Bachelor of Technology (Computer Engineering)
Scheme of studies / Examination

(Semester- 3)

Course No	Subject	Teaching Schedule				Examination Schedule (Marks)				Duration of Exam (Hours)
		L	T	P	Total	Theory	Sessional	Practical	T	
MATH-201E /HUM-201E	Mathematics-III / Basics of Economics & Management	3	1	-	4	100	50	-	150	**3**
CSE-201 E	Data Base Management Systems	3	1	-	4	100	50	-	150	**3**
CSE-203 E	Data Structures	3	1	-	4	100	50	-	150	**3**
CSE-205 E	Discrete Structures	3	1	-	4	100	50	-	150	**3**
CSE-207 E	Internet Fundamentals	3	1	-	4	100	50	-	150	**3**
ECE-203 E	Analog Comm.	3	1	-	4	100	50	-	150	**3**
IT-253 E	Internet Lab	-	-	3	3	-	50	25	75	**3**
CSE-209 E	Data Base Management Systems Lab.	-	-	3	3	-	25	25	50	**3**
CSE-211 E	Data Structures Lab	-	-	3	3	-	50	25	75	**3**
ECE-207E	Analog Comm. Lab	-	-	2	2	-	25	25	50	**3**
TOTAL		**18**	**6**	**11**	**35**	**600**	**450**	**100**	**1150**	

Common to Bachelor of Technology (Computer Engineering) / Information Technology.

Schemes of Studies / Examination

(Semester- 4)

Course No.	Subject	Teaching Schedule				Examination Schedule				Duration Of Exam (Hours)
		L	T	P	Total	Theory	Sessional	Practical	T	
MATH 201E HUM 201E	Mathematics III / Basics of Economics & Mgt.	3	1	-	4	100	50	-	150	3
CSE 202E	Computer Architecture & Organization	3	1	-	4	100	50	-	150	3
CSE 204E	Programming Languages	3	1	-	4	100	50	-	150	3
IT 252E	Object Oriented Programming using C++	3	1	-	4	100	50	-	150	3
ECE 204E	Digital electronics	3	1	-	4	100	50	-	150	3
ECE 216E	Microprocessors & Interfacing	3	1	-	4	100	50	-	150	3
IT 256E	C++ Programming Lab	-	-	3	3	-	50	25	75	3
ECE 218E	Digital electronics lab	-	-	3	3	-	50	25	50	3
ECE 218	Microprocessor & Interfacing Lab	-	-	3	3	-	25	25	75	3
GPCSE 210	General Proficiency / Practical Training	1	-	-	1	-	50		50	-
TOTAL		19	6	9	34	600	475	75	1150	

14.05.

(V.K. Kanjilal)

CHAIRMAN 17/05

Deptt. of Computer Sc. &

Recommended

Bachelor of Technology (Computer Engineering)
Scheme of Courses/examination
(5th Semester)

Sr. No	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				Duration of Exam (Hours)
			L	T	P/D	Tot	Th	Sess	P/V V	Tot	
1	HUT-302	Fundamentals of Management	3	1	-	4	100	50	-	150	3
2	CSE-301	Design & Analysis of Algorithms	4	1	-	5	100	25	-	125	3
3	CSE-303	Computer Networks	3	2	-	5	75	50	-	125	3
4	CSE-305	Automata Theory	4	2	-	6	100	50	-	150	3
5	CSE-307	Operating Systems	3	1	-	4	75	25	-	100	3
6	CSE-311	Advance Technologies (Pr)	-	-	3	3	-	50	50	100	3
7	CSE-313	Operating Systems (Pr)	-	-	3	3	-	50	50	100	3
8	CSE-315	Algorithm Design (Pr)	-	-	3	3	-	50	25	75	3
9	CSE-317	Seminar	-	2	-	2	-	50	-	50	-
10	CSE-319	Training Viva	-	-	-	-	-	75	-	75	-
TOTAL											
Total			17	9	9	35	450	475	125	1050	

14.7.05
(Sushil Bansal)

(Chandan Sh)

SHASHI BHUSHAN

14/7/05

Bachelor of Technology (Computer Engineering)
Scheme of Courses/examination
(6th Semester)

Sr. No	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				Duration of Exam (Hours)
			L	T	P/D	Tot	Th	Sess	P/V	Tot	
1	*	Departmental Elective I	3	2	-	5	100	50	-	150	3
2	CSE-302	Mobile Computing	4	2	-	6	100	50	-	150	3
3	CSE-304	Computer Hardware Technologies	4	1	-	5	100	25	-	125	3
4	CSE-306	Network Management & Security	4	1	-	5	100	50	-	150	3
5	CSE-308	Software Engineering	4	1	-	5	100	25	-	125	3
6	CSE-312	Computer Hardware & Troubleshooting (Pr)	-	-	3	3	-	50	50	100	3
7	CSE-314	Mobile Computing (Pr)	-	-	3	3	-	50	50	100	3
8	CSE-316	Software Engineering (Pr)	-	-	3	3	-	50	50	100	3
		TOTAL	19	7	9	35				1000	

***Departmental Elective:**

1. CSE-320 Digital Signal Processing
2. CSE-321 Multimedia Technique
3. CSE-322 Graph Theory & combinations
4. CSE-323 Logic of Programming
5. CSE-324 Advanced Database Systems
6. CSE-325 Parallel Computing

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Bachelor of Technology (Computer Engineering)
Schemes of Studies / Examination
(Semester- 7TH)

Sl. No.	Course No.	Subject	Teaching Schedule				Examination Schedule			Duration Of Exam (Hours)	
			L	T	P	Total	Theory	Sessional	Practical	T	
1	*	Departmental Elective-II	3	1	-	4	75	50	-	125	3
2	**	Departmental Elective-III	3	1	-	4	75	50	-	125	3
3	CSE-401	Compiler Design	4	1	-	5	100	25	-	125	3
4	CSE-403	Web Engineering	3	1	-	4	75	25	-	100	3
5	CSE-405	Statistical Models for Computer science	4	1	-	5	100	25	-	125	3
6	CSE-407	Unix & Linux Programming (Pr)	-	-	*1+2	3	-	50	50	100	3
7	CSE-409	Web Engineering (Pr)	-	-	2	2	-	25	25	50	3
8	CSE-411	Minor Project	-	-	6	6	75	50	-	125	3
9	CSE-413	Seminar	-	2	-	2	-	50	-	50	-
10	CSE-415	Training Viva	-	-	-	-	-	75	-	75	-
		TOTAL	17	7	11	35				1000	

Departmental Elective-II

1. CSE-441 Software Project Management
2. CSE-443 Embedded System Design
3. CSE-445 Artificial Intelligence
4. CSE-447 Image Processing

Departmental Elective-III

1. CSE-471 - Unix & Linux Programming
2. CSE-473 - Security & Cryptography

Bachelor of Technology (Computer Engineering)
Schemes of Studies / Examination
(Semester- 8TH)

Sl. No.	Course No.	Subject	Teaching Schedule				Examination Schedule			Duration Of Exam (Hours)	
			L	T	P	Total	Theory	Sessional	Practical	Total	
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 & 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	-
8	CSE-414	General Fitness & Professional Aptitude	-	-		-	-	-	75	75	3
		TOTAL	14	6	15	35				1000	

Departmental Elective-IV

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

Departmental Elective- V

1. CSE-472 Object Oriented Software Engineering
2. CSE-474 Simulation and Modeling
3. CSE-476 Data warehousing and Data Mining

HUM-201E : BASICS OF ECONOMICS & MANAGEMENT

L	T	P
3	1	--

Sessional	:	50 marks
Theory	:	100 marks
Total	:	150 marks
Duration of Exams.	:	3 hours.

Unit – I

Meaning of Industrial Economic, production function, its types, least cost combination, law of variable proportion, law of returns; increasing, constant & Diminishing.

Fixed & variable costs in short run & long run, opportunity costs, relation between AC & MC, U-shaped short run AC curve.

Price & output determination under monopoly in short run & long run, price discrimination, price determination under discriminating Monopoly, comparison between Monopoly & perfect competition.

Unit-II

Meaning of management, characteristics of management, management Vs administration, management - Art, Science & Profession, Fayol's principles of management, Human relations approach. Functions of management.

Unit-III

Planning & Organizing

Planning, steps in planning, Planning premises, difference between planning policy & strategy, Authority & responsibility, centralization & decentralization.

Unit-IV

Staffing, Directing & Controlling – Manpower planning, Recruitment & section styles of leadership, communication process and barriers, control process and steps in controlling.

Note :– Eight questions are to be set taking two from each unit. The students are required to attempt five questions in all taking at least one from each unit.

Text Books :

1. "Modern Economic Theory" Dewett, K.K., S. Chand & Co.
2. "Economic Analysis" K.P. Sudharam & E.N. Sudharam (Sultan Chand & Co.)
3. "Micro Economics Theory" M.L. Jhingan (Konark Pub.Pvt. Ltd.)
4. "Principles and Practices of Management" L.M. Parshad.
5. "Essentials of Management" Harold Kaontz.
6. "Organization and Management" R.D.Aggarwal, Tata McGraw Hill.

CSE-201 E Database Management Systems

L	T	P
3	1	-

Sessional: 50 Marks
Exam: 100 Marks
Total: 150 Marks
Duration of Exam: 3 Hrs.

Unit–1:Introduction Overview of database Management System: Various views of data, data Models, Schemes Introduction to Database Languages & Environments, Advantages of DBMS over file processing systems. Responsibility o Database Administrator, Three levels architecture of Database Systems, : Introduction to Client/Server architecture.

Data Models : E-R Diagram (Entity Relationship), mapping Constraints, Keys. Reduction of E-R diagram into tables Naming Secondary Storage Devices. Network & Hierarchical Model.

Unit-2: File Organisation: Sequential Files, index sequential files, direct files, Hashing, B-trees Index files, Inverted Lists.

Relational Model, Relational Algebra & various operations (set operations, select, project, join, division), Order, Relationa calculus: Domain, Tuple. Well Formed Formula, specifications. quantifiers.

Unit-3: Introduction to Query Languages : QBE, integrity constraints, functional dependencies & Normalization (Norma forms- up to 5th Normal forms).

Unit-4: Introduction to Distributed Data processing, Object Oriented Data Base Management Systems parallel Databases data mining & data warehousing, Concurrency control : Transaction, Timestamping, Lock-based Protocols, serializabilit and Recovery Techniques.

Text Books:

- Database System Concepts by A. Silberschatz, H.F. Korth and S. Sudarshan, 3rd edition, 1997, McGraw-Hill, International Edition.
- Introduction to Database Management system by Bipin Desai, 1991, Galgotia Pub.

Reference Books:

- Fundamentals of Database Systems by R. Elmasri and S.B. Navathe, 3rd edition, 2000, Addision-Wesley, Low Priced Edition.
- An Introduction to Database Systems by C.J. Date, 7th edition, Addison-Wesley, Low Priced Edition, 2000.
- Database Management and Design by G.W. Hansen and J.V. Hansen, 2nd edition, 1999, Prentice-Hall of India, Eastern Economy Edition.
- Database Management Systems by A.K. Majumdar and P. Bhattacharyya, 5th edition, 1999, Tata McGraw-Hill Publishing.
- A Guide to the SQL Standard, Date, C. and Darwen,H. 3rd edition, Reading, MA: 1994, Addison-Wesley.
- Data Management & file Structure by Looms, 1989. PHI

Note: Eight questions will be set in all by the examiners taking at least two questions from each unit .Students will be required to attempt five questions in all at least one from each unit.

CSE-203 E DATA STRUCTURES

L	T	P
3	1	-

Sessional: 50 Marks
Exam: 100 Marks
Total: 150 Marks
Duration of Exam: 3 Hrs.

Unit-1: Introduction : Introduction to Data Structures: Definition & abstract data types, Static and Dynamic implementations, Examples and real life applications; built in and user defined data structures, Ordered list and Operations on it. **Arrays**: Definition, implementation, lower bound, upper bound, addressing an element at a particular index for one dimensional arrays, Two dimensional arrays and Multi-dimensional arrays. Implementation of Data Structures like structure/ Record, Union, Sparse matrices : implementation of transpose.

Stacks : Sequential implementation of stacks, operations, Polish-notations, Evaluation of postfix expression, Converting Infix expression to Prefix and Postfix expression, Applications.

Unit-2: Queues: Definition, Sequential implementation of linear queues, Operations. Circular queue: implementation (using arrays), Advantage over linear queue, Priority queues & Applications.

Linked Lists :Need of dynamic data structures, continuous & linked implementation of lists. Operations on lists. Dynamic implementation of linked lists, Operations. Comparison between Array and Dynamic Implementation of linked list. Linked implementation of stacks and queues. Circular lists, implementation of primitive operations. Doubly linked lists : continuos & dynamic implementation, operations.

Unit-3: Trees : Definition, Basic terminology, Binary tree, Array and Dynamic Implementation of a binary tree, primitive operations on binary trees. External and internal nodes. Binary tree traversals : preorder, inorder and postorder traversals. Representation of infix, postifix and prefix expressions using trees. Representation of lists as binary trees. Introduction to Binary Search Trees, B trees, B+ trees , AVL Trees, threaded trees, balanced multi way search trees,

Unit- 4 : Graphs :Definition of undirected & Directed Graphs & Networks, Basic terminology, Representation of graphs,. Graph traversals and spanning forests, minimum-spanning trees, computer representation of graphs. **Tables** : Definition, Hash Functions, Implementation & Applications.

Sorting & Searching : Basic Searching techniques (Linear & binary). Introduction to Sorting. Sorting using selection, insertion, bubble, merge, quick, radix, heap sort.

Text Book:

- Data Structures using C by A. M. Tenenbaum. Langsam, Moshe J. Augentem, PHI Pub.

Reference Books:

- Data Structures and Algorithms by A.V. Aho, J.E. Hopcroft and T.D. Ullman, Original edition, Addison-Wesley, 1999, Low Priced Edition.
- Fundamentals of Data structures by Ellis Horowitz & Sartaj Sahni, Pub, 1983,AW
- Fundamentals of computer algorithms by Horowitz Sahni and Rajasekaran.
- Data Structures and Program Design in C By Robert Kruse, PHI,
- Theory & Problems of Data Structures by Jr. Symour Lipschetz, Schaum's outline by TMH
- Introduction to Computers Science -An algorithms approach . Jean Paul Tremblay, Richard B. Bunt, 2002, T.M.H.
- Data Structure and the Standard Template library -- Willam J. Collins, 2003, T.M.H

Note: Eight questions will be set in all by the examiners taking at least two questions from each unit .Students will be required to attempt five questions in all at least one from each unit.

