

MAHARSHI DAYANAND UNIVERSITY, ROHTAK (HARYANA)
SCHEME OF STUDIES & EXAMINATION FOR
B. TECH. (ELECTRONICS AND COMPUTER ENGG.)
SEMESTER-VII

‘F’ Scheme effective from 2011-12

Sr. No.	Course No.	Course Title	Teaching Schedule				Marks of class work	Examination		Total Marks	Duration Of Exam
			L	T	P	Total		Theory	Practical		
1	EC-711-F	System Simulation and Modeling	3	1	-	4	50	100	-	150	3
2	EC-712-F	Compiler Design	3	1	-	4	50	100	-	150	3
3	IT-401-F	Data Warehousing & Data Mining	3	1	-	4	50	100	-	150	3
4		Elective I*	3	1	-	4	50	100	-	150	3
5	EE-402-F	Wireless Communication	3	1	-	4	50	100	-	150	3
6	EC-715-F	System Simulation and Modeling Lab	-	-	3	3	50	-	50	100	3
7	CSE-411-F	Compiler Design Lab	-	-	3	3	50	-	50	100	3
8	CSE-315-F	Practical Training-II	-	-	2	2	-	-	-	-	3
9	CSE-413-F	Project	-	-	4	4	50	-	50	100	3
		TOTAL	15	5	12	32	400	500	150	1050	

NOTE:

1. Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.

2. *Student will be permitted to opt for any one elective run by the other departments. However, the departments will offer only those electives for which they have expertise. The choice of the students for any elective shall not be a binding for the department to offer, if the department does not have expertise.

3. Assessment of Practical Training-I, undergone at the end of IV semester, will be based on seminar, viva-voce, report and certificate of practical training obtained by the student from the industry. According to performance letter grades A, B, C, F are to be awarded. A student who is awarded ‘F’ grade is required to repeat Practical Training.

4. Project load will be treated as 2 hours per week for Project Coordinator and 1 hour for each participating teacher. Project will commence in VII semester where the students will identify the Project problem, complete the design/procure the

material/start the fabrication/complete the survey etc., depending upon the nature of the problem. Project will continue in VIII semester.

Elective-I

- | | |
|---------------|---|
| 1. PHY-451-F | NANO Technology |
| 2. HUM-457-F | Business Communication |
| 3. CSE-432-F | Digital Image Processing |
| 4. CSIT-401-F | Mobile Computing |
| 5. CSIT-402-F | Cyber Crime Investigation & Cyber Forensics |
| 6. IT-472-F | Introduction to VLSI Design |
| 7. CSE-446-F | Natural Language Processing |
| 8. EC-821-F | Digital IC Design |
| 9. CSE-407-F | Neural Networks |

MAHARSHI DAYANAND UNIVERSITY, ROHTAK (HARYANA)
SCHEME OF STUDIES & EXAMINATION FOR
B. TECH. (ELECTRONICS AND COMPUTER ENGG.)
SEMESTER –VIII

‘F’ Scheme Effective from 2011-2012

Sr. No.	Course No.	Course Title	Teaching Schedule				Marks of class work	Examination		Total Marks	Duration Of Exam
			L	T	P	Total		Theory	Practical		
1	CSE-305-F	Analysis and Design of Algorithms	3	1	-	4	50	100	-	150	3
2	EC-812-F	Satellite Communication	3	1	-	4	50	100	-	150	3
3		Elective-1	3	1	-	4	50	100	-	150	3
4		Elective-2	3	1	-	4	50	100	-	150	3
5	EC-815-F	Satellite Communication Lab	-	-	2	4	50	-	50	100	3
6	CSIT-410-F	Seminar	-	-	4	4	50	-	-	50	3
7	CSE-413-F	Project	-	-	8	8	100	-	100	200	3
8	GP-SSE-402-F	General Proficiency	-	-	-	-	-	-	-	-	
		TOTAL	12	4	14	32	400	400	150	950	

NOTE:-

- 1. Students will be allowed to use the non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.**
- 2. A team consisting of Principal/Director, HOD of concerned department and external examiner appointed by University shall carry out the evaluation of the student for his/her General Fitness for the Profession.**
- 3. Project load will be treated as 2 hrs. per week for the project coordinator and 1 hour for each participating teacher. Project involving design, fabrication, testing, computer simulation, case studies etc., which has been commenced by students in VII semester, will be completed in VIII semester.**

