Bachelor of technology (Computer Engineering)
Schemes of Studies / Examination
(Semester-8th)

S.No.	Course No.	Subject	Teaching Schedule				Examination Schedule			Duration of Exam (Hours)	
			L	T	P	Total	Theory	Sessional	Practical	Total marks	
1	*	Departmental Elective-IV	3	1	-	4	75	50	-	125	3
2	**	Departmental Elective-V	3	1	-	4	75	50	-	125	3
3	CSE-402	Neural Networks and Fuzzy Logic	4	1	-	5	100	50	-	150	3
4	CSE-404	Interactive Computer Graphics	4	1	-	5	100	25	-	125	3
5	CSE-406	Neural Networks (Pr.)	-	-	3	3	-	50	50	100	3
6	CSE-408	Major Project	-	-	12	12	-	100	100	200	3
7	CSE-410	Seminar	-	2	-	2	-	50	-	50	-
8	CSE-412	Comprehensive Viva-Voce	-	-	-	-	-	50	-	50	-
9	CSE-414	General Fitness & Professional Aptitude	-	-	-	-	-	-	75	75	3
Total			**14**	**6**	**15**	**35**				**1000**	

Department Elective-IV
1.   CSE-440   Distributed Operating System
2.   CSE-442   Software Quality Models & Testing
3.   CSE-444   Bioinformatics
4.   CSE-446   Expert Systems
5.   CSE-448   Real Time System & Software
6.   CSE-450   Software Verification, Validation & Testing

Departmental Elective-V
1.   CSE-472   Object Oriented Software Engineering
2.   CSE-474   Simulation & Modeling
3.   CSE-476   Date Warehousing & Date Mining

Neural Network & Fuzzy Logic

CSE-402   **Theory : 100**
L T P   **Sessional : 50**
4 1 -

Unit-1

Introduction: Concept of Neural Networks, Characteristics of Neural Networks, Historical perspective and application of Neural Networks.
Fundamental of Neural Networks: The Biological prototype, Neuron concept, Single layer Neural Networks, Multi Layer Neural Networks, Terminology, Notation and representation of Neural Networks, Training of Artificial Neural Networks.
Representation of Perceptron and issues, Perceptron learning and training, classification, liner separability.

Unit-2

Hopfield nets: Structure, training , and applications, stability
Back propagation: Concept, Applications, and Back Propagation Training Algorithms:
Counter Propagation Networks: Kohonan Network, Grossberg Layer & Training, application of counter propagation, Image classification.

Unit-3

Bi-directional Associat4th
e Memories: Structure, retrieving a stored association, encoding associations, memory capacity.
ART: ART architecture, ART classification operation, ART implementation, and characteristics of ART.

Unit-4

Optical Neural Networks: Vector Matrix Multipliers, Hop field net using Electro optical matrix multipliers, Holographic correlator, Optical Hopfield net using Volume Holograms.
The Cognitrons and Neocognitrons: Their structure and training.
Genetic Algorithms : Elements, a simple genetic algorithm, working of genetic algorithms evolving neural networks.
Operating Systems: Real Time Functions and Services, OS Architectures-Real Time UNIX and POSIX, Issues in Task management-Processes and Threads, Scheduling Synchronization and communication.

Note: - There will be 8 question in all. Two questions will be set from each unit students are3 required to attempt five questions selecting at least one question from each unit.

Books
  1. Real-Time Systems and software by Alan C. Shaw; John Wiley & Sons Inc

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Interactive Computer Graphics
(CSE-404)

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L	**T**	**P**	**Theory: 100**
4	**I**	**-**	**Sessional: 25**

UNIT-1

Display Devices: Line and point plotting systems: Raster, vector, pixel and point plotters, Continual refresh and storage displays, Digital frame buffer, Plasma panel display, Very high-resolution devices. High-speed drawing, Display processors, Character generators, Colour Display techniques (shadow mask and penetration CRT, colour look-up tables, analog false colours, hard copy colour printers)

UNIT-2

Display Description: Screen co-ordinates; user co-ordinates, Graphical data structures (compressed incremental list, vector list, use of homogeneous coordinates); Display code generation Graphical functions: the view algorithm. Two-dimensional transformation, Line drawing, Circle drawing algorithms.

