی

۲۔ نیا افسانہ۔ وقار عظیم

۳۔ فنِ افسانہ نگاری وقار عظیم

۔ داستان سے افسانے تک۔ وقار عظیم ۴

۔ نیا اردو افسانہ۔ مرتبہ: گوپی چند نارنگ ۵

۔ اردو افسانہ: روایت اور مسائل۔ گوپی چند نارنگ۶S

۔ اردو کے بہترین افسانے۔ مرتبہ: ڈاکٹر اطہر پرویز ۷

۔ انتظار حسین کے سترہ افسانے۔ انتظار حسین ۸

۹۔ فکر و تحقیق۔ افسانہ نمبر۔ قومی قونسل برائے فروغ اردو زبان نئی دہلی
۱۰۔ فکر و تحقیق۔ ناول نمبر۔ قومی قونسل برائے فروغ اردو زبان نئی دہلی
۱۱۔ فکشن شعریات۔ گوپی چند نارنگ

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Programme: Programme: M.A. Economics

Course Title: Basic Econometrics

Course Code: MAE-333

Course Objective: The course is intended to familiarize students with different types of econometric models and the procedure to use them for the analyses of complex datasets.

Course Outcomes:

CO1: The students will be familiarized with the basic concepts of econometrics including the procedure of hypothesis testing and various types of data.
CO2: They will be acquainted with various concepts regarding multiple regression analysis.
CO3: They will be able to identify various econometric issues in regression analysis and take appropriate remedial measures.
CO4: They will be able to make use of dummy variable and qualitative response variable regressions to analyze qualitative variables.
CO5: They will be able familiarized with dynamic models and their uses.

Syllabus

Unit-I: Basic Econometrics

Nature, meaning and scope of Econometrics; Methodology of Econometrics; Nature and types of Data for econometrics; Concept of Population and sample Regression Function; Linear regression model – Assumptions, Estimation (through OLS approach) and properties of estimators; Gauss-Markov Theorem; Interval estimation and Hypotheses testing, Tests of significance and confidence interval approach

Unit II: Extension of Two Variable Linear Regression Models

Functional forms of Regression Models; Log-Linear Model, Semilog Models, Reciprocal Models, Logarithmic Reciprocal Model. Multiple Regression Model– Assumptions and Estimation; Concept of Coefficient of Determination for Linear and Multiple Regression Model ($r^2$and R^2 And Adjusted R^2)

Unit III: Problems in Regression Analysis

Multicollinearity– reasons, consequences, methods of detection, important remedial measures. Heteroscedasticity- reasons, consequences, methods of detection (Spearman rank correlation test, Goldfeld and Quandt test, Glejser test), important remedial measures; Autocorrelation- reasons, consequences, methods of detection (Durbin-Watson statistic), important remedial measures.

Unit IV: Dummy Variable and Qualitative Response Models

Programme: Programme: M.A. Economics

Dummy variable – use of dummy variables, regression with dummy dependent variables for measuring the change of parameter.Qualitative Response Models- linear probability model (LPM);LogitModel;Probit Model; Tobit Model.

Unit V: Dynamic Econometric Models

Autoregressive and distributed lag models; Role of lag in economics; Endogenous lagged variable– Koyak geometric lag model, Nerloves's Partial adjustment model, Cagan's adaptive expectations model; Exogenous lagged variable– Almon approach to distributed-lag models

Note: Emphasize will be laid down the practical application from all technique in each unit

Course Delivery

-Lectures

-Presentations

-Group Discussions

Assessment

-Written Assignment and Presentation: 14 marks

-Mid Term Test: 16 marks

-Attendance: 10 marks

Programme: Programme: M.A. Economics

Course Title: Advanced Econometrics

Corse Code: MAE-450

Course Objectives: This paper covers various statistical methods applicable to different topics in Economics and those needed for applied economic research .An Introductory unit on multivariate methods has also been included in the course; which constitutes an important tool for analysis in multivariate data in development-related studies

Expected Outcome:

Course Description: This course includes topics related to simultaneous equation models, Time Series Analysis, Panel Data Techniques and Multi-variate analysis.