ELECTIVE-1

- | | |
|--------------|--|
| 1. HUM-451-F | Language Skill for Engineers |
| 2. CSE-442-F | Human Computer Interaction |
| 3. EC-818-F | Telecommunication-Switching and Networks |
| 4. EC-819-F | Mixed Signal IC Design |
| 5. EC-820-F | Low Power Design |
| 6. EC-722-F | Bioinformatics |
| 7. EC-822-F | Analog IC Design |
| 8. EC-823-F | MEMS |

Elective-II

- | | |
|--------------|-------------------------------------|
| 1. CSE-444-F | Fuzzy Logic |
| 2. CSIT-404 | Parallel Computation & Applications |
| 3. CSE-403-F | Software Project Management |
| 4. IT-471-F | Management Information System |
| 5. IT-464-F | Network Security Management |
| 6. CSE-401-F | Advanced Computer Architecture |
| 7. CSE-402-F | Distributed Operating Systems |
| 8. CH-453-F | Pollution & Control |

EC-711-F

SYSTEM SIMULATION AND MODELING

L T P
3 1 -

Class work Marks: 50
Theory Marks : 100
Total Marks : 150
Time duration : 3 Hrs

NOTE: For setting up the questions paper, Questions No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common questions, which is compulsory, and one questions from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

Introduction to Simulation: System & System Environment, Components of a System, Discrete and Continuous Systems, Model of a System and Types of Models,. Discrete Event System Simulation, Advantages and Disadvantages of Simulation, Areas of Application.

Section-B

Techniques of Simulation: Monte Carlo Method, Types of System Simulations, Real Time Simulation, Stochastic Variables, Discrete Probability Functions General Principles: Concepts in Discrete Event Simulation, Event Scheduling /Time Advance Algorithm, List Processing, Using Dynamic Allocation & Linked List Simulation Software: History of Simulation Software, Selection of Simulation Software, Simulation in C++, GPSS, Simulations Packages, Trends in simulation Software

. Section-C

Statistical Models in Simulation: Useful Statistical Models, Discrete Distributions, Continuous Distributions, Poisson Process, Empirical Distributions Queuing Models: Characteristics of Queuing systems, Queuing Notation, Long Run Measures of performance of Queuing Systems, Steady State Behavior of infinite Population Markovian Models, Steady State Behavior of finite Population Models.

Section-D

Networks of Queues Random Number Generation: Properties of Random Numbers, Generation of Pseudo-Random Numbers, Techniques for Generating Random Numbers, Tests for Random Numbers, Inverse transform Techniques, Convolution Methods, and Acceptance –Rejection Techniques Input Modeling: Data Collection, Identifying the Distribution with Data, Parameter Estimation, Chi – Square Test, Selecting Input Models with Data Verification & Validation of simulation Modeling: Model Building, Verification & Validation, Verification of simulation Models, Calibration & Validation of Models.

REFERENCE BOOKS:

1. Gordon G, “System Simulation”, PHI 2nd Edition 1998.
2. Deo Narsingh, “System Simulation with Digital Computers”, PHI, New Delhi 1993.
3. K S Trivedi, “Probability and Statistics with Reliability, Queuing and Computer Science Application”, PHI
4. Subranranian, K R V and Sudaresan R Kadayam, “System simulation: Introduction to GPSS”, CBS, New Delhi 1993.
5. W Feller, ”An introduction to Probability Theory and its Applications,” Val 182, Wiley Eastern Ltd. ND.

L T P
3 1 -

Class work Marks: 50
Theory Marks : 100
Total Marks : 150
Time duration : 3 Hrs

NOTE: For setting up the questions paper, Questions No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common questions, which is compulsory, and one questions from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

Compiler structure: analysis-synthesis model of compilation, various phases of a compiler, tool based approach to compiler construction. Lexical analysis interface with input, parser and symbol table, token, lexeme and patterns.

Section-B

Difficulties in lexical analysis. Error reporting. Implementation. Regular definition, Transition diagrams, LEX. Syntax analysis: CFGs, ambiguity, associativity, precedence, top down parsing, recursive descent parsing, transformation on the grammars, predictive parsing, bottom up parsing, operator precedence grammars, LR parsers (SLR, LALR, LR), YACC.

