

ANNEXURE I
GOA UNIVERSITY
SECOND YEAR OF BACHELOR'S DEGREE COURSE IN INFORMATION TECHNOLOGY
SCHEME OF INSTRUCTION AND EXMINATION

SEMESTER III

Sub Code	Subjects	Scheme of Instruction Hrs/Week			Scheme of Examination					
		L	T	P	Th. Dur (Hrs)	Marks				
						Th.	S	P	O	Total
IT 3.1	Applied Mathematics III	3	1	0	3	100	25	-	-	125
IT 3.2	Numerical Methods	3	0	2	3	100	25*	-	-	125
IT 3.3	Analog & Digital Circuits	3	1	2	3	100	25*	-	-	125
IT 3.4	Computer Organization & Architecture	3	1	2	3	100	25*	-	-	125
IT 3.5	Data Structures using C	3	1	2	3	100	25*	50	-	175
IT 3.6	System Analysis & Design	3	1	2	3	100	25*	50	-	175
	TOTAL	18	05	10	-	600	150	100	-	850

*20 marks for Internal Tests and 5 marks for internal practical test

SEMESTER IV

Sub Code	Subjects	Scheme of Instruction Hrs/Week			Scheme of Examination					
		L	T	P	Th. Dur (Hrs)	Marks				
						Th.	S	P	O	Total
IT 4.1	Discrete Mathematical structures	3	1	0	3	100	25	-	-	125
IT 4.2	Signals & Systems	3	1	0	3	100	25	-	-	125
IT 4.3	Computer Hardware & Troubleshooting	3	1	2	3	100	25*	-	-	125
IT 4.4	Microprocessors & Interfacing	3	1	2	3	100	25*	50	-	175
IT 4.5	Design & Analysis of Algorithms	3	1	2	3	100	25*	-	-	125
IT 4.6	Object Oriented Programming System	3	1	2	3	100	25*	50	-	175
	TOTAL	18	06	08	-	600	150	100	-	850

*20 marks for Internal Tests and 5 marks for internal practical test

L-Lectures, T-Tutorials P-Practicals
Th-.Dur.- Duration of Theory paper
Th-Theory, S-Sessional, P-Pracital, O-Oral.

ANNEXURE II

IT 3.1 APPLIED MATHEMATICS – III

Lectures Per week	:(3+1+0)
Max Marks for Theory paper	:100
Max marks for sessionals	:25
Duration of Paper	:3 hours
Total Number of Modules	:4
Number of Questions from Each Module	:2 (Each question shall carry 20marks)
Total Number of Questions to be answered	:5(At least one question from each module with two compulsory questions from any one module)

MODULE 1

Linear Algebra: Types of Matrices, Determinants, Adjoint inverse of Matrices, Elementary transformation, rank using elementary transformation, Canonical and normal form, system of equations $AX = B$ and $AX = 0$, linearly independent systems. (6hr)

Eigen values, Eigen vectors, properties, similar Matrices, Cayley Hamilton theorem, Applications, Minimal polynomial, Diagonalization, function of Matrices. (5hr)

MODULE 2

Z-Transforms, Inverse, convolution, properties, Applications. (4hr)

Probability: Classical definition, Axiomatic definition, Sample space, events, Independent events, Conditional probability, theorem of total probability, Baye's theorem of probability. (7hr)

MODULE 3

Random variables: Discrete and Continuous distribution, density function, Marginal and conditional distribution, Stochastic independence. (4hr)

Discrete probability distribution: Binomial, Multinomial, Poisson, Geometric and Hypergeometric.

Continuous probability distribution: Uniform, exponential, Normal and Gamma. (4hr)

Expectation: Expectation of function, Variance, moment generating function, Characteristic function. (4hr)

MODULE 4

Laplace Transforms, inverse, properties, convolution and application. (6hr)

Fourier Transforms, Inverse, convolution, properties, applications. (5hr)

TEXT BOOKS:

1. Applied Mathematics –III-By R. M. Baphana Technova Publication
2. Engineering Mathematics (for semester III) by T Veerajan, Tata MCGraw-Hill Publishing Company
3. Engineering Mathematics Voll-III P. Kandasamy S.Chand &Company

REFERENCE BOOKS:

1. A First Course in Probability by Ross. S, Collian Mac Millan, NewYork.
2. Probability and Statistics in engineering and Management Science by William W. Hines, John Wiley and Sons Publications
3. Advanced Engineering Mathematics by Kreyazig.
4. A Text Book of Matrices by Shanti Narayan, S. Chand and Company
5. Engineering Mathematics by C. N. Tembhekar & P.D.Shobhane, Das Ganu Prakashan
6. Theory and Problems in Matrices, Schaum outline series.
7. Engineering Mathematics, Vol. I & II, S.Chand and Company.
8. Theory & Problems of Probability and statistics by Murray R. Spiegel, Schaums outline series.
9. Introduction to Probability and Statistics by Seymour Lipschutz, Schaums outline series.

IT 3.2 NUMERICAL METHODS

Lectures Per week	:(3+0+2)
Max Marks for Theory paper	:100
Max marks for sessionals	:25(20 for Internal test and 5 for internal practical test)
Duration of Paper	:3 hours
Total Number of Modules	:4
Number of Questions from Each Module	:2 (Each question shall carry 20marks)
Total Number of Questions to be answered	:5(At least one question from each module with two compulsory questions from any one module)

MODULE 1 (12 hours)

1) Introduction to Numerical Computing(3 hrs)

Introduction, Numeric data, Analog computing, Digital computing, Process of numerical computing, Characteristics of Numerical computing, computational environment.

2) Approximations and Errors in Computing (3 hrs)

Inherent errors, Numerical Errors, Absolute and Relative errors, Convergence of Iterative Processes

3) Solutions of Non-linear equations (3 hrs)

Bisection Method, False Position Method, Newton Raphson, Secant method,

4) Direct solution of Linear Equations (3 hrs)

Solution by Elimination, Basic Gauss Elimination method, Gauss Elimination with pivoting, Gauss – Jordan method

MODULE 2 (11 hours)

Iterative Solutions of Linear Equations (3 hrs)

Jacobi iteration method, Gauss Seidel method, Method of relaxation, convergence of iteration methods.

Interpolation (5 hrs)

Linear Interpolation, Lagrange's Interpolation Polynomial, Newton's Interpolation Polynomial, Divided difference table, Interpolation with Equidistant points.

Regression (3 hrs)

Fitting Linear Equations, Fitting transcendental equations, Fitting polynomial function

MODULE 3 (11 hours)

Numerical differentiation (5 hrs)

Differentiating Continuous Functions, Differentiating Tabulated functions, difference tables, Richardson Extrapolation

Numerical Intergration (6 hrs)

Trapezoidal Rule, Simpson's 1/3 rule, Simpson's 3/8 rule, Romberg Intergration

MODULE 4 (11 hours)

Numerical Solution of Ordinary Differential equations (6 hrs)

Taylor Series Method, Euler's methods, Heun's Method, Polygon Method, Runge-Kutta methods

Numerical Solution of Partial Differential Equations (5 hrs)

Deriving differential Equations, Elliptic Equations, Parabolic Equations, Hyperbolic Equations

TEXT BOOKS:

1. Numerical Methods by E. Balaguruswamy, Tata Mc Graw Hill.
2. Introductory Methods of Numerical Analysis by S. S. Shastri, PHI

REFERENCE BOOKS:

1. Numerical Algorithms by E.V. Krishnamurthy and Sen, PHI
2. Computer Oriented Numerical Techniques by Rajaraman, PHI
3. Numerical Methods in Engineering and Science by B.S. Grewal, Khanna Publications

IT 3.3 ANALOG AND DIGITAL CIRCUITS

Lectures Per week	:(3+1+2)
Max Marks for Theory paper	:100
Max marks for sessionals	:25(20 for Internal test and 5 for internal practical test)
Duration of Paper	:3 hours
Total Number of Modules	:4
Number of Questions from Each Module	:2 (Each question shall carry 20marks)
Total Number of Questions to be answered	:5(At least one question from each module with two compulsory questions from any one module)

Module 1

Number Systems and Codes Conversions (binary to decimal and decimal to binary), Octal and hexadecimal numbers, Codes (ASCII, Excess-3, Gray), Error detection and correction codes.

Arithmetic Circuits Binary Addition & Subtraction, Unsigned binary numbers, 2's Complement Representation & Arithmetic, Adder-Subtractor. (4 hrs)

Digital Logic: Binary Numbers, basic gates, Boolean algebra, Nor and Nand Gates, And or Invert Gates, De Morgan's theorem, Positive and Negative Logic. (3 hrs)

Combination Logic Circuits Boolean laws/theorems, Sum of Products, Truth table, Pairs, Quads, and Octets, Karnagh mapping, Product of Sums Method and Simplification

Data Processing Circuits Multiplexers, Demultiplexers, decoder, BCD to decimal decoder, 7-segment decoder, encoders. (4 hrs)

Module 2

Flip-Flops RS Flip-Flops, Gated Flip-Flops, Edge-Triggered RS, D, and JK Flip-Flops, Flip-Flop timing, JK Master-Slave Flip-Flops (4 hrs)

Registers Types of Registers, Serial in-serial out, Serial in-parallel out, Parallel in-serial out, Parallel in-parallel out, Ring counters (3 hrs)

Counters Asynchronous counters, Synchronous counters, changing the counter modulus, decade, and shift counters, A MOD-10 shift counter with decoding .