UNIT-3

Interactive graphics: Pointing and position devices (cursor, lightpen, digitizing tablet, the mouse, track balls). Interactive graphical techniques, Positioning (Elastic or Rubber Band lines, Linking, zooming, panning clipping, windowing, scissoring). Mouse programming.

UNIT-4

3-D Graphics: Wire-frame, perspective display, perspective depth, projective transformations, Hidden line and surface elimination, Transparent solids, shading. Two-dimensional transformations, 3-dimensional transformations, Interactive Graphical Techniques GUI.

Note:- There will be 8 questions in all. Two Questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.

Books
1. Giloi, W.K. Interactive Computer Graphic, Prentice Hall
2. Newman, W. Sproul, R.F. Principles of Interactive Computer Graphic, McGraw Hill
3. Harrington, S. Computer Graphic: A Programming Approach, Tata McGraw Hill
4. Hearn, D. Baker, Computer Graphics, Prentice Hall
5. Kelley Bootle, Mastering Turbo C

Neural Networks Practicals
(CSE-406)

L   T   P   **Practical :50**
     -   3   **Sessional: 50**

Design & train
1. NN for AND ,OR gate using perception.
2. Perception to classify odd and even numbers.
3. NN for alphabet recognition using backpropagation.
4. Hopfield n/w for recognizing patterns such as '+' and '-'.
5. Nn for EX-OR classification using Back propagation.
6. CPN for image classification.
7. Name and telephone number recognition system.

Departmental Elective-IV
Distributed Operating System (CSE-440)

L T P   **Theory :   75**
3 1 -   **Sessional : 50**
Unit-1
Architecture of distributed operating system: Introduction, motivation, system architecture type, issues in distributed operating system, Communication primitive.
Unit-2
Distributed mutual Inclusion: Introduction, classification, preliminaries,simple solution, non token based algorithm,Lamport algorithm,Ricart algorithm,Maekowa's algorithm, A generalized non token based algorithm, Broadcast algorithm, Heuristic algorithm, tree based algorithm, comparative performance analysis.
Unit-3
Distributed deadlock detection: Introduction, deadlock handling strategies, issues in deadlock detection & resolution, Control organization, centralized, distributed & hierarchical detection algorithm.

Unit-4
Distributed File System: Introduction, architecture, mechanism for building, design issues, log structured file system.
Distributed Scheduling: Introduction, motivation, issues in load distribution, component of load algorithm, stabilizing load distribution algorithm, performance comparison, selection of a suitable load sharing algorithm, requirement for load distribution, task migration, issues in task migration.
Note: - There will be 8 questions in all. Two questions will be set from each unit. Students are required to attempt five questions selecting at least one question from each unit.
Books
   1. Mukesh Singhal & N.G Shivaratri: Advanced Concepts in OS
   2. AS Tanenbaum: Modern OS PHI
   A.Silberschatz,P.Galving,G.Gahne: Applied O.S Concepts

Expert Systems
(Departmental Elective – IV)

CSE-446

Theory : 75
L T P   **Sessional : 50**
3 1 -

Unit-1

Feature of expert system, Representation and organization of knowledge, Basics characteristics, types of problems handled by expert systems, Case study of PROSPECTOR.

Unit-2

Expert system Tools: Techniques of knowledge representations in expert systems, knowledge engineering, System-building aids, support facilities, stage in the development of expert systems.

Unit-3

Building an Expert System: Expert system development, Selection of tool, Acquiring knowledge, Building process.

Unit-4

Problems with Expert Systems: Difficulties, common pitfalls in planning, dealing with domain expert, difficulties during development.

Note: - There will be 8 questions in all. Two questions will be set from each unit students are3 required to attempt five questions selecting at least one question from each unit.