Section-C

Syntax directed definitions: inherited and synthesized attributes, dependency graph, evaluation order, bottom up and top down evaluation of attributes, L- and S-attributed definitions. Type checking: type system, type expressions, structural and name equivalence of types, type conversion, overloaded functions and operators, polymorphic functions. Run time system: storage organization, activation tree, activation record, parameter passing, symbol table, dynamic storage allocation.

Section-D

Intermediate code generation: intermediate representations, translation of declarations, assignments, control flow, Boolean expressions and procedure calls. Implementation issues. Code generation and instruction selection: issues, basic blocks and flow graphs, register allocation, code generation, dag representation of programs, code generation from dags, peep hole optimization, code generator generators, specifications of machine.

REFERENCE BOOKS:

1. V. Aho, R. Sethi, and J. D. Ullman. Compilers: Principles, Techniques and Tools , Addison-Wesley, 1988.
2. Fischer and R. LeBlanc. Crafting a Compiler, Benjamin Cummings, 1991..
3. C. Holub. Compiler Design in C, Prentice-Hall Inc., 1993.
4. Appel. Modern Compiler Implementation in C: Basic Design, Cambridge Press.
5. Fraser and Hanson. A Retargetable C Compiler: Design and Implementation, Addison-Wesley.

IT-401-F

DATA WAREHOUSING AND DATA MINING

L T P
3 1 0

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

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section A

Data warehousing Definition, usage and trends. DBMS vs data warehouse, Data marts, Metadata, Multidimensional data mode, Data cubes, Schemas for Multidimensional Database: stars, snowflakes and fact constellations.

Data warehouse process & architecture, OLTP vs OLAP, ROLAP vs MOLAP, types of OLAP, servers, 3-Tier data warehouse architecture, distributed and virtual data warehouses, data warehouse manager.

Section B

Data warehouse implementation, computation of data cubes, modelling OLAP data, OLAP queries manager, data warehouse back end tools, complex aggregation at multiple granularities, tuning and testing of data warehouse.

Section C

Data mining definition & task, KDD versus data mining, data mining techniques, tools and applications.

Data mining query languages, data specification, specifying knowledge, hierarchy specification, pattern presentation & visualisation specification, data mining languages and standardisation of data mining.

Section D

Data mining techniques: Association rules, Clustering techniques, Decision tree knowledge discovery through Neural Networks & Genetic Algorithm, Rough Sets, Support Vector Machines and Fuzzy techniques.

Mining complex data objects, Spatial databases, Multimedia databases, Time series and Sequence data; mining Text Databases and mining Word Wide Web.

Text Books:

- Data Warehousing In the Real World; Sam Anahory & Dennis Murray; 1997, Pearson
- Data Mining- Concepts & Techniques; Jiawei Han & Micheline Kamber- 2001, Morgan Kaufmann.
- Data Mining Techniques; Arun Pujar; 2001, University Press; Hyderabad.

Reference Books:

- Data Mining; Pieter Adriaans & Dolf Zantinge; 1997, Pearson,
- Data Warehousing, Data Mining and OLTP; Alex Berson, 1997, Mc Graw Hill.
- Data warehousing System; Mallach; 2000, Mc Graw Hill.
- Building the Data Warehouse; W.H. Inman, 1996, John Wiley & Sons.
- Developing the Data Warehouses; W.H Inman,C.Klelly, John Wiley & Sons.
- Managing the Data Warehouses; W.H.Inman, C.L.Gassey, John Wiley & Sons. .

L T P
3 1 0

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

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

INTRODUCTION TO WIRELESS COMMUNICATION SYSTEMS: Evolution of mobile radio communications, examples of wireless comm. systems, paging systems, Cordless telephone systems, comparison of various wireless systems.

MODERN WIRELESS COMMUNICATION SYSTEMS: Second generation cellular networks, third generation wireless networks, wireless in local loop, wireless local area networks, Blue tooth and Personal Area networks.

Section-B

INTRODUCTION TO CELLULAR MOBILE SYSTEMS: Spectrum Allocation, basic Cellular Systems, performance Criteria, Operation of cellular systems, analog cellular systems, digital Cellular Systems.

CELLULAR SYSTEM DESIGN FUNDAMENTALS: Frequency Reuse, channel assignment strategies, handoff Strategies, Interference and system capacity, tracking and grade off service, improving coverage and capacity.