D/A and A/D conversion Asynchronous counters, Synchronous counters, changing the counter modulus, decade, and shift counters, A MOD-10 shift counter . (4 hrs)

Module 3

Op-amp – ideal characteristics – op-amp-as inverting amplifier – op-amp.as non-inverting amplifier – input offset voltage – input offset current – slew rate – Application – adder, subtractor, integrator, differentiator – unity gain buffer – comparator . Opamp as waveform generators. (5 hrs)

Feed back amplifiers – types of feedback – gain with negative feedback – stability of gain – reduction of distortion – effect of feedback on input and output resistance – emitter follower – current series feedback amplifier – differential amplifier – differential mode gain of a differential amplifier – common mode gain – CMRR. (6 hrs)

Module 4

Clocks and Timing Circuits Clock waveforms, TTL clock, Schmitt Trigger, 555 Timers (Astable, Monostable), Monostables with input logic. (6 hrs)

Oscillators – Barkhausen criterion for oscillation – Hartley oscillator – Colpits' oscillator – phase shift oscillator astable multivibrator – Piezoelectric crystals – crystal oscillator. (6 hrs)

Voltage Regulators: Definition, design and letter using IC 723. (6 hrs)

TEXT BOOK S:

1. Modern Digital Electronics – R.P. Jain, II Edn., TMH.
2. OpAmps & Linear Integrated Circuits – Ramakant A. Gayakwad, II Edn., PHI

REFERENCE BOOKS

1. Digital Principles and Applications – A.P. Malvino, Donald P. Leach IV Edn, TMH
2. Digital Computer Electronics – Malvino II Edn., TMH
3. Microelectronics – Jacob Millman, TMH
4. Integrated Electronics: Analog and Digital Electronic Circuits and Systems – Millman and Halkias, TMH.
5. Electronics for Scientist & Engineers – Vishwanathan, Mehta and Rajaraman, PHI.
6. Digital Principles & Applications – Malvino & Leach, PHI
7. Microelectronics – Jacob Millman, Arvin GRabel, II Edn., MGH

IT 3.4 Computer Organization And Architecture

Lectures Per week	:(3+1+2)
Max Marks for Theory paper	:100
Max marks for sessionals	:25(20 for Internal test and 5 for internal practical test)
Duration of Paper	:3 hours
Total Number of Modules	:4
Number of Questions from Each Module	:2 (Each question shall carry 20marks)
Total Number of Questions to be answered	:5(At least one question from each module with two compulsory questions from any one module)

MODULE I

I) Introduction to Computer Organization (1 hrs)

Computer System Organization

- Computer components
- Functions
- Interconnection Structure

II) Computer Architecture (1 hrs)

1) Integer Representation

- Unsigned Numbers
- Signed Numbers
 - Signed Magnitude
 - 2's Complement
 - Biased Representation

2) Integer Arithmetic (3 hrs)

- Negation
- Addition
- Subtraction
- Multiplication
 - Unsigned
 - Signed (Booth's Algorithm)
- Division
 - Unsigned
 - Signed

3) Floating Point Representation (1 hrs)

- IEEE 32 bits, 64 bits

4) Floating Point Arithmetic (3 hrs)

- Addition
- Subtraction
- Multiplication
- Division
- Accurate Arithmetic
 - Guard bits
 - Rounding

III) Instruction Set (2 hrs)

- 1) Elements of Machine Instructions
- 2) Representation of Instructions
- 3) Types of Instructions
- 4) Number of Addresses (Instruction Formats)
- 5) Types of Operands
- 6) Addressing Modes

MODULE II

I) Semiconductor Memory (4 hrs)

- 1) Memory Hierarchy
- 2) Characteristics of Memory System
- 3) Semiconductor RAM Memories
 - Internal Organization of Memory Chip
 - Static RAM
 - Asynchronous DRAM
 - Synchronous DRAM
 - Connection of Memory to the processor
 - RAM Bus memory
 - ROM
 - PROM
 - EPROM
 - EEPROM
 - Flash Memory
 - Error Correction

II) Cache Memory (1 hrs)

- 1) Basics of Cache
 - Structure
 - Read operation
- 2) Elements of Cache Design

III) Associative Memory (2 hrs)

- 1) Working principle
- 2) Associative memory cell and array

IV) External Memory (3 hrs)

- 1) Magnetic Disk
 - Floppy
 - Hard Disk
 - Read/Write Mechanism
 - Physical Characteristics
 - Disk performance parameters
- 2) Magnetic Tape
- 3) Optical Memory
 - CD
 - CD-R
 - CD-RW
 - DVD-R
 - DVD-ROM
- 4) RAID

V) Memory Organization and Interleaving (1/2 hrs)

VI) Virtual Memory (1 ½ hrs)

- 1) Logical versus physical address space
- 2) working principle
- 3) Mapping Functions
- 4) Replacement policy

MODULE III

1) Input/Output (4 hrs)

- External Devices
- I/O Modules
- Programmed I/O
- Interrupt Driven I/O (Interrupt Controller and PPI)
- Direct Memory Access (DMA Controller)
- I/O Channel and Processor

2) Asynchronous Data Transfer (2 hrs)

- Strobe Control
- Handshaking
- Asynchronous Serial Transfer
- Asynchronous Communication Interface

3) CPU Structure and Functions (5 hrs)

- 1) Processor Organization
 - 2) Register Organization
 - 3) CPU performance and its factors
 - 4) Instruction Pipeline
 - Basic Concepts of Pipelining
 - Pipeline Performance
 - Pipeline Hazards
 - Structural Hazards
 - Data Hazards
 - Control Hazards
 - 5) Dealing with branches
- 4) Introduction to HyperThreaded Processors and Dual core Processors

MODULE IV

1) Buses (2 hrs)

- Bus interconnection
 - VGA
- Asynchronous v/s Synchronous Buses
- PCI Bus
- SCSI
- USB

2) CISC , RISC (2 hrs)

- Architecture
- Characteristics
- Pipelining
- Overlapped Register Window Concept
- Compiler based Register Organization
 - Examples

3) Multiprocessors (3 hrs)

- Characteristics of multiprocessors
- Types of Parallel Processor
- Interconnection structures
- Interprocessor arbitration
- Cache Coherence
- Multiprogramming v/s Multiprocessing
- Symmetric Multiprocessor

4) Control Unit (2 hrs)

- 1) Micro Operations
- 2) Control of the Processor

5) Hardwired (1 hrs)

- 1) Hardwired Control
- 2) Complete Processor

6) Micro programmed Control Unit (1 hrs)

- 1) Horizontal v/s Vertical microinstructions
- 2) Control Memory
- 3) Micro programmed control unit
- 4) Micro instruction sequencing and execution

Books: -

- 1) Computer Organization And Architecture. Edition VI
By William Stallings
- 2) Computer Organisation and Architecture
By M. Morris Mano
- 2) Computer Organization. Edition V
By Carl Hamacher, Zvonko Vranesic, Safal Zaky

Reference: -

- 1) Computer Organisation And Design. Edition III
By David A. Patterson, John L. Hennesy
- 2) Computer Organization. Edition V
By Carl Hamacher, Zvonko Vranesic, Safal Zaky
- 3) How Computers Work
By Ron White, Timothy Edward Downs
- 3) Computer organization and Design Edition II
By P. Pal chauthauri

IT 3.5 DATA STRUCTURES USING C

Lectures Per week	:(3+1+2)
Max Marks for Theory paper	:100
Max marks for sessionals	:25(20 for Internal test and 5 for internal practical test)
Duration of Paper	:3 hours
Total Number of Modules	:4
Number of Questions from Each Module	:2 (Each question shall carry 20marks)
Total Number of Questions to be answered	:5(At least one question from each module with two compulsory questions from any one module)

MODULE 1 (11 Hrs)

(2 Hrs) **Overview of C Programming:** Control structures, Strings, Functions,

(3 Hrs) **Storage classes and preprocessors, Pointers:** Initializing pointers, Pointer arithmetic, Pointers and function arguments, Pointer to function, Pointers and arrays, Pointers and string, Array of pointers, Pointers to pointer, Memory allocation in C,

(2 Hrs) **Structures:** Structures and functions, Array of structures, Nested Structures, Structures and pointers, Copy structure,

(2 Hrs) **Unions,** User define data type (typedef), enumerated data type, bit fields, symbolic constants, use of structures,

(2 Hrs) **Files:** Working with strings, Formatted input and output with strings, Error while reading a file, Stdin, Stdout, Stderr pointers, Functions: rewind, ftell, fflush, fseek, Erasing files.

MODULE 2 (12 Hrs)

(2 Hrs) Introduction to Data representation and Data Structures: **Arrays:** Representation of arrays and their applications,

(4 Hrs) **Stacks:** Representation of stacks and its applications, **Recursion,**

(3 Hrs) **Queues:** Representation of queues and its applications, Circular queues, Priority queues.

(3 Hrs) **List:** Singly linked list, doubly linked list, circular linked list, linked stacks and queues, and its applications.

MODULE 3 (11 Hrs)

(5 Hrs) **Trees:** Basic terminology, binary trees and their representations, traversals of trees, applications of trees, B-tree, AVL.

(6 Hrs) **Graphs:** Basic terminology, representation of graphs, directed and undirected graphs and their traversals, depth first and breadth first search, spanning trees. Applications of graphs: shortest path problem, topological sorting, matching.

MODULE 4 (11 Hrs)

(6 Hrs) **Sorting:** Basic concept, Exchange sort, Insertion sort, Selection sort, Exchange sort, Merge sort, Radix sort, Heaps and Heap sort.

(5 Hrs) **Searching:** Basic searching techniques, sequential and binary search, tree searching. **Hashing:** Hash function, collision handling mechanisms.

TEXT BOOKS:

1. Data Structures and Algorithms by Alfred V. Aho, John E. Hopcroft & J. D. Ullman, Addison Wesley
2. Data Structures using C & C++ by Yedidyah Langson, Moshej Augenstein, Aaron M. Tenenbaum, Prentice Hall of India
3. Data Structures and Program Design in C by Robert L. Kruse, PHI
4. Fundamentals of Computers and Programming in C, a practical approach by G. S. Baluja and G. K. Baluja publisher : Dhanapat Rai & Co.

REFERENCE BOOKS:

1. Fundamentals of Data Structures by Ellis Horowitz and Sartaj Sahni, Galgotia Publications
2. An introduction to data structures with applications by Jean Paul Tremblay and Paul G. Sorenson – Tata McGrawHill
3. Fundamentals of Computer Algorithms by Ellis Horowitz and Sartaj Sahni – Galgotia Publications

IT 3.6: SYSTEM ANALYSIS AND DESIGN

Lectures Per week	:(3+1+2)
Max Marks for Theory paper	:100
Max marks for sessionals	:25(20 for Internal test and 5 for internal practical test)
Duration of Paper	:3 hours
Total Number of Modules	:4
Number of Questions from Each Module	:2 (Each question shall carry 20marks)
Total Number of Questions to be answered	:5(At least one question from each module with two compulsory questions from any one module)

MODULE-I

- **Systems Concepts and the Information Systems Environment (3hr)**

Introduction. The Systems Concept: Definition. Characteristics of a System: Organization. Interaction. Interdependence. Integration. Central Objective. Elements of a Systems : Outputs and Inputs. Processor(s). Controls. Feedback. Environment. Boundaries and Interface. Types of Systems: Physical or Abstract Systems. Open or Closed Systems. Man-Made Information Systems. Illustration-A Dynamic Personnel Information System Model.