Contents:

Unit I: Simultaneous Equation Models

Introduction and examples; Simultaneous equation bias and inconsistency of OLS estimators; The identification problem; Rules of identification-order and rank conditions; Methods of Estimating simultaneous equation system-recursive methods and OLS, indirect least squares (ILS); 2SLS; Maximum likelihood and introduction to 3 SLS.

Units II: Time Series Analysis I

Time series models analysis; Stationarity and non-stationarity, correlogram, unit roots, co-integration, spurious regression, Dickey-Fuller test, Engle-Granger test,white noise process, Random walk model

Unit III: Time Series Analysis II

Forecasting with multivariate regression model; Time series models and forecasting: MA,AR,

ARMA and ARIMA Models, Box-Jenkins methodology; Introduction to vector autoregression.

UNIT IV: Panel Data Techniques

Programme: Programme: M.A. Economics

Panel data techniques; Estimation of panel data regression model- fixed effects model and random effect model; Fixed versus random effect model.

Unit V: Multivariate Analysis

Multivariate; Factor Analysis, Principal Component Analysis, Can0nical Correlation Analysis, Discriminant Analysis

Course Delivery

-Lectures

-Presentations

-Group Discussions

Assessment

-Written Assignment and Presentation: 14 marks

-Mid Term Test: 16 marks

-Attendance: 10 marks

-Internal Exam: 40 marks

-External Exam: 60 marks

Programme: Programme: M.A. Economics

Course Title: Indian Economy

Course Code: MAE-443

Course Objective: The knowledge of economic theory bears fruits only when it is applied to address economic issues facing a nation. Using theoretical wisdom to address practical economic issues effectively is possible only if the economist is fully aware about the nature of the economy, the complexity of economic issues, and the outcomes of the policy interventions. The course aims to familiarize students with features of Indian economy, both at the aggregate level and the sectoral level. It is intended to provide students the knowledge regarding trends in various parameters of growth and development over the last few decades. Sectoral performance and the effect of economic reforms carried out over the years on various fronts are studied, in detail, to enhance students' understanding regarding the dynamics of the economy.

Course Outcomes:

CO1: After going through this course, the students will be fully aware about the features of Indian economy including planning strategies and its achievements.

CO2: They will gain in-depth knowledge regarding the dynamics of India's agricultural sector and study various issues facing or linked to agricultural sector besides the policy reforms.

CO3: They will be familiar with the dynamics of industrial performance and will gain understanding of the issues facing industrial sector despite much of policy reforms.

CO4: They will be familiarized with key reforms across different sectors of the economy.

CO5: They will gain in-depth knowledge regarding India's trade with other countries and study various reforms and initiatives aimed to boost India's trading capacity.

Syllabus

Unit-I: An Overview of Indian Economy

Understanding the Indian Economy; The Colonial Period; Post-Independence Economy; Planning for the Economy – Objectives, Strategy and Achievements, Relevance of Planning in the Context Globalization, Five Year Plans and different Sectors of the Economy– Twelfth Five Year Plan (2012-2017), Growth of GDP and Per Capita Income, Regional Variations, Performance of different Sectors; Sectoral Contribution to GDP

Unit-III: The Agricultural Sector

Land Reform, Agricultural Growth and Productivity, Green Revolution and After; issues relating to public and private capital formation in agriculture, Price; Subsidy and Taxation Policies, Crop and Livestock Insurance, Food security and PDS, Agricultural Labour and Rural Unemployment, Rural Employment Schemes, Evaluation of Rural Credit Policies, Financial Sector Reforms and Rural Credit, Microfinance- Self-Help Groups and NGO's, Agricultural Marketing, WTO and Indian agriculture.