Section-C

MULTIPLE ACCESS TECHNIQUES FOR WIRELESS COMMUNICATION: Introduction to Multiple Access, FDMA, TDMA, Spread Spectrum multiple Access, space division multiple access, packet ratio, capacity of a cellular systems.

WIRELESS NETWORKING: Difference between wireless and fixed telephone networks, development of wireless networks, fixed network transmission hierarchy, traffic routing in wireless networks, wireless data services, common channel signaling, ISDN (Integrated Services digital Networks), advanced intelligent networks.

Section-D

INTELLIGENT CELL CONCEPT AND APPLICATION: Intelligent cell concept, applications of intelligent micro-cell Systems, in-Building Communication, CDMA cellular Radio Networks.

TEXT BOOKS:

1. Wireless Communications: Theodore S. Rappaport; Pearsons.
2. Mobile Cellular Telecommunication: W.C.Y.Lee; McGraw Hill

REFERENCE BOOK:

1. Mobile Communications: Jochen Schiller; Pearson

EC-715-F SYSTEM SIMULATION AND MODELING LAB

L T P
0 0 2

Theory : 50 Marks
Class work : 50 Marks
Total : 100 Marks

LIST OF EXPERIMENTS:

Implementation of the followings Simulation problems in GPSS or any High Level Programming Language

1. Computer Generation of Random Numbers.
2. Testing Random Number Generators.
3. Monte-Carlo Simulation.
4. Simulation of Single Server Queuing System.
5. Simulation of Two-Server Queuing System.
6. Simulation of Inventory System.
7. Simulation of Telephone System.

NOTE: Ten experiments are to be performed. Remaining experiments may either be designed & set by the concerned institution as per the scope of the syllabus.

CSE-411-F

COMPILER DESIGN LAB

L T P
0 0 3

Class Work Marks: 50
Exam Marks: 50
Total Marks: 100
Duration of exam: 3 hrs.

1. Practice of LEX/YACC of compiler writing.
2. Write a program to check whether a string belong to the grammar or not.
3. Write a program to generate a parse tree.
4. Write a program to find leading terminals.
5. Write a program to find trailing terminals.
6. Write a program to compute FIRST of non-terminal.
7. Write a program to compute FOLLOW of non-terminal.
8. Write a program to check whether a grammar is left Recursion and remove left Recursion.
9. Write a program to remove left factoring.
10. Write a program to check whether a grammar is operator precedent.
11. To show all the operations of a stack.
12. To show various operations i.e. read, write and modify in a text file.

Note : At least 10 programs are required to be developed in the semester.

CSE-413-F

PROJECT

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0 0 8

Class Work Marks: 100
Exam Marks: 100
Total Marks: 200
Duration of Exam: 3 Hrs.

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3 1 0

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

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section A

Introduction to Nanotech: Crystalline-Non crystalline materials, Fundamental of Nanotechnology and Nanomaterials in Metals, other Materials, & Biosystem, Molecular Recognition, Quantum Mechanics and Quantum Ideas in Nanotechnology. Semiconductor Nanoparticles.

Section B

Preparation and Characterization of Nanoparticles: Nanoscale Lithography, Dip Pen Lithography, E-Beam Lithography, Nanosphere Lithography; Molecular Synthesis, Nanoscale Crystal Growth, Polymerization Nanobricks and Building blocks: Tools for Measuring Nanostructures-Scanning Prob Instrument, Spectroscopy, Electrochemistry, Election Microscope Tools to Make Nanostructure.

Section C

Properties & Application of Nano Crystalline Materials: Application in Sensors, Nanoscale Biostructure Electronics, Magnets, optics, Fabrication Biomedical Applications, Smart Materials-Self Healing Structures, Heterogenous Nanostructure and composites En capsulation, Carbon Nanotubes.

Section D

Synthesis of semiconductor Nanoclusters, Processing of Nanomaterials Nanobusiness-Boom, Bust and Nano Tech. NanoEthics

Text Books:

1. Camarata, R.C. Nanomaterials synthesis, properties and application Institute of Physics Publication.
2. Madou, Fundamentals of microfabrication, Mcgraw Hill.
3. Sibelia, J.P., A Guide to Material characterization, Prentice Hall.
4. Mark Ratner, Daniel Ratner-Nano Technology-A Gentle Introduction to the next big idea.