Books

1. Waterman D.A.A Guide to Expert Systems, Addison Wesley Longman
2. Hayes-Roth, Lenat and Waterman: Building Expert Systems, Addison Wesley
3. Weiss S.M. and Kulikowski C.A.A Practical Guide to Designing Expert Systems, Rowman & Allanheld, New Jersey

Software Verification, Validation & Testing
(Departmental Elective – IV)

CSE-450   **Theory : 75**
L T P   **Sessional : 50**
3 1 -

Unit-1

Introduction: What is software testing and why it is so hard?, Error, Fault, Failure, Incident, Test Cases, Testing Process, Limitations of Testing, No absolute proof of correctness, overview of Graph Theory & Discrete Mathematics.

Functional Testing: Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing, Cause Effect Graphing Technique.

Unit-2

Structural Testing: Path Testing, DD-Paths, Cyclomatic Complexity, Graph Metrics, Data Flow Testing, Mutation testing.

Reducing the number of test cases:
Prioritization guidelines, Priority category, Scheme, Risk Analysis, Regression Testing, Slice testing

Unit-3

Testing Activities: Unit Testing, Levels of Testing, Integration Testing, System Testing, Debugging, Domain Testing,

Object Oriented Testing : Issues in Object Oriented Testing, Class Testing, GUI Testing, Object Oriented Integration and System Testing.

Unit-4

Testing Tools : Static Testing, Dynamic Testing Tools, Characteristics of Modern Tools.

Note: - There will be 8 question in all. Two questions will be set from each unit students are3 required to attempt five questions selecting at least one question from each unit.

BOOKS:

1. William Perry, "effective Methods for Softeware Testing:, John Wiley & Sonsm New York, 1995.
2. Cem Kaner, Jack Falk, Nguyen Quoe, "Testing Computer Software", Second Edition, Van Nostrand Reinhold, New York, 1993.
3. Boris Beizer, "Software Testing Techniques", Secdond Volume, Second Edition, Van Nostrand Reinhold, New York, 1990.
4. Louise Tamres, "Software Testing", Pearson Education Asia, 2002.
5. Roger S. Pressman, "Software Engineering – A Practitioner's Appraoch", Fifth Edition, MsGraw-Hill International Edition, New Delhi, 2001.
6. Boris Beizer, "Black-Box Testing – Techniques for Functional Testing of Software and Systems", John Wiley & Sons Inc.., New York, 1995.
7. K.K. Aggarwal & Yogesh, "Software Engineering", New Age International Publishers, New Delhi, 2003.
8. Marc Roper, "Software Testing", McGraw-Hill Book Co., London, 1994.
9. Gordon Schulmeyer, "Zero Defect Software", McGraw-Hill, New York, 1990.
10. Watts Humphrey, "Managing the Software Process:, Addison Wesley Pub. Co. Inc., Massachusetts, 1989.
11. Boris Beizer, "Software System Testing and Quality Assuarance", Van Nostrand Beizer, New York, 1984.
12. Glenford Myers, "The Art of Software Testing", John Wiley & Sons Inc., New York, 1979.

Object Oriented Software Engineering
(Departmental Elective – V)

CSE-472

Theory : 75
L T P   **Sessional : 50**
3 1 -

Unit-1

Design Objects, Class Hierarchy, Inheritance, Polymorphism, Object relationships and associations, Aggregations and Object Containment, Objec-t Persistence, Meta –classes. Object-oriented system development life cycle, Software development process object oriented systems development: a use-case driven approach.

Unit-2

Object modeling techniques as software as software engineering methodology, Rumbaugh methodology, Jacobson methodology, Booch methodology, Patterns, frameworks, the unified modeling language (UML).

Unit-3

Analysis Process, Use-Case Driven Object Oriented Analysis, Use-Case Model, Object Classification, Theory, Different Approaches for identifying classes, classes, responsibilities and collaborators, identifying Object Relationships, attributes and Methods, super-sub class relationship, Apart of Relationship-Aggregation, Class Responsibilities, Object Responsibilities.