CSE-205 E Discrete Structures

L	T	P
3	1	-

Sessional: 50 Marks
Exam: 100 Marks
Total: 150 Marks
Duration of Exam: 3 Hrs.

Unit-1: Set Theory: Introduction to set theory, Set operations, Algebra of sets, combination of sets, Duality, Finite and Infinite sets, Classes of sets, Power Sets, Multi sets, Cartesian Product, Representation of relations, Types of relation, Binary Relations, Equivalence relations and partitions, Partial ordering relations and lattices, Mathematics Induction, Principle of Inclusion & Exclusion, Propositions.

Function and its types, Composition of function and relations, Cardinality and inverse relations. Functions & Pigeo principles.

Unit-2: Propositional Calculus: Basic operations: AND(^), OR(v), NOT(~), Truth value of a compound statement, propositions, tautologies, contradictions.

Techniques Of Counting: Rules of Sum of products, Permutations with and without repetition, Combination.

Recursion And Recurrence Relation :Polynomials and their evaluation, Sequences, Introduction to AP, GP and AG series, partial fractions, linear recurrence relation with constant coefficients, Homogeneous solutions, Particular solutions, Total solution of a recurrence relation using generating functions.

Unit-3: Algebric Structures Definition, elementary properties of algebric structures, examples of a Monoid, Submonoid, Semigroup, Groups and rings, Homomorphism, Isomorphism and Automorphism, Subgroups and Normal subgroups, Cyclic groups, Integral domain and fields, Cosets, Lagrange's theorem, Rings, Division Ring.

Unit-4: Graphs And Trees: Introduction to graphs, Directed and Undirected graphs, Homomorphic and Isomorphic graphs, Subgraphs, Cut points and Bridges, Multigraph and Weighted graph, Paths and circuits, Shortest path in weighted graphs, Eurelian path and circuits, Hamilton paths and circuits, Planar graphs, Euler's formula, Trees, Rooted Trees, Spanning Trees & cut-sets, Binary trees and its traversals

Text Book:

- Elements of Discrete Mathematics C.L Liu, 1985, McGraw Hill

Reference Books:

- Concrete Mathematics: A Foundation for Computer Science, Ronald Graham, Donald Knuth and Oren Patashik, 1989, Addison-Wesley.
- Mathematical Structures for Computer Science, Judith L. Gersting, 1993, Computer Science Press.
- Applied Discrete Structures for Computer Science, Doerr and Levasseur. (Chicago: 1985,SRA
- Discrete Mathematics by A. Chtewynd and P. Diggle (Modular Mathematics series), 1995, Edward Arnold, London.
- Schaums Outline series: Theory and problems of Probability by S. Lipshutz, 1982, McGraw-Hill Singapore
- Discrete Mathematical Structures, B. Kolman and R.C. Busby, 1996, PHI
- Discrete Mathematical Structures with Applications to Computers by Tembley & Manohar, 1995, Mc Graw Hill.
- Discrete Mathematics & Structure, Satyender Bal Gupta, 2nd Ed., Luxmi Pub.

Note: Eight questions will be set in all by the examiners taking at least two questions from each unit .Students will be required to attempt five questions in all at least one from each unit.

-10- 6-

CSE-207 E Internet Fundamentals

L	T	P
3	1	-

Sessional: 50 Marks
Exam : 100 Marks
Total : 150 Marks
Duration of Exam: 3 Hrs.

Unit-1 : The Internet: Introduction to networks and internet, history, Internet, Intranet & Extranet, Working of Internet, Internet Congestion, internet culture, business culture on internet. Collaborative computing & the internet. Modes of Connecting to Internet, Internet Service Providers(ISPs), Internet address, standard address, domain name, DNS, IP.v6.Modems, Speed and time continuum, communications software; internet tools.

Unit-2 : World Wide Web : Introduction, Miscellaneous Web Browser details, searching the www: Directories search engines and meta search engines, search fundamentals, search strategies, working of the search engines, Telnet and FTP, HTTP, Gophar Commands, TCP/IP.
Introduction to Browser, Coast-to-coast surfing, hypertext markup language, Web page installation, Web page setup, Basics of HTML & formatting and hyperlink creation.Using FrontPage Express, Plug-ins.

Unit-3: Electronic Mail: Introduction, advantages and disadvantages, User Ids, Pass words, e-mail addresses, message components, message composition, mailer features, E-mail inner workings, E-mail management, MIME types, Newsgroups, mailing lists, chat rooms, secure-mails, SMTP, PICO, Pine, Library cards catalog, online ref. works.

Languages: Basic and advanced HTML, Basics of scripting languages – XML, DHTML, Java Script.

Unit-4 : Servers : Introduction to Web Servers: PWS, IIS, Apache; Microsoft Personal Web Server. Accessing & using these servers.

Privacy and security topics: Introduction, Software Complexity, Attacks, security and privacy levels, security policy, accessibility and risk analysis, Encryption schemes, Secure Web document, Digital Signatures, Firewalls, Intrusion detection systems

Text Book:

- Fundamentals of the Internet and the World Wide Web, Raymond Greenlaw and Ellen Hepp – 2001, TMH
- Internet & World Wide Programming, Deitel,Deitel & Nieto, 2000, Pearson Education

Reference Books:

- Complete idiots guide to java script,. Aron Weiss, QUE, 1997
- Network firewalls, Kironjeet syan -New Rider Pub.
- Networking Essentials – Firewall Media.
- www.secinf.com
- www.hackers.com
- Alfred Glkossbrenner-Internet 101 Computing MGH, 1996

Note: Eight questions will be set in all by the examiners taking at least two questions from each unit .Students will be required to attempt five questions in all at least one from each unit.

B.TECH IIIRD SEMESTER
ANALOG COMMUNICATION
(ECE-203E)

L	T	P
3	1	-

THEORY	:	100 Marks
SESSIONAL	:	50 Marks
TOTAL	:	150 Marks
TIME	:	3 Hrs.

UNIT – I

NOISE: Classification of Noise, Various sources of Noise, Methods of Noise Calculation in networks and inter connected networks. Addition of noise due to several sources; noise in amplifiers in cascade, noise in reactive circuits, Noise figure, its calculation and measurement. Noise temperature, Mathematical representation of random noise, narrow band noise and its representation. Transmission of noise through linear systems, signal to noise ratio, noise bandwidth.

UNIT-II

MODULATION TECHNIQUES: Basic constituents of Communication Systems, need of modulation, Amplitude modulation, spectrum of AM wave, modulation index, DSBSC modulation, SSB Modulation, Collector modulation, Square law modulation methods, Methods of generating SSB Signals, vestigial side band modulation, Detection of AM Signal; Diode detector, Square Law Detector. Time Constant RC in diode detector. Diode detector with filter. FDM, Power relations in AM wave.

UNIT-III

ANGLE MODULATION: frequency and phase modulation, spectrum of FM Wave, modulation index and Bandwidth of FM Signal, NBFM and WBFM, Comparison between FM and PM Signals, FM and AM signals, AM and NBFM Signals, FM generation methods, Demodulation methods; slope detector, ratio detector, Foster-Seeley discriminator. Pre-emphasis & De-emphasis, effect of noise on carrier; noise triangle.

UNIT-IV

TRANSMITER AND RECEIVER: Classification of radio transmitters, Block diagram of AM transmitter, Frequency Scintillation, Frequency drift, Radio broadcast transmitter, Radio telephone transmitter, Privacy devices, Armstrong FM transmitter, Simple FM transmitter using Reactance modulator.

Classification of radio receivers, TRF receives, superheterodyne receivers, Image Signal rejection, frequency mixers. Tracking and alignment of receivers, Intermediate frequency, AGC, AFC, SSB receiver.

REFERENCE BOOKS:

1. Taub & Schilling, Principles of Communication Systems, TMH.
2. Mithal G K, Radio Engineering, Khanna Pub.
3. Simon Haykin, Communication Systems, John Wiley.
4. Dungan F.R., Electronics Communication System, Thomson-Delmar
5. Electronics Communication System: Kennedy; TMH

NOTE:

Eight questions are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all.

CSE- 209 E Database Management Systems Lab

L	T	P
-	-	3

Sessional: 25 Marks
Exam: 25 Marks
Total: 50 Marks
Duration of Exam: 3 Hrs.

1. Create a database and write the programs to carry out the following operation :
    1. Add a record in the database
    2. Delete a record in the database
    3. Modify the record in the database
    4. Generate queries
    5. Data operations
    6. List all the records of database in ascending order.
2. Create a view to display details of employees working on more than one project.
3. Create a view to display details of employees not working on any project.
4. Create a view to display employees name and projects name for employees working on projects <P1 and P3> or <P2 and P4>.
5. Using two tables create a view which shall perform EQUIJOIN.
6. Write trigger for before and after insertion. Detection and updation process.
7. Write a procedure to give incentive to employees working on all projects. If no such employee found give app. Message.
8. Write a procedure for computing amount telephone bill on the basic of following conditions.

Usage of S/w:

1. VB, ORACLE and/or DB2
2. VB, MSACCESS
3. ORACLE, D2K
4. VB, MS SQL SERVER 2000

CSE-211 E Data Structures Lab

L	T	P
-	-	3

Sessional: 50 Marks
Exam: 25 Marks
Total: 75 Marks
Duration of Exam: 3 Hrs.

1. Write a program to search an element in a two-dimensional array using linear search.
2. Using iteration & recursion concepts write programs for finding the element in the array using Binary Search Method
3. Write a program to perform following operations on tables using functions only
   a) Addition b) Subtraction c) Multiplication d) Transpose
4. Write a program to implement Queue.
5. Write a program to implement Stack.
6. Write a program to implement the various operations on string such as length of string concatenation, reverse of a string & copy of a string to another.
7. Write a program for swapping of two numbers using 'call by value' and 'call by reference strategies.
8. Write a program to implement binary search tree.
   (Insertion and Deletion in Binary search Tree)
9. Write a program to create a linked list & perform operations such as insert, delete, update, reverse in the link list
10. Write the program for implementation of a file and performing operations such as insert, delete, update a record in the file.
11. Create a linked list and perform the following operations on it
    a) add a node b) Delete a node
12. Write a program to simulate the various searching & sorting algorithms and compare their timings for a list of 1000 elements.
13. Write a program to simulate the various graph traversing algorithms.
14. Write a program which simulates the various tree traversal algorithms.
15. Write a program to implement various Searching Techniques.
16. Write a program to implement Sorting Techniques.

Note: **At least 5 to 10 more exercises to be given by the teacher concerned.**

B.TECH IIIRD SEMESTER
ANALOG COMMUNICATION LAB
(ECE-207E)

L	T	P
-	-	2

Sessional : 25 Marks
Viva : 25 Marks
Total : 50 Marks
Time : 3hrs.

LIST OF EXPERIMENTS:

1. i) To study Double Sideband Amplitude Modulation and determine its modulation factor and power in sidebands.
   ii) To study amplitude demodulation by linear diode detector.
2. i) To study Frequency Modulation and determine its modulation factor.
   ii) To study PLL 565 as frequency demodulator
3. To study Sampling and reconstruction of pulse amplitude modulation system.
4. To study the Sensitivity characteristics of superhetrodyne receiver.
5. To study the Selectivity characteristics of superhetrodyne receiver.
6. To study the Fidelity characteristics of superhetrodyne receiver.
7. i) To study Pulse Amplitude Modulation
   a) Using switching method
   b) By sample and hold circuit.
   ii) To demodulate the obtained PAM signal by IInd order Low pass filter.
8. To study Pulse Width Modulation / Demodulation.
9. To study Pulse Position Modulation / Demodulation.
10. To study active filters (Low-pass, High-pass, Band-pass, Notch filter).

NOTE:

At least seven experiments are to be performed from above list and the concerned institution as per the scope of the syllabus can set remaining three.

-15- -12-

CSE- 202 E Computer Architecture & Organization

L	T	P
3	1	-

Sessional:	50	Marks
Exam :	100	Marks
Total:	150	Marks

Duration of Exam: 3 Hrs.

Unit-1: General System Architecture: Store program control concept, Flynn's classification of computers (SISD, MISD, MIMD); Multilevel viewpoint of a machine: digital logic, micro architecture, ISA, operating systems, high level language; structured organization; CPU, caches, main memory, secondary memory units & I/O; Performance metrics; MIPS, MFLOPS.

Instruction Set Architecture: Instruction set based classification of processors (RISC, CISC, and their comparison); addressing modes: register, immediate, direct, indirect, indexed; Operations in the instruction set; Arithmetic and Logical, Data Transfer, Machine Control Flow; Instruction set formats (fixed, variable, hybrid); Language of the machine: 8086 ; simulation using MASM

Unit-2: Basic non pipelined CPU Architecture: CPU Architecture types (accumulator, register, stack, memory/ register) detailed data path of a typical register based CPU, Fetch-Decode-Execute cycle (typically 3 to 5 stage); microinstruction sequencing, implementation of control unit, Enhancing performance with pipelining, Hardwired control design method, Micro programmed control unit.

Unit-3: Memory Hierarchy & I/O Techniques: The need for a memory hierarchy (Locality of reference principle, Memory hierarchy in practice: Cache, main memory and secondary memory, Memory parameters: access/ cycle time, cost per bit); Main memory (Semiconductor RAM & ROM organization, memory expansion, Static & dynamic memory types); Cache memory (Associative & direct mapped cache organizations. Allocation & replacement polices, segments, pages & file organization, virtual memory.

Unit-4: Introduction to Parallelism: Goals of parallelism (Exploitation of concurrency, throughput enhancement); Amdahl's law; Instruction level parallelism (pipelining, super scaling –basic features); Processor level parallelism (Multiprocessor systems overview).

Computer Organization [80x86]: Instruction codes, computer register, computer instructions, timing and control, instruction cycle, type of instructions, memory reference, register reference. I/O reference, Basics of Logic Design, accumulator logic, Control memory, address sequencing, micro-instruction formats, micro-program sequencer, Stack Organization, Instruction Formats, Types of interrupts; Memory Hierarchy. Programmed I/O, DMA & Interrupts.