HUM-457-F

BUSINESS COMMUNICATION

L T P
3 1 0

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

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The course proposes to help students develop business and technical communication competence. It focuses on writing skills and strategies for specific purposes. The inevitability of introducing this course to Engineering students is embodied in that it has comparatively a high concentration of certain complex writing techniques and procedures.

Section A

Business Correspondence : Characteristics and formats of Business letter; Quotations, Orders, Tenders, Sales letters, claim and adjustment letters, Credit and Collection letters, Application Letters for vacant situations with emphasis on Resumes and Curriculum Vitae; E-mail and Netiquette-format, style and tone.

Section B

Business Reports and Proposals : Importance, Function, Pattern and formats of Reports, Typical Business Reports, Report Organisation and Presentation, and Formal Reports; Proposal Formats, Writing problem-Solving proposals, Executive Summary Proposals and project Proposals.

Section C

Meetings : Writing of Memorandum, Notes, Agenda and minutes of Meeting.

Section D

Public Relations and Advertising Documents: Press Releases, Public Service announcements, Advertising Strategy and its objective, Designing of Classified and Display Advertising copies.

Text Book:

1. Business Communication: Process & Product by Hary Ellen Guffey, IV Edition, South-Western College Publishing, Cincinnati.

2. Business Correspondence and Report Writing by R.C. Sharma & Krishna Mohan, Tata Macgraw Hill Publication, New Delhi.
3. Effective Business English and Correspondence by M.S. Ramesh and C.C. Pattanshetti, R. Chand & Co., New Delhi. 4. Effective Letters in Business by Robert by C. Shruter, Tata Macgraw Hill, New Delhi.
5. English Business Letters by F.W. Wing & D. Anncrec, Orient Longman.
6. Written Communication in English by Sarah Freeman, Orient Longman.
7. International Business English by Leo Jones & Richard Alexander, Cambridge University Press.
8. General and Business English by Sweet Stephen, Sir Issac Pitman & Sons Ltd., London.
9. How to Write and Present Technical Information, Charles H. Sides, Cambridge University Press, U.K.
10. Strategies for Engineering Communication, Susan Stevenson Steve Whitmore, John Wiley and Sons, Inc. Printed in India by Replika Press. Pvt. Ltd., Delhi.

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Section-A

Introduction and Fundamental to Digital Image Processing: What is Digital Image Processing, Origin of Digital Image Processing, Examples that use Digital Image Processing, Fundamental steps in Digital Image Processing, Components of Digital Image Processing System, Image sensing and acquisition, Image sampling, quantization and representation, Basic relationship between pixels.

Section-B

Image Enhancement in the Spatial Domain & Frequency domain: Background, Basic gray level transformation, Histogram processing, Basics of spatial filtering, Smoothing and Sharpening Spatial filters, Introduction to Fourier Transform and the Frequency Domain, Discrete Fourier Transform. Smoothing and Sharpening Frequency-Domain filters.

Image Restoration: Image Degradation/Restoration Process, Noise models, Restoration in presence of noise, Inverse Filtering, Minimum Mean Square Filtering, Geometric mean filter, Geometric transformations.

Section-C

Color Image Processing: Color Fundamentals, Color models, Basis of full color image processing, Color transformations.

Image Compression: Fundamentals, Image compression models, Error free compression, Lossy compression.

Image Segmentation: Detection of Discontinuities, Edge linking and boundary detection, Thresholding, Region oriented segmentation.

Section-D

Representation, Description and Recognition: Representation-chain codes, polygonal approximation and skeletons, Boundary descriptors-simple descriptors, shape numbers, Regional descriptors- simple, topological descriptors, Pattern and Pattern classes-Recognition based on matching techniques.

Recognition: Pattern and pattern Classes, Decision-Theoretic Methods.

TEXT BOOK:

1. Digital Image Processing by Rafael C. Gonzalez & Richard E. Woods –2002, Pearson Education.

REFERENCE BOOK:

1. Digital Image Processing by A.K. Jain, 1995,-PHI

L T P
3 1 0

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

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Section-A

Introduction: Wireless communication, Wireless data technologies, Frequencies for radio signals, antennas and signal propagation, need and types of multiplexing techniques, modulation types, use of spread spectrum, cellular systems.

