## M.Sc. SOFTWARE SYSTEMS (5 YEARS)

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## SEMESTER X

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Total Credits for the Programme: 217

## LIST OF ELECTIVES

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UNIT I RHETORICAL FUNCTIONS
Definition, Description, Process Description, Comparison, Classification, Stating Problems and Proposing Solutions, Making Lists, Narrating Events, Asking Questions and Answering.

UNIT II WRITING

UNIT III READING
Texts on the topics given below.
I. The Use of Language, Media
II. Nature, Its Treasures, Sources of Power
III. Threatened Environment- Solutions
IV. Genetic Research - GM Food
V. Modern High Tech Tools – Computers, Cyber Space.

UNIT IV SPEAKING AND LISTENING SKILLS PRACTICE, VOCABULARY

UNIT V GRAMMAR

TOTAL: 45 PERIODS

TEXTBOOK

REFERENCES
UNIT I COMPLEX NUMBERS

Complex Numbers – Geometric Representation – DeMoivre’s theorem and its Applications – Exponential and circular functions – Hyperbolic functions - Inverse hyperbolic functions – Logarithmic functions.

UNIT II MATRICES


UNIT III FUNCTIONS OF SEVERAL VARIABLES


UNIT IV INTEGRAL CALCULUS


UNIT V ORDINARY DIFFERENTIAL EQUATION


TOTAL: 60 PERIODS

TEXTBOOK


REFERENCES

UNIT I  PROPERTIES OF MATTER  12
Torsion pendulum – Depression of a cantilever – Uniform and Non Uniform bending-I shape girders-
production and measurement of high vacuum – Rotary pump-Diffusion pump- Pirani Gauge-Penning
Gauge-Viscosity- Oswald Viscometer – Comparison of viscosity.

UNIT II  ACOUSTICS  12
Acoustics of buildings – Absorption coefficient-Intensity – Loudness – Reverberation time-Sabines’s
formula – Noise pollution – Noise control in a machine – Ultrasoundics – Production – Magnetostriction
and piezoelectric methods – Applications of ultrasonics in Engineering and Medicine.

UNIT III  HEAT AND THERMODYNAMICS  12
Thermal conductivity – Forbe’s and lee’s disc methods – Radial flow of heat-Thermal conductivity of
rubber and glass-Thermal insulation in buildings-Laws of thermodynamics – Carno’t cycle as heat
engine and refrigerator – Carnot’s theorem – Ideal Otto and diesel engines
– Concept of entropy – Entropy temperature diagram of carnot’s cycle.

UNIT IV  OPTICS  12
Photometry – Lummer Brodhum photometer – Flicker photometer – Antireflection coating – Air wedge
– Testing of flat surfaces – Michelson’s Interferometer and its applications – Photoelasticity and its
applications – Sextant – Metallurgical microscopes – Scanning electron microscopes.

UNIT V  LASER AND FIBRE OPTICS  12
Principle and lasers – laser characteristics – Ruby-NdYAG, He-Ne, Co2 and semiconductor lasers –
propagation of light through optical fiber-types of optical fiber – applications of optical fibers as optical
waveguides and sensors.

TOTAL: 60 PERIODS

TEXTBOOK

REFERENCES
UNIT II
Minimization: Map Method, Four Variable, Five Variable MAP, Product of Sum Minimization, Don’t Care Conditions, NAND, NOR Implementation, Introduction to HDL.
Combinational Logic : Combinational Circuits, Analysis and Design Procedure, Binary Adder, Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexes, HDL for combinational Circuits.

UNIT III

UNIT III
Registers and Counters: Registers, Shift Registers, Ripple Counters, Synchronous Counters, Other Counters, HDL for Registers and Counter.

UNIT III

TOTAL: 60 PERIODS

TEXT BOOK

REFERENCES

SS7102 PROBLEM SOLVING TECHNIQUES

UNIT I INTRODUCTION

UNIT II FACTORING METHODS AND ARRAY TECHNIQUES

UNIT III MERGING, SORTING AND SEARCHING

UNIT IV DYNAMIC DATA STRUCTURE ALGORITHMS

UNIT V RECURSIVE ALGORITHMS
Binary Tree Traversal – Recursive Quick Sort – Towers of Hanoi Problem.

TOTAL: 45 PERIODS
**TEXTBOOK**

**REFERENCES**

---

**SS7111 DEVICES LABORATORY**

- Semiconductor devices such as PN diode, Zener diode, BJT, SCR, UJT, FET etc, - Characteristic, Parameters and typical applications, Common Transducer Characteristics and application.

**TOTAL: 60 PERIODS**

**SS7112 DIGITAL LABORATORY**

1. Binary and BCD counter using 7493
2. Verification of NAND, NOR, XOR, AND, OR Gate Logic
3. Parity Generator
4. Encoder / Coder
5. Multiplexes / Demultiplexes
6. Adder / Subtractor
7. Code Converters
8. Comparators
9. Up / Down 4 bit Binary Counter
10. Up / Down 4 bit Decimal Counter
11. Shift Register
12. Ring Counter

**TOTAL: 60 PERIODS**
UNIT I FUNDAMENTALS OF COMPUTERS AND OPERATING SYSTEMS

UNIT II OFFICE AUTOMATION
a. Word Processing
b. Data Base Management System
c. Spread Sheet Package
d. Presentation Software.

TOTAL: 60 PERIODS

UNIT I RHETORICAL FUNCTIONS
Description, Stating Purposes and Uses, Giving Instructions, Making Recommendations, Bringing out Causal Relations, Writing Checklists.

UNIT II WRITING

UNIT III READING
Texts on the topics given below.
  o Architecture
  o Advertisements and Media
  o Technological Innovations
  o Travel and Tourism
  o Industry and Management

UNIT IV SPEAKING AND LISTENING SKILLS PRACTICE, VOCABULARY

UNIT V GRAMMAR
Infinitives, ‘If’ clauses, Future Tense, Use of Pronouns and Prepositions, Direct and Indirect Speeches, Simple Past and Simple Past Perfect Tense, Word Formation, Prefixes and Suffixes.