Unit-IV: The Industrial Sector

Industrial Growth in India: Trends and Prospects, Public Sector Enterprises and Their Performance, Industrial Sickness, Privatisation and Disinvestments Debate; Growth and Pattern of Industrialization; Small-Scale Industries: Definition, Performance and Policy, Productivity in Industrial Sector; Exit Policy - Issues in Labour Market Reforms; Approaches for Employment Generation; Industry and WTO.

Unit-III: Economic Reforms

Rationale of Internal and External Reforms; Key Economic Reforms introduced in India and their impact; Financial Sector Reforms– Banking Sector Reforms and Narasimham Committee, Financial Sector Legislative Reforms Commission (FSLRC); Fiscal policy reforms– Tax reforms since 1991; Fiscal consolidation and FRBM Act; Goods and service Tax (GST)Inclusive growth in India; Financial Inclusion.

Unit V: External Sector and Economic Reforms

Structure of India's foreign trade– Trends in volume, direction, and composition; Background of economic reforms– trade policy reforms, Recent trade policy Exchange rate policy– exchange rate management in India; Issue of current and capitalaccount convertibility; Role of FDI and MNCs; Globalisation of Indian economy; WTO and its impact. Start-Up India and Make in India Policy.

Course Delivery

-Lectures

-Presentations

-Group Discussions

Assessment

-Written Assignment and Presentation: 14 marks

-Mid Term Test: 16 marks

-Attendance: 10 marks

Programme: Programme: M.A. Economics

Course Title: Industrial Economics

Course Code: MAE-335

Course Objectives: The aim of this course is to provide knowledge to the students on the basis of issues such as pricing policy, efficiency, demand analysis, forecasting, productivity, capacity utilization and the issues involved in the industrial development in India. The objective is to provide a thorough knowledge about industrial economics in Indian context.

Course Outcomes:

CO1: To be familiarized with various concepts regarding organization and efficiency.

CO2: To be familizarized with different forms of market structure.

CO3: To explain the factors determining growth and industrial location.

CO4: Students can explain measurements of financial ratios and their role in industrial performance.

CO5: They can pin down factors affecting investment decisions.

Syllabus

Unit I: Concept, organization and Efficiency

Meaning and Scope of Industrial Economics, Organisational Pattern of Firms-Private Sector, Public Sector and Joint Sector; objectives of a firm, Industrial Efficiency-Meaning, Determinants and its Measurement; Profitabiliyy-Concept and Measurement.

Unit II: Market Structure and Demand Forecasting

Market Structure-Standard Forms of Market Structure, Concept of Workable Competition, Market Concentration-Concept and Its Measurement; Demand Forecastinh-Need, Types and Techniques; Meanings and Obectives of Diversification, Vertical Integration and Merger-Its Motives and Measurement.

Unit III: Growth of Firm and Industrial Location

Theories of growth of firm-Downie, Penrose and Marris Theories; Industrial Location Analysis Determinants of Industrial Location, Industrial Location Theories-Weber and Sargent Florence, Causes of Industrial Imbalance, Industrial Locational Pattern in India.

Unit IV: Industrial Finance

Industrial Finance: Need, Types and Sources of Finance; Financial Ratios-Its classification and description, Interrelatedness of Financial Ratios, Standards for Comparison of Financial Ratios; Problems of Financial Analysis, Profitability-Concept and Its Measurement.

Unit V: Investment Decisions

Programme: Programme: M.A. Economics

Nature and Types of Investment Decisions, Methods of Project Evaluation-the Payback Method, the Net Present Value Method (NPV) , Internal Rate of Return Method(IRR), Appraisal of Public Projects-Shadow Pricing (Little Mirrlees and UNIDO approaches), Social Cost-Benefit Analysis.