- **The System Development Life Cycle (4hr)**

Introduction. The Systems Development Life Cycle: Recognition of Need-What Is the Problem? Feasibility Study. Analysis. Design. Implementation. Post-Implementation and Maintenance. Considerations for Candidate Systems: Political Considerations. Planning and Control for System Success. Prototyping.

- **The Role of the Systems Analyst (4hr)**

Introduction. Definition. Historical Perspective: The Early Years. The War Effort. What Does It Take to Do Systems Analysis? Academic and Personal Qualifications. The Multifaceted Role of the Analyst: Change Agent. Investigator and Monitor. Architect. Psychologist. Salesperson. Motivator. Politician. The Analyst/User Interface: Behavioral Issues. Conflict Resolution. The Place of the Analyst in the MIS Organization: The MIS Organization. Rising Positions in System Development: The Paraprofessional. The Technical Writer. Conclusions.

MODULE-II

- **Systems Planning and the Initials Investigation (3hr)**

Introduction. Bases for Planning in Systems Analysis: Dimensions of Planning. Initial Investigation: Needs Identification. Determining the Users Information Requirements. Case Scenario. Problem Definition and Project Initiation. Background Analysis. Fact Analysis. Determination of Feasibility.

- **Information Gathering (2hr)**

Introduction. What Kinds OF Information Do We Need? Information about User Staff. Information about Work Flow. Where does Information Originate? Information-Gathering. Tools: Review of Literature, Procedure, & Forms. On-Site Observation. Interviews & Questionnaires. Types of Interview and Questionnaires.

- **The Tools Of Structured Analysis (2hr)**

Introduction. What is Structured Analysis? The Tools of Structured Analysis: The Data Flow Diagram(DFD). Data Dictionary. Decision Tree and Structured English. Decision Tables. Pros and Cons of each Tool.

- **Feasibility Study (2hr)**

Introduction. Systems Performance Definition: Statement of Constraints. Identification of Specific System Objectives. Description of Outputs. Feasibility Considerations. Steps in Feasibility Analysis. Feasibility Report. Oral Presentation.

- **Cost/Benefit Analysis (2hr)**

Introduction. Data Analysis. Cost/Benefit Analysis: Cost and Benefit Categories. Procedure Cost/Benefit Determination. The System Proposal.

MODULE-III

- **The Process and Stages of Systems Design (4hr)**

Introduction. The Process of Design: Logical and Physical Design. Design Methodologies: Structured Design. Form-Driven Methodology-the IPO Charts. Structured Walkthrough. Major Development Activities: Personnel Allocation. Audit Considerations: Processing Controls and Data Validations. Audit Trail and Documentation Control.

- **Input/output and Form Design (3hr)**

Introduction. Input Design: Input Data. Input Media and Devices. Output Design. Forms Design: What Is a Form? Classification of Forms. Requirements of Forms Design. Carbon Paper as a Form Copier. Types of Forms. Layout Considerations. Forms Control.

- **Data Base Design (4hr)**

Data Base Design: Objectives of Data Base. Key Terms. Logical and Physical Views of Data. Data Structure. Normalization. The Role of the Data Base Administrator.

MODULE-IV

- **System Testing and Quality Assurance (3hr)**

Introduction. Why System Testing? What do we test for? The Nature of Test Data. The Test Plan: Activity Network for System Testing. System Testing. Quality Assurance Goals in the Systems Life Cycle. Levels of Quality Assurance. Trends in Testing. Role of the Data Processing Auditor: The Audit Trail.

- **Implementation and Software Maintenance (3hr)**

Introduction. Conversion: Activity Network for Conversion. Combating Resistance to Change. Post-Implementation Review: Request for Review. A Review Plan. Software Maintenance: Maintenance or Enhancement? Primary Activities of a Maintenance Procedure. Reducing Maintenance Costs.

- **Hardware/Software Selection and the Computer Contract (3hr)**

Introduction. The Computer Industry: Hardware Suppliers. Software Suppliers. Service Suppliers. The Software Industry: Types of Software. A Procedure of for Hardware/Software Selection: Major Phase in Selection. Software Selection. The Evaluation Process. Financial Considerations in Selection: The Rental Option. The Lease Option. The Purchase Option. The Used Computer. The Computer Contract: The Art Of Negotiation. Contract Checklist.

- **Project Scheduling and Software (1hr)**

Introduction. Why Do Systems Fail? What Is Project management?

- **Security, Disaster/Recovery, and Ethics in System Development (2hr)**

Introduction. System Security. Definitions. Threats to Systems Security. Control Measures. Disaster/Recovery Planning: The Plan. Ethics in System Development: Ethics Codes and Standards of Behavior.

Suggestion for Practical:

Students are expected to take up at least two Case Studies in SYSTEM ANALYSIS AND DESIGN subject. Implementation is to be with application tools, database tools and test tools. A report needed to be developed and presented during practical exams.

Text Books:

- 1) System analysis and Design by Bliss M Awad II Edition, Galgotia Publications
- 2) System Analysis and Design Methods, Jeffery White & Lonmic D Benter, IV Edition, Galgotia Pub.

Reference Books:

- 1) Introducing System Analysis and Design Vol I and Vol II International Edition NCC
- 2) Analysis and Design of Information System, V. Rajaraman, PHI
- 3) Introduction to SAD, Iger T Haconyszicwych, PHI
- 4) Analysis and Design of Information System, J.A. Sema, THM

IT 4.1: DISCRETE MATHEMATICAL STRUCTURES

Lectures Per week	:(3+1+0)
Max Marks for Theory paper	:100
Max marks for sessionals	:25
Duration of Paper	:3 hours
Total Number of Modules	:4
Number of Questions from Each Module	:2 (Each question shall carry 20marks)
Total Number of Questions to be answered	:5(At least one question from each module with two compulsory questions from any one module)

MODULE-I

Relations, Functions, Equivalence relations, Partially ordered sets, Mathematical Induction, (5hr)
Recurrence relations, Counting, Permutations, Combinations, Pigeonhole Principle, Principle of Inclusion and Exclusion. (6hr)

MODULE-II

Propositional Calculus, Boolean Algebra (5hr)
Algebraic Structures: Monoids, groups, subgroups, cyclic groups, Abelian groups, Homomorphism and isomorphism of groups (6hr)

MODULE-III

Rings, Integral domain, Fields (3hr)
Vectorspaces: Definition, properties, subspaces, Linear combination, Linear span, Linear independence & dependence of vectors, Basis, Finite dimensional vectorspaces. Linear Transformation. (8hr)

MODULE-IV

Graph Theory: Introduction to graphs, representing graphs and graph isomorphism, connectivity, Euler's and Hamiltonian paths, shortest path problems, planar graphs, graph colouring. (6hr)

Introduction to Languages and finite state machines: Regular expressions, Regular Languages, Finite state automata, Grammars and finite state machines. (6hr)

TEXT BOOKS:

- 1) A textbook of Discrete Mathematics by Swapan Kumar Sarkar, S. Chand Publications
- 2) Discrete Mathematics and its applications by Kenneth Rosen, TMH

REFERENCE BOOKS:

- 1) Elements of Discrete Mathematics by C. L. Liu, TMH
- 2) Discrete Mathematical Structures by Dr. D.S.C. Prism Books
- 3) Discrete Mathematics By Seymour Lipschutz, Schaum outline series, TMH
- 4) Discrete Mathematical structures with applications to Computer Science, Trembley and Manohar, TMH
- 5) Graph theory with application to Engineering and Computer Science by Narsingh Deo, PHI

IT 4.2 SIGNALS AND SYSTEMS

MODULE 1

Modeling Concepts and Analysis in Time Domain

Introduction, Examples of Systems, Signal Models, Energy and Power Signals, Energy and Power Spectral Densities, System Modelling Concepts, Superposition Integral with Examples, Properties of Convolution Integral, Impulse Response, Step Response, Frequency Response, Stability.

MODULE 2

The Fourier Series and The Fourier Transform and Applications

Trigonometric and Complex Exponential Fourier Series, Symmetry Properties of the Coefficients, Parseval's Theorem, Line Spectra, Steady State Response Of Distortionless System, Rate of Convergence of Fourier Spectra. The Fourier Integral, Energy Spectral Density, Fourier Transforms In the Limit, Fourier Transform Theorems, System Analysis with the Fourier Transform, Steady State System Response to Sinusoidal Inputs, Ideal Filters Bandwidth and Rise Time.

MODULE 3

The Laplace Transform, Introduction and Examples, Theorems, Inversion of Rational Functions, inversion Integral and its use in obtaining inverse Laplace Transform, Double sided Laplace Transform.

Discrete Time signals and systems, Analog to Digital Conversion: Sampling Theorem, Data Reconstruction and Filtering.

The Z transform, properties, Inverse Z transform and methods
Difference Equations and Discrete Time Systems.

Module 4

Analysis and Design of Digital Filters, Structures of Digital Processors, Discrete Time Integration, IIR and FIR filter design.

The DFT and FFT Algorithms, Comparison of DFT, Computation of DFT, properties
Examples, Mathematical Derivation of FFT, Decimation in Time and Frequency, Applications of FFT.

TEXT BOOKS

1. Signals and Systems by Zeimer, Tranter, Fannin, IE – Prentice Hall of India.

2. Signals and Systems by Oppenheim and Willsky with Hamid Nawab, Prentice Hall of India

REFERENCE BOOKS:

1. Introduction to Signals and Systems by Linder, McGraw Hill.

2. Signals and Systems by Nagrath, Sharan, Rajan and Kumar, McGraw Hill. 3. Signals and Systems by Simon Haykin & Barry Van Veen, John Wiley and sons.

IT 4.3: COMPUTER HARDWARE AND TROUBLESHOOTING

MODULE 1

PC Components and features.

Microprocessor types and specifications.

Processor family (8086 onwards.....P3, P4, AMD, Dual core)

Motherboard Components.

Introduction to 8259, 8257 and 8275 circuits.

8279 – Keyboard / Display controller: Block diagram, working principle and interface to a PC system.

Organization of a keyboard, types of keyboards and key switches, interfacing of a keyboard.

MODULE 2

Secondary storage devices: Hard disk drives: Construction, working principle, installation procedure for single and multiple drives, partitioning and interfacing to a PC system.

Floppy disk drive: Construction, working principle, drive assembly, recording techniques and interfacing to a PC system.