TOTAL: 45 PERIODS

TEXTBOOK
REFERENCES

SS7201 ANALYTICAL GEOMETRY AND REAL AND COMPLEX ANALYSIS

UNIT I MULTIPLE INTEGRALS

UNIT II VECTOR CALCULUS
Scalar and vector point functions – vector operator del, gradient, Divergence and curl, line integral – surface integrals – Verification of Gauss divergence – Green’s and Stokes theorems.

UNIT III THREE DIMENSIONAL GEOMETRY

UNIT IV ANALYTIC FUNCTION

UNIT V COMPLEX INTEGRATION
Cauchy’s integral theorem – Cauchy integral formula – Taylor’s and laurant’s theorem (statement only) – singularities – Cauchy’s residue theorem – integration a round a unit circle – Integration a round a semicircle (no poles on real axis).

TOTAL: 60 PERIODS

TEXTBOOKS

REFERENCES
UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

TOTAL: 45 PERIODS

TEXTBOOK

REFERENCES

UNIT I

UNIT II
Arithmetic – Design of fast adders – Binary Multiplication – Division – Floating point numbers and operations.
UNIT III

UNIT IV
Memory System – RAM and ROM – Cache memories – Performance considerations – Virtual memories - secondary storage devices – Associative memories.

UNIT V
Case study of one RISC and one CISC Processor.

TOTAL: 45 PERIODS

TEXTBOOK

REFERENCES
UNIT I  FUNDAMENTALS OF COBOL  9

UNIT II  BRANCHING, LOOPING AND TABLE HANDLING  9

UNIT III  FILE PROCESSING  9

UNIT IV  INTRODUCTION TO DAT PROCESSING  9

UNIT V  CASE STUDIES  9

TOTAL: 45 PERIODS

TEXTBOOK

REFERENCES

Implementation of
1. Input / output function
2. Control Functions
3. Functions
4. Arrays
5. Pointers
6. Structures and Unions
7. Files
using case studies on: Roots of a quadratic equation, Measures of location – Matrix Operations – Evaluation of trigonometric functions – Pay roll problems. String operations like substring, concatenation, finding a string from a given paragraph, finding the number of words in a paragraph.

**TOTAL: 60 PERIODS**

**SS7212 COBOL LABORATORY**

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1. Program for Control Structures IF..ELSE, GO TO, PERFORM.
2. Program for Arithmetic Verbs and Picture Clause.
4. Sorting and Merging.
5. Indexed Sequential File Updation.
7. Table Handling.
8. Table Searching.

**TOTAL: 60 PERIODS**

**MA7352 PARTIAL DIFFERENTIAL EQUATIONS AND INTEGRAL TRANSFORMS**

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**UNIT I**

**PARTIAL DIFFERENTIAL EQUATIONS**

Formation of Partial differential equations – Lagrange’s linear equation of first order Non linear equation of the first order – Homogeneous linear second order equations with constant coefficients.

**UNIT II**

**FOURIER SERIES**

Dirichlet’s conditions – General Fourier series – Half range series – Parseval’s formula.

**UNIT III**

**FOURIER TRANSFORM**

Fourier integral theorem (statement only) – Fourier Transform – Fourier sine and cosine Transforms - properties – Transforms of simple functions – Parseval’s theorem.

**UNIT IV**

**LAPLACE TRANSFORM**

UNIT V  Z- TRANSFORM
z – Transform, some standard z – transforms – properties – Initial and final value theorem –
convolution theorem – inverse z-transforms.

TOTAL: 60 PERIODS

TEXTBOOKS

REFERENCE
S.Chand and Company Ltd., New Delhi, 2002.

MA7353  NUMERICAL METHODS

UNIT I  SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS
9+3
Iterative method and Newton - Raphson method for Algebraic and Transcendental Equations.
Solutions of linear system by Gaussian, Gauss-Jordan, Jacobi and Gauss-Seidel methods. Inverse of
a matrix by Gauss-Jordan method. Eigenvalue of a matrix by Power methods.

UNIT II  INTERPOLATION
9+3
Newton’s divided difference formula, Lagrange’s formula. Newton’s forward and backward difference
formulae, Natural Cubic Spline.

UNIT III  NUMERICAL DIFFERENTIATION AND INTEGRATION
9+3
Numerical differentiation with interpolating polynomials, Numerical integration by Trapezoidal and
Simpson’s 1/3rd rule. Double integrals using Trapezoidal and Simpson’s rules.

UNIT IV  INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL
EQUATIONS
9+3
Single Step Methods-Taylor Series, Euler and Modified Euler, methods for first order differential
equations, Runge-Kutta method of order four for first and second order differential equations.
Multistep Methods-Milne and Adam’s-Bashforth predictor and corrector methods for first order
differential equations.

UNIT V  BOUNDARY VALUE PROBLEMS FOR ORDINARY AND PARTIAL
DIFFERENTIAL EQUATIONS
9+3
Finite difference solution for the second order ordinary differential equations. Finite difference solution
for one dimensional heat equation (explicit scheme), one dimensional wave equation and two
dimensional Laplace and Poisson equations.

L: 45 +T:15 = 60 PERIODS

TEXTBOOK
REFERENCES

SS7301 DATA STRUCTURES

UNIT I

UNIT II
Queues – Simulation – Priority Queues Linear Data Structures and their linked storage representation – Pointers and Linked Allocation – Linked Linear Lists – Applications of Linked Linear Lists – Polynomial Manipulation.

UNIT III

UNIT IV

UNIT V

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
UNIT I

UNIT II
Functions in C++, Classes and Objects.

UNIT III
Constructors and Destructors, Operators Overloading and Type Conversion.

UNIT IV
Inheritance, Extending Classes, Pointers, Virtual Functions and Polymorphism.

UNIT V
Managing Console Input / Output Operations, Working with Files.