Course Delivery

-Lectures

-Presentations

-Group Discussions

Assessment

-Written Assignment and Presentation: 14 marks

-Mid Term Test: 16 marks

-Attendance: 10 marks

-Internal Exam: 40 marks

-External Exam: 60 marks

Programme: Programme: M.A. Economics

Course Title: Statistical Methods

Course Code: MAE – 223

Course Objectives:

The course introduces basic and advanced statistical concepts and methods that are vital for understanding and interpretation of various economic issues and concepts. The course is essential for conduct of research and basic data analysis, which has been increasingly become popular in all walks of life. Statistics is one of the most useful subjects in academic, professional and corporate world. In this respect the course is aimed at enhancing the understanding, interpretation and data analysing skills of students.

Course Outcomes:

CO-1: Introducing the basic Statistical concepts and appreciate the importance and use of Descriptive statistics.
CO-2: To be able to understand and use correlation and regression analysis in data analysis and interpretation.
CO-3: To understanding data and Probability Distributions as fundamentals tools for Inferential Statistics.
CO-4: To understand the basics of Sampling and data collection using sampling techniques.
CO-5: To be able understand basics of hypothesis testing and some basic techniques and tests used in data analysis and research.

Syllabus

Unit I: Elementary Statistics

Introduction to Basic Statistics; Data Collection Methods; Types of Data; Frequency Distribution: Measures of Central Tendency; Measures of Dispersion, Range, Quartile Deviation, Mean Deviation, Standard Deviation, Moments Skewness and Kurtosis, with their characteristics.

Unit II: Correlation and Regression

Correlation- Methods of Measuring Correlation– Graphical Methods and Algebraic Methods– Karl Pearson's Coefficient of Correlation and Spearman's Rank Correlation Coefficient; Properties of Correlation Coefficient; Partial and Multiple Correlations; Simple Linear Regression, Multiple Regression.

Unit III: Probability and Distribution

Meaning and Definition of Probability– Classical and Empirical Definitions of Probability; Deterministic and non-Deterministic Experiments; Types of Events; Laws of Addition and

Multiplication; Conditional Probability and Concept of Independence; Baye's Theorem and its Applications. Probability Distributions, Normal Distribution, Binomial Distribution, Poisson Distribution& their Characteristics.

Unit IV: Theory of Sampling and Estimation

Sampling & Types of Sampling Techniques. Sampling Design– Steps in Sampling Design, Characteristics of a Good Sample Design; Concept of Estimator and; Estimation– Types of Estimators and their Properties; Characteristics of Good Estimator– Small and Large Sample Properties; Standard Error of an Estimate.

Unit V: Hypothesis Testing

Testing of Hypothesis; Level of Significance, Confidence Limits and Critical Region; Type I and Type II Error; One Tailed and Two Tailed Tests; Parametric Tests– A Conceptual Introduction of Z– Test, T– Test, Chi– Square Test, F– Test.Introduction to Nonparametric Methods, Principal Components and Factor Analysis, Analysis of Variance – One Way.

Course Delivery

-Lectures

-Presentations

Assessment:

-Assignment and Presentation: 14 marks

-Mid Term Test: 16 marks

-Attendance: 10 marks

Programme: Programme: M.A. Economics

Course Title: The Principles of Banking

Course Code: ECO-221

Course Objectives: This course links the fields of macroeconomics and central banking. The role of money in the economy and the impact of monetary policy on the macro economy are examined. The course aims at providing students with the means to analyse monetary questions and institutions. It is not a course designed to further technical expertise in the instruments used in financial markets.

Theories will be introduced during the lectures. Practical applications to current issues in money and banking will be discussed during the bi-weekly seminar. This course links the fields of macroeconomics and central banking. The role of money in the economy and the impact of monetary policy on the macroeconomy are examined. The course aims at providing students with the means to analyze monetary questions and institutions. It is not a course designed to further technical expertise in the instruments used in financial markets.

Course Outcomes:

On successful completion of this course, students will be able to:

CO1: Identify the economic principles underlying the operation of financial intermediaries.

CO2: Explain how central banks conduct monetary policy.

CO3: Use models to analyze monetary and macroeconomic issues.

CO4: Conduct a theoretical analysis of real-world issues and phenomena.