8272 – Floppy disk controller: Block diagram, working principle and interface to drive and PC system.

CDROM Drive: Construction, working principle and interface to a PC system.

DVD : working principle and interface to a PC system

MODULE 3

I/O interfaces: IDE and SCSI

Buses: Types of buses

Printers: Types of printers, working principle, troubleshooting

Plotters: Types of Plotters.

Power Supply Units: SMPS, UPS, construction, working principle, power line problems and counter measures.

MODULE 4

Troubleshooting and fault finding: Types and nature of faults, fault diagnosis and trouble shooting for each subsystem in a PC, POST.

Diagnostic tools: Logic probe, logic pulser, logic analyzer, IC tester, digital oscilloscope

Diagnostic software: Types, preventive maintenance for a PC system.

TEXT BOOKS

1. Troubleshooting, Maintenance and Repairing PCs - By Stephen Bigelow, TMH
2. Advanced Microprocessors and Peripherals: Architecture, Programming and Interfacing – By Ray and Bharchandani, TMH
3. IBM PC and Clones – Hardware, Troubleshooting and Maintenance – By Govindarajalu, TMH

REFERENCE BOOKS

1. Microprocessors and Interfacing – By D.V. Hall, TMH
2. The Complete PC Upgrade and Maintenance Guide – By Mark Minasi, BPB Publications
3. Upgrading and Repairing PCs – By Scout Muller, PHI

IT 4.4: MICROPROCESSOR AND INTERFACING

MODULE 1

Microprocessor 8086:

Detail study of 8086 architecture, addressing modes, instruction formats, data transfer instructions, string instructions, logical instructions, arithmetic instructions, processor control instructions, comparison of 8086 with 8088, assembly language programming, assembly process, assembler directives, procedures-far procedures, near procedures, parameter passing techniques, macros, macro advantages

MODULE 2

8086 CPU Module:

Basic 8086 CPU design, generating system clock and reset signals, microcomputer bus type and buffering techniques. System Bus Structure: Basic 8086 configurations, maximum and minimum mode, system bus timing, interrupts and interrupt responses

8087 Coprocessor: Architecture, connection and cooperation with main processor, Instruction Set of 8087, Programming with the Arithmetic Coprocessor. Use of floating point ADD/SUB/MUL/DIV instructions, Use of F.P. instruction for generating Sine/Cosine/Exp/Log functions.

MODULE 3

Interfacing: Programmable Peripheral Interface (PPI): Basic Description of 8255, Architecture, Modes of operation, programming the 8255. Programmable timer 8253/8254,

Interrupt Controller: Features of 8259, block diagram of 8259, Interrupt sequence, priority modes and other features Programming the 8259 and interfacing.

Brief introduction to DMA controller and keyboard, Video controller. System Design of 8086 using Memory chips and simple I/O devices using interfaces.

MODULE 4

80386 Architecture : Architecture and signal descriptors, Register organization, Addressing modes, Extended instruction set.

Real mode operation of 80836: Real mode operation, Memory addressing and interrupt processing.

Protected mode operation of 80386: Protected mode operation, memory organization – segmentation, descriptor types, and paging, interrupt processing in protected mode. 80386 Memory Management Unit: MMU, virtual memory, descriptor tables GDT, LDT, IDT
Review processors from 80486 onwards.

Text Book

1. The 8086/8088 family design, programming and interfacing – John F.Uffenbeck (PHI)
2. MICROPROCESSORS AND INTERFACING: Programming and Hardware, - By Douglas V. Hall, TMH

Reference Books:

1. Microprocessor Systems: The 8086/8088 family architecture programming and design – By Liu and Gibson, PHI
2. Microprocessor Architecture, Programming and Applications - By Gaonkar, PHI

Term work

It shall consist of minimum 8-10 experiments based on the following topics

1. Assembly language programming for 8086.

Study of instruction set, Use of MUL/DIV instructions, Use of string processing instruction, use of XLAT instruction for code conversion.

2. Assembly language programming for 8086/8087

Study of NDP instruction set, Use of floating point ADD/SUB/MUL/DIV instructions, Use of F.P. instruction for generating Sine/Cosine/Exp/Log functions.

3. Use of ROM-BIOS services
4. Use of DOS interrupt services.
5. Programs based on 386 addressing modes.
6. Programs based on bit manipulation instructions using assembly language or C.
7. Programs to find square-root of 16-bit number.
8. Interfacing keyboard, display controller, elevators

IT 4.5 DESIGN AND ANALYSIS OF ALGORITHMS

MODULE 1

Algorithm Analysis & Complexity :

Algorithm Definition and Specification.

Performance analysis (Space complexity, Time complexity, Asymptotic Notations)

Recurrences (methods)

Performance measurement.

Performance analysis of recursive algorithms.

Recursion.

Towers of Hanoi problem.

Comparison of recursion and Iteration.

Dynamic Storage Management.

Garbage Collection.

MODULE 2

Divide and Conquer strategy :

General method.

Binary search

Finding Maximum and Minimum.

Merge sort technique.

Quick sort technique

Greedy method strategy :

General method

Knapsack problem.

Job sequencing with deadlines.

Minimum cost Spanning trees(Prims & Kruskals algorithm)

Optimal storage on tapes.

Optimal merge patterns.

Single source Shortest paths.

MODULE 3

Dynamic Programming :

General method

Multistage graphs

All pairs shortest paths

Single Source Shortest paths

Knapsack problem

Travelling Sales person problem.

Flow Shop Scheduling.

Search & Traversal Techniques :

Techniques for graphs- Breadth first search, Depth first search, D search.

Connected components and spanning trees.

Biconnected components.

Code Optimization.

Text processing algorithms (pattern matching)

MODULE 4

Backtracking :

General method.

Sum of subsets Problem.

Graph Coloring.

Hamiltonian Cycles.

NP-Hard & NP-Complete Problems :

Basic concepts- non-deterministic algorithms.

NP-Hard and NP-Complete classes.

COOK's theorem.

NP-Hard Scheduling Problems.

NP-Hard Code generation Problems.

TEXT BOOKS

1. Fundamentals of Computer Algorithms – E.Horowitz & S.Sahni, Galgotia publication.
2. Introduction to Algorithms – T.H.Cormen, C.E. Leiserson, R.L.Rivest, PHI

REFERENCE BOOKS

1. The Design and Analysis of Computer Algorithms – Aho Hopcraft & Ulman, Addison Wesley.
2. Algorithms – Robert Sedjewick, Addison Wesley.
3. Fundamentals of Algorithms – Brassord & Bratley, PHI

IT 4.6 :OBJECT ORIENTED PROGRAMMING

MODULE 1

Introduction: Principles of object oriented programming, object-oriented paradigm. Overview and Benefits of Object-Oriented Programming: Approaches to Software Design ,Evolution of the Object Model ,Benefits of Object Programming, Modeling using UML:UML overview, Nature and purpose of models, Static view, Use case view, Static machine view, Activity view, Interaction view

MODULE 2

Abstract data types (ADT), Encapsulation and information hiding, tokens, expressions, control structures, functions , Classes and Objects, Constructors and destructors. Concepts of polymorphism, Function overloading, operator overloading, Overloading types, & rules, explicit & implicit type conversion operators.

MODULE 3

Inheritance, extending classes, multiple inheritance, hybrid inheritance, pointers, virtual functions, and classes, and polymorphism. I/O streams and classes, Manipulators, Classes for file streams, file I/O operations and functions.

MODULE 4

Template functions and classes, implementation, Exception handling: Need, Throwing mechanism, try, catch block, Introduction to the Standard Template Library: Components of STL, Containers, Algorithms, Iterators, Applications.

TEXT BOOKS:

1. Object oriented programming with C++ by E Balaguruswamy, Tata McGraw Hill
2. Mastering C++ by K R Venugopal, Rajkumar, T. Ravishankar – Tata McGraw Hill
3. The UML Reference Manual by J.Rumbaugh et al,

REFERENCE BOOKS:

1. Teach yourself C++ by Herbert Schildt, TMH
2. Programming with C++ by J. R. Hubbard (Schaum's Outlines), McGraw Hill.
3. Programming with C++ by D. Ravichandran, McGraw Hill.

GOA UNIVERSITY
SECOND YEAR OF BACHELOR'S DEGREE COURSE IN INFORMATION TECHNOLOGY
SCHEME OF INSTRUCTION AND EXMINATION

SEMESTER V

Sub Code	Subjects	Scheme of Instruction Hrs/Week			Scheme of Examination					
		L	T	P	Th. Dur (Hrs)	Marks				
						Th.	S	P	O	Total
IT 5.1	Introduction to Data Communication	3	1	0	3	100	25	-	-	125
IT 5.2	Digital Signal Processing	3	1	0	3	100	25	-	-	125
IT 5.3	Software Engineering	3	1	2	3	100	25*	-	-	125
IT 5.4	Intelligent Agents	3	1	2	3	100	25*	-	-	125
IT 5.5	Operating Systems	3	1	2	3	100	25*	50	-	175
IT 5.6	Database Management Systems	3	1	2	3	100	25*	50	-	175
	TOTAL	18	06	08	-	600	150	100	-	850

*20 marks for Internal Tests and 5 marks for internal practical test

SEMESTER VI

Sub Code	Subjects	Scheme of Instruction Hrs/Week			Scheme of Examination					
		L	T	P	Th. Dur (Hrs)	Marks				
						Th.	S	P	O	Total
IT 6.1	Entrepreneurship Development	3	0	0	3	100	25	-	-	125
IT 6.2	Theory of Computation	3	0	2	3	100	25	-	-	125
IT 6.3	Computer Networks	3	1	2	3	100	25*	-	-	125
IT 6.4	Computer Graphics	3	1	2	3	100	25*	50	-	175
IT 6.5	Web Technology	3	1	2	3	100	25*	50	-	175
IT 6.6	Software Testing & Quality Assurance	3	1	2	3	100	25*	-	-	125
	TOTAL	18	04	10	-	600	150	100	-	850

*20 marks for Internal Tests and 5 marks for internal practical test

L-Lectures, T-Tutorials P-Practicals
Th-.Dur.- Duration of Theory paper
Th-Theory, S-Sessional, P-Practical, O-Oral.

IT 5.1IDC INTRODUCTION TO DATA COMMUNICATION

Lectures per week	:	3+1+0
Max. Marks for Theory paper	:	100
Max. Marks for Sessionals	:	20 + 5
Duration of paper	:	3 hours
Total no. of modules	:	4
No. of questions from each module	:	2
Total no. of questions to be answered	:	5

(At least one question from each module with two compulsory questions from any one module).