TOTAL: 45 PERIODS

TEXTBOOK

REFERENCES

UNIT I
INTRODUCTION

UNIT II
STORAGE STRUCTURES

UNIT III
RELATIONAL MODEL

UNIT IV
QUERY AND TRANSACTION PROCESSING
UNIT V CONCURRENCY, RECOVERY AND SECURITY


TOTAL: 45 PERIODS

TEXTBOOK


REFERENCES


SS7311 C++ LABORATORY

1. Simple Programs in C++
2. Create a Complex Number Class with all possible Operators
3. Create a Vector Class
4. Create a String Class
5. Create a Time Class
6. Create a Date Class
7. Create a Matrix Class
8. Create an Employee Class with Derived Classes
9. Create Lists
10. File Handling
11. Operator Overloading

TOTAL: 60 PERIODS

SS7312 DATA STRUCTURES LABORATORY

Arrays and Structures in C, Infix, Postfix, Prefix expressions using stack, Recursion, Linked list, Circular linked list, Queues as circular list, Operation on binary trees – Insort, Quicksort, Heapsort, Shell sort, Sequential search and binary search.

TOTAL: 60 PERIODS
**SS7313**  
**RDBMS LABORATORY**  
**L T P C**  
0 0 4 2  
1. Data Definition, Manipulation of base Tables and views.  
2. High level programming language extensions.  
3. Front and tools.  
5. Reports.  

**TOTAL: 60 PERIODS**

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**MA7454**  
**DISCRETE MATHEMATICS**  
**L T P C**  
3 1 0 4  
1. **UNIT I**  
   **MATHEMATICAL LOGIC**  
   12  
2. **UNIT II**  
   **RELATIONS AND FUNCTIONS**  
   12  
   Equivalence relation – Function – Composition – Identity and Inverse.  
3. **UNIT III**  
   **GROUPS**  
   12  
   Definition and Examples – Subgroups – Homomorphism – Cosets and Lagrange’s theorem – Normal subgroups – Group Codes.  
4. **UNIT IV**  
   **RINGS AND FIELDS**  
   12  
   Basic definition and concepts – Rings - Fields - Polynomial Rings – Field extension.  
5. **UNIT V**  
   **BOOLEAN ALGEBRA**  
   12  
   Posets – Lattices – special Lattices – Boolean Algebra.  

**TOTAL: 60 PERIODS**

**TEXTBOOKS**  

**REFERENCES**  
UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V
The Optimizing Process – Defect Prevention – Conclusion.

TOTAL: 45 PERIODS

TEXTBOOK

REFERENCES
UNIT V

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
OUTCOMES
Upon Completion of the course, the students will be able to
• To reconstruct the software architecture that can be used for an application of your choice.
• Able to design the software using design fundamentals and methodologies.
• To create a good software by using the styles, architectural design space.

REFERENCES:

SS7404 COMPUTER GRAPHICS AND MULTIMEDIA

UNIT I OVERVIEW OF COMPUTER GRAPHICS AND MULTIMEDIA 9

UNIT II OUTPUT PRIMITIVES AND 2D TRANSFORMATIONS 9

UNIT III 3D GRAPHICS 9

UNIT IV MULTIMEDIA TOOLS AND COMMUNICATIONS 9

UNIT V MULTIMEDIA INFORMATION REPRESENTATION 9

TOTAL: 45 PERIODS

TEXTBOOKS
# REFERENCES


## SS7405 MANAGEMENT INFORMATION SYSTEM

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## UNIT II INFORMATION TECHNOLOGY IN MANAGEMENT

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## UNIT III IS IN DECISION MAKING

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## UNIT IV PLANNING INFORMATION SYSTEMS

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## UNIT V CONTROLS, SECURITY AND APPLICATIONS

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TOTAL: 45 PERIODS
TEXTBOOKS

REFERENCES

SS7411 OPERATING SYSTEM AND SYSTEM SOFTWARE LABORATORY L T P C
0 0 4 2
A. Operating System
1. Writing device drivers in DOS and UNIX environments
2. Performance measures of various processor scheduling methods
4. Pipes and message in UNIX environment
B. System Software
1. Creation of symbol table.
2. Searching the table of Symbols.
3. Implementation of an assembler.
4. Linking assembly language with C.
5. Developing a simple text editor.
6. Developing a simple graphical editor.
7. Package development.

TOTAL: 60 PERIODS

SS7412 COMPUTER GRAPHICS AND MULTIMEDIA LABORATORY L T P C
0 0 4 2

The above exercises are to be carried out in open GL environment. (9 labs)

Tweened Animation- Motion tween – Motion along open/closed guided path - Shape tween– Size tween – Color Tween – morphing – Fractal drawing – Image editing tool –Audio and Video Editing tools. (9 labs)

Mini project

TOTAL: 60 PERIODS
SS7501 OPERATIONS RESEARCH

UNIT I LINEAR PROGRAMMING 9

UNIT II APPLICATION OF LINEAR PROGRAMMING 9
Transportation Model – Assignment Model – Transportation Models.

UNIT III NETWORK MODELS 9
Shortest Route Problem – Critical Path Computation – PERT Networks.

UNIT IV INVENTORY MODELS 9
Deterministic Inventory Models – Static and Dynamic EOQ Models – Continuous review Probabilistic EOQ Model – s-S Policy for single Period Model.

UNIT V QUEUING SYSTEMS 9

TOTAL (45+15): 60 PERIODS

TEXT BOOK

REFERENCES

SS7502 COMPUTER NETWORKS

UNIT I 9

UNIT II 9
Direct Link Networks – Ethernet (802.3) – Token Rinks (802.5, FODI) – Packet Switching – switching and Forwarding – Bridges and LAN Switches – Cell Switching (ATM).

UNIT III 9
Internet Working – Simple Internet Working (IP) – Routing.

UNIT IV 9
Internetworking – Global Internet – Multicast

UNIT V 9
End-to-End Protocols – Simple Demultiplexer (UDP) – Reliable Byte Stream (TCP).

TOTAL: 45 PERIODS

TEXTBOOK
REFERENCES

SS7503   DESIGN AND ANALYSIS OF ALGORITHMS  

UNIT I  

UNIT II  

UNIT III  

UNIT IV  
Backtracking – General Method – 8 Queens Problem – Graph Coloring - Branch and Bound – Method – 0/1 Knapsack Problem.

