Semester-VIII

Theory Courses

Course Code	Title	Scheme of Examination				Hrs./Week		
		Duration (hrs)	IA	UE	Total Marks	L	T	P
ITE-821	Major Project-Phase-2		250	200	450			
	Elective-III	3	40	60	100	3	1	0
	Elective-IV	3	40	60	100	3	1	0
Total			330	320	650			

Elective Papers in VIII semester:

- Students will be required to opt for two elective papers from ITE-841 to ITE-852.
- The choice of electives will rest with the students. However, in no case will the department run more than two subjects for one elective paper.

Electives-III & IV

CODE	SUBJECT	CODE	SUBJECT
ITE-841	Grid Computing	ITE-847	Bio Informatics
ITE-842	Distributed Databases	ITE-848	Wireless Networks
ITE-843	Disaster Management	ITE-849	Embedded Systems
ITE-844	Cloud Computing	ITE-850	Expert Systems
ITE-845	Pattern Recognition	ITE-851	Advanced Microprocessors & Microcontrollers
ITE-846	Neural Networks	ITE-852	Multimedia

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- After completing the Major Project-Phase I in semester VII the students are required to complete the Major Project- Phase II during semester VIII. Depending upon the infrastructure, computing and other laboratory facilities the students shall be offered in house project on campus or they can complete their project work in any organization/industry outside the campus. Major Project- Phase II shall be evaluated as per university statues.

- For each theory course the assessment pattern will be as shown in table 1.

Table 1: Distribution of Weightage for theory courses of 100 marks.

Continuous Assessment		**University Examination**	
Component	**Weightage**	**Component**	**Weightage**
Cyclic Test 1	15	Written Examination	60
Cyclic Test 2	15		
Assignment 1	05		
Assignment 2	05		
Total	**40**		**60**

- For laboratory courses the assessment pattern will be as shown in table 2.

Table 2 Distribution of Weightage for laboratory courses of 50 marks.

Continuous Assessment		**University Examination**	
Component	**Weightage**	**Component**	**Weightage**
Continuous assessment of practical work, timely submission of lab records.	15	Lab experiment/procedure/ writing /tabulation/innovation as applicable	15
Test	10	Viva Voce	10
Total	**25**		**25**

Semester VIII

Elective

Course Title: Grid Computing **Max Marks: 100**
Course Code: ITE-841 **University Exam: 60**
Duration of Exam: 3 hours **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.

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.

Semester VIII

Elective

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.

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.

Semester VIII

Elective

Course Title: Disaster Management **Max Marks: 100**
Course Code: ITE-843 **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)

Text Books:

1. Krishnamurthy et al ***D M Glo Chall*** 1st Edition, Universities Press (2009).
2. Bhattacharya T. ***D Sci a M*** Tata McGraw Hill.

References:

1. Mullick N. H. ***D M*** , 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.

Semester VIII

Elective

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.

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.

Semester VIII

Elective

Course Title: Pattern Recognition **Max Marks: 100**
Course Code: ITE–845 **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 Pattern Recognition.

Unit-I

Introduction to Pattern Recognition, Types of Images, Regular Pattern, Irregular Pattern, Fuzzy Methods. Statistical Pattern Recognition, Feature Selection, Syntactic Pattern Recognition, Clustering and Non-Supervised Learning Methods.

Unit-II

Combined Detection Method, Edge Detection, Edge Linking, Gradient. Laplacian, Line Detection, Method Based, Point Detection, Snake Methods.

Unit-III

Boundary Description Detection, Matching, Merging Segmentation, Smoothing, Splitting of Boundaries Syntactic, Analysis of Region Boundaries and Study of Shape by Region Analysis.

Unit-IV

Explanation of how Fuzzy Approach can be applied to Pattern Recognition, Classificatory Analysis Preprocessing, Feature Detection and Primitive Extraction, Adaptive Classification of Fuzzy Grammar.

Unit-V

Algorithms for Pattern Recognition, Neural Network Fundamentals, Approaches for Pattern Recognition. Simulation Exercises.

Text Books:

1. **Rajjan Shingal,** Pattern Recognition Techniques & Applications, John Wiley & Sons.
2. **Earl Gose,** Pattern Recognition and Image Analysis, PHI.

Reference Books:

1. **Robert Scholkofe,** Pattern Recognition – Statistical, Structural & Neural approach**,** John Wiley & Sons.
2. **Duda & Harts,** Pattern Classification and Scene Analysis, John Wiley & Sons.

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.

Semester VIII

Elective

Course Title: Neural Networks **Max Marks: 100**
Course Code: ITE-846 **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.

Unit-V

Applications: Character Recognition, Signal Restoration, Pattern Recognition. Matlab Simulation Exercises.

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.

Semester VIII

Elective

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.

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.

Semester VIII

Elective

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.

Text Books:

1. **William Stallings**, "Wireless communications & Networking", Prentice Hall
2. **Kaven Pahlavan**, "Principles of Wireless Networks", Pearson Education India.

References:

1. **Nicopolitidis Obaidat H. 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.

Semester VIII

Elective

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.

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.

Semester VIII

Elective

Course Title: Expert Systems **Max Marks: 100**
Course Code: ITE-850 **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.

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.

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.

Semester VIII

Elective

Course Title: Adv Microprocessors & Microcontrollers **Max Marks: 100**
Course Code: ITE-851 **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 Advanced Microprocessors and Microcontrollers.

Unit-I

Introduction: 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

Pin Diagram of 8086: Pin Diagram of 8086, Interrupts of 8086, Minimum Mode and Maximum Mode of Operation. Timing Diagram. Memory Interfacing.

Unit-III

Assembly Language Programs of 8086: Assembly Language Programs of 8086 Involving Logical, Branch & Call Instructions, Sorting, Evaluation of Arithmetic, Expressions, String Manipulation.

Unit-IV

Micro-Controllers: 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

8051: 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.

Text Books:

1. **A.K.Ray and K.M.Bhurchandi**, Advanced microprocessor and Peripherals, TMH.
2. **Deshmukh**, Micro Controllers, Tata McGraw Hill, Edition.

Reference Books:

1. **Douglas U. Hall**, Micro Processors & Interfacing, 2007.
2. **Liu and GA Gibson,** Micro Computer System 8086/8088 Family Architecture, Programming and Design, 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 selecting at least one question from each unit.

Semester VIII

Elective

Course Title: Multimedia **Max Marks: 100**
Course Code: ITE-852 **University Exam: 60**
Duration of Exam: 3 hours **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.

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.