CO5: Explain the importance and relevance of money in economic world.

Syllabus

Unit 1: Money

Barter System, Evolution of Money, Money-concept, Classification and Functions, Money and Near Money, System of Note Issue, Measures of Money Supply in India, Quantity Theory of Money.

Unit II: Monetary Standards

Concept of Monetary Standard, Metallic Standard, Monometallic, Bimetallism, Paper Standard, Gold Standard, Meaning , Functions and Characteristics, Concept of Interest Rates

Unit III: Central Banking System

Central Banking and Indian Money Market, Meaning and Functions of Central Bank, Objectives and Methods of Credit Control- Quantitative and Qualitative Methods, Role and

Functions of Reserve Bank of India, Structure, Functions and Weaknesses of Indian Money Market.

Unit IV: Banking System

Commercial Banking, Meaning and Functions of Commercial Banks, Process of Credit Creation-Purpose and Limitations , Liabilities and Assets of Banks, Investment Policy of Commercial Banks, Commercial Banks and Economic Development , Banking Sector Reforms in India.

Unit V: Inflation

Business Cycle- Features, Phases, Causes and Consequences, Definition and Measurement of Inflation, Types of Inflation, Impact of Inflation, Measures to Control Inflation, Monetary and Fiscal Policies: Objectives , Instruments.

Course Delivery

-Lectures

-Presentations

-Group Discussions

Assessment

-Written Assignment and Presentation: 14 marks

-Mid Term Test: 16 marks

-Attendance: 10 marks

-Internal Exam: 40 marks

-External Exam: 60 marks

Programme: Programme: M.A. Economics

Course Title: Public Finance

Course Code: MAE-332

Course Objectives:

The Course aims to equip the students with focused and relevant knowledge about the theoretical and empirical developments in Public Finance and to give students a thorough understanding of the principles of public Economics that apply to Macro Economic issues Like Inflation, Indian Tax Policy, Issues in the social Sector, and Public finance system in view of Indian Budget. Procedures connected to Horizontal and vertical Devolution in view of rate of Unemployment and Growth.

Course Outcomes:

On completion of the course students would be able to:

CO1: Understand the sources of finance both public and private, demonstrate the role of government to correct market failures and possible advantage of public financing.

CO2: Attain the advantages and knowledge of public investments and other government expenditures.

CO3: Understand the causes of growing public expenditures for various programmes and policies within and outside the country.

CO4: Understand the possible burden, benefits and distribution of various types of taxes among various classes of people, know the general trend and impact on general welfare and arouse them to suggest good and bad tax system.

CO5: Understand the needs of public borrowing from all possible sources to meet necessary public investment/expenditures. Also be alerted to find sources for repayment.

Syllabus

Unit -I: Issues in Macro Economics Definition and measurement of inflation, Types of inflation, Impact of inflation, Measures to control Inflation. Monetary and Fiscal Policies: Objectives, Instruments. Inflation, Measurement of Inflation: WPI & CPI in India- System of weighting and issues in computation,

Unit- II : Indian Tax Policy

Features and Assessment of The Indian Tax System, Role of Taxation (Tax Policy), Role of public Borrowing in mobilization of Resources, External Finance, Grants Vs Foreign Loans, Role of deficit financing in mobilization of resources, Surpluses of the public Enterprises,

Programme: Programme: M.A. Economics

Unit- III : Issues in Social sector and Public policy

Social Sector - Theoretical Paradigms : Approaches &Definition, Theories of Social Sector: Social Exclusion & Inclusion, Social Development Index , Human Resource Development &Human Development : Differences and Linkages, Measurement of Various Forms of Human Development – Special characteristics of Education, Health, Nutrition

Unit-IV: The Public Budget and Federal Finance

The Kinds of Budget, Classification of Budgets: Economic Classification and Functional Classification, Performance and Programme Budgeting System (PPBS), Zero-Base Budgeting, Balanced Budget-Arguments for Balanced Budget, Arguments against Balanced Budget, The Balanced Budget Multiplier, Fiscal Policy and Stability

Unit-V: Wages and Unemployment

Business cycle- features, phases, causes and consequences, Wage rigidity and structural unemployment, Relationship between Inflation and unemployment in closed and open economy, Monetary and Fiscal policies as Stabilizers, Fiscal Road map and debt relief to the states.