Course Objectives:

To learn and understand fundamentals of data communications.

To understand the conceptual and analytical differences between analog and digital communication.

To understand a conceptual foundation for the study of data communications using the open system interconnection (OSI) layered architecture model..

Review Current events in the field of communications so that the student has a sound working knowledge in today's competitive environment.

Have a clear idea how data could transfer between senders and receivers either wired or wireless..

Instructional Objectives:

After completing this course student shall

- Know the basic concepts of networking.
- Know different network topologies and their advantages and disadvantages.
- Know how to build a network model and why.
- Understand how data could be encoded to digital bits.
- Identify different types of Transmission Mediums.
- Recognize the network layers and their main jobs.
- Apply and differentiate between different error detection and correction methods.

Module 1

Introduction of data communication, Overview, communications model, components, Networks-distributed processing. Protocol architecture : needs, OSI Model(Functions), TCP/IP Model(Functions), Protocols and standards. (03 hr)

Basic concepts of data communication, Line configuration, Topology, Transmission modes, Categories of networks, Inter networks. (03 hr)

Transmission media: Guided Media – Twisted–pair cable, Coaxial cable and Optical fiber. Unguided Media – Wireless Communication, Terrestrial microwave, satellite communication and cellular telephony. (03 hr)

Shannon's Theorem, Comparison of different Media, Transmission Impairments - Distortion, Attenuation and noise. Performance. (03 hr)

Module 2

Data Encoding: Digital data digital signals : Unipolar, polar, Bipolar. Analog data
Analog signals : AM, FM, PM. Digital data analog signals: ASK, FSK, PSK. Analog data
digital signals: PAM, PCM.. (04 hr)

Data communication interface: Physical Layer. Digital Data transmission: Asynchronous
and synchronous transmission. DTE-DCE interface, Modems-56k,cable modem.

Interfacing: V.24/EIA 232-F, ISDN Physical Interface. (05 hr)

Spread Spectrum: Concept, FHSS, DSSS, CDMA. (02 hr)

Module 3

Data Link Layer: Flow Control – Stop and Wait Flow Control, Sliding Window

Error Detection: Types of errors, Detection Methods, Parity Check, VRC, LRC,CRC
using modulo-2, Polynomials (CRC-16, CRC-32),Checksum.

Error Correction: Hamming Code. Error Control – Stop and Wait ARQ, Go-Back-N
ARQ and Selective-Reject ARQ. (06 hr)

Data Link Protocols Asynchronous Protocols, Synchronous Protocols.

Character Oriented Protocols – BSC. Bit-Oriented Protocols- HDLC, Configuration,
Types of frames and Modes of Communication, operation. Switching: Packet Switching,
Circuit Switching and Message Switching. (05 hr)

Module 4

Local Area Networks: Introduction, Topologies (Bus, Ring, Star, Tree) and transmission
media. LAN Protocol Architecture : LLC(Logical Link Control), Medium Access Control
(MAC). (03 hr)

Introduction to Networking and Internetworking devices. Repeaters, Routers, Gateways,
Bridges: Functions, Protocol Architecture and Spanning Tree Approach. Wireless LANs:
Technology, Requirements, Wireless LAN applications. (05 hr)

High Speed LANs: Emergence, Ethernet, Token Ring, Fiber channel. (02 hr)

Case Study: Introduction to Blue tooth (In brief) (01 hr)

TEXTBOOKS:

- 1) Data and Computer Communication - William Stallings. Seventh edition.
- 2) Data Communication and Networking – B.A. Forouzan, Tata McGraw Hill

REFERENCE BOOKS:

1. Computer Networks – Andrew Tanenbaum
2. Computer Networks and Internets -Douglas Comer
3. Design and Analysis of Computer Communication Networks – V. Ahuja, McGraw Hill.

IT 5.2 DSP DIGITAL SIGNAL PROCESSING

Lectures per week	:	3+1+0
Max. Marks for Theory paper	:	100
Max. Marks for Sessionals	:	20 + 5
Duration of paper	:	3 hours
Total no. of modules	:	4
No. of questions from each module	:	2
Total no. of questions to be answered	:	5

(At least one question from each module with two compulsory questions from any one module).

Course Objectives:

- To learn methodology to analyze signals and systems
- To get acquainted with the DSP Processors

Instructional Objectives

At the conclusion of this course, students will be able to:

- Describe the Sampling Theorem and how this relates to Aliasing and Folding.
- Determine if a system is a Linear Time-Invariant (LTI) System.
- Take the Z-transform of a LTI system

Determine the frequency response of FIR and IIR filters.

- Understand the relationship between poles, zeros, and stability.
- Determine the spectrum of a signal using the DFT, FFT, and spectrogram.
- Design, analyze, and implement digital filters in Matlab.

Module I

Introduction (3 Hrs)

Digital signal processing and its benefits, Application areas, Key DSP operations, Overview of real-world applications of DSP, Audio applications of DSP, Telecommunication applications of DSP.

Analog I/O interface for real-time DSP systems (7 Hrs)

Typical real-time DSP systems, Analog-to-digital conversion process, Sampling – lowpass and bandpass signals, Uniform and non-uniform quantization and encoding, Digital-to-analog conversion process: signal recovery, The DAC. Constraints of real-time signal processing with analog input/output signals. Application examples

Module II

Discrete transforms (4 Hrs)

Introduction. DFT and its inverse. Properties of the DFT. Computational complexity of the DFT. The decimation-in-time fast Fourier transform algorithm. Inverse fast Fourier transforms. Implementation of the FFT. Worked examples.

The z-transform and its applications in signal processing (6 Hrs)

Discrete-time signals and systems. The z-transform. The inverse z-transform. Properties of the z-transform. Some applications of the z-transform in signal processing-Pole-zero description of discrete-time systems. Frequency response estimation. Frequency units used in discrete-time systems. Stability consideration. Impulse response estimation. Applications in digital filter design. Realization structures for digital filters

Module III

Correlation and convolution (6 Hrs)

Introduction. Correlation description- cross and autocorrelation. Fast correlation. Convolution description- properties of convolution. circular convolution. system identification. Deconvolution. fast linear convolution, overlap-add method, overlap-save method. The relationship between convolution and correlation. Implementation of correlation and convolution

A framework for digital filter design (4 Hrs)

Introduction to digital filters. Types of digital filters: FIR and IIR filters. Choosing between. FIR and IIR filters. Filter design steps. Illustrative examples.

Module IV

Finite impulse response (FIR) filter design (5 Hrs)

Introduction. FIR filter design. FIR filter specifications. FIR coefficient calculation methods. Window method. Frequency sampling method. Realization structures for FIR filters

Design of infinite impulse response (IIR) digital filters (5 Hrs)

Introduction. Design stages for digital IIR filters. Performance specification. Coefficient calculation methods for IIR filters. Impulse invariant method of coefficient calculation. Bilinear z-transform (BZT) method of coefficient calculation. Use of BZT and classical analog filters to design IIR filters. Realization structures for IIR digital filter.

Text books:

1. Digital Signal Processing – A practical approach by Emmanuel C. Ifeakor, Barrie W. Jervis, Pearson Education Limited
2. Introduction to Digital Signal Processing by Johnny Johnson, Prentice –Hall of India Private Limited
3. Digital Signal Processing – Principles, Algorithms and Applications by John G. Proakis, Dimitris G. Manolakis, Prentice –Hall of India Private Limited

Reference Book:

1. Digital Signal Processing by S. Salivahannan, A Vallavaraj, C Gnanapriya, Tata McGraw Hill Publishing Company Limited

IT 5.3 SOFTWARE ENGINEERING

Lectures per week	: 3+1+2
Max marks for theory paper	: 100
Max marks for sessionals	: 25
Duration of paper	: 3 hours
Total no. of modules	: 4
No. of questions from each module	: 2
Total no. of questions to be answered	: 5 (At least one question from each module with two compulsory questions from any one module.)

Course Objectives:

To learn and understand the concepts of Software Engineering. To apply the Principles of Software Engineering for Software Development. Students will gain experience in software project management; requirements, analysis, and design; procedural maturity; social, ethical, cultural, and safety issues in deployment; interpersonal skills for management and team membership; and the software engineering tact of systems architecture.

Instructional Objectives

Students who complete this course will feel comfortable in the role of a Software Designer, Software Architect or Project Manager for the development of software to solve business and technical problems. Students become conversant in methodologies, architectural approaches, project management techniques, and team dynamics.

MODULE 1

Classical Software Engineering:

Introduction to Software Engineering, scope of software engineering: The software process- client, developer and software development life cycle user requirement phase, specification phase, Design phase implementation phase, Integration phase, maintenance phase improving the software process, capability maturity models, costs and benefits of software process management.

(09hr)

Software life cycle models and comparison of all life cycle models. (03hr)

MODULE 2

Basic design concepts: Cohesion and its various types, coupling and its various types and partitioning. (03hr)

Effort estimation and scheduling, Cost estimation models- Function point analysis and COCOMO Interoperability- CASE tools in use for object oriented software engineering- UML and its usage in software engineering. (06hr)

Software Re-engineering. (02hr)

MODULE 3

Software testing: software quality assurance, The essentials of software testing, clean sheet approach, verification testing, validation testing , Software testing tools- for classical engineering and object oriented engineering- software testing standards

(06hr)

Integration testing: Master test planning, Organizational approaches to testing object oriented testing, Testing standards (05hr)

MODULE 4

Software Project management: Managing software project, project planning, process planning- the standard process, requirement change management, quality management, Risk management, the project management plan team structure, communication, scheduling, quality planning, measurement and tracking planning, team programming aspects, software configuration management. (08hr)

Project execution, project monitoring and control, project closure performing, closure analysis, closure analysis report. (03hr)

TEXT BOOKS

1. Object Oriented and Classical Software Engineering- Stephen R.Schah (TMH)
2. Software Project Management in practice- Pankaj Jalote- PEA
3. Software Engineering – A practitioner’s approach – by Roger S. Pressman, McGraw Hill (6th edition)

REFERENCE BOOKS

1. A discipline for Software Engineering – by Watts S. Humphrey, Pearson Education
2. Software Engineering – by K. K. Aggarwal and Yogesh Singh, New Age Publications
3. ‘Ed-Kit’ - Software testing in real world. Addison Wesley 1995
4. Effective methods for software testing(second edition) John-Wiley 1999
5. Software testing techniques(2nd edition) Van Nostrand Rein loud 1990
6. The art of software testing, Jon Wiley Mayers G.J.