Text Books:

- Computer Organization and Design, 2nd Ed., by David A. Patterson and John L. Hennessy, Morgan 1997, Kauffmann.
- Computer Architecture and Organization, 3rd Edi, by John P. Hayes, 1998, TMH.

Reference Books:

- Operating Systems Internals and Design Principles by William Stallings,4th edition, 2001, Prentice-Hall Upper Saddle River, New Jersey
- Computer Organization, 5th Edi, by Carl Hamacher, Zvonko Vranesic,2002, Safwat Zaky.
- Structured Computer Organisation by A.S. Tanenbaum, 4th edition, Prentice-Hall of India, 1999, Eastern Economic Edition.
- Computer Organisation & Architecture: Designing for performance by W. Stallings, 4th edition, 1996, Prentice-Hall International edition.
- Computer Architecture & Organisation by M. Mano, 1990, Prentice-Hall.
- Computer Architecture- Nicholas Carter, 2002, T.M.H.

Note: Eight questions will be set in all by the examiners taking at least two questions from each unit .Students will be required to attempt five questions in all at least one from each unit.

CSE-204 E Programming Languages

L	T	P
3	1	-

Sessional: 50 Marks
Exam: 100 Marks
Total: 150 Marks
Duration of Exam: 3 Hrs.

Unit-1: Introduction: A brief history, Characteristics of a good programming language, Programming language translators compiler & interpreters , Elementary data types – data objects, variable & constants, data types, Specification & implementation of elementary data types, Declarations ,type checking & type conversions . Assignment & initialization, Numeric data types, enumerations, Booleans & characters.
Syntax & Semantics : Introduction, general problem of describing syntax, formal method of describing syntax, attribute grammar dynamic semantic.

Unit-2: Structured data objects : Structured data objects & data types , specification & implementation of structured data types, Declaration & type checking of data structure .vector & arrays, records Character strings, variable size data structures , Union, pointer & programmer defined data objects, sets, files.
Subprograms and Programmer Defined Data Types: Evolution of data type concept abstraction, encapsulation & information hiding , Subprograms ,type definitions, abstract data types, over loaded subprograms, generic subprograms.

Unit–3: Sequence Control: Implicit & explicit sequence control ,sequence control within expressions, sequence control within statement, Subprogram sequence control: simple call return, recursive subprograms, Exception & exception handlers, co routines, sequence control. Concurrency – subprogram level concurrency, synchronization through semaphores, monitors & message passing
Data Control: Names & referencing environment, static & dynamic scope, block structure, Local data & local referencing environment, Shared data: dynamic & static scope. Parameter & parameter transmission schemes.

Unit-4: Storage Management: Major run time elements requiring storage ,programmer and system controlled storage management & phases . Static storage management . Stack based storage management, Heap storage management ,variable & fixed size elements.
Programming Languages: Introduction to procedural, non-procedural ,structured, logical, functional and object oriented programming language, Comparison of C & C++ programming languages.

Text Book:

- Programming languages Design & Implementation by T.W. .Pratt, 1996, Prentice Hall Pub.
- Programming Languages – Principles and Paradigms by Allen Tucker & Robert Noonan, 2002, TMH,

Reference Books:

- Fundamentals of Programming languages by Ellis Horowitz, 1984, Galgotia publications (Springer Verlag),
- Programming languages concepts by C. Ghezzi, 1989, Wiley Publications.,
- Programming Languages – Principles and Pradigms Allen Tucker , Robert Noonan 2002, T.M.H.

Note: Eight questions will be set in all by the examiners taking at least two questions from each unit .Students will be required to attempt five questions in all at least one from each unit.

IT-252 E Object Oriented Programming Using C++

L	T	P
3	1	-

Sessional:	50	Marks
Exam:	100	Marks
Total:	150	Marks

Duration of Exam: 3 Hrs.

Unit-1: Introduction to C++, C++ Standard Library, Basics of a Typical C++ Environment, Pre-processors Directives, Illustrative Simple C++ Programs. Header Files and Namespaces, library files. Concept of objects, basic of object modeling, object classes, associations, behaviors, description, Object Oriented Analysis & Object Modeling techniques,

Object Oriented Concepts : Introduction to Objects and Object Oriented Programming, Encapsulation (Information Hiding), Access Modifiers: Controlling access to a class, method, or variable (public, protected, private, package), Other Modifiers, Polymorphism: Overloading,, Inheritance, Overriding Methods, Abstract Classes, Reusability, Class's Behaviors.

Classes and Data Abstraction: Introduction, Structure Definitions, Accessing Members of Structures, Class Scope and Accessing Class Members, Separating Interface from Implementation, Controlling Access Function And Utility Functions, Initializing Class Objects: Constructors, Using Default Arguments With Constructors, Using Destructors, Classes : Const(Constant) Object And Const Member Functions, Object as Member of Classes, Friend Function and Friend Classes, Using This Pointer, Dynamic Memory Allocation with New and Delete, Static Class Members, Container Classes And Integrators, Proxy Classes, Function overloading.

Unit-2: Operator Overloading: Introduction, Fundamentals of Operator Overloading, Restrictions On Operators Overloading, Operator Functions as Class Members vs. as Friend Functions, Overloading, <<, >> Overloading Unary Operators, Overloading Binary Operators.

Inheritance: Introduction, Inheritance: Base Classes And Derived Classes, Protected Members, Casting Base-Class Pointers to Derived- Class Pointers, Using Member Functions, Overriding Base –Class Members in a Derived Class, Public, Protected and Private Inheritance, Using Constructors and Destructors in derived Classes, Implicit Derived –Class Object To Base- Class Object Conversion, Composition Vs. Inheritance.

Unit-3: Virtual Functions and Polymorphism: Introduction to Virtual Functions, Abstract Base Classes And Concrete Classes, Polymorphism, New Classes And Dynamic Binding, Virtual Destructors, Polymorphism, Dynamic Binding.

Files and I/O Streams: Files and Streams, Creating a Sequential Access File, Reading Data From A Sequential Access File, Updating Sequential Access Files, Random Access Files, Creating A Random Access File, Writing Data Randomly To a Random Access File, Reading Data Sequentially from a Random Access File. Stream Input/Output Classes and Objects, Stream Output, Stream Input, Unformatted I/O (with read and write), Stream Manipulators, Stream Format States, Stream Error States.

Unit-4: Templates & Exception Handling: Function Templates, Overloading Template Functions, Class Template, Class Templates and Non-Type Parameters, Templates and Inheritance, Templates and Friends, Templates and Static Members.

Introduction, Basics of C++ Exception Handling: Try Throw, Catch, Throwing an Exception, Catching an Exception, Re-throwing an Exception, Exception specifications, Processing Unexpected Exceptions, Stack Unwinding, Constructors, Destructors and Exception Handling, Exceptions and Inheritance.

Text Books:

- C++ How to Program by H M Deitel and P J Deitel, 1998, Prentice Hall
- Object Oriented Programming in Turbo C++ by Robert Lafore ,1994, The WAITE Group Press.
- Programming with C++ By D Ravichandran, 2003, T.M.H

Reference books:

- Object oriented Programming with C++ by E Balagurusamy, 2001, Tata McGraw-Hill
- Computing Concepts with C++ Essentials by Horstmann, 2003, John Wiley,
- The Complete Reference in C++ By Herbert Schildt, 2002, TMH.
- C++ Programming Fundamentals by Chuck Easttom, Firewall Media.

Note: Eight questions will be set in all by the examiners taking at least two questions from each unit .Students will be required to attempt five questions in all at least one from each unit.

B.TECH IVTH SEMESTER
DIGITAL ELECTRONICS
(ECE-204E)

L	T	P
3	1	-

Theory	:	100 Marks
Sessional	:	50 Marks
Total	:	150 Marks
Duration of Exam:		3 Hrs.

UNIT 1 FUNDAMENTALS OF DIGITAL TECHNIQUES:
Digital signal, logic gates: AND, OR, NOT, NAND, NOR- EX-OR, EX-NOR, Boolean algebra. Review o
Number systems. Binary codes: BCD, Excess-3, Gray codes.
COMBINATIONAL DESIGN USING GATES:
Design using gates. Karnaugh map and Quine Mcluskey methods of simplification.
UNIT 2 COMBINATIONAL DESIGN USING MST DEVICES
Multiplexers and Demultiplexers and their use as logic elements. Decoders. Adders / Subtracters. BCI **arithmetic** Circuits. Encoders. Decoders / Drivers for display devices.
SEQUENTIAL CIRCUITS:
Flip Flops: S-R- J-K, T, D, master-slave, edge triggered- shift registers, sequence generators. Counter **Asynchronous** and Synchronous Ring counters and Johnson Counter, Design of Synchronous an **Asynchronous** sequential circuits.
UNIT 3 DIGITAL LOGIC FAMILIES:
Switching mode operation of p-n junction, bipolar and MOS-devices. Bipolar logic families: RTL, DTL DCTL, HTL, TTL, ECL, MOS, and CMOS logic families. Tristate logic. Interfacing of CMOS and TT families.
UNIT 4 A/D AND D/A CONVERTERS:
Sample and hold circuit, weighted resistor and R -2 R ladder D/A Converters, specifications for D/A converters. A/D converters: Quantization, parallel -comparator, successive approximation, countin type.
Dual-slope ADC, specifications of ADCs.
PROGRAMMABLE LOGIC DEVICES:
ROM, PLA, PAL, Introduction to FPGA and CPLDs.
TEXT BOOK:
1. Modem Digital Electronics (Edition III): R. P. Jain; TMH
REFERENCE BOOKS:
1. Digital Integrated Electronics: Taub & Schilling; MGH
2. Digital Principles and Applications: Malvino & Leach: McGraw Hill.
3. Digital Design: Morris Mano: PHI.

NOTE: Eight questions are to be set in all by the examiner taking two questions from each unit. Stude will be required to attempt five questions taking atleast one question from each unit. Each question w carry equal marks.

4/1/04

ECE-216 E Microprocessors And Interfacing

L	T	P
3	1	-

Sessional: 50 Marks
Exam: 100 Marks
Total: 150 Marks
Duration of Exam: 3 Hrs.

Unit-1:THE 8085 PROCESSOR : Introduction to microprocessor. 8085 microprocessor : Architecture, instruction set, interrupt structure, and assembly language programming.

MEMORY INTERFACING: Semiconductor memory and its types- Static and dynamic RAM, ROM, EPROM, EEROM and NOVRAM- Interfacing memory- Interfacing SRAM, DRAM, EPROM etc. Timing of RAM and ROM signals.

Unit-2 : THE 8086 MICROPROCESSOR ARCHITECTURE : Architecture, block diagram of 8086, details of sub-blocks such as EU, BIU; memory segmentation and physical address computations, program relocation, addressing modes, instruction formats, pin diagram and description of various signals.

INSTRUCTION SET OF 8086 : Instruction execution timing, assembler instruction format, data transfer instructions, arithmetic instructions, branch instructions, looping instructions, NOP and HLT instructions, flag manipulation instructions, logical instructions, shift and rotate instructions, directives and operators, programming examples.

Unit-3 : INTERFACING DEVICE : The 8255 PPI chip: Architecture, control words, modes and examples.Interfacing D/A and A/D converters

Unit-4: DMA : Introduction to DMA process, 8237 DMA controller.

INTERRUPT AND TIMER : 8259 Programmable interrupt controller, Programmable interval timer chips.

Text Books :

- Microprocessor Architecture, Programming & Applications with 8085 : Ramesh S Gaonkar; Wiley Eastern Ltd.
- The Intel Microprocessors 8086- Pentium processor : Brey; PHI

Reference Books :

- Microprocessors and interfacing : Hall; TMH
- The 8088 & 8086 Microprocessors-Programming, interfacing,Hardware & Applications :Triebel & Singh; PHI
- Microcomputer systems: the 8086/8088 Family: architecture, Programming & Design : Yu-Chang Liu & Glenn A Gibson; PHI.
- Advanced Microprocessors and Interfacing : Badri Ram; TMH

Note: Eight questions will be set in all by the examiners taking at least two questions from each unit .Students will be required to attempt five questions in all at least one from each unit.

-20-

IT-256 E C ++ Programming Lab.

L	T	P
-	-	3

Sessional: 50 Marks
Exam: 25 Marks
Total: 75 Marks
Duration of Exam: 3 Hrs.

Q1. Raising a number n to a power p is the same as multiplying n by itself p times. Write a function called power ( ) that takes a double value for n and an int value for p, and returns the result as double value. Use a default argument of 2 for p, so that if this argument is omitted, the number will be squared. Write a main ( ) function that gets values from the user to test this function.

Q2. A point on the two dimensional plane can be represented by two numbers: an X coordinate and a Y coordinate. For example, (4,5) represents a point 4 units to the right of the origin along the X axis and 5 units up the Y axis. The sum of two points can be defined as a new point whose X coordinate is the sum of the X coordinates of the points and whose Y coordinate is the sum of their Y coordinates. Write a program that uses a structure called point to model a point. Define three points, and have the user input values to two of them. Than set the third point equal to the sum of the other two, and display the value of the new point. Interaction with the program might look like this:

Enter coordinates for P1: 3 4
Enter coordinates for P2: 5 7
Coordinates of P1 + P2 are : 8, 11

Q 3. Create the equivalent of a four function calculator. The program should request the user to enter a number, an operator, and another number. It should then carry out the specified arithmetical operation: adding, subtracting, multiplying, or dividing the two numbers. (It should use a switch statement to select the operation). Finally it should display the result. When it finishes the calculation, the program should ask if the user wants to do another calculation. The response can be 'Y' or 'N'. Some sample interaction with the program might look like this.

Enter first number, operator, second number: 10/ 3
Answer = 3.333333
Do another (Y/ N)? Y
Enter first number, operator, second number 12 + 100
Answer = 112
Do another (Y/ N) ? N

Q4. A phone number, such as (212) 767-8900, can be thought of as having three parts: the area code (212), the exchange (767) and the number (8900). Write a program that uses a structure to store these three parts of a phone number separately. Call the structure phone. Create two structure variables of type phone. Initialize one, and have the user input a number for the other one. Then display both numbers. The interchange might look like this:

Enter your area code, exchange, and number: 415 555 1212
My number is (212) 767-8900
Your number is (415) 555-1212

Q 5. Create two classes DM and DB which store the value of distances. DM stores distances in metres and centimeters and DB in feet and inches. Write a program that can read values for the class objects and add one object of DM with another object of DB. Use a friend function to carry out the addition operation. The object that stores the results maybe a DM object or DB object, depending on the units in which the results are required. The display should be in the format of feet and inches or metres and cenitmetres depending on the object on display.