Medium Access Control: Need for MAC algorithm, medium access methods and comparison of these methods.

Section-B

Digital mobile Phone Systems: GSM: mobile services, system architecture, radio interference, protocols, localization and calling, hand over, security, new data services, other digital cellular networks, comparison with GSM.

Section-C

Wireless LAN: Introduction, advantages and design goals for wireless LAN, Infrastructure, ad-hoc networks, IEEE 802.11: system and protocol architecture, physical layer, HIPERLAN protocol architecture and physical layer and MAC, Blue tooth physical and MAC layer. Wireless ad-hoc networks.

Protocols for mobile computing: Mobile network layer, mobile IP, Snooping TCP, Mobile TCP, Fast and selective retransmission and recovery, Transaction oriented TCP.

Section-D

Wireless Application Protocol: WAP architecture wireless datagram protocol, transport layer security, WML, script.

Palm OS: - Architecture, features of kernel, memory, system managers, Symbian OS: Architecture, hardware interface, memory, management, Window CE: features and architecture.

TEXT BOOKS:

1. Mobile Communications – Jachen Schiller (Addison- Wesley)
2. Mobile Computing – Asoke K Talukder, Roopa R Yavgal, (TMH Publishing)

CSIT-402-F CYBER CRIME INVESTIGATIONS AND CYBER FORENSICS

L T P
3 1 0

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

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section A

Introduction : Review of TCP/IP and TCP, IP Header analysis, Introduction to Cyber World, Cyber attacks and cyber security, Information warfare and cyber terrorism, Types of cyber attacks, Cyber Crime and Digital Fraud, Overview of Types of computer forensics i.e. Media Forensics, Network forensics (internet forensics), Machine forensic, Email forensic (e-mail tracing and investigations)

Section B

Live Data collection and investigating windows environment: windows Registry analysis, Gathering Tools to create a response toolkit (Built in tools like netstat, cmd.exe, nbtstat, arp, md5sum, regdmp etc and tools available as freeware like Fport, Pslist etc), Obtaining volatile Data (tools like coffee, Helix can be used) Computer forensics in windows environment, Log analysis and event viewer, File auditing, identifying rogue machines, hidden files and unauthorized access points

Section C

Live Data collection and investigating Unix/Linux environment: /Proc file system overview, Gathering Tools to create a response toolkit (Built in tools like losetup, Vnode, netstat, df, md5sum, strace etc and tools available as freeware like Encase, Carbonite etc)
Handling Investigations in Unix/Linux Environment: Log Analysis (Network, host, user logging details), Recording incident time/date stamps, Identifying rogue processes, unauthorized access points, unauthorized user/group accounts,

Section D

Forensic tools and report generation: Recovery of Deleted files in windows and UNIX, Analyzing network traffic, sniffers, Ethical Hacking, Hardware forensic tools like Port scanning and vulnerability assessment tools like Nmap, Netscan etc. Password recovery (tools like John the ripper, L0phtcrack, and THC-Hydra), Mobile forensic tools and analysis of called data record Template for computer forensic reports

TEXT BOOKS:

1. Incident Response & Computer Forensics. Mandia, k., Proise, c., Pepe, m. 2nd edition. Tata-McGraw Hill, 2003.
2. Guide to Computer Forensics and Investigations, 2nd edition, Bill Nelson, Amelia Phillips, Frank Enfinger, and Chris Steuart , Thomson Learning.

REFERENCE BOOKS:

1. Digital Evidence and Computer Crime, 2nd Edition , Eoghan Casey , academic Press File System Forensic Analysis by Brian Carrier, addition Wesley.
2. Windows Forensic Analysis DVD Toolkit (Book with DVD-ROM), Harlan Carvey, syngress Publication.
3. EnCE: The Official EnCase Certified Examiner Study Guide, 2nd Edition, Steve Bunting, sybex Publication.

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Section-A

Crystal Growth: MGS, EGS, Czochralski crystal Puller, Silicon shaping, Wafer Preparation. Epitaxy: Vapour Phase Epitaxy, Epitaxial Layer evaluation Molecular Beam Epitaxy.

Oxidation: Thermal Oxidation Kinetics, Oxidation techniques, Oxide Properties, Oxidation induced Defects