Unit-4

Object Oriented design process, corollaries, design axioms, design patterns, object oriented design philosophy, UML Object Constraint Language, Designing Classes: The Process, Class Visibility, Refining Attributes, Designing Methods and Protocols, Packages and managing classes, Designing interface objects, View layer interface design, Macro and Micro level interface design process.

Note: - There will be 8 question in all. Two questions will be set from each unit students are3 required to attempt five questions selecting at least one question from each unit.

BOOKS
1. Ali Bahrami, Object Oriented Systems Development, : McGraw Hill, 1999
2. Rumbaugh et.al., Object Oriented Modeling and Design, PHI, 1997
3. Forouzan, Coombs and Fegan: Introduction to data Communications and Networks TMH, 1999.
4. Willam Stalling: Data and Computer Communications 5/e, PHI.

Simulation and Modeling
(Departmental Elective – V)

CSE-474

Theory : 75

L T P   **Sessional : 50**

3 1 -

Unit-1

Introduction: System Concepts, System boundaries and environment, continuous and discrete systems, system modeling, types of Models, Modeling methodology, Model validation, Principles & Nature of Computer modeling and simulation.

Unit-2

Continuous and Discrete: Analog us. Digital Simulation, Continuous simulation vs. Numerical Integration, Concepts of simulation of continuous and discrete system with the help of live example, generation of random numbers, generation of non-uniformly distributed random numbers, generation of Poisson and Erlang variates.

Unit-3

Simulators for the Live systems: Simulation of a water reservoir system, Simulation of a hypothetical computer, Simulation of queuing Systems, basic concepts of queuing theory, simulation of single server, two server and general queuing theory, simulation in inventory control systems, elements of Inventory theory, inventory models, simulators for complex inventory systems.

Unit-4

Design and Evaluation of Simulation Experiments: Length of simulation, run variance reduction techniques, Experiment layout and Validation.

Note: - There will be 8 question in all. Two questions will be set from each unit students are3 required to attempt five questions selecting at least one question from each unit.

Books

1. Gordon G.: System Simulation, Prentice-Hall of India Pvt. Ltd. New Delhi 1993
2. Narsingh Deo: System Simulation with Digital Computer:, PHI New Delhi 1993
3. Neelankavil Frances: Computer Simulation and Modeling, John Wiley & Sons, New York, 1987
4. Payne, James A., Introduction to Simulation: Programming Techniques and Methods of Analysis, McGraw-Hill International Editions, Computer Science Services, New York (1998)
5. Reitam Julian: Computer Simulation Experiments, Wiley Interscience 1971

Data Warehousing and Data Mining
(Departmental Elective – V)

CSE-476

Theory : 75
L T P   **Sessional : 50**
3 1 -

Unit-1

Data Warehousing: Definition, Scope, Practical Implications, Structures and functions.

Data Mining : Process, Technologies & Rules, platform tools & tool characteristics, operational vs. information systems.

Unit-2

Types of Data Warehouses: Host based, single stage, LAN based, Multistage, stationary distributed & virtual data-warehouses.

Unit-3

Data warehouses Architecture: Operational data & operational data bases. Data warehouse architecture model, 2-tier, 3-tier & 4-tier data warehouses.

OLAP & DSS support in data warehouses.

Unit-4

Data Mining : Knowledge discovery through statistical techniques, Knowledge discovery through neural network, Fuzzy tech. & genetic algorithms.

Note: - There will be 8 questions in all. Two questions will be set from each unit students are3 required to attempt five questions selecting at least one question from each unit.

Books

1. "Building the Data Warehouse", W.H.lnmon, John Wiley & Sons.
2. "Developing the Data Warehouse", W.H.Lnmon, Cc.Kelly, John Wiley & Sons.
3. "Managing the Data Warehouse", W.H.Lnmon. C.L.Gassey, John Wiley & Sons.
4. "Advances in knowledge discovery & Data Mining", Fayyad, Usama M.et. al., MIT Press.
5. "Data Mining", A.K.Pujari; Longman Publisher.