Q 6. Create a class rational which represents a numerical value by two double values- NUMERATOR & DENOMINATOR. Include the following public member Functions:

- constructor with no arguments (default).
- constructor with two arguments.
- void reduce( ) that reduces the rational number by eliminating the highest common factor between the numerator and denominator.
- Overload + operator to add two rational number.
- Overload >> operator to enable input through cin.
- Overload << operator to enable output through cout.

Write a main ( ) to test all the functions in the class.

Q 7. Consider the following class definition

```
class father {
protected : int age;
public:
        father (int x) {age = x;}
        virtual void iam ( )
        { cout < < "I AM THE FATHER, my age is : "<< age<< endl;}
};
```

Derive the two classes son and daughter from the above class and for each, define iam ( ) to write our similar but appropriate messages. You should also define suitable constructors for these classes.

Now, write a main ( ) that creates objects of the three classes and then calls iam ( ) for them. Declare pointer to father. Successively, assign addresses of objects of the two derived classes to this pointer and in each case, call iam ( ) through the pointer to demonstrate polymorphism in action.

Q 8. Write a program that creates a binary file by reading the data for the students from the terminal. The data of each student consist of roll no., name (a string of 30 or lesser no. of characters) and marks.

Q9. A hospital wants to create a database regarding its indoor patients. The information to store include

a) Name of the patient
b) Date of admission
c) Disease
d) Date of discharge

Create a structure to store the date (year, month and date as its members). Create a base class to store the above information. The member function should include functions to enter information and display a list of all the patients in the database. Create a derived class to store the age of the patients. List the information about all the to store the age of the patients. List the information about all the pediatric patients (less than twelve years in age).

Q 10. Make a class **Employee** with a name and salary. Make a class **Manager** inherit from **Employee**. Add an instance variable, named department, of type string. Supply a method to **toString** that prints the manager's name, department and salary. Make a class **Executive** inherit from **Manager**. Supply a method **to String** that prints the string **"Executive"** followed by the information stored in the **Manager** superclass object. Supply a test program that tests these classes and methods.

Q11. Imagine a tollbooth with a class called toll Booth. The two data items are a type unsigned int to hold the total number of cars, and a type double to hold the total amount of money collected. A constructor initializes both these to 0. A member function called payingCar ( ) increments the car total and adds 0.50 to the cash total. Another function, called nopayCar ( ), increments the car total but adds nothing to the cash total. Finally, a member function called displays the two totals. Include a program to test this class. This program should allow the user to push one key to count a paying car, and another to count a nonpaying car. Pushing the ESC kay should cause the program to print out the total cars and total cash and then exit.

Q12. Write a function called reversit ( ) that reverses a string (an array of char). Use a for loop that swaps the first and last characters, then the second and next to last characters and so on. The string should be passed to reversit ( ) as an argument.

Write a program to exercise reversit ( ). The program should get a string from the user, call reversit ( ), and print out the result. Use an input method that allows embedded blanks. Test the program with Napoleon's famous phrase, "Able was I ere I saw Elba)".

Q13. Create some objects of the string class, and put them in a Deque-some at the head of the Deque and some at the tail. Display the contents of the Deque using the forEach ( ) function and a user written display function. Then search the Deque for a particular string, using the first That ( ) function and display any strings that match. Finally remove all the items from the Deque using the getLeft ( ) function and display each item. Notice the order in which the items are displayed: Using getLeft ( ), those inserted on the left (head) of the Deque are removed in "last in first out" order while those put on the right side are removed in "first in first out" order. The opposite would be true if getRight ( ) were used.

Q 14. Assume that a bank maintains two kinds of accounts for customers, one called as savings account and the other as current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level, a service charge is imposed.

Create a class account that stores customer name, account number and type of account. From this derive the classes cur_acct and sav_acct to make them more specific to their requirements. Include necessary member functions in order to achieve the following tasks:

a) Accept deposit from a customer and update the balance.
b) Display the balance.
c) Compute and deposit interest..
d) Permit withdrawal and update the balance.
e) Check for the minimum balance, impose penalty, necessary and update the balance.
f) Do not use any constructors. Use member functions to initialize the class members.

Q 15. Create a base class called shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base class, a member function get_data ( ) to initialize baseclass data members and another member function display_area ( ) to compute and display the area of figures. Make display_area ( ) as a virtual function and redefine this function in the derived classes to suit their requirements. Using these three classes, design a program that will accept dimensions of a triangle or a rectangle interactively and display the area.

Remember the two values given as input will be treated as lengths of two sides in the case of rectangles and as base and height in the case of triangles and used as follows:
Area of rectangle = x * y
Area of triangle = ½ * x * y

B.TECH IVTH SEMESTER
DIGITAL ELECTRONICS LAB
(ECE-210E)

L	T	P
-	-	3

Sessional	: 50 Marks
Viva	: ~~50~~ Marks
Total	: ~~100~~ Marks
Time	: 3hrs.

LIST OF EXPERIMENTS:

1. Familiarization with Digital Trainer Kit and associated equipment.
2. Study of TTL gates AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.
3. Design and realize a given function using K-Maps and verify its performance.
4. To verify the operation of Multiplexer and Demultiplexer.
5. To verify the operation of Comparator.
6. To verify the truth table of S-R, J-K, T, D Flip-flops.
7. To verify the operation of Bi-directional shift register.
8. To design and verify the operation of 3-bit asynchronous counter.
9. To design and verify the operation of asynchronous Up/down counter using J-K FFs.
10. To design and verify the operation of asynchronous Decade counter.
11. Study of TTL logic family characteristics.
12. Study of Encoder and Decoder.
13. Study of BCD to 7 segment Decoder.

NOTE:
Eight questions are to be set in all by the examiner taking two questions from each un
Students will be required to attempt five questions in all.

ECE-218 E Microprocessors and Interfacing Lab.

L	T	P
-	-	3

Sessional: 25 Marks
Exam: 25 Marks
Total: 50 Marks
Duration of Exam: 3 Hrs.

LIST OF EXPERIMENTS

1. Study of 8085 Microprocessor kit.

2. Write a program using 8085 and verify for :
   a. addition of two 8-bit numbers.
   b. addition of two 8-bit numbers (with carry).

3. Write a program using 8085 and verify for :
   a. 8-bit subtraction (display borrow)
   b. 16-bit subtraction (display borrow)

4. Write a program using 8085 for multiplication of two 8- bit numbers by repeated addition method. Check for minimum number of additions and test for typical data.
5. Write a program using 8085 for multiplication of two 8- bit numbers by bit rotation method and verify.
6. Write a program using 8085 for division of two 8- bit numbers by repeated subtraction method and test for typical data.
7. Write a program using 8085 for dividing two 8- bit numbers by bit rotation method and test for typical data.
8. Study of 8086 microprocessor kit
9. Write a program using 8086 for division of a defined double word (stored in a data segment) by another double word division and verify.
10. Write a program using 8086 for finding the square root of a given number and verify.
11. Write a program using 8086 for copying 12 bytes of data from source to destination and verify.

12. Write a program using 8086 and verify for:
    a. Finding the largest number from an array.
    b. Finding the smallest number from an array.

13. Write a program using 8086 for arranging an array of numbers in descending order and verify.

14. Write a program using 8086 for arranging an array of numbers in ascending order and verify.

15. Write a program for finding square of a number using look-up table and verify.

16. Write a program to interface a two digit number using seven-segment LEDs. Use 8085/8086 microprocessor and 8255 PPI.

17. Write a program to control the operation of stepper motor using 8085/8086 microprocessor and 8255 PPI.

Note: At least ten experiments have to be performed in the semester out of which seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus of EE-309-C.

Suggested Books:

1. Business Environment – Francis Charurilam (Himalaya Publishing House).
2. Management – Harold, Koontz and Cyrilo' Donell (Mc Graw Hill)
3. Principles of Personnel Management – Edwin B. Flippo (Mc Graw Hill)
4. Personnel Management and Industrial Relations – D.C. Sharma and R.C. Sharma) (SJ Publications, Meerut)
5. Basic Marketing – Cundiff and Still (PHI, India)
6. Marketing Management – S.A. Sherlekar (Himalaya Publishing House Bombay)
7. Principles and Practice of Management – L.M. Prasad
8. Financial Management – I.M. Pandey (Vikas Publishing House, New Delhi)
9. International Marketing – Vorn terpestre and Ravi Sasathy.
10. Production Management – E.S. Buffa & W. H. Tausart, Richand D. Irwin, Homewood, Illionis.
11. Personnel Management – C.B. Mamoria, (Himalaya Publishing House)

CSE- 301 **Design & Analysis of Algorithms**

L	T	P		
4	1	-	Theory:	100
			Sessional:	25

Unit 1.

Introduction:

Review of elementary data structures, analyzing algorithms, asymptotic notation, recurrence relations, Hash tables, Binary search trees.

Sorting and Order Statistics

Heapsort, Priority queues, Quicksort, Sorting in linear time, medians and order statistics, dynamic order statistics.

Unit 2.

Advanced Design and Analysis Techniques

Dynamic programming - Elements, Matrix-chain multiplication, longest common subsequence, optimal polygon triangulation. Greedy algorithms Elements, activity-selection problem, Huffman codes, task scheduling problem.

Advanced Data Structures

Operations in B- Trees, Binomial heaps, Fibonacci heaps, data structures for disjoint sets, strings.

Unit 3.

Graph Algorithms

Review of graph algorithms, topological sort, strongly connected components, minimum spanning trees - Kruskal and Prim's, Single source shortest paths, relaxation, Dijkstra's algorithm, Bellman-Ford algorithm, single source shortest paths for directed acyclic graphs, difference constraints and shortest paths, All pairs shortest paths - shortest paths and matrix multiplication, Floyd-Warshall algorithm, Johnson's algorithm.

Unit 4.

Flow and Sorting Networks

Flow networks, Ford-Fulkerson method, Maximum bipartite matching, Sorting Networks, Comparison network, The zero-one principle, Bitonic sorting network, merging network.

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. Cormen, Leiserson and Rivest: Introduction to Algorithms, 2/e, PHI.
2. Horowitz, Ellis and Sahni, Sartaj; Fundamentals of Computer Algorithms, Galgotia Publications.
3. Aho, Hopcroft, and Ullman: The Design and Analysis of Computer Algorithms, Addison Wesley.
4. R. B. Patel, Expert Data Structures With C, Khanna Publications, Delhi, India, 2nd Edition 2004, ISBN 81-87325-07-0, pp. 1-909.
5. R. B. Patel & M.M.S. Rauthan, Expert Data Structures With C++, Khanna Publications, Delhi, India, 2nd Edition 2004, ISBN: 87522-03-8, pp. 1-752.

CSE- 303 **Computer Networks**

L	T	P		
3	2	-	Theory:	75
			Sessional:	50

Unit 1.

Introduction

Network Functions, Network Topology, Network Services, switching Approaches, Transmission media and systems, multiplexing and signaling techniques. Error detection and correction, ISDN and BISDN

Layered Architectures

Examples, OSI Reference Model, Overview of TCP/IP architecture, Socket system calls, SNMP, Electronic Mail.

Unit 2.

Peer-to-Peer Protocols

Protocols, Service Models and End-to-End requirements, ARQ, Sliding window, RTP, HDLC, PPP protocols, Statistical Multiplexing.

MAC and LAN Protocols

Multiple access communication, Random Access-ALOHA, Slotted ALOHA, CSMA, CSMA-CD, Channelization -: FDMA, TDMA,. CDMA, Channelization in Cellular networks LAN Standards - 802.3, 802.4, 802.5,
802.6, FDDI, 802.11, LAN Bridges.

Unit 3.

Packet Switching Networks

Packet network topology, Datagrams and Virtual Circuits - Structure of Switch / Router, Connectionless and Virtual Circuit packet Switching, X.25, Routing Algorithms, ATM Networks, Traffic management and QoS - FIFO, Priority Queues Fair Queuing, Congestion Control techniques.

Unit 4.

TCP/IP

Architecture, Internet protocols - IP packet, Addressing, Subnet addressing, II routing, CIDR, ARP, RARP, ICMP, Reassembly, IPv6, UDP, Transmission Contro Protocol - TCP, Reliable stream service, operation, Protocol, DHCP, Mobile IF Internet Routing protocols, Multicast Routing:

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

BOOKS

1. Leon Garcia and Indra Widjaja: Communication Networks - Fundament Concepts and Key Architectures, TMH, 2000.
2. A.S. Tanenbaum: Computer Networks, 3/e, PHI, 1997.
3. Forouzan, Coombs and Fegan: Introduction to Data Communications ar Networks, TMH, 1999.
4. William Stallings: Data and Computer Communications 5/e, PHI.

CSE-305 **Automata Theory**

L	T	P		
4	2	-	Theory:	100
			Sessional:	50

Unit-1

Finite Automata and Regular Expression: Finite State System, Basic Definition Non-Deterministic finite Automata (NDFA), Deterministic finite Automata (DFA), Equivalence of DFA and NDFA, Finite Automata with E-moves, Regular expression, Equivalence of finite Automata and expression, Regular expression conversion and vice-versa.

Unit -2

Introduction to Machines: Concept of basic machines, Properties and limitations of FSM, Moore and Mealy Machines, Equivalence of Moore and Mealy Machines. Conversion of NFA and DFA by Arden's method.

Properties of Regular sets: The Pumping Lemma for regular sets, Application of the pumping Lemma, Closure Properties of regular sets, Myhill-Nerode Theorem and minimization of Finite Automata, Minimization Algorithm.

Unit-3

Grammars: Definition, Context free and Context sensitive Grammar, Ambiguity, Regular grammar, Reduced forms, Removal of useless symbols and unit production, Chomsky Normal Form (CNF), Griebach Normal Form (GNF).

Pushdown Automata: Introduction to push-down machines, Application of push down machines.

Unit-4

Turing Machines, Deterministic and Non-Deterministic Turing Machines, Design of T.M, Halting Problem of T.M., PCP problem.

Chomsky Hierarchy: Chomsky hierarchies of grammars, unrestricted grammar, Context sensitive Language, Relation between languages of classes.

Computability: Basic Concepts, Primitive Recursive functions.