IT 5.4IA INTELLIGENT AGENTS

Lectures per week	:	3+1+0
Max. Marks for Theory paper	:	100
Max. Marks for Sessionals	:	20 + 5
Duration of paper	:	3 hours
Total no. of modules	:	4
No. of questions from each module	:	2
Total no. of questions to be answered	:	5

(At least one question from each module with two compulsory questions from any one module).

Course Objectives

- To understand the concepts of Artificial intelligence
- To Learn and Understand the knowledge representation techniques for knowledge base
- To Learn and Understand the fundamentals of Neural Network

Instructional Objective:

At the end of the course the student will be able to analyze a problem which requires intelligent techniques to solve. Student will also learn the knowledge representation and manipulation techniques.

Module I

Intelligent agents: environment, properties and structure. Problem solving agents. Searching for solutions. Breadth-first search, Depth-first search, uniform-cost search, Depth-limited and Iterative deepening depth-first search. Heuristic search strategies: Best-first search, memory bounded heuristic search, Hill climbing search and simulated annealing search. (08hrs)
Constraint Satisfaction problems, backtracking search, propagating information..(02 hr)
Game Playing, the minimax algorithm, alpha-beta pruning, imperfect-real time decisions, games involving an element of chance. (03hr)

Module II

Logical agents, Propositional logic, reasoning in propositional logic. First order predicate logic, Inference in First-order predicate logic. Unification algorithm. Forward chaining, backward chaining. conjunctive normal form for predicate logic. theorem proving by resolution principle. (08hr)
Semantic networks. Reasoning with default information. Truth maintenance system (04hr)

Module III

Planning problem, Planning with state space search, Partial order planning. (04hr)
Acting under uncertainty, conditional probability, the axioms of probability, full-joint distribution, independence, Bayes' rule. and its use.. Bayesian (belief) networks. (06hr)
The basis of utility theory and utility functions. (02hr)

Module IV

Forms of learning, inductive learning, learning decision trees. (04hr)
Learning in Neural networks. (03hr)
Communication as action, syntactic analysis, augmented grammars, semantic interpretation. (05)

Text Books:

1. Stewart Russel and Peter Norvig. “ Artificial Intelligence- A Modern Approach”, PHI, 1995
2. Elain Rich and Kevin Knight, “Artificial Intelligence”, TMH, second edition. 1993

Reference Books

1. Nils J Nilsson, :Artificial Intelligence- A new Synthesis”, Harcourt Asia PTE Ltd, Morgan Kaufman 1988
2. Eugene Charniak and Drew Mc Dermott, Addison Wesley, “Introduction to Artificial Intelligence”, ISE Reprint 1998.

IT 5.5 OPERATING SYSTEMS

Lectures per week	:	3+1+2
Max. Marks for Theory paper	:	100
Max. Marks for Sessionals	:	20 + 5
Max. Marks for Practicals	:	50
Duration of paper	:	3 hours
Total no. of modules	:	4
No. of questions from each module	:	2
Total no. of questions to be answered	:	5

(At least one question from each module with two compulsory questions from any one module).

Course Objective:-

The Operating System is a program that acts as an intermediary between a computer user and the computer hardware. The primary aims of an operating system are resource management, scheduling and access control. This course aims to describe the fundamental concepts behind operating systems, and examine the ways in which its design goals can be achieved.

Instructional Objective:

At the end of the course, the students should know:

1. The fundamental concepts of operating systems, its evolution and various architectures.
2. The terminologies associated with operating system concepts such as processes, threads, concurrency control, synchronization, CPU scheduling and semaphores.
3. The general concepts and algorithms used in process management, deadlock handling, memory management, file systems, I/O systems and security.
4. Implementation specific issues based on the Linux and Windows Operating Systems.

MODULE 1

Introduction to Operating Systems: Overview and working of different operating systems.(03hr)

Process management: Concept, Threads, CPU Scheduling, Process Synchronization.(04hr)

Deadlocks: Concept, Deadlock prevention, Deadlock avoidance, Deadlock detection and recovery. (05hr)

MODULE 2

Memory management: Concept, Swapping, Contiguous memory allocation, Paging,(05hr)
Segmentation, Segmentation with paging.

Virtual memory: Concept, Demand paging, Page replacement, Thrashing.(04hr)

File System: File system interface and File system implementation.(03hr)

MODULE 3

I/O Systems: Overview of I/O Systems, Secondary storage structure, Tertiary storage structure. (08hr)

Protection and security issues. (03hr)

MODULE 4

Case studies of operating systems- Windows and Unix.

Basic overview, commands, process management and memory management in each. (08hr)

Shell programming in Unix. (03hr)

Text Books:-

1. The Operating System Concepts by Silberschatz and Galvin, Wesley Publishing Co. (page numbers given in syllabus as per the 3rd edition)
2. Operating Systems by W Stallings. PHI. (page numbers given in syllabus as per the 5th edition)
3. UNIX – Concepts and applications by Sumitabha Das, Tata McGraw Hill (page numbers given in syllabus as per the 3rd edition)

Reference Books:-

1. Operating systems, Design and implementation by A.S Tanenbaum, PHI.
2. Operating Systems by Milenkovic, Tata McGraw Hill.
3. Operating Systems by Achyut S. Godbole, Tata McGraw Hill.
4. The Design of the UNIX Operating System by Maurice J. Bach, PHI
5. Linux Kernel Internals by M Beck, H Bohme, M Dziadzka, U Kunitz, R Magnus, D Verworner, Addison Wesley
6. Unix System Programming using C++ by Terence Chan, PHI

IT 5.6 DATABASE MANAGEMENT SYSTEMS

Lectures per week	:	3+1+2
Max. Marks for Theory paper	:	100
Max. Marks for Sessionals	:	20 + 5
Max. Marks fore Practical Exam	:	50
Duration of paper	:	3 hours
Total no. of modules	:	4
No. of questions from each module	:	2
Total no. of questions to be answered	:	5

(At least one question from each module with two compulsory questions from any one module).

Course Objective:

This course introduces database management system (DBMS) which is computer software designed for the purpose of managing databases. It is a collection of programs that enables you to store, modify, and extract information from a database. The students will learn Database concepts, Data Models, various approaches to Database Design, Relational Model, Optimization principles and Control.

Instructional Objective:

At the end of the course the student will be able to:

- Understand the key concepts and terminology of RDBMS
- Learn the basics of database modeling.
- Understand database design and normalization techniques.
- Implement access to the data using various techniques.
- Know the strategies and methods for query processing, optimization, database transaction processing and security.

MODULE1

Database systems versus File system. Data base administrator & Data base Users. Characteristics of the Data base. Data base Systems Architecture. Data Models View of data. Schemes & Instances . Database system Architecture & Data Independence Data base Languages. (03hr)
Entities, Attributes and Relationships. Cardinality of Relationships, Keys, Strong and Weak Entity Sets. E-R Diagram notation. Extended ER: Generalization, Specialization, and Aggregation. Translating your ER Model into Relational Model (03hr)
Relational Data Model & Relational Algebra. Relational Model Concepts. Relational Model Constraints and Relational Algebra. Operations like select, project, rename, Set operations, join, Division, Aggregate functions (03hr)
Tuple variables, Range Relations, Expressions, Formulae, Quantifiers, Safe Expressions. Domain Relational Calculus : Formal Definition, Safe expressions (03hr)

MODULE 3

I/O Systems: Overview of I/O Systems, Secondary storage structure, Tertiary storage structure. (08hr)

Protection and security issues. (03hr)

MODULE 4

Case studies of operating systems- Windows and Unix.

Basic overview, commands, process management and memory management in each. (08hr)

Shell programming in Unix. (03hr)

Text Books:-

1. The Operating System Concepts by Silberschatz and Galvin, Wesley Publishing Co. (page numbers given in syllabus as per the 3rd edition)
2. Operating Systems by W Stallings. PHI. (page numbers given in syllabus as per the 5th edition)
3. UNIX – Concepts and applications by Sumitabha Das, Tata McGraw Hill (page numbers given in syllabus as per the 3rd edition)

Reference Books:-

1. Operating systems, Design and implementation by A.S Tanenbaum, PHI.
2. Operating Systems by Milenkovic, Tata McGraw Hill.
3. Operating Systems by Achyut S. Godbole, Tata McGraw Hill.
4. The Design of the UNIX Operating System by Maurice J. Bach, PHI
5. Linux Kernel Internals by M Beck, H Bohme, M Dziadzka, U Kunitz, R Magnus, D Verworner, Addison Wesley
6. Unix System Programming using C++ by Terence Chan, PHI

IT 6.1ED Entrepreneurship Development

Lectures per week	: 03
Max. marks for theory paper	: 100
Max. mks for sessionals	: 25
Duration of paper	: 3 hours
Total no of modules	: 4
No of questions from each module	: 2
Total no of questions to be answered	: 5

(At least one question from each module with two compulsory questions from any one module).

Course Objective: To expose the students to the comprehensive Entrepreneurship Development and equip them with requisite skills, knowledge and competencies so that they can take up Entrepreneurship as their career.

Instructional Objective:

At the end of the course, the students would be familiar with the following:

- Concept of Entrepreneurship.
- Project identification, development and implementation
- Project financing, institutional finance and SSI
- Project Management.