Course Delivery

-Lectures

-Presentations

-Group Discussions

Assessment

-Written Assignment and Presentation: 14 marks

-Mid Term Test: 16 marks

-Attendance: 10 marks

Programme: Programme: M.A. Economics

Course Title: International Economics

Course Code: MAE-331

Course Objective: The course aims to familiarize students with different schools of thought investigating how international trade is beneficial for all trading countries, and factors affecting the dynamics of imports and exports of an economy. The course is intended to acquaint students about various policy options available for monetary authorities to deal with situations of macroeconomic instability at a time when economies are increasingly becoming globalized. Besides, it also aims at enhancing awareness about the anatomy of the international economic crisis that affected global economy, in the past several decades.

Contents:

UNIT -I: Theory of International Trade – I

Significance and scope of International Economics, Economic Basis ofInternational Trade, Contributions of Adam Smith, David Ricardo and J. S, Mill tothe theory of International Trade, Theory of Opportunity Cost.

UNIT -II: Theory of International trade- II

Modern Theories of International Trade: Heckscher-Ohilin Theory of I rude and itsempirical verification, Rybeznski Theorem, The Stolper – Samuelson Theorem,Factor-Price-Equalization Theorem, International Trade in Specific Factors Model,Imperfect Competition and Iuuernationa1 Trade: Concept of Intra-Industry Trade,its Basis Measurement and Significance, New Theories of Trade : Kravis andLinder.

UNIT- III: Gains from Trade and International TradePolicy

Concepts of Terms of Trade, their uses and limitations, Hypotheses of SecularDeterioration in Terms of Trade, Reasons for Deterioration in Commodity Termsof Trade and Policy Implications for Developing Countries; Trade as Engine of30Growth: Concept of ImmiserizingGrowth, Empirical Evidence and Policy Issues;Theory of Interventions: Tariffs, Quotas and Non-Tariff Barriers to InternationalTrade, Economic Effects of Tariffs and Quotas (Partial and General EquilibriumAnalysis); Theory of Optimum Tariff, Concepts of Nominal and Effective Tariffs.

UNIT -IV: Balance of Payments

Meaning and Components of Balance of Payments, Equilibrium and Disequilibrium in the Balance of Payments (BOP), Process of Adjustment under Fixed and Flexible Exchange Rate Regimes, Expenditure Changing and Expenditure Switching Policies for Balance of Payments (BOP) Adjustment, Policies for Achieving Internal and External Equilibrium simultaneously: Mundell- Flemming Model, The Monetary Apporach to the Theory of Balance of Payments
(BOP) adjustment.

UNIT-V: Contemporary Issues in International Economics: Reform of the International Monetary System, International Capital Flows. International Debt Crisis**.** Global Financial crisis of 2008; Asian crisis of 1997; Financial Crisis in Emerging Market. Problems of international banking, Problems of international finance for developing countries); Financial and economic crisis - Recent financial crises (Mexico 1994, Asia 1997-98, Russia 1998, Sub-

prime mortgage crisis of 2008-09, What was the same, and what was different in 2008-09, European crisis in 2010-15, Russian crisis in 2014-15)

Course Delivery

-Lectures

-Presentations

-Group Discussions

Assessment

-Written Assignment and Presentation: 14 marks

-Mid Term Test: 16 marks

-Attendance: 10 marks

Course Outcomes:

CO1: After going through this course, the students will be able to explain logically why international trade is beneficial for trading countries.

CO2: They will have understanding of the modern theoretical insights regarding different aspects of the international trade not covered by the traditional theories.