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

Text Books

1. R. B. Patel, & Prem Nath, Theory of Automata and Formal Languages, Umesh Publication, New Delhi, 1st Edition 2005, ISBN-81-88114-53-7, pp. 1-496.
2. John C. Martin: Introduction to Languages and the Theory of Computation, MGH.

Books

1. Lewis & Papadimitriou: Elements of the Theory of Computation, PHI.
2. Daniel I.A. Cohen: Introduction to Computer Theory: John Wiley.
3. J.E. Hopcroft and J..D. Ullman: Introduction to Automata Theory Languages and Computation, Narosa.
4. Introduction to Automata Theory,languages & computations –Hopcroaft & O.D.Ullman,R.Motwani.
5. Theory of Computer Sc. (Automata, Language & Computation):K.L.P.Mishra & N.Chandershekaran.
6. Introduction to formal language & Automata – Peter Linz.

CSE-307 Operating Systems

L	T	P		
3	1	-	Theory:	75
			Sessional:	25

Unit 1.

File & CPU Management

Operating system functions and characteristics, historical evolution of operating systems. Real time systems, Distributed systems, Methodologies for implementation of O/S service system calls, system programs, Interrupt mechanisms, concept of threading.

File Systems: Functions of the system, File access and allocation methods, Directory Systems: Structured Organization, directory and file protection mechanisms, implementation issues; hierarchy of file and device management.

CPU Scheduling: Levels of Scheduling, Comparative study of scheduling algorithms, multiple processor scheduling.

Unit 2.

Storage & Device Management

Storage Management: Storage allocation methods: Single contiguous allocation, multiple contiguous allocation, Paging, Segmentation, Combination of Paging and Segmentation, Virtual memory concepts, Demand Paging, Page replacement Algorithms, Thrashing.

Device Management: Hardware Organization, Device scheduling, policies & *I/O* management.

Protection: Mechanisms and Policies, Implementation.

Unit 3.

Deadlocks & Concurrency Control

Deadlock: Deadlock characterization, Deadlock prevention and avoidance, Deadlock detection and recovery, practical considerations.

Concurrent Processes: Critical section problem, Semaphores, Classical process coordination Problems and their solutions, Interprocess Communications, multithreading.

Unit 4.

Case Studies

DOS: Study of DOS with reference to storage management, device management, file system, interrupt mechanism.

UNIX: Study of UNIX with reference to storage management, file system, concurrency control, CPU scheduling.

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. Peterson, J.L. & Silbersehatz, A. Operating System Concepts, Addison, Wesley.
2. Brineh, Hansen, Operating System Principles, Prentice Hall of India.
3. Haberman, A.N.: Introduction to Operating System Design Galgotia Publication, New Delhi.
4. Tanenbaum, A.S., Operating Systems.
5. Hansen, P.B., Architecture Of Concurrent Programs, PHI.
6. Shaw, A.C.; Logic Design of Operating Systems, PHI.

CSE- 311 **Advanced Technologies (Pr.)**

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

1. Learn Basics of Java language and its development tools/libraries.
2. Generate an editor screen containing menus, dialog boxes etc. using Java.
3. Create an applet with a text field and three buttons. When you press each button, make some different text appear in the text field. Add a check box to the applet created, capture the event, and insert different text into the text field.
4. Create an applet with a button and a text field. Write a handleEvent() so that if the button has the focus, characters typed into it will appear in the text field.
5. Create your own Java Bean called Valve that contains two properties: a Boolean called "on" and an integer called "level". Create a manifest file, use **jar** to package your Bean then load it into the beanbox or into your own Beans-enabled program builder tool e.g., BDK so that you can test it.
6. Develop a servlet that gets invoked when a form on a Web page in HTML is submitted. Create a Cookie object and enter/ display value for that cookie.
7. Using Java develop a front end for a contact management program using a flat-file database containing names, addresses, telephone numbers, email addresses, etc. You should be able to easily add new names to the database. When typing in the name to be looked up, use automatic name completion. The database may be distributed or centralized.
8. Java Networking- Java Sockets and RMI.
9. Programming under development tool ASP.net

BOOKS

1. Core Java Volume I and II from Sun Micro Systems.
2. Huges, Java Networking, Hut Publication, Pune.
3. Java 2: The Complete Reference 4/e; Herbert Schildt, TMH, Delhi.
4. Java Beans Programming from the Ground Up: Joseph O'Neil, TMH, Delhi
5. Java Servlets, Application Development; Karl Moss, TMH, Delhi.

CSE- 313 **Operating System (Pr.)**

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

1. Study of H/W & *S/W* requirement of different operating system.
2. Implementation of contiguous, linked and indirect allocation strategies assuming randomly generated free space list.
3. Implementation of worst, best & first fit for contiguous allocation assuming randomly generated free space list.
4. Implementation of Compaction for the continually changing memory layout & calculate total movement of data.
5. Calculation of external & Internal fragmentation for different program & for different page size.
6. Implementation of resource allocation graph.
7. Implementation of Banker's algorithm.
8. Conversion of resource allocation graph to wait for graph.
9. Implementation of Bernstein's condition for concurrency.
10. Implementation of Fork & Join Construct.
11. Implementation of "Semaphore" for concurrency.
12. Study of system calls and various OS management services in Unix/Linux OS and their implementation.

CSE-315 **Algorithms Design (Pr.)**

L	T	P		
-	-	3	Practical:	25
			Sessional:	50

1. Implement the minimum cost spanning tree algorithm.
2. Implement the shortest path algorithm.
3. Implement the algorithm to compute roots of optimal subtrees.
4. An Euler circuit for an undirected graph is a path that starts and ends at the same vertex and uses each edge exactly once. A connected undirected graph G has an Euler circuit. If and only if every vertex is of even degree. Give an algorithm and implement to find the Euler Circuit in a graph with e edges provided one exists.
5. Give an algorithm to determine whether a directed graph with positive and negative cost edges has negative cost cycle.
6. Write an algorithm in which given an n x n matrix M of positive integers is given and that finds a sequence of adjacent entries starting from M[n,l] and ending at M[l,n] such that the sum of the absolute values of differences between adjacent entries is minimized. Two entries M[i,j] and

M[k, i] are adjacent if
(a) i- K+ - 1 and j -1, or
(b) I= k and j = 1+ _1.
For ex. in the following fig. Sequence, 7,5,8,7,9.6.12 is a solution.

1	9	6	12
8	7	3	5
5	9	11	4
7	3	2	6

Matrix of Positive Integers.

7. Write a complete LC branch and bound algorithm for the job sequencing with deadlines problem. Use the fixed tuple size formulation.
8. Write a LC branch and bound algorithm for the knapsack problem using the fixed tuple size formulation.
9. The postfix representation of an infix arithmetic expression LDR is defined recursively to the postfix representation of L followed by the postfix representation of R followed by 0. L and R are respectively the left and right periods of 0. Consider some examples:

Infix	Postfix.
(i) a + b	ab +
(ii)(a+B) *C	ab + *
(iii) (a-b)/(e*d)	ab-ed*/

(a) Write an algorithm to evaluate a postfix expression E. Assume E is presented as a string and that there exists an algorithm NEXT-TOKEN(E) that returns the next token (i.e., operator or operand) in E. When all tokens in E have been extracted, NEXT-TOKEN(E) returns. Assume that the only operators in E are binary +, -, * and /. (Hint: Make a left to right scan off using a stack to store operands and results. When even an operator is run in E, the top two operands on the stack are its right and left operands).

10. Write an algorithm to obtain the postfix form of an infix expression E. Again assume E has only the binary operators +, -,x,and /. (Hint: Make a left to right scan of E using a stack to store operators until both the left and right operands of an operator have been output in postfix form). Note that E may contain parenthesis.

CSE-302 **Mobile Computing**

L	T	P		
4	2	-	Theory	100
			~~Practical:~~	
			Sessional:	50

Unit 1.

Introduction: Challenges in mobile computing, coping with uncertainties, resource poorness, bandwidth, etc. Cellular architecture, co-channel interference, frequency reuse, capacity increase by cell splitting. Evolution of mobile system: CDMA, FDMA, TDMA, GSM.

Mobility Management: Cellular architecture, Co-channel interference, Mobility: handoff, types of handoffs; location management, HLR-VLR scheme, hierarchical scheme, predictive location management schemes. Mobile IP, cellular IP.

Unit 2.

Publishing & Accessing Data in Air: Pull and push based data delivery models, data dissemination by broadcast, broadcast disks, directory service in air, energy efficient indexing scheme for push based data delivery.

File System Support for Mobility: Distributed file sharing for mobility support, Coda and other storage manager for mobility support

Unit 3.

Ad-hoc Network Routing Protocols: Ad hoc network routing protocols, destination sequenced distance vector algorithm, cluster based gateway switch routing, global state routing, fish-eye state routing, dynamic source routing, ad hoc on-demand routing, location aided routing, zonal routing algorithm.

Unit 4.

Mobile Transaction and Commerce: Models for mobile transaction, Kangaroo and Joey transactions, team transaction, Recovery model for mobile transactions. Electronic payment and protocols for mobile commerce.

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. Mobility: Processes, Computers, and Agents, Dejan Milojicic, Frederick Douglis, Richard Wheeler, Addison-Wesley Professional; 1st edition (April 19, 1999).
2. Ivan Stojmenovic' (Editor), Handbook of Wireless Networks and Mobile Computing, Wiley, ISBN: 0-471-41902-8, February 2002
3. Yi-Bing Lin & Imrich Chlamtac, "Wireless and Mobile Networks Architectures", John Wiley & Sons, 2001.
4. Raj Pandya, "Mobile and Personal Communication systems and services", Prentice Hall of India, 2001.

CSE- 304 **Computer Hardware Technologies**

L	T	P		
4	1	-	Theory:	100
			Sessional:	25

Unit 1.

Memory

Memory, memory chips & modules, memory types, advanced memory technologies. troubleshooting memory.

Power Supply

Power supply function and operation, power supply quality and specification, power protection and back up, backup power system; UPS; troubleshooting power supply.

Unit 2.

Motherboard

PC family tree, motherboard controllers and system resources, input-output ports, IRQ, I/O bus system: ISA, MCA, EISA, VESA local bus, PCI, AGP, PCIX; on board I/O devices, ROMBIOS, ROM POST, CMOS setup.

Unit 3.

Interfaces and *I/O* Ports

Floppy disk interface, IDE interface: ATA standards, master-slave configuration, data transfer mode; SCSI interface: SCSI bus, SCSI standards; which is better SCSI or IDE; serial ports, parallel ports, USB, Video adapters, troubleshooting Video adapters.

Unit 4.

Device drives and peripherals

Floppy disk drive, hard disk drive, CD ROM drive, DVD ROM drive, recordable drives, keyboards, mice, printers and monitors, trouble-shooting drives and peripherals.

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. Craig Zacker & John Rourtre: PC Hardware- The complete reference, TMH. .
2. Mark Minosi: The complete PC Upgrade & Maintenance Guide 4/e, . BPB publications.
3. S.K. Chauhan: PC Upgrading, maintenance and troubleshooting guide.

CSE-306 **Network Management and Security**

L	T	P		
4	1	-	Theory:	100
			Sessional:	50

Unit 1.

Introduction: need and basic goals for computer security, security threats etc.

Cryptographic building blocks: symmetric and asymmetric key cryptography, cryptographic hash functions, digital signature schemes etc., with representative applications for each.

Unit 2.

Operating System Security: low-level protection mechanisms, access control: models for access control, some confidentiality, integrity, and hybrid models of access control such as Bell-La Padula, Biba, Chinese Wall etc., discretionary v/s mandatory access control.

Case studies: Java access control policy specifications, SELinux security model and implementation. Program flaws: bugs which have security implications such as buffer overflows, race conditions etc.

Unit 3.

Malicious code: viruses, worms, Trojan horses; how they work and how to defend against them.

Network Security: problems in network security; kinds of attacks, PKI, key exchange protocols, example protocols such as PGP, Kerberos, IPSEC/VPN, SSL, S/MIME etc.

Unit 4.

Protocol vulnerabilities: examples of protocol vulnerabilities such as in TCP/IP, denial of service attacks, etc.

Tools for network security such as firewalls and intrusion detection systems.

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. Michael E. Whitman & Herbert J. Mattord, Principles of Information Security, Vikash Publishing House Pvt. Ltd., New Delhi.
2. William Stalling "Cryptography and Network Security" Pearson Education.
3. Charels P. Pfleeger "Security in Computing" Prentice Hall.
4. Jeff Crume "Inside Internet Security" Addison Wesley.

CSE-308 **Software Engineering**

L	T	P		
4	1	-	Theory:	100
			Sessional:	25

Unit 1.
Software and Software engineering- Software characteristics, software crisis, software engineering paradigms.
Planning a software project-software cost estimation, project scheduling, personal planning, team structure.

Unit 2.
Software configuration management, quality assurance, project monitoring, risk management.
Software requirement analysis- structured analysis, object oriented analysis and data modeling, software requirement specification, validation.

Unit 3.
Design and implementation of software – software design fundamentals, design methodology (structured design and object oriented design), design verification, monitoring and control coding.
Software reliability: metric and specification, fault avoidance and tolerance, exception handling, defensive programming.

Unit 4.
Testing – Testing fundamentals, white box and black box testing software testing software testing strategies: unit testing, integration testing, validation testing, system testing, debugging.
Software Maintenance – maintenance characteristics, maintainability, maintenance tasks, maintenance side effects.
CASE tools.

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. Pressman S.Roger, Software Engineering, Tata McGraw-Hill
2. Jalote Pankaj, An integrated approach to software engineering ,Narosa Publishing House
3. Sommerville Ian, Software Engineering, 5th ed., Addison Wesley-2000
4. Fairley Richard, Software, Software Engineering Concepts, Tata Mcgraw-Hill

CSE- 312 **Computer Hardware & Troubleshooting (Pr.)**

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

1. To solder and de-solder various components.
2. To check and measure various supply voltages of PC.
3. To make comparative study of motherboards: 386, 486, PI, PII, PIII.
4. To observe and study various cables, connections and parts used in computer communication.
5. To study various cards used in a system viz. display card, LAN card etc.
6. To remove, study and replace floppy disk drive.
7. To remove, study and replace hard disk.
8. To remove, study and replace CD ROM drive.
9. To study monitor, its circuitry and various presets and some elementary fault detection.
10. To study printer assembly and elementary fault detection of DMP and laser printers.
11. To observe various cables and connectors used in networking.
12. To study parts of keyboard and mouse.
13. To assemble a PC.
14. Troubleshooting exercises related to various components of computer like monitor, drives, memory, and printers etc.