Module 1

Definition and clarification of concept of entrepreneurship: Qualities of an entrepreneur
Skills required for entrepreneurship, Functions of an entrepreneur, Importance of entrepreneur in economic development. 2 hrs

Theories of Entrepreneurship: Economic theory, Sociological theory, Psychological theory. 1 hr

Types of entrepreneurs: Based on type of business, Based on use of technology, Based on motivation, Based on stages of development, Based on motive, Based on capital ownership, Danhof's classification. Other types 1 hr

Project identification: External environment analysis, Meaning and characteristics of a project, Classification of projects, Project life-cycle, Project identification, Sources and screening of project ideas 2 hrs

Project formulation: Meaning and significance, Feasibility analysis, Techno-economic analysis, Input analysis, Financial analysis, Social cost benefit analysis. 1 hr

Project feasibility

Pre-feasibility study: Project feasibility report - Meaning, Importance and Contents
Importance of location of a project. 2 hrs

Module 2

Project financing and institutional finance: Classification of capital – Fixed capital - Meaning, Factors governing fixed capital requirements, Working capital – Meaning and concepts, Types, Factors determining working capital requirements. 2 hrs

Sources of finance – Share capital, Debenture capital, Lease finance and term loans from commercial banks. 1 hr

Institutional finance. IFCI, ICICI, IDBI, SIDBI, EXIM Bank, Commercial banks – Functions and schemes. 2 hrs

Small scale industries: Definition and characteristics, Role in Indian economy, Steps for starting a SSI unit, Problems faced by SSIs. Incentives and subsidies – Need and Types 3 hrs

Module 3

Financial aspects: Break even analysis, Income statement, Balance sheet. 5 hrs

Profit and loss account, Fund flow statement, Ratio analysis – Liquidity, leverage and profitability ratios. 4 hrs

Capital budgeting – Need, Importance, Process, Nature of capital budgeting problem, Weighted average cost of capital, approaches to fixing a capital budget, methods of project evaluation (Payback period, Accounting rate of return, discounted cash flow, Net Present Value Index) 4 hrs

Module 4

Managerial aspects: Introduction to management, Functions of a manager, Different schools of management. 5 hrs

Types of organisation structures, Leadership- Trait theory, Behavioural theory, Contingency theory, Motivation -Carrot and stick theory, Maslow's theory, Herzberg's theory, Vroom's theory, McClelland's theory. 3 hrs

Communication – Importance, Process, types and forms, Barriers to communication, Principles of effective communication. 2 hrs

Marketing management, Meaning and importance, Marketing mix, Types of marketing tasks, Market segmentation – process and criteria, Marketing implementation and control. 3 hrs

Textbooks :

- 1) Entrepreneurial Development and Project Management by A. Vinod 4th Edition Calicut University Publication, 2002
- 2) Entrepreneurship and Small Business Management by Dr C.B. Gupta and Dr. S.S. Khanka 2nd Edition, Sultan Chand and Sons, 1997
- 3) Entrepreneurship Development by Dr. C.B.Gupta and N.P.Srinivasan 4th Edition, Sultan Chand and Sons, 1997.

Reference Books

- 1) Marketing Management by Philip Kotler 11th edition, Pearson Education, 2003
- 2) Principles of Management by P. C. Tripathi and P.N. Reddy 2nd Edition Tata McGraw Hill, 1991
- 3) Fundamentals of Financial Management by Prassanna Chandra 3rd Edition Tata McGraw Hill, 2001
- 4) Management by Harold Koontz and Heinz Weihrich 9th Edition McGraw Hill, 1988

IT 6.2TC THEORY OF COMPUTATION

Lectures per week	:	3+0+2
Max. Marks for Theory paper	:	100
Max. Marks for Sessionals	:	20 + 5
Duration of paper	:	3 hours
Total no. of modules	:	4
No. of questions from each module	:	2
Total no. of questions to be answered	:	5

(At least one question from each module with two compulsory questions from any one module).

Course Objectives

The major objective of this course is to introduce the student to the concepts of theory of computation in computer science. The student should acquire insights into the relationship amongst formal languages, formal grammars, and automata.

Instructional Objective:

At the end of the course, the students would be familiar with the following:

- formal languages and grammars
- finite-state automata, pushdown automata
- Turing machines, Church's Thesis, undecidability
- Recursively Enumerable Languages and Unsolvable Problems.

Module-1

Regular Languages and Finite Automata :- Regular Languages and Regular Expressions, The memory required to recognize a language, Finite Automata (DFA), Distinguishing one string from another, Union, Intersection, and Complements. (6hrs)

Nondeterministic and Kleene's theorem :- NFA, Converting NFA to DFA, ϵ -NFA, Kleene's theorem, Converting an ϵ -NFA to an NFA, Regular Languages, Myhill-Nerode theorem
Minimal finite Automata, The pumping lemma for regular languages, Closure properties
Decision Problem, Moore and Mealy Machine. (6hrs)

Module 2

Context-free Grammars and Push down Automata:- Context-Free Grammars and Languages
Derivation Trees and Ambiguity, An unambiguous CFG for algebraic Expression, Simplified forms and Normal Forms – CNF, GNF. (6hrs)

Pumping Lemma, Closure Properties, Push Down Automata :- DPDA, PDA corresponding to a given CFG – Top-down PDA, Bottom-up PDA, CFG corresponding to a given PDA, Parsing
Top-down parsing, Bottom-up parsing. (6hrs)

Module-3

Turing Machine and their languages :- Turing Machine Introduction, Computing a Partial function with a Turing machine, Combining Turing machine,. (8hrs)

Variations of Turing Machine, Nondeterministic Turing Machine, Universal Turing Machine, Church-Turing Thesis (4hrs)

Module-4

Recursively Enumerable and Recursive languages, Enumerating a Language, General Grammars
Unrestricted Grammars and Turing Machine. Context-Sensitive Language and Grammar
Linear Bounded Automata, Chomsky Hierarchy. (8hrs)

Unsolvable Problems :- A non recursive language and unsolvable Decision problems, Reducing one problem to another, The halting problem. Rice's Theorem. Closure Properties of families of languages. (8hrs)

Text Books

1. Introduction to languages and the theory of computation By John C. Martin, Tata McGraw Hill
2. Introduction to Automata Theory, Languages and Computation By Hopcraft and Ullman, Narosa Publishing House.

Reference Books

1. Theoretical Science - By Krishnamurthy, AWEP.
2. Theory of Computer Science - By Brady, McGraw Hill.
3. Computations, Finite and Infinite Machines - By Minsky, Prentice Hall

IT 6.3CN COMPUTER NETWORKS

Lectures per week	:	3+1+2
Max. Marks for Theory paper	:	100
Max. Marks for Sessionals	:	20 + 5
Duration of paper	:	3 hours
Total no. of modules	:	4
No. of questions from each module	:	2
Total no. of questions to be answered	:	5

(At least one question from each module with two compulsory questions from any one module).

Course Objective:

This course will focus on imparting knowledge about various components of data communications emphasizing on the physical layer and data link layer of the OSI stack. It also provides overview of computer networks .

Instructional Objectives:

At the end of the course, the student will:

- Understand the basic concepts of data communication components used at various transmission speeds.
- Identify the characteristics and analyze specific role of Data Communication technologies such as multiplexers, ISDN, ATM, wireless, satellite and fiber optic communication.
- Get an overview of 3G networks, LAN and WAN

MODULE 1

Data Link Layer - Medium Access Sub layer (MAC). Multiple Access Protocols: ALOHA, Carrier Sense Multiple Access (CSMA) protocols, Collision-free protocols – Bit-Map Protocol, Binary Countdown, Limited contention protocols – Adaptive Tree Walk Protocol , WDMA (Wavelength Division Multiple Access) Protocol.

Network Layer: The OSI Model and functions of the seven layers, TCP/IP Protocol stack – Concept of IP Address ARP, RARP, ICMP, Ports and Sockets, TCP and UDP Connections.

MODULE 2

Network Layer (Contd.): Network Layer design issues , Routing Algorithms, Congestion Control algorithms. Networking and Internetworking Devices: Repeaters, bridges, routers and gateways.

Application Layer of TCP/IP: Domain Name System – DNS, File Transfer Protocol – FTP Telnet Protocol, Hyper Text Transfer Protocol (HTTP) , Simple Mail Transfer Protocol (SMTP) Simple Network Management Protocol (SNMP)

MODULE 3

Integrated Services Digital Network (ISDN): Principles & Objectives of ISDN, User Interface of ISDN, Architecture of ISDN, ISDN Physical Layer, ISDN Data Link Layer.

MODULE 4

Frame Relay: Frame Relay - Protocols and Services, Frame Relay Congestion Control .

Asynchronous Transfer Mode – ATM: Asynchronous ATM – ATM Protocols, ATM Adaptation Layer, ATM Traffic and Congestion Control .

Wireless Communication – An Overview: History of wireless communication, and future trends Wireless Generations and Standards, Cellular Concept and Cellular System Fundamentals , Wireless Standards. Antennas : WLAN Technology and Bluetooth, Introduction to Wireless WANs , GSM Networks, Satellite Communications.

TEXTBOOKS:

1) Data and Computer Communication - William Stallings

2) ISDN and Broadband ISDN with Frame Relay & ATM – William Stallings, 4th Edition

REFERENCE BOOKS:

1. Computer Networks – Andrew Tanenbaum

2. Wireless Networked Communications: Concepts, Technology and Implementation-Bud Bates

3. Computer Networks and Internets - Douglas Comer

4. Design and Analysis of Computer Communication Networks – V. Ahuja
,McGraw Hill

IT 6.4CG COMPUTER GRAPHICS

Lectures per week	:	3+1+2
Max. Marks for Theory paper	:	100
Max. Marks for Sessionals	:	20 + 5
Max marks for practicals	:	50
Duration of paper	:	3 hours
Total no. of modules	:	4
No. of questions from each module	:	2
Total no. of questions to be answered	:	5

(At least one question from each module with two compulsory questions from any one module).

*Disclaimer: Page numbers listed for each topic are only suggestions. Teacher may include

Course Objectives:

- This course is designed to provide a comprehensive introduction to computer graphics leading to the ability to understand contemporary terminology, progress, issues, and trends.
- A thorough introduction to computer graphics techniques, including 3D modeling, rendering and animation. Topics cover: geometric transformations, geometric algorithms, 3D object models (surface and volume), visible surface detection algorithms, image synthesis, shading and mapping, global illumination and animation techniques

Instructional Objectives

- Describe the purpose of Computer Graphics and its applications
- Describe and implement methods for performing 2-Dimensional geometric transformations.
- Describe the concept of 3-Dimensional Graphics and methods for performing 3-Dimensional geometric transformations.