CO3: They will understand the gains from trade and the implications of various trade policies on the welfare of nations.

CO4: The students will be familiarized with various concepts regarding the Balance of Payments and available policy options to achieve equilibrium in both internal and external sectors of the country.

CO5: They will be acquainted with contemporary issues in international economics including various financial crisis across the world over past few decades.

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5. Dominick Salvatore (2004) *International Economics*, John Wiley & Sons Inc.
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8. Paul R. Krugman and Maurice Obstfeld (2007), *International Economics:* Theory and Policy, Pearson Education, New Delhi.
9. Sodersten Bo (1991) *International Economics*, The Macmillan Press Ltd. London.

Programme: Programme: M.A. Economics

Course Title: International Political Economy

Course Code: MAE - 442

Course Objectives:

This paper deals with theoretical and practical aspects of interaction between International Politics and Economics. It provides insights into significant issues that need critical consideration in the era of globalisation. The basic objective of this course is to enable the students to graduate from the basics of the discipline to a higher level of critical analysis of the issues that determine global economic frame of reference.

Contents:

Unit-I: International Political Economy

International Political Economy: Meaning, Traditional Schools of International Political Economy. The invention of the world economy, The Economic Revolution. Origins of the Third World, Major problems of third world economies, inequality, structural transformation. Ancient and Medieval Economic Growth.

Unit II: The International Trade System

The International Trade System: Meaning; the Creation of the Post-war Trade System; Evolution of the Multilaterals Trade System; The Problem of Trade Cooperation; The Politics of Trade Liberalization; Multilateral Institutions an Trade Cooperation; Protection: Protection and its Consequence the structure of Protection in the Advanced Industrialized Countries; The Economic Consequences of Protection.

Unit -III: The Theory of Regional Blocks

Forms of Economic Cooperation; Static and Dynamic effects of a Custom Union: Production effect; Consumption Effects. European Union (EU) and North American Free Trade Agreement (NAFTA). Economic Progress of SAARC, SAFTA, etc. for Asian Economic Cooperation; Problems and Prospects of forming customs union in the Asian Region: Globalization: meaning; essential conditions for Globalization; implications and impact of Globalization.

Unit-IV: International Trade and Financial Institutions

The international Monetary System: The rise and fall of Gold Standard and Bretton Wood System (the interwar periods); Present International Monetary System 1M17: Objectives; functions; Conditionality clause of the IMF; The Collapse of Bretton Wood System; World Bank: and its contribution - limitations. GATT and WTO: GATT and Trade Liberalization: The Doha Declaration; WTO and Developing Countries with Special reference to India; Trade Related Investment Measures (TRIMs), Trade related aspects of Intellectual property (TRIPs) and General Agreement of Trade in Services (GATS).

Unit- V: Current Development and Problems in the International Economy

Asian Crisis and the lessons for the developing countries like India; Impact of Trade Reforms Since 1991 on Balance of Payments, Multinational Corporations: Definitions, benefits; domestic politics and MNCs; The Host Country Dilema; Regulating MNCs activity in

Developing Countries; international Regulation of MNCs. International Devt: Debt-Growth link; Magnitude of Debt Problem; Causes of Debt problem; Remedial and preventive measures; Reasons for sharp rise in India's External Debt.

Course Delivery

-Lectures

-Presentations

-Group Discussions

Assessment

-Written Assignment and Presentation: 14 marks

-Mid Term Test: 16 marks

-Attendance: 10 marks

Course Outcomes:

CO-1: To understand the basic theoretical framework and various issues in the focus of International political economy.

CO-2: To understand the evolution of international trade system and appreciate the role of Multilateral institutions in Economic coordination among countries.

CO-3: To understand the basics concepts relating to regional trade cooperation and evaluate the progress of some prominent regional trading arrangements.

CO-4: To understand the evolution and functioning of international trade and financial institutions.

CO-5: To understand the dynamics between international institutions, MNCs and third-world countries with reference to India.

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