BOOKS

1. Mark Mines Complete PC upgrade & maintenance guide, BPB publications.
2. Craig Zacker & John Rouske, PC Hard ware: The Complete Reference, TMH.
3. Scott Mueller, Upgrading and Repairing PCs, PHI, 1999

CSE-314 **Mobile Computing (Pr)**

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

1. Design a prototype that implements the Cache management for a mobile computing environment?

2. Design a System: The challenges of developing high performance, high reliability, and high quality software systems are too much for ad hoc and informal engineering techniques that might have worked in the past on less demanding systems. New techniques for managing these growing complexities are required to meet today's time-to-market, productivity and quality demands.

3. Peer-to-peer communication system: As computers become more pervasive and homes become better connected, a new generation of applications will be deployed over the Internet. In this model, peer-to-peer applications become very attractive because they improve scalability and enhance performance by enabling direct and real-time communication among the peers. We need to propose a decentralized management system that manages the peer-to-peer applications and the system resources in an integrated way: monitors the behavior of the peer-to-peer applications transparently and obtains accurate resource projections, manages the connections between the peers and distributes the objects in response to the user requests and changing processing and networking conditions.

4. Write programs that implement the few sorting algorithms (bubble, selection, etc) for *n* data. It stops the operation when the counter for sorting index is at 100, 1000, 10000 and so on, stores the contents of the registers, program counter and partially sorted list of data, etc. It resumes the operation after 30 sec from the point of the termination.

5. Write a program that implements the bubble sort for *n* data. It stops the operation when the counter for sorting index is at 100, 1000, 10000, and so on, stores the contents of the registers, program counter and partially sorted list of data, etc. It transfers the code and data across the network on the new destination and resumes the operation from the point of termination on the previous node. Finally the result from the last node in the itinerary is sent back to the process-initiating node.

6. Develop a prototype that performs parallel computation of the same task on different nodes. Finally process initiator (master node) receives the result and computation time required to complete the task on an each node and displays to the user. Compare the computing power of different nodes.

Books

1. Mobility: Processes, Computers, and Agents, Dejan Milojicic, Frederick Douglis, Richard Wheeler, Addison-Wesley Professional; 1st edition (April 19, 1999).
2. Ivan Stojmenovic' (Editor), Handbook of Wireless Networks and Mobile Computingm, Wiley, ISBN: 0-471-41902-8, February 2002
3. Core Java Volume I and II from Sun Micro Systems.
4. Huges, Java Networking, Hut Publication, Pune
5. Java 2: The Complete Reference 4/e: Herbert Schildt, TMH, Delhi.
6. Java Beans Programming from the Ground Up: Joseph O'Neil, TMH, Delhi
7. Java Servlets: Application Development; Karl Moss, TMH, Delhi.

CSE- 316 **Software Engineering (Pr.)**

L	T	P
-	-	3

Practical: 50
Sessional: 50

1. (i) Implement Receipt Acknowledgement and updation of Inventory (RAUP)
   a) Find unadjusted Functional points (UFP)
   b) Calculate FPC by Mark II Method
   (ii) To estimate effort and schedule
   Calculate the compression factor and the manpower required based on given information of software.
2. Suggest an action plan for the following risks without compromising the project, process or product parameters
   a) Language skills inadequate in two people in a team of five
   b) Specially ordered hardware and software likely to be delivered three months late.
   c) Customer and end user not convinced on new technology implementation as a correct choice.
   d) Software required interface with other technologies on which the project team has no experience.
3. Implement a Testing strategy for the following software development cases:
   (a) Rule based deterministic closed large but simple payroll system for a company.
   (b) Development of a customer relation management system for a retail distribution chain. The retail organization is not sure about the scope, and failure feature.
   (c) Modification to existing order processing system for a multi-location multi-product company.
4. Build a work breakdown structure for the following
   a) Delivery of the software, initiation to development covering lifecycle.
   b) Development of prototype
   c) Development of a process for a function
5. In a hospital management system develop the following diagrams for a Ward Service Management System (SMW).
   (a) Work Flow
   (b) System Flow
   (c) DFD
   Develop on effective modular design of SMW using these diagrams.
6. Draw three level DFD's for CLPS. Modularize the CLPS and structure them top-down as functional model.
7. Conduct a task analysis for the following users:
   (a) officer at railway ticket reservation window
   (b) officer at insurance claim settlement desk
   (c) clerk at call center, answering queries of customers who have purchased cars from the company.
8. Based on the business model of DEL develop a modular structure for a business system model. Draw a complete system flowchart.

Books

1. W. S. Jawadekar, Software Engineering Principle and Approaches, TMH, 2004.
2. Pressman S.Roger, Software Engineering, Tata McGraw-Hill
3. Jalote Pankaj, An integrated approach to software engineering, Narosa Publishing House
4. Sommerville Ian, Software Engineering, 5th ed., Addison Wesley-2000
5. Fairley Richard, Software, Software Engineering Concepts, Tata McGraw-Hill

CSE-320 **Digital Signal Processing**
(Departmental Elective I)

L	T	P
3	2	-

Theory: 100
Sessional: 50

Unit 1.
Introduction
Signals, Systems and signal processing, classifications of signals, concept of frequency in continuous time and discrete time signals, Analog to digital and digital to analog conversion, discrete time signals, discrete time systems, LTI systems, difference equations, and implementation of discrete time systems.

Unit 2.
Z- transform and its Applications
Z Transform, properties of Z-transform, Inversion of Z transform, applications of Z transform. Discrete Fourier Transform(DFT), properties of DFT, Linear filtering methods based on the DFT, frequency analysis of signals using the DFT.

Unit 3.
Fast Fourier transform and its applications
FFT algorithms (Radix 2 FFT) algorithm, Implementation of Discrete time systems, Structures for FIR systems, direct *form* structure, Cascade form structure, parallel form, structures for IIR systems, cascade, direct form and parallel form structures.

Unit 4.
Design of Digital Filters
Design of IIR filters, Bilinear transformation and impulse invariance method, Matched Z transformation design of FIR filters with different methods.

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. John G. Proakis and Dimitris G. Manolakis, Digital Signal Processing, PHI
2. Oppenheim & Schaffer, Digital Signal Processing, PHI.
3. Rabiner & Gold, Digital Signal Processing applications.
4. S.K . Mitra, Digital Signal Processing, TMH.
5. S. Salivayhan, A Vallavraj, C. Gnanapriya, Digital Signal Processing, TMH.

CSE-321 **Multimedia Techniques**
(Departmental Elective I)

L	T	P		
3	2	-	Theory:	100
			Sessional:	50

Unit 1.

Basics of Multimedia Technology

Computers, Communication and Entertainment; Multimedia -An introduction: Framework for multimedia systems; multimedia devices. CD Audio, CD-ROM, CD-I; presentation devices and the user interface; multimedia presentation and authoring; professional development tools; LANs & multimedia, Internet, World Wide Web & Multimedia; distribution network - ATM & ADSL; multimedia servers & databases: vector graphics; 3-D graphics programs; animation techniques; shading; anti-aliasing; morphing; video on demand

Unit 2.

Image Compression & Standards

Making still images; editing and capturing images; scanning images; computer color models; color palettes; vector drawing; 3-D drawing and rendering; JPEG-objectives and architecture; JPEG-DCT encoding and quantization, JPEG statistical coding; JPEG predictive lossless coding; *JPEG* performance; Overview of other image file formats as GIF, TIFF, BMP, PNG etc.

Unit 3.

Audio & Video

Digital representation of sound; time domain sampled representation; method of encoding the analog signals; sub-band coding; Fourier method; transmission of digital sound; digital audio signal processing; stereophonic & quadraphonic signal processing; editing sampled sound; MPEG Audio; audio compression & decompression; brief survey of speech recognition and generation; audio synthesis; Musical Instrument Digital Interface (MIDI); digital video and image Compression; MPEG Motion video compression standard; DVI technology; time-based media representation and delivery.

Unit 4.

Virtual Reality

Applications of multimedia, Intelligent multimedia system, Desktop Virtual Reality (VR), VR operating System, Virtual environment displays and orientation tracking; visually coupled system requirements; intelligent VR software systems.

Applicatiohs of environments in various fields viz. Entertainment, manufacturing, business, education, etc.

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. Villamil & Molina Multimedia: An Introduction, PHI.
2. Lozano, Multimedia: Sound & Video PHI.
3. Villamil & Molina Multimedia: Production, Planning and Delivery, PHI.
4. Sinclair, Multimedia on the PC, BPB.
5. Tay Vaughan, Multimedia :Making it work, TMH

CSE-322 **Graph Theory & Combinatorics**
(Departmental Elective I)

L	T	P		
3	2	-	Theory:	100
			Sessional:	50

Unit 1.
Introduction
Basic concepts, subgraphs, vertex, degrees, walks, paths, circuits, cycles, trees, spanning trees, cut vertices and cut edges, connectivity, Euler tours and Hamiltonian cycles, matching perfect matching, connectivity, and
separability, network flows, 1-isomorphism and 2-isomorphism.
Unit 2.
Advanced Features
Vertex coloring, chromatic polynomial, edge coloring, planar and non-planar graphs, Euler's formula Kuratowski's theorem, test for planarity, directed graphs, tournaments, networks, max flow, min cut theorems, graph enumeration, Polya's counting theorem.
Unit 3.
Graph Algorithms
Computer representation of graph, shortest path algorithms, minimal spanning tree, fundamental circuit, depth first search, planarity testing, directed circuits, isomorphism, performance of graph theoretic algorithms.
Unit 4.
Combinatorics
Basic combination numbers, recurrence relations, generating functions, multinomial, counting principles, Polya' s theorem, inclusion and exclusion principles, block design and error correcting codes, Hadamard matrices, finite geometry.

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. Deo N.: Graph Theory and Applications, Prentice Hall
2. D.B.West: Introduction to Graph Theory, Prentice Hall
3. S.A.Choudum: A First Course in Graph Theory, MacMillan [India]
4. V.Krishnamurthy: Combinatorics-- Theory and Applications, Affiliated East-West
5. Alan Tucker: Applied combinatories, Wiley.

CSE-323 **Logic of Programming**
(Departmental Elective 1)

L	T	P		
3	2	-	Theory:	100
			Sessional:	50

Unit 1.
Fundamentals
Propositions, Tautologies, Precedence rules, System definition, Reasoning using Transformations, Formal Systems, Axioms, Inference Rules, Predicates, Quantification, Free and bound identifiers, Data Values & Types, Generators, semantic definitions of functions, Generator Induction, definedness condition.

Unit 2.
Semantics

Predicate Transformers, various commands, Alternative and Iterative commands, Procedure call, The characterization of semantics, The semantic characterization of programming language, Two Theorems, Design of Properly terminating constructs, Euclid's Algorithms,, Interrupts, spin locks.

Unit 3.

Communicating Sequential Processes (CSP)
Parallel commands, Coroutines, Subroutines and data representation, monitors and scheduling, Integer semaphore, Dining Philosophers Problem

Note: - There will be 8 questions in all. At least 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. David Gries, The Science of Programming, Narosa Publishing House
2. E.W.Dijkstra, A Discipline of Programming PHI
3. Hoare and Jones, Essays in Computing Science, TMH.

CSE-324 **Advanced Database Systems**
(Departmental Elective I)

L	T	P		
3	2	-	Theory:	100
			Sessional:	50

Unit 1.

Parallel & Distributed Data bases

Architecture for parallel databases, Parallel query evaluation, parallelizing individual operations, parallel query optimization Introduction to distributed databases, distributed DBMS architectures, storing data in a distributed DBMS, distributed catalog management, distributed query processing, updating distributed data, introduction to distributed transactions, distributed concurrency control, recovery.

Unit 2.

Data Mining

Introduction, counting co-occurrences, mining for rules, tree structured rules, clustering, similarity search over sequences.

Unit 3.

Object Database Systems

User-defined ADT, structured types, objects & reference types, inheritance, design for an ORDBMS, challenges in implementing an ORDBMS, OODBMS, comparison of RDBMS with OODBMS & ORDBMS.

Unit 4.

Advanced Topics

Advanced transaction processing, integrated access to multiple data source, mobile databases main memory databases, multimedia databases, GIS, temporal & sequence databases.

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. R. Ramakrishnan & J. Gehrks Database Management Systems: MGH, International Ed., 2000.
2. Korth, Silberschatz, Sudershan: Data Base concepts, MGH, 2001.
3. C. J. Date, Database Systems:, 7th Ed., Addison Wesley, Pearson Education, 2000.

CSE-325 **Parallel Computing**
(Departmental Elective I)

L	T	P		
3	2	-	Theory:	100
			Sessional:	50

Unit 1.
Introduction: Paradigms of parallel computing: Synchronous - vector/array, SIMD, Systolic; Asynchronous - MIMD, reduction paradigm.
Hardware taxonomy: Flynn's classifications, Handler's classifications.
Software taxonomy: Kung's taxonomy, SPMD.

Unit 2.
Abstract parallel computational models: Combinational circuits, Sorting network, PRAM models, Interconnection RAMs. Parallelism approaches - data parallelism, control parallelism
Performance Metrics: Laws governing performance measurements. Metrics - speedups, efficiency, utilization, communication overheads, single/multiple program performances, bench marks.

Unit 3.
Parallel Processors: Taxonomy and topology - shared memory multiprocessors, distributed memory networks. Processor organization - Static and dynamic interconnections. Embeddings and simulations.
Parallel Programming: Shared memory programming, distributed memory programming, object oriented programming, data parallel programming, functional and dataflow programming.

Unit 4.
Scheduling and Parallelization: Scheduling parallel programs. Loop scheduling. Parallelization of sequential programs. Parallel programming support environments.

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. M. J. Quinn. *Parallel Computing: Theory and Practice* , McGraw Hill, New York,1994.
2. T. G. Lewis and H. El-Rewini. *Introduction to Parallel Computing* , Prentice Hall, New Jersey, 1992.
3. T. G. Lewis. *Parallel Programming: A Machine-Independent Approach* , IEEE Computer Society Press, Los Alamitos, 1994.