Module 1

Overview of graphic systems: Video display devices, Refresh cathode ray tubes
Raster scan displays, Random scan displays, Color CRT monitors, Direct view storage tubes
Flat panel Displays, Raster scans systems, Random scan systems. Input devices: Keyboard,
Mouse, Trackball and Space ball, Joystick, Image scanners, Touch panels, Light pens (5 hrs)
Output Primitives. Points and lines, Line drawing algorithms, DDA, Bresenham's line algorithm
Circle generating algorithms, Properties of circles, Midpoint circle algorithm, Ellipse generating
algorithm, Properties of Ellipses, Midpoint ellipse algorithm, Filled area primitives, Scan line
polygon Fill algorithm, Inside – outside tests, Scan line fill of curved boundary, Boundary fill
algorithm, Flood fill algorithm, Fill area functions. (5 hrs)
Attributes of Output Primitives: Line Attributes, Pen and brush options, Curve attributes, Color
and gray scale levels, Color tables, Area fill attributes, Character attributes, Text attributes,
Marker attributes, Antialiasing . (3 hrs)

Module 2

Two Dimensional Geometric Transformations: Basic Transformations, Translation, Rotation,
Scaling, Composite transformation, Translations, Rotations, Scaling, Other transformations,
Reflection, Shear. (2hrs)

Two-Dimensional Viewing: The viewing pipeline, Viewing coordinate reference frame, Window to viewport coordinate transformation, 2-D viewing functions, Clipping operations, Point Clipping, Line clipping, Cohen- Sutherland Line Clipping, Polygon Clipping, Sutherland Hodgeman Polygon clipping, Weiler- Atherton Polygon Clipping, Other polygon clipping algorithm. Curve clipping, Text clipping. (4hrs)

Graphical User Interface and Interactive Input Methods: Input to Graphical Data, Logical classification of Input devices, Locator devices, Stroke devices, String devices, Valuator devices Choice devices, Pick devices. (2hrs)

Graphical Input Techniques: Positioning Techniques, Pointing and Selection, Inking and Painting

Event Handling: Polling, Interrupts, The Event Queue, Light-Pen Interrupts.

Input functions. Raster Graphics Fundamentals. Window and View port. (4hrs)

Module 3

Three Dimensional Concepts: 3- Dimensional display methods, Parallel projections Perspective projection, Depth cueing, Surface rendering, Exploded and cutaway views. Three Dimensional Object representations, Polygon surfaces, Polygon tables, Three Dimensional Geometric and Modeling transformations. (4hrs)

Three Dimensional Viewing, Transformation from world to viewing coordinates Projections. Design of a Simple Graphics Package. Functional Domains, Graphic Primitives Windowing Functions, Miscellaneous Functions. (4hrs)

Picture Structure: Defining Symbols By Procedures, Display Procedures, Boxing, Structured Display Files. Techniques for Achieving Realism. Curves And Surfaces: Shape Description Requirements, Parametric Functions, Bezier Methods. (4hrs)

B-Spline Methods.

Module 4

Classification of visible – surface detection algorithms. Illumination Models and Surface-Rendering Methods. Color Models and Color Applications. Computer Animation: Design of animation sequences, General computer animation functions, Raster Animations, Computer animation languages, Motion specification, Direct motion specification, Goal directed systems Kinematics and dynamics. (7hrs)

Display Processors. Device-Independent Graphics Systems, Device Independence, Graphics System Design. User Interface Design, Components of the User Interface. The Users Model. (5hrs)

Text Books

1. Computer Graphics By Donald Hearn and M. P. Baker, Prentice Hall of India Pvt. Ltd. ISBN-81-203-0944-8.
2. Principles of Interactive Graphics By William Newman and Robert Sproull, Tata McGraw hill Publishing company Ltd. ISBN-0-07-463293-0

Reference Books

1. Introduction to Computer Graphics By N. Krishnamurthy, TMH
2. Computer Graphics By Steven Harrington, Tata McGraw Hill.
3. Compute Graphics: Principles and Practice By Foley, Van Dam, Feiner and Hughes

IT6.5WT WEB TECHNOLOGIES

Lectures per week	:	3+1+2
Max. Marks for Theory paper	:	100
Max. Marks for Sessionals	:	20 + 5
Max Marks for Practical Examination	:	50
Duration of paper	:	3 hours
Total no. of modules	:	4
No. of questions from each module	:	2
Total no. of questions to be answered	:	5

(At least one question from each module with two compulsory questions from any one module).

Course objectives:

This course introduces the technologies behind today's web-based applications. Students will be motivated to working with and building real web applications. After completing this course, students will acquire a good understanding of the basic design principles of the web model of computing.

Instructional objectives.

At the end of course student will be able to apply the technology to build and maintain web pages in static or dynamic manner.

Module 1

Internetworking Concepts: Hardware and software issues, Internet history, ARPAnet.

Internet topology, Internal architecture of ISP, TCP, ports, sockets etc.

Domain Name Servers, E-Mail (SMTP, POP, MIME, IMAP), FTP, TFTP, www, HTTP, Telnet, Usenet, Web browsers, Web servers, proxy servers, Web Searching and Web Casting Techniques. (4hrs)

Creating a Web-site and Mark-up languages: HTML, DHTML, XML. Tiered Architectures. Types of Web Pages: Static, Dynamic, CGI, Active. (3hrs)

Java Technology: Java Evolution, Overview of Java and JVM, Data types and scope of variables, Classes, objects and methods, Arrays, strings and vectors, Interfaces, Packages, Thread Programming, Exception Handling, File Handling in Java. (4hrs)

Module 2

GUI/AWT Programming. JDBC. Applet Programming. JSP, Java Servlets. (3 Hrs)

Distributed Multi-tiered Applications: Introduction to J2EE, Architecture, Applications, Technologies Security. (4Hrs)

Enterprise Java Beans: Advantages, Architecture, Entity and Session Beans, Creating and deploying an EJB. (4 Hrs)

Module 3

Understanding the .Net Framework: .Net Frame work, benefits, Elements of the Framework, Common Language Runtime:.Net Class Library, Unifying Components, .Net with ASP.net. (06hrs)

Creating and deploying an ASP.net Application. Building Forms with Web Controls. Validating User Input. ASP.net Security: IIS Server, Authentication, Role-based Security. (06hrs)

Module 4

Introduction to E-Commerce: Types of E-commerce, Approaches for developing e-commerce solutions
E-procurement: phases, models, solutions. Trading Models. Buyer-side purchasing. SCM, CRM. (3hrs)
User Sessions in e-commerce applications. Techniques for maintaining state information. P2P
Computing. E-Commerce Transaction Management. TP Monitors, ORB, CTM, MTS. Message
Queues.

(3hrs)

E-Commerce Security Issues: Cryptography, Digital Signatures, Digital Certificates, Organizational
Security Issues. Some emerging Web Technologies (Case Studies). 1) Java Struts – MVC architecture -
Struts overview, characteristics. 2) AJAX – Model, Applications, characteristics. 3) Ruby on Rails –
Ruby, Rails, Advantages of RoR.

Text Books:-

1. Web Technologies By Achyut Godbole, Wesley Publishing Co. (page numbers given in syllabus as per the 2003 publication)
2. Programming with Java By E. Balaguruswamy. TMG. (page numbers given in syllabus as per the 2nd edition)
3. J2EE Professional Projects By Pallavi Jain & Shadab Siddiqui (Premier Press 2002)
4. ASP.Net Bible By Mridula Parihar et al., Tata McGraw Hill (2005)

References Books:-

Internet and Web Technologies By Raj Kamal (2002)

<http://struts.apache.org/>

<http://www.ajax.org/>

<http://www.rubyonrails.org/>

IT6.6 SOFTWARE TESTING AND QUALITY ASSURANCE

Lectures per week	:	3+1+2
Max. Marks for Theory paper	:	100
Max. Marks for Sessionals	:	20 + 5
Duration of paper	:	3 hours
Total no. of modules	:	4
No. of questions from each module	:	2
Total no. of questions to be answered	:	5

(At least one question from each module with two compulsory questions from any one module).

Course Objectives

To enable students to develop and implement an effective testing strategy; plan and prepare appropriate tests for all phases of development and be able to measure and control the quality of their testing. To convince students of the importance of finding and resolving error early and to give them strategies and techniques for building-in quality from the start.

Instructional objectives

This course will enable students to:

Manage, plan and prepare rigorous, formal, visible and repeatable tests that will fully exercise software, in the development of quality systems.

Apply different testing approaches (black box, white box, static and dynamic) to all stages of software development.

Prepare test plans, strategy, specifications, procedures and controls to provide a structured approach to testing.

Identify what is involved in acceptance testing, system testing, integration testing and unit testing, what should be tested when and by whom.

Document testing appropriately.

Apply the techniques and methods covered to testing packages.

Describe the different types of testing tools available and identify the appropriate types of tools for their needs.

MODULE I

Overview of software testing :: Software testing, Advantages of software testing.

The difference between software bugs and software faults. Priorities for software testing

The definition of a good software test. (05hrs)

Introducing software test cases and test data. Blackbox testing and whitebox testing. :

Statement, Branch, DDpath, Condition Coverage, Decision/Condition Coverage, Multiple

Condition Coverage, Path,Data Flow,Equivalence Partitioning, Boundary Value Analysis,

Causeeffect Graphing,Category Partition, Mutation Testing,Code Walkthroughs and inspections,

An outline of the Software Testing of Object orientated Programs . (07hrs)

MODULE II

Software Testing throughout the Software Process: Unit Testing, Integration Testing, System Testing, Regression Testing, Stress Testing, Performance Testing, Software Testing and Extreme Programming. The Automation of Software Testing. Difficulties and Limitations of Software Testing. The Business of Software Testing. (07hrs)

Software Tools Introduction. Functional Testing. Test Automation Theory, Rational Functional Tester – Overview, Rational Functional Tester Step by Step. (04hrs)

MODULE III

Software Testing Life cycle Practice : Test Planning. Key Points in Test Planning. Test Case Design. Test Requirement Analysis. Test Data Preparation. (05hrs)

Testing Execution and Defect tracking. Testing Execution based on Test Case. Defect Tracking Procedure and Tool. Test Reporting. Key Points in Test Reporting. Testing Results Summary and Analysis. (06hrs)

MODULE IV

Software Quality Assurance : Concept and Definition, Standards and Procedures.

Software Quality Assurance Activities, SQA Relationships to Other Assurance Activities.

Verification and Validation. Monitoring: Formal Test Monitoring. (05hrs)

Software Quality Assurance During the Software Acquisition Life Cycle: Software Concept and Initiation Phase, Software Requirements Phase, Software Architectural (Preliminary) Design Phase, Software Detailed Design Phase, Software Implementation Phase, Software Integration and Test Phase. (06hrs)

Textbook:

Software testing, Marc Roper, McGrawHill Companies, 1994. ISBN: 0077074661

References:

Software Engineering – A Practitioner’s Approach (5th ED), Roger S. Pressman, Tshinghua Press, 2001.

Software quality assurance, Daniel Galin, China Machine Press, ISBN : Software testing, R. Patton, China Machine Press, ISBN