UNIT V  

TOTAL: 45 PERIODS

TEXTBOOK

REFERENCES

SS7504   PRINCIPLES OF DATA COMMUNICATION  

UNIT I  
BASICS OF COMMUNICATION  
Basics of AM, FM and PM Block Diagram, Concepts of AM, FM modulators and demodulators - Pulse modulation systems - Pulse amplitude modulation - Sampling, Quantisation, Quantisation error.

UNIT II  
INFORMATION THEORY AND CODING  
Discrete Messages - Concepts of entropy and information rate - Shannon’s theorem - channel capacity - Orthogonal signals and their use - Introduction to coding - Coding and Decoding - Algebraic codes, burst error correction codes - Convolution coding and decoding.
UNIT III DATA TRANSMISSION CONCEPTS 9

UNIT IV DATA ENCODING 9
Digital data Digital signals - Variations of NRZ and biphase - Digital data Analog signals - ASK, FSK, PSK, QPSK - Analog Data Digital signals - PCM, DM.

UNIT V DATA LINK CONTROL 9
Flow control, Error control - HDLC, Multiplexing.

TOTAL : 45 PERIODS

TEXTBOOKS

REFERENCE

SS7505 THEORY OF COMPUTATION

UNIT I LANGUAGE AND FINITE AUTOMATA 12
Alphabets and Languages – Finite representation of Languages – Deterministic and Nondeterministic finite automata – Finite automata and regular expressions – Languages that are and are not regular.

UNIT II CONTEXT – FREE LANGUAGES 12
Context free grammars – parse trees – Pushdown automata – Pushdown automata and context free grammars – Languages that are and are not context – free.

UNIT III TURING MACHINES 12

UNIT IV UNDECIDABILITY 12
Universal Turing Machines – The halting Problem – Undecidable problems about Turing achnes – Unsolvable problems about grammars.

UNIT V COMPLEXITY AND NP-COMPLETENESS 12
The Class –P- The class NP.

TOTAL : 60 PERIODS

TEXTBOOK

REFERENCES
Implementation of following problems using C
1. Binary Search Algorithm
2. Finding Maximum and Minimum of a given list
3. Mergesort
4. Quicksort using divide-and-conquer algorithm
5. Shortest path algorithms (any 2 algorithms)
6. Traversals and Searching in Graphs
7. Minimal Spanning Tree Algorithm

TOTAL: 60 PERIODS

1. Inter Process Communication (IPC) using Message Queue.
2. IPC using pipes.
4. Implementation of wait and signal using binary semaphores.
6. Counting Semaphores at the user level using binary semaphores.
7. Signaling Processes.
8. Deadlock detection (for process passing messages).
9. Process Scheduling FCFS.

TOTAL: 60 PERIODS

A. OPERATIONS RESEARCH LABORATORY
1. Solving inequalities using simplex, two-phase, dual simplex methods.
2. Solving the transportation problems using north-west corner rule, row-minimum, matrix-minimum.
4. To find the critical path for the given PERT and CPM network.
B. NETWORKS LABORATORY
1. Working with Java Scripts.
2. Creating ActiveX Controls.
3. OLE Server.
4. OLE Container
5. Working with URL Monikers.
6. Creating an ISAPI Extension
7. Creating an ISAPI Filter.
8. Building IIS Application
10. ActiveX Documents.

TOTAL: 60 PERIODS

SS7601 CLOUD COMPUTING L T P C
3 0 0 3

OBJECTIVE
- To understand the concept of cloud and utility computing
- To understand the various issues in cloud computing
- To familiarise themselves with the lead players in cloud
- To appreciate the emergence of cloud as the next generation computing paradigm
- To be able to set up a private cloud
  At the end of this course the student should be able to
- Appreciate the new computing model called cloud computing and why it’s creating such a hype in the 21st century;
- Use the open source cloud services;
- Understand that one of the major issues in usage of public cloud is security;
- Is expected to deploy a private cloud and understand the issues currently prevailing.

UNIT I INTRODUCTION
Evolution of cloud computing – Need for cloud computing - Benefits - Limitations - Migration into Cloud - Basics of virtualization - Desktop virtualization - Server virtualization - Case study: VMware - Basics of web services - Key concepts

UNIT II CLOUD ARCHITECTURE

UNIT III ISSUES IN CLOUD
Federation in cloud - Four levels of federation - Privacy in cloud - Security in cloud - Software-as-a-Service security - Case study: Aneka - Service level agreements
UNIT IV CLOUD STORAGE
Overview of cloud storage - Cloud storage providers - Case studies: Walrus - Amazon S3 - Cloud file system – Map Reduce - Case study: Hadoop

UNIT V CLOUD DEPLOYMENT TOOLS
Study of open source cloud platforms - Eucalyptus - Nimbus - Open Nebula

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
7. www.open.eucalyptus.com/
9. www.nimbusproject.org

SS7602 ARTIFICIAL INTELLIGENCE

UNIT I INTRODUCTION

UNIT II KNOWLEDGE REPRESENTATION

UNIT III SYMBOLIC REASONING AND UNCERTAINTY
UNIT IV  NATURAL LANGUAGE PROCESSING AND DISTRIBUTED ARTIFICIAL INTELLIGENCE 9

UNIT V  EXPERT SYSTEMS 9

TEXTBOOKS

REFERENCE
TEXTBOOK

REFERENCE

SS7604 OBJECT ORIENTED ANALYSIS AND DESIGN

UNIT I OBJECT BASIS
Object Oriented Philosophy – Object – Object State, behaviors and methods. Encapsulation and information hiding Class Relationship among classes polymorphism, aggregation, object containment, meta classes.

UNIT II OBJECT ORIENTED METHODOLOGIES
Rumbaugh object Model, Booch methodology Jacobson methodology, patterns, frame works and unified approach.

UNIT III OBJECT ORIENTED ANALYSIS

UNIT IV OBJECT ORIENTED DESIGN

UNIT V UML AND PROGRAMMING
Introduction to unified modeling language – UML diagrams – class diagrams and use case diagrams – State and dynamic models. Case study to inventory, sales and banking.

TOTAL: 45 PERIODS

TEXTBOOK

REFERENCES

SS7605 ENVIRONMENTAL SCIENCE AND ENGINEERING

AIM
To create awareness in every engineering graduate about the importance of environment, the effect of technology on the environment and ecological balance and make them sensitive to the environment problems in every professional endeavour that they participates.
OBJECTIVE
At the end of this course the student is expected to understand what constitutes the environment, what are precious resources in the environment, how to conserve these resources, what is the role of a human being in maintaining a clean environment and useful environment for the future generations and how to maintain ecological balance and preserve bio-diversity. The role of government and non-government organization in environment managements.

UNIT I  ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY  14
Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.
Field study of common plants, insects, birds
Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT II  ENVIRONMENTAL POLLUTION  8
Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – soil waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides.
Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT III  NATURAL RESOURCES  10
Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.
Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

UNIT IV  SOCIAL ISSUES AND THE ENVIRONMENT  7
UNIT V  HUMAN POPULATION AND THE ENVIRONMENT


TOTAL: 45 PERIODS

TEXTBOOKS

REFERENCES

SS7611  CASE TOOLS AND UML LABORATORY

1.  Familiarization of features of any one of the standard UML case tool.
2.  Capturing key functional requirements as Use cases and class diagram for online ticket / hotel reservation systems, student information system, sales and marketing system, banking system and inventory tracking system.
3.  Interacting diagrams, state chart diagrams etc for systems in 2.
4.  Implementation using any one of object oriented languages like Java, C++ for systems in 2.
5.  Component diagrams, deployment diagrams for system in 2.
6.  Unit test case, integration test case for systems in 2.

TOTAL: 60 PERIODS

SS7612  INTERNET PROGRAMMING LABORATORY

(2 Experiments under each of the following)
2.  Experiments with Active / JAVA server pages.
4.  JAVA Servlets
5.  On-line Transactions – Database connectivity

TOTAL: 60 PERIODS
UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

TOTAL: 45 PERIODS

TEXTBOOK

REFERENCE
UNIT I  INTRODUCTION
Advantages and Disadvantages, Systems - Components of a system - Types of System - Model of a System - Simulation examples.

UNIT II  MODELS IN SIMULATION

UNIT III  RANDOM NUMBERS

UNIT IV  SIMULATION LANGUAGES
Comparison and selection of simulation languages, study of any one simulation language (Simulation using C++, GPSS, Arena).

UNIT V  ANALYSIS OF SIMULATION DATA

TOTAL: 45 PERIODS

TEXTBOOK

REFERENCES

OBJECTIVE
- This course deals with evolving multidimensional massive data sets and the various analysis which may be performed on it.

UNIT I  INTRODUCTION TO BIG DATA

UNIT II  DATA ANALYSIS
UNIT III: MINING DATA STREAMS

UNIT IV: FREQUENT ITEMSETS AND CLUSTERING

UNIT V: FRAMEWORKS AND VISUALIZATION
MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases - S3 - Hadoop Distributed file systems – Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications:

OUTCOMES:
The student should be made to:
- Apply the statistical analysis methods.
- Compare and contrast various soft computing frameworks.
- Design distributed file systems.
- Apply Stream data model.
- Use Visualisation techniques

TEXTBOOKS

REFERENCES

SS7704 OBJECT ORIENTED SOFTWARE ENGINEERING

UNIT I

UNIT II

UNIT III
Analysis – Requirements Model – Analysis Model.
UNIT IV

UNIT V

TOTAL: 45 PERIODS

TEXTBOOK

REFERENCE

SS7711 GUI APPLICATIONS LABORATORY
L T P C
0 0 4 2
1. Dialog based applications with common controls and ActiveX Controls
2. Applications with menus and toolbars
3. Database Applications to Add, Delete, Modify and View Records
4. Applications with document/view architecture (SDI, MDI )
5. Applications with serialization
6. Database connectivity.
7. Application of all above concepts.

TOTAL: 60 PERIODS

SS7712 SOFTWARE LABORATORY I
L T P C
0 0 4 2
2. Using any of the CASE tools, Practice requirement analysis and specification for different firms.
3. Case study of cost estimation models.
4. Practice object oriented design principles for implementation.
5. Practice function oriented design.
6. Practice creating software documentation for all the phases of software development life cycle with respect to any real time application.
7. Simulate a tools for path testing principles.
8. Simulate a tools for testing based on control structures.
9. Simulate a tools that reflects black box testing concepts

TOTAL: 60 PERIODS
SS7801  SOFTWARE QUALITY ASSURANCE  
UNIT I  
Introduction to software quality – Software modeling – Scope of the software quality program – Establishing quality goals – Purpose, quality of goals – SQA planning software – Productivity and documentation.

UNIT II  

UNIT III  

UNIT IV  
Tools, Techniques and methodologies, Code control, Media control, Supplier control, Records collection, Maintenance and retention, Training and risk management.

UNIT V  
ISO 9000 model, cmm model, Comparisons, ISO 9000 weaknesses, cmm weaknesses, SPICE – Software process improvement and capability determination.

TOTAL: 45 PERIODS

TEXTBOOK  

REFERENCES  

SS7802  MULTIMEDIA SYSTEMS  
UNIT I  

UNIT II  

UNIT III  
UNIT IV
O.S. support for continuous media applications – limitations in workstation O.S. – New OS support – experiments using real time mach – middleware system services architecture – media stream protocol.

UNIT V

TOTAL: 45 PERIODS

TEXTBOOK

REFERENCES

SS7803 XML AND WEB SERVICES

OBJECTIVIES
- To learn the basics of XML technology.
- To understand the background of distributed information system.
- To analyze and design a web service based application.
- To learn the security features of web services and service composition.

UNIT I
XML FUNDAMENTALS

UNIT II
DISTRIBUTED INFORMATION SYSTEM

UNIT III
WEB SERVICES

UNIT IV
XML SECURITY

UNIT V
SERVICE COMPOSITION

TOTAL: 45 PERIODS
OUTCOMES
Upon Completion of the course, the students should be able to:
- Create, validate, parse, and transform XML documents.
- Design a middleware solution based application.
- Develop web services using different technologies.
- Compose set of web services using BPEL.

REFERENCES

SS7811 SOFTWARE LABORATORY II L T P C

1. Simulate a process maturity model for a function ie., test the function at various loads.
2. Implement some of the software quality assurance factors.
3. Practice software configuration management principles.
4. Implement a tool for data gathering.
5. Develop a tool for process analysis and modelling.
6. Simulate a model that takes care of personnel training in software industry.
7. Implement a capability maturity model for any of the software firm.
8. Simulate the defect prevent model.

TOTAL: 60 PERIODS

SS7812 XML AND WEB SERVICES LABORATORY L T P C

1. XML document creation.
2. Importing and Exporting XML document in database.
3. XSL Transformation
4. Internal and External DTD creation
5. XML Schema creation
7. Web Service creation using JAX-WS
8. Web Service creation using JAX-RS
9. Web Service creation using .NET
10. JAXB Marshaling and Unmarshaling
A possible set of applications may be the following:
   a. Currency Conversion
   b. Temperature Conversion c. Ticket Booking
   d. Dictionary

TOTAL: 60 PERIODS
UNIT I  MEASUREMENT THEORY  

UNIT II  DATA COLLECTION AND ANALYSIS  

UNIT III  PRODUCT METRICS  

UNIT IV  QUALITY METRICS  
Software quality metrics – Product quality – Process quality – Metrics for software maintenance – Case studies of Metrics Program – Motorola – HP and IBM.

UNIT V  MANAGEMENT METRICS  

TOTAL: 45 PERIODS

TEXTBOOKS

REFERENCES

SS7902  SOFTWARE PROJECT MANAGEMENT  
OBJECTIVES:
• To develop an awareness of the need for project planning and management
• To apply professional attitudes and techniques to managing a project
• Explain the stages in the system development lifecycle and the activities that are carried out to implement an IT application;
• Demonstrate an understanding of steps needed to build and maintain effective development teams;
• Explain the procedures needed to monitor, control and report upon an IT development project;
• Discuss and where appropriate apply the principles of project risk management.
• Explain the ways in which appropriate quality attributes of the products of an IT development project can be assessed and assured.
UNIT I  FUNDAMENTALS  9
Conventional software management - Evolution of software economics - Improving software economics - Conventional Vs Modern software project management.

UNIT II  SOFTWARE MANAGEMENT PROCESS FRAMEWORK  9
Lifecycle phases - Artifacts of the process - Model based software architectures - Workflows of the process - Checkpoints of the process.
Lifecycle phases - Artifacts of the process – model based software architectures workflows of the process checkpoints of the process.

UNIT III  SOFTWARE MANAGEMENT DISCIPLINES  9
Iterative process planning - Organization and Responsibilities - Process automation - Process control and process instrumentation - Tailoring the process.
Project planning - Scheduling - Tracking and Control - Time and Cost overruns - Project organization - Staffing - Group working - Team dynamics.

UNIT IV  MANAGED AND OPTIMIZED PROCESSES  9
Quality management and ISO 9000 quality assurance method - Configuration management - Quality reviews - Software standards - Tracking of defects - Process improvements - SCI/CMM models - Other process models - Data gathering and analysis - Principles of data gathering - Data gathering process - Software measures - Data analysis - Managing software quality - Defect prevention.

UNIT V  CASE STUDIES  9
COCOMO Cost estimation model - Change metrics - Case studies.

TOTAL: 45 PERIODS

TEXTBOOKS

REFERENCES

SS7903  NETWORK SECURITY  9

UNIT I

UNIT II
UNIT III

UNIT IV
Standards and IP security – Introduction to Kerberos – Tickets and Ticket granting tickets.

UNIT V

TOTAL : 45 PERIODS

TEXTBOOK

REFERENCES
UNIT IV LEADING
Definition – Leadership models – Motivation – theories of motivation – Communication process –
Types – Models – Barriers – Effective Communication.

UNIT V CONTROLLING
Definition – Importance – Budgetary and Non-budgetary controlling models – Management by
objectives – Management by exception – Control techniques and Information technology.

TOTAL: 45 PERIODS

TEXTBOOKS

REFERENCES

SS7911 SOFTWARE LABORATORY III

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TOTAL: 60 PERIODS

SS7099 PROJECT WORK

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The project will be of one semester duration. The students will be sent to different organizations
involved in science communication activities as per interest and specialization of students, mostly
located in the place of the study. They will have to carry out a research project related to the area of
interest and submit a research project report at the end of the semester. The students shall defend
their dissertation in front of experts during viva-voce examination.
# LIST OF ELECTIVES

<table>
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<tr>
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<td>SOFTWARE REUSE</td>
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## UNIT I: INTRODUCTION
Organizing Reuse – Introduction – Motivation for Reuse – Reuse driven organizations – Managing a reuse project – the characteristics of reuse of projects – Roles in reuse projects – Adopting a project to reuse – Reuse tools.

## UNIT II: REUSE METRICS
Managing a repository – The REBOOT component model – Classification – Configuration management of the repository – Managing the repository – Computer supported cooperative working – Process metrics for reuse – Product metrics – Cost estimation – Forming a reuse strategy – Assessing reuse maturity.

## UNIT III: REUSABLE COMPONENTS

## UNIT IV: REUSE PHASES
Development with reuse – with reuse specific activities – Common reuse processes – Phases of development with reuse – Impact of reuse on development cycle.

## UNIT V: CLEAN ROOM SOFTWARE ENGINEERING

**TOTAL: 45 PERIODS**

## TEXTBOOKS

## REFERENCES

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## UNIT I: BASIC CONCEPTS
Importance of communication and documentation ; Different types of communications ; Spoken communication ; written communication ; Different types of documentation.

## UNIT II: SPOKEN INDIVIDUAL SPOKEN COMMUNICATION
Elements of good individual communication – getting over nervousness – organizing one self – characteristics of effective communication – augmenting spoken words by actions and other means – other aspects of spoken communication like speeches; presentation; use of visual aids.
UNIT III  GROUP COMMUNICATION  9

UNIT IV  DIFFERENT TYPES OF WRITTEN COMMUNICATION  9

UNIT V  TECHNOLOGY AND STANDARDS  9

TOTAL: 45 PERIODS

TEXTBOOKS

REFERENCES

SS7075  USER INTERFACE DESIGN  L T P C
3 0 0 3

UNIT I  9
Form – Idioms and affordances – history of rectangles on the screen – windows with a small w – lord of the files – storage and retrieval systems – choosing platforms.

UNIT II  9

UNIT III  9
UNIT IV

UNIT V

TOTAL: 45 PERIODS

TEXTBOOKS

REFERENCES

TOTAL: 45 PERIODS

TEXT BOOKS
UNIT I AGENTS – OVERVIEW
Agent Definition – Agent programming Paradigms – Agents Vs Objects – Aglet – Mobile Agents – Agent Frameworks – Agent Reasoning.

UNIT II JAVA AGENTS

UNIT III MULTIAGENT SYSTEMS

UNIT IV INTELLIGENT SOFTWARE AGENTS
Interface Agents – Agent Communication Languages – Agent Knowledge representation – Agent adaptability – Belief Desire Intension – Mobile Agent Applications.

UNIT V AGENTS AND SECURITY

TOTAL: 45 PERIODS

TEXTBOOKS

REFERENCES
UNIT IV

UNIT V
Reliability evaluation techniques – Obtaining parameter values, Reliability models for hardware redundancy, Software error models, tasking time into account. Clock synchronization: Clocks, A non-fault tolerant synchronization algorithms, impact of faults, fault tolerance synchronization hardware, synchronization in software.

TOTAL: 45 PERIODS

TEXTBOOK

REFERENCES

SS7079 COMPONENT BASED DEVELOPMENT  L T P C
UNIT I INTRODUCTION
What is CBD? – Industrialization of software development, CBD drivers and benefits, technology evolution, components and network computing.

UNIT II FUNDAMENTALS
Basic concepts of CBD Scenarios for CBD, evolution or revolution?, build, find and use components and objects.

UNIT III MODELS
Basic concepts of object models Components and interfaces, working with interfaces, component and interface modeling, specification models, domain modeling, describing classes, patterns and frameworks.

UNIT IV USING CBD
Categorizing & deploying components, CORBA, DCOM.

UNIT V FRAMEWORKS
Class libraries, encapsulated components, software frameworks, pre-built applications.

TOTAL: 45 PERIODS

TEXTBOOK
REFERENCES

SS7080 COMPILER DESIGN L T P C
3 0 0 3

UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

TOTAL: 45 PERIODS

TEXTBOOK

REFERENCES

SS7081 MICROPROCESSORS L T P C
3 0 0 3

UNIT I
UNIT II
The 8085 Programming Model – Instruction Classification – Formats – Instruction Set – Assembly Language Programming – Example Programs.

UNIT III

UNIT IV

UNIT V
Applications – ADC/DAC Interface – Traffic Light Controller – Interfacing Keyboard and Server – Segment Displays – Bidirectional Transfer between two microcomputers – Introduction to higher level processor and micro controllers.

TOTAL: 45 PERIODS

TEXTBOOK

REFERENCES

SS7082
NETWORK PROTOCOLS

UNIT I

UNIT II
Internet Multicasting – Mobile IP – Bootstrap And Auto configuration (BOOTP, DHCP).

UNIT III
The Domain Name System (DNS) – Applications: Remote Login (TELNET, Rlogin) – File Transfer and Access (FTP, TFTP, NFS).

UNIT IV

UNIT V

TOTAL: 45 PERIODS
TEXTBOOK

REFERENCES

SS7083 WIRELESS TECHNOLOGY L T P C
UNIT I
High speed modems for spread spectrum Technology coding Techniques for wireless Transmissions.

UNIT II

UNIT III
Mobility Management – Radio Resources and Power Management – Security in Wireless Networks
GSM and TDMA Technology - Introduction to GSM – Mechanisms to support a mobile environment – communications in the infrastructure.

UNIT IV

UNIT V

TOTAL: 45 PERIODS

TEXTBOOK

REFERENCES
UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

TOTAL: 45 PERIODS

TEXTBOOKS

REFERENCES
UNIT III

UNIT IV

UNIT V

TOTAL: 45 PERIODS

TEXTBOOK

REFERENCES

SS7086 DATA MINING AND DATA WAREHOUSING

UNIT I DATA MINING – INTRODUCTION

UNIT II KNOWLEDGE DISCOVERY PROCESS

UNIT III DATAWAREHOUSE – ARCHITECTURE

UNIT IV HARDWARE AND OPERATIONAL DESIGN
Hardware and operational design of data warehouse – Hardware architecture – Physical layout – Security – Backup and recovery – Service level agreement – Operating the data warehouse.
UNIT V  PLANNING, TUNING AND TESTING  9
Capacity planning – Tuning the data warehouse – Testing the data warehouse – Data warehouse features.

TOTAL: 45 PERIODS

TEXTBOOKS

SS7087  CRYPTOGRAPHY

UNIT I  CONVENTIONAL ENCRYPTION  9

UNIT II  NUMBER THEORY AND PUBLIC KEY CRYPTOGRAPHY  9

UNIT III  MESSAGE AUTHORIZATION AND HASH FUNCTIONS  9

UNIT IV  DIGITAL SIGNATURE AND AUTHENTICATION PROTOCOLS  9
Digital Signature – Authentication Protocols – Digital Signature Standard.

UNIT V  NETWORK SECURITY  9

TOTAL: 45 PERIODS

TEXTBOOK

REFERENCES

SS7088  MOBILE COMPUTING

UNIT I  INTRODUCTION  9
UNIT II  TELECOMMUNICATION SYSTEMS  9

UNIT III  WIRELESS LAN  9

UNIT IV  MOBILE IP  9

UNIT V  WIRELESS APPLICATION PROTOCOL  9

TOTAL: 45 PERIODS

TEXT BOOK

REFERENCE

SS7089  EXTREME PROGRAMMING  L T P C
3 0 0 3

UNIT I

UNIT II
Decision Making, Branching and Looping – if, if…else, switch, …? : operators, while, do, for, foreach and jump in loops, Methods in C# - declaring methods, the main method, invoking methods, nesting methods, method parameters, pass by value and pass by reference, Variable argument lists – Overloading methods.

UNIT III
Arrays – Creating an array, Variable size arrays, Array list class – Manipulating Strings – Structures, Nested Structures – Enumerations, Initialization, base types and type conversion.

UNIT IV
Classes and Objects – Definition, Creating objects, Constructors and destructors, Nesting, Overloaded constructors, Inheritance and Polymorphism – classical, multilevel, hierarchical inheritances, Subclass, Subclass constructors, Overriding methods, Abstract Classes and Methods, Interfaces, Interfaces and Inheritance – Operator Overloading.

UNIT V
Delegates – Declaration Methods, Initialization and Invocation, Multicast delegates, I/O operations – Console Input/Output, Formatting, Errors and Exceptions, Type of Errors – Exceptions – Exception for debugging.

TOTAL: 45 PERIODS
TEXTBOOK

REFERENCES

SS7090 PARALLEL COMPUTING

UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

TOTAL: 45 PERIODS

TEXTBOOKS

REFERENCES
SS7091  SOFT COMPUTING  L T P C
UNIT I  INTRODUCTION  9
Soft computing paradigms – Neural network – Fuzzy type – Derivation free optimization methods of
genetics algorithms – Soft computing characteristics.

UNIT II  FUZZY LOGIC  9
Sets – Properties – Arithmetics - Members function – Fuzzy relations – Relation equations – Fuzzy
measures – Types of uncertainty – Members of uncertainties – Measures of fuzziness – Probabilities
Possibility – Measures of fuzzy events.

UNIT III  NEURAL COMPUTING  9
Neuron modeling – Learning in Simple Neuron – Perception earning curve – Proof – Limitations of
perception.

UNIT IV  NEURAL NETWORKS  9
Multi-level perception – Algorithms – Visualizing network behaviour – B:PN – Self organizing network

UNIT V  GENTIC ALGORITHMS  9
Introduction – Biological terminology – Search space and fitness landscapes – Elements of genetic
algorithms – Genetic algorithms in problem solving.

TOTAL: 45 PERIODS

TEXTBOOKS

REFERENCES

SS7092  SOFTWARE RELIABILITY  L T P C
UNIT I  INTRODUCTION TO SOFTWARE RELIABILITY  9
Software Reliability Definitions - software disasters - Errors - faults - failures - different views of
software reliability – software requirements specification - Causes of unreliability in software -
Dependable systems: reliable, safe, secure, maintainable, and available - Software maintenance.

UNIT II  SOFTWARE RELIABILITY IMPROVEMENT  9
The phases of a Software Project - Monitoring the development process – The software life cycle
models - software engineering - Structured Analysis and structured Design - Fault tolerance -
Inspection - Software cost and schedule.

UNIT III  SOFTWARE QUALITY MANAGEMENT  9
Software quality modeling - Diverse approaches and sources of information - Fault avoidance,
removal and tolerance - Process maturity levels (CMM) - Software quality assurance (SQA) -
Monitoring the quality of software - Total quality management (TQA) - Measuring Software Reliability -
The statistical approach - Software reliability metrics.
UNIT IV SOFTWARE RELIABILITY TECHNIQUES AND TOOLS
Data Trends - Complete prediction Systems - overview of some software reliability models - The recalibration of the models - Analysis of model accuracy - Reliability growth models and trend analysis - Software Costs Models - Super models.

UNIT V SOFTWARE RELIABILITY ENGINEERING PRACTICE

TEXTBOOKS

REFERENCES

SS7093 IMAGE PROCESSING

UNIT I

UNIT II

UNIT III
Image enhancement – point operations – contrast structuring, clipping and thresholding etc – Histogram modeling – Spairal operations – special averaging and low pass filtering, Directorial smoothing, median filtering, Replication, Linear interpolation, Magnification and interpolation (Zooming) – false color and pseudo color.

UNIT IV

UNIT V
Image data compression – Pirel coding – PCM, Entrophy coding, Runlength, Bitplane extraction – Predictive techniques – Delta modulation line by line DCPM etc – Interface – Coding of two tone images.

TOTAL: 45 PERIODS
TEXTBOOK

REFERENCES

SS7094

UNIT I  DIGITAL IMAGE PROCESSING FUNDAMENTALS  L T P C
Digital image representation – An image model – Digital image processing transforms – Overview of L-Transforms and Fourier Transforms.

UNIT II  IMAGE PROCESSING AND SEGMENTATION

UNIT III  BOUNDARY DETECTION

UNIT IV  IMAGE REPRESENTATION

UNIT V  MATCHING AND INFERENCE
Semantic nets – Matching – Inference – Computer reasoning – Production systems – Active knowledge – Goal achievement.

TOTAL: 45 PERIODS

TEXTBOOK

REFERENCES
UNIT I INTRODUCTION

UNIT II STATISTICAL PATTERN RECOGNITION

UNIT III CLUSTER ANALYSIS
Unsupervised learning – Clustering for unsupervised learning and classification – C- means algorithm – Hierarchical clustering procedure – Graph theoretic approach to pattern clustering – Validity of clustering solutions.

UNIT IV SYNTACTIC PATTERN RECOGNITION
Elements of formal grammer – String generation as pattern description – Recognition of syntactic description – Parsing – Stochastic grammer and applications – Graph based structural representation.

UNIT V FEATURE EXTENTION AND RECENT ADVANCES

TOTAL: 45 PERIODS

TEXTBOOKS

REFERENCES
UNIT III FRAMEWORKS 9
Algorithms and frameworks for patterns.

UNIT IV CATALOGS 9
Patterns catalogs and writing patterns.

UNIT V ADVANCED PATTERNS 9
Anti-patterns – Case studies in UML and CORBA.

TOTAL: 45 PERIODS

TEXTBOOKS

REFERENCES