Compiler Design

CSE-401

L	T	P
4	1	-

Theory: 100
Sessional: 25

Unit-1

Assemblers, linkers, loaders, compilers and translators, the structure of a compiler, different states in the construction of a compiler, Design of lexical analyzer, Basic Parsing Techniques, Parsers, shift-reduce parsing, operator- precedence parsing, top-down parsing predictive parsers, L.R. Parsers, the canonical collection of L R (O) items, construction of SLR parsing tables, construction canonical L.R. Parsing tables, Constructing LALR parsing tables implementation of L R Parsing tables.

Unit – 2

Syntax-Directed Translation: Syntax-directed translation schemes, implementation of syntax directed translators, intermediate code, postfix notation, parse trees and syntax trees, three address code, quadruples, and triples, translation of assignment statements. Boolean expressions, control statements.

Symbol labels

The contents of a symbol table data structures for symbol tables representing scope information.

Unit-3

Run Time Storage Administration: Implementation of a simple stack allocation scheme, implementation of block structured languages, storage allocation in block structured languages.

Error Detection And Recovery: Error, Lexical-phase errors, syntactic-phase errors, semantic errors.

Unit -4

Code Optimization: The principle sources of optimization, loop optimization, the DAG representation of basic blocks, value number and algebraic laws, global dataflow analysis.

Code Generation: Object programs, problems in code generation, a machine model, a single code generator, register allocation and assignment, code generation from DAGs, peephole optimization.

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. Aho A.V. and Ullaman J.D. Principles of Compiler Design, Addison Wesley
2. Donovan, J, System Programming , TMH
3. D.M. Dhamdhere: Compiler construction- Principles and Practice Mc Milan India
4. David Grics: Compiler Construction for digital computer

Web Engineering

CSE-403

L	T	P
3	1	-

Theory: 75
Sessional: 25

Unit-1

Information Architecture: The role of Information Architect, Collaboration and communication, Organizing information, organizational challenges, Organizing web sites and Intranets, Creating cohesive organization systems, designing navigation systems, types of navigation systems, Integrated navigation elements, designing elegant navigation systems, Searching systems, Searching your web site, designing the search interface, Indexing the right stuff, To search or not to search grouping content, conceptual design, High level Architecture Blueprint. Architectural Page Mockups, Design Sketches.

Unit-2

Dynamic HTML and Web Designing: HTML Basic concepts, Good web design, process of web publishing phases of web site development, STRUCTURE OF HTML documents, HTML elements- Core attributes, Language attributes, Core events, Block level events, Text level events, Linking basics, Linking in HTML, Images and Anchors, Anchor Attributes, Image maps, Semantic linking meta information, image preliminaries, Image download issues, Images and buttons, introduction to layout: Backgrounds, color and text, fonts, layout with tables. Advanced layout: Frames and layers, HTML and other media types. Audio support in browsers, video support, other binary formats. Style sheets, positioning with style sheets. Basic Interactivity and HTML: FORMS, form control, new and emerging form elements.

Unit -3

CGI Using PERL: Introduction to CGI, Alternative technologies, The Hypertext Transport protocol, URLs, HTTP, Browser requests, Server Responses, Proxies, Content Negotiation, The common Gateway Interface, The CGI Environment, Environment variables, CGI Output, forms and CGI, Sending Data to the server, form Tags, Decoding from input, Architectural Guidelines, Coding Guidelines, Efficiency and optimization.
Unit -4Java Server Pages: Basics, Integrating Scripts in JSPs, JSP Objects and Components, configuring and troubleshooting, JSP: request and response objects,

retrieving the contents of an HTML format, retrieving a query string, Working with Beans, Cookies, creating and Reading Cookies. Using Application Objects and Events. **XML:** Relationship between HTML, SGML and XML, Basic XML, Valid documents, ways to use XML, XML for data files, embedding XML into HTML documents. Converting XML to HTML for Display, Displaying XML using CSS and XSL, rewriting HTML as XML, the future of XML.

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. Thomas A Powell, HTML The Complete Reference, Tata McGraw Hill Publications.
2. SCSEt Guelich, Shishir Gundavaram, Gunther Birzneik; CGI Programming with PERL 2/e, O' Reilly.
3. Doug Tidwell, James Snell, Pavel Kulchenko; Programming web services with SOAP, O' Reilly
4. Pardi, XML in Action, Web Technology, PHI
5. Yong, XML step by step, PHI
6. Aaron, Weiss, Rebecca Taply, Kim Daniels, Stuven Mulder, Jeff Kaneshki, Web Authoring Desk reference, Techmedia publications

Statistical Models for Computer Science

CSE-405

L	T	P	
4	1	-	**Theory: 100**
			Sessional: 25

Unit-1

Probability Models, Sample Space, Events, their algebra, graphical methods of representing events, Probability Axioms and their applications, Condition probability, Independence of Events, Bayes' Rule and Bernoulli Trials.

Unit-2

Random variables, and their event spaces, Probability mass function, Distribution functions, some discrete distributions (Bernoulli, Binomial, Geometric, Negative Binomial, poisson, Hyper geometric and Uniform), Probability Generating Function, Discrete random vectors. Continuous random variables: some continuous distributions (Exponential, Hyperexponential, Erlang, Gamma, Normal), Functions of random variables, jointly distributed random variables. Expectation, Expectation of functions of more than one random variable, Brief introduction to Conditional pmf: pdf and expectation, Moments and transforms of some distributions (Uniform, Bernoulli,

Binomial, Geometric, Poisson. Exponential, Gamma, Normal), Computation of mean time to failure.

Unit-3

Stochastic Processes, Classification of stochastic processes, the Bernoulli process, The Poisson process, renewal process, renewal model of program behavior.

Unit-4

Markov Chains, Computation of n-step transition probabilities, State classification and limiting distributions, Distribution of times between state changes, Irreducible finite chains with aperiodic states, M/G/1 queuing system, Discrete parameter Birth-Death processes, Analysis of program execution time. Continuous parameter Markov Chains, Birth-Death process with special cases, Non-Birth-Death Processes.

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. K.S. Trivedi, Probability, Statistics with Reliability, Queuing and Computer Science Applications, PHI, 2001.
2. J.F. Hayes, Modeling of Computer Communication Networks, Khanna Publishing, Delhi.
3. W. Feller, An Introduction to Probability Theory and its applications. 2vols. Wiley Eastern, 1975.
4. L. Kleinroek, Queuing Systems, 2 vols, John Wiley, 1976.

CSE-407 **UNIX & Linux Programming (Pr)**

L	T	P		
-	-	*1+2	Practical:	50
			Sessional:	50

1. Familiarize with Unix/Linux logging/logout and simple commands.
2. Familiarize with vi editor.
3. Using Bash shell develop simple shell programs.
4. Develop advanced shell programs using grep, fgrep & egrep.
5. Compile and debug various C programs using different options.
6. Learning of installation and upgradation of Linux operating system.
7. Install, Linux on a PC having some other previously installed operating system. All OSs should be usable.
8. *As* supervisor create and maintain user accounts, learn package installation, taking backups, creation of scripts for file and user management, creation of startup and shutdown scripts using at, cron etc.

Note: Atleast 5 to 10 more exercises are to be given by the teacher concerned.

- *Teachers are supposed to devote 1 period for giving instructions to clear the concepts UNIX & Linux and 2 periods for the lab work.*

Web Engineering (Pr.)

CSE-409

L	T	P
-	-	2

Practical: 25
Sessional: 25

1. Chalk out the storyboard and design of Diary Food Limited. As the name reflects your site diary products and aims at opening an online store. Your storyboard should cover all the features that you plan to have on the site.
2. Create your own page with your favorite hobbies.
3. Create a Menu or a table of content web page. Each menu item or section of the table of content should load a different web page. For example, if the user clicks on menu one or section I then the link should take him to respective menu html or section and so on.
4. Create a web site for your college.
5. Create a frameset that is divided into three sections. The frameset should have three zones.
    - The Topmost section of the frameset should take up about just 15% of the browser window. Name this frame title.
    - The middle section should be 70% of the browser window. Name this frame title.
    - The lower section should be 15% of the browser window. Name this frame menu. Create pages for each section. For the lowermost section, create page that loads the content into the middle section. The topmost section should contain a page describing the web page itself.
6. Create a web page, which displays the map of your country Link, each city /state on the image map, such that the respective HTML page of the city/state is displayed when the user selects an area.
7. Add the tickertape applet to your page by customizing it for the following settings:
    - Increase the count by one.
    - Accordingly update the message count.
    - Change the text color to (237,192,171)
    - Experiment with changing the scrolling speed.
    - Customize the message text as per your page requirement.
8. Incorporate a quest book into the Diary Food Webpage and use Java Script to build validations into the form.
9. Use Style sheet to modify the following:
    - Change background to modify the following.
    - Change font type, face and color.
    - Align Text.

- Remove underlines from hyperlinks.

10. Use Microsoft's Personal Web Server to set up your Website.

Departmental Elective-II

Software Project Management

CSE-441

(Departmental Elective II)

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

Unit-1

Conventional Software management: Evolution of software economics. Improving software economics: reducing product size, software processes, team effectiveness, automation through. Software environments. Principles of modem software management.

Unit-2

Software management Process: Framework,: Life cycle phases- inception, elaboration, construction and training phase. Artifacts of the process- the artifact sets, management artifacts, engineering artifacts, and pragmatics artifacts. Model based software architectures. Workflows of the process. Checkpoints of the process.

Unit-3

Software Management Disciplines: Iterative process planning. Project organizations and responsibilities. Process automation. Project control and process instrumentation-core metrics, management indicators, life cycle expectations. Process discriminants.

NOTE: There will be 8 questions in all. At least two questions will be set from each unit.

Books

1. Software Project management,Walker Royce, Addison Wesley, 1998.
2. Project management 2/e, Maylor.
3. Managing the Software Process, Humphrey.
4. Managing global software Projects, Ramesh, TMfH,2001.

Embedded System Design

CSE-443

(Departmental Elective II)

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

Unit-1

Introduction to an embedded systems and its design:: Introduction to ES & its applications, Design parameters of an ES and its significance (with respect to all parameter), Present trends in ES, Embedded system design life cycle, Product specifications and hardware, software partitioning, Co-design

RTOS & its overview:

Spell of OS 2 Difference between OS 2 RTOS, Role of RTOS in ES 2 its process models (Process transition diagram), Course structure, Overview Window, CE, Unix, Mino Kernel, UCOs & RT linux, Interrupt roatining in RTOS &^ Inblow response cycle, Different IPC machines in RTOS, Scheduling construm in RTOS (hand 2 soft), Memory sowing and its protechan, Encapsulation of Semephores and Queues, Timon in RTOS (Watch dog timer)

Unit-2

Processor Selection: Role of processor selection in ES (Mp V/s Uc), Mino control – 8051, 16232 bit mino controller 2 its processor, More about micro controller applications with respect to embedded system design, DSP's in ES, New trends in processing and DSP's.

Cost Compiler and cross assembly for embedded systems

Why we need cross compiler / Assemble, Embedded software development take chain and software development tool chain, Compiler linker, locators, cross assembles, GCC compiler.

Unit-3

Basic Concepts of Device Driving:

Device drives introduction & how device driver are different from the normal ports, Sevical communication enterface device drivers.

System Synthesis and Debugging Techniques:

Introduction to system synthesis & Hardware and Software, Biomultation & methods to improve to speed of simulations, Emulators (ICE) and its type, How emolutors an difference for simulations, Introduction JTAG and OCP (on chich and debugging)

Unit-4

Communication Protocols with reference to ES:

Introduction to protocol, why we need in ES, Overview TCP (IP), UDD< wings protocols, IrDA, Blue Box, IEEE 8811
Other design issues and current trends on its application of ES
Memory optimization, Poorer optimization, Co-similation of its system on chip and SOS (System on Slices), Revision of Cost

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. John Catsoulis, "Designing Embedded Hardware", O'reilly
2. An Embedded Software Primer", David E. Simon, Pearson Education
3. Frank Vahid, Tony Givargis, "Embedded System Design", John Wiley & Sons, Inc
4. Karim Yaghmour, "Building Embedded Linux Systems", O'reilly
5. Michael Barr, "Programming Embedded Systems", O'reilly
6. Alan C. Shaw, "Real-time systems & software", John Wiley & sons, Inc.
7. Wayne Wolf, " Computers as Components", Harcourt India Pvt. Ltd.

Artificial Intelligence

CSE-445

(Departmental Elective II)

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

Unit-I

Introduction: Definition of Artificial Intelligence (AI), Evolution of Computing , History of AI, Classical Romantic and modern period, subject area, Architecture of AI machines, logic family, classification of logic.
Production System: Production rules, the working memory, Recognize-act cycle, conflict resolution strategies, refractoriness, specify alternative approach for conflict resolution by Meta rules, Architecture of production system.

Unit-2

Propositional Logic: Proposition, tautologies, Theorem proving, Semantic method of theorem proving, forward chaining, backward chaining standard theorems, method of substitution. Theorem proving using Wang's algorithm.
Predicate Logic: Alphabet of first order logic (FOL), predicate, well formed formula, clause form, algorithm for writing sentence into clause form, Unification of predicates, unification algorithm, resolution Robinson's interface rule, Scene interpretation using predicate logic.

Unit-3

Default and Non monotonic Logic: Axiomatic theory, Monotonicity, non-atomic reasoning using McDermott's NML-I, problems with NML-I, reasoning with NML-II, Case study of Truth Maintenance system(TMS), neural network fundamentals.
Imprecision and Uncertainty: Definition, Probabilistic techniques, Certainty factor based reasoning, conditional probability. Medical diagnosis problem, Baye's Theorem and its limitations, Bayesian belief network, propagation of belief, Dumpster-Shafer theory of uncertainty management, belief interval, Fuzzy relation, inverse Fuzzy relations, Fuzzy post inverse, Fuzzy Inversion.

Unit-4

Intelligent Search Techniques: Heuristic function, AND-OR graph, OR Graph, Heuristic search, A* algorithm and examples.
Logic Programming with Prolog: Logic program, Horn clause, program for scene interpretation, unification of goals, SLD resolution, SLD tree, flow of satisfaction, controlling back tracking using CUT, command use of CUT, implementation of backtracking using stack, risk of using cuts, fail predicate, application of cut-fail combination, replacing cut-fail by not.

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. A. Konar: Artificial Intelligence and Soft Computing—Behavioral and Cognitive Modeling of Human Brain, CRC Press, USA.
2. E. Charniak and D. McDermott: Introduction to Artificial Intelligence, Addison Wesley Longman.
3. Ellinc and rich: Artificial Intelligence, 2/e 1992.
4. Rich and Knight: Artificial Intelligence, 2/e 1992.

