Semester-V

Theory Courses

Course Code	Title	Scheme of Examination				Hrs./Week		
		Duration (hrs)	IA	UE	Total Marks	L	T	P
ITE-521	Theory of Automata	3	40	60	100	3	1	0
ITE-522	Visual Programming	3	40	60	100	3	1	0
ITE-523	Software Engineering	3	40	60	100	3	1	0
ITE-524	Digital Communication System	3	40	60	100	3	1	0
ITE-525	Computer Graphics & Multimedia	3	40	60	100	3	1	0
ITE-526	Computer Organization & Architecture	3	40	60	100	3	1	0
Total			**240**	**360**	**600**			

Laboratory Courses

ITE-531	Visual Programming	2	25	25	50	0	0	2
ITE-532	Digital Communication System	2	25	25	50	0	0	2
ITE-533	Computer Graphics & Multimedia	2	25	25	50	0	0	2
Total			**75**	**75**	**150**			
Total (Theory + Lab)			**315**	**435**	**750**			

Semester V

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.**Semester V**

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.

Semester V

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.

Semester V

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.

Semester VI

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.

Semester V

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.

Semester V

Course Title: Visual Programming **Max Marks: 50**
Course Code: ITE-531 **University Exam:25**
Duration of Exam: 3 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

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

Semester V

Course Title: Digital communication System **Max Marks: 50**
Course Code: ITE-532 **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

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

Semester V

Course Title: Computer Graphics & Multimedia **Max Marks: 50**
Course Code: ITE-533 **University Exam:25**
Duration of Exam: 3 hours **Internal Assessment: 25**

List of Experiments:

1. To draw a line using DDA Algorithm.
2. To draw a line using Bresenham'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.

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