Image Processing

CSE - 447

(Departmental Elective II)

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

Unit-1

Image Processing Fourier Transform and Z-Transform, Causality and stability, Toeplit and Circulate Metrics, orthogonal and unitary Matrices and Kroenker product, Markov Processes Kl Transform Mean square Estimates and Orthogonal Principles.

-58

Image sampling quantization, Band Limited Image Sampling Versus Replication, Reconstruction of image from samples Sampling Theorem, Sampling Theorem for Random Fields, Sampling Optimal Sampling, Nonrectangular Grid Sampling, Sampling Aperture, Display Aperture/ Interpolation Functions, Lang range Interpolation, Moire Effect. Image Quantization Uniform Optimal Quantizer, Properties of Mean Square Quantizer, Commands Design Visual Quantization

Unit-2

Image Transforms: Two Dimensional Orthogonal and Unitary Transforms and their properties. One Dimensional And Two Dimensional DFT Cosine and Sine Transforms Iiadmard, slant ,IIARR and KI, Transforms and their properties, Approximation to KI Transforms. Image representation by stochastic model, One Dimensional Causal Models, AR and ARMA models, Non Causal Representation Spectral factorization, Image Decomposition.

Unit-3

Image Enhancement and Restoration: Point Operation. Histogram Modeling, Spatial Operations, Transform Operations. MultiSpeciral Image Enhancement. Image Observation Models, Inverse and Wiener Filtering FIR wiener Filters, Filtering using Image Transform Causal Models and recursive filtering Maximum entropy restoration. Extrapolation of band limited signal.

Unit-4

Image Analysis and Image Compression: Spatial feature extraction, Edge detection and boundary extraction Boundary, region and moment representations structures, Texture, Image Segmentation, Reconstruction from Projections, Pixel Coding, Productive Techniques, Transform Coding Theory, Coding of Image, Coding of two-tone image.

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. Anil Jain: Digital Image Processing
2. Gonzalez Woods: Image Processing

Departmental Elective-III

UNIX & Linux Programming

CSE-471

L	T	P		
3	1	-	Theory:	75
			Sessional:	25

Unit-1

Linux Startup: User accounts, accessing Linux - starting and shutting processes, Logging in and Logging out, Command line, simple commands

Shell Programming: Unix file system: Linux/Unix files, i-nodes and structure and file system related commands, Shell as command processor, shell variables, creating command substitution, scripts, functions, conditionals, loops, customizing environment

Unit-2

Regular Expressions and Filters: Introducing regular expressions patterns, syntax, character classes, quantifiers, introduction to egrep, sed, programming with awk and perl.

Unit-3

The C Environment: The C compiler, vi editor, compiler options, managing projects, memory management, use of makefiles, dependency calculations, memory management - dynamic and static memory, building and using static and dynamic libraries, using ldd, soname, dynamic loader, debugging with gdb

Unit-4

Processes in Linux: Processes, starting and stopping processes, initialization processes, rc and init files, job control - at, batch, cron, time, network files, security, privileges, authentication, password administration, archiving, Signals and signal handlers, Linux I/O system.

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. John Goerzen: Linux Programming Bible, IDG Books, New Delhi, 2000.
2. Sumitabha Das: Your Unix - The Ultimate Guide, TMH, 2000.
3. Mathew: Professional Linux Programming, vol.1 & 2, Wrox-Shroff, 2001.
4. Welsh & Kaufmann: Running Linux, O'Reiley & Associates, 2000.

Security and Cryptography

CSE -473

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

Unit-1

Traditional Cryptography: Crypto analysis, substitution and transposition ciphers, cryptographic principles, secret – key algorithms: DES, DES chaining, Breaking DES, IDEA, Differential and Linear crypto analysis Public –key algorithms : RSA, Knapsack.

Unit-2

Authentication protocols: KDC protocols, shared secret key, Diffle-Hellman Key exchange, Needham –n Schroeder protocol, Using Kerbros, interlock protocol, digital signatures- Secret key and public key signatures, DSS, message digest, MD5 and Secure Hash algorithms

Unit-3

Computer security Mechanisms: Role of different security Mechanisms, passwords-technology and administration, principles of database system security , epidemic of viruses: types of viruses , study of different virus codes, means of spread, prevention from virus, life cycle of a virus, immunization, Trojan horse and bombs with examples, writing antivirus / Trojan codes.

Unit-4

Network security: Basics, Security Functions, preventing loss and damage, securing local area network- authorization, security plan and policy, Securing enterprise network-setting priorities, security plans, securing network components, hardware security, levels of access control and authorization.

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. Richard H. Baker, Network security , Mcgraw Hill International Ed. 1996
2. B. Schneier , Applied Cryptography, John Wiley New York, 1996
3. C. Kaufman et. Al, Network security , Prentice Hall International,1998

Neural Networks & Fuzzy Logic

CSE-402

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

UNIT 1.

Introduction: Concepts of neural networks, Characteristics of Neural Networks, Historical Perspective, and Applications of Neural Networks.
Fundamentals 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, linear 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, applications of counter propagation, Image classification.

UNIT 3

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

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. Li Min Fu," Neural Networks in Computer Intelligence", McGraw-Hill, Inc.
2. Philip D. Wasserman, "Neural Computing Theory and Practice", ANZA Research Inc.
3. Melaine Mitchell, "An introduction to Genetic Algorithms", PHI.
4. M. H. Hassun, "Fundamentals of Artificial Neural Networks", PHI.

Interactive Computer Graphics

CSE-404

L T P **Theory: 100**

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 (shadowmask 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 positing devices (cursor, lightpen, digitizing tablet, the mouse, track balls). Interactive graphical techniques. Positioning (Elastic or Rubber Bank 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-dimesional 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 Graphics, Prentice Hall
2. Newman, W., Sproul, R.F., Principles of Interactive Computer Graphics, McGraw Hill
3. Harrington, S., Computer Graphics: A Programming Approach, Tata McGraw Hill
4. Hearn, D. Basker, Computer Graphics, Prentice Hall
5. Kelley Bootle, Mastering Turbo C
6. Roggers, D.F., Procedural Elements for Computer Graphics, Mcgraw Hill
7. Foley, J.D., Van Dam A, Fundamentals of Interactive Computer Graphics, Addison Wesley.
8. Tosijasu. L.K.Computer Graphics, Springer Verilag.

Neural Networks (Pr.)

CSE-406

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

Design and train

1. NN for AND, OR gate using perceptron.
2. Perceptron to classify odd and even numbers.
3. NN for alphabet recognition using backpropagation.
4. Hopfield network for recognizing patterns such as '+' and '-'.
5. NN for EXOR classification using Back propagation.
6. CPN for image classification.
7. Name and Telephone number recognition system

Note: Atleast 5 to 10 more exercises are to be given by the teacher concerned.

Departmental Elective-IV

Distributed Operating Systems

CSE-440

(Departmental Elective IV)

L	T	P		
3	1	-	Theory:	75
			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, Mackawa's algorithm, A generalized non token based algorithm, token based algorithm, Broad cast algorithm, Heuristic algorithm, tree based algorithm, comparative performance analysis.

Unit-3

Distributed dead lock detection: Introduction, dead lock 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 operati g systems, TMH 2001.
2. A S Tanenbaum : Modern Operating Systems ,PHI.
3. A. Silberschatz, P. Galving, G. Gahne : Applied operating system concepts, Wiley.

CSE-442 **Software Quality Models and Testing**

(Departmental Elective IV)

L	T	P
3	1	-

Theory : 75
Sessional: 50

Unit-1

Software Quality: Meaning and scope, software quality factors, software quality metrics, relationship b/w quality factors and quality metrics, quality management system, software reviews, formal technical reviews, correctness proof, statistical quality assurance, clear room, software engineering, standards of software quality assurance.

Unit-2

Software Reliability: meaning and its relation with software quality, reliability modeling-exponential failure time models (viz., Jelinski Moranda model, Schneidiwind's model, Musa's basic execution time model, hyberexponential model), Weibull and gamma failure time model (viz. Weibull model, S-shaped reliability growth model), and infinite failure category models (viz. Duane's model, geometric model, Muse-Okumto model). Types of failure, bath-tub Curve, Exponential law of reliability.

Unit-3

Software Testing: Meaning. Scope and its relationship with software quality, software testing techniques: white box testing, basis path testing, control structure testing and black box testing, etc.
Software testing strategies: unit testing, integration testing, validation testing and system testing, etc.

Unit-4

Unit-2

Computing evolution: Phylogenetic Analysis Sequence- based taxonomy: overview and assumptions, from Multiple Alignment to phylogeny Neighbor, Joining Maximum Likelyhood Vs. Parsimony, The molecular Clock, Computer Tools for patterns, mapping and phylogenetic analysis, Mathematical tools of proteins and nucleic acids, sequence-Function Relationships Sequence Homology and Conserved Regions , Conserved DNA Sequences.

Unit-3

Bioinformatics tools: Networks- WWW, CERN EMBnet; EMBL Database, SEQNET, Gen Bank, NLM ,Etc. , Sequence Databases and Sequence Analysis: Genomic , CDNA EMBL database GenBank Protein sequence, Pattern recognition tools
Similarity searching , secondary sources, genome databases, Molecular graphics software and other packages, To find sequences based on keywords & phrases, to grab individual sequences or whole groups of Sequences from a database

Unit-4

Genomics: Introduction , genome scale sequencing , comparative and evolutionary genomics, microarrays, proteomics, pharmacogenomics, Development using computer tools for sequencing projects, PCR and restriction mapping practical and theoretical problems in sequencing. The challenges of whole genome sequencing, web based tools for restriction mapping, new technologies and new bioinformatics tools.

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. Teresa K. Attwood, David J. Parry-Smith: Introduction to Bioinformatics, 1999, Longman Higher Education, 0582327881
2. S. eddy, a. Krogh, G. Mitchison, Richard Durbin: Biological sequence analysis: probabilistic models of proteins and nucleic acids,1999, Cambridge University Press. 0521629713
3. Andreas Baxevanis , B.F. Francis Ouellete: Bioinformatics : a practical guide to the analysis of genes and proteins,1998,john Wiley & sons, inc. 0471191965
4. James D. Tisdall: Beginning perl for Bioinformatics. 2001. O'reilly & Associates. 0596000804
5. Michael S. Wterman: Mathematical methods for DNA sequences, 1989, CRC Press.

Expert Systems

CSE-446

(Departmental Elective IV)

L	T	P
3	1	-

Theory : 75
Sessional: 50

Unit-1

Features 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, stages 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 are 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

Real Time Systems and Software

CSE-448

(Departmental Elective IV)

L	T	P	
3	1	-	Theory: 75 Practical: 50

Unit-1

Introduction, Real-time Versus Conventional Software, Computer Hardware for **Monitoring and** Control, Software Engineering Issues.

Process and State-based Systems model, Periodic and Sporadic Process, Cyclic **Executives,** CE definitions and Properties, Foreground-Background Organiazations, **Standard OS** and Concurrency – Architectures, Systems Objects and Object-Oriented **Structures,** Abstract Data Types, General Object Classes

Unit-2

Requirements and Design Specifications: Classification of Notations, Data Flow **Diagrams,** Tabular Languages, State Machine, Communicating Real Time State **Machine- Basic** features, Timeing and clocks, Sementics Tools and Extensions, **Statecharts-Concepts** and Graphical Syntax, Semantics and Tools

Declarative Specifications: Regular Expressions and Extensions, Traditional Logics-**Propositional Logic,** Predicates, Temporal logic, Real time Logic

Unit-3

Deterministic Scheduling : Assumptions and Candidate Algorithms, Basic RM and EDF **Results,** Process Interactions-Prority Inversiotn and Inheritance

Execution Time Prediction: Measurement of Software by software, Program Analysis **With Timing** Schema, Schema Concepts, Basic Blocks, Statements and Control, Schema **Practice, Prediction** by optimisation, System Interference and Architectural Complexities

Unit-4

Timer Application, Properities of Real and ideal clocks, Clock Servers – Lamport's **Logical clocks,** Monotonic Clock service, A software Clock server, Clock **Synchronization-** Centralized Synchronization, Distributed Synchronization

Programming Languages: Real Time Language Features, Ada-Core Language, Annex **Facilities for** Real Time Programming, Ada and Software Fault Tolerance, Java and **Real-time** Externsions, CSP and Occam

Operating Systems: Real Time Functions and Sevices, OS Architectures-Real Time UNIX and POSIX, Issues in Task management- Processes and Threads, Scheduling, Synchronization and communication

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

Software Verification, Validation & Testing

CSE-450

(Departmental Elective IV)

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

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 based 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 Tools, Dynamic Testing Tools, Characteristics of Modern Tools.

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. William Perry, "Effective Methods for Software Testing", John Wiley & Sons, New York, 1995.
2. Cem Kaner, Jack Falk, Nguyen Quoc, "Testing Computer Software", Second Edition, Van Nostrand Reinhold, New York, 1993.
3. Boris Beizer, "Software Testing Techniques", Second 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 Approach", Fifth Edition, McGraw-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 Singh, "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 Assurance", Van Nostrand Reinhold, New York, 1984.
12. Glenford Myers, "The Art of Software Testing", John Wiley & Sons Inc., New York, 1979.

Departmental Elective-V

Object Oriented Software Engineering

CSE-472

L	T	P
3	1	-

Theory : 75
Sessional: 50

Unit-1

Design Objects, Class Hierarchy, inheritance, polymorphism, object relationships and associations, aggregations and object containment, object persistence, meta-classes, Object-oriented systems development life cycle, Software development process object oriented systems development: a use-case driven approach.

Unit-2

Object modeling techniques 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 Relationships, Apart of Relationships-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 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. 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. William Stallings: Data and Computer Communications 5/e, PHI.

Simulation and Modeling

CSE-474

(Departmental Elective- V)

L	T	P
3	1	-

Theory : 75
Sessional: 50

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 vs. 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 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. 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 Modelling, 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

CSE-476

(Departmental Elective-V)

L	T	P	Theory: 75
3	1	-	Practical: 50

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: Metadata, 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 networks, Fuzzy tech. & genetic algorithms.

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. "Building the Data Warehouse", W.H.Inmon, John Wiley & Sons.
2. "Developing the Data Warehouse", W.H.Inmon, C.Kelly, John Wiley & Sons.
3. "Managing the Data Warehouse", W.H.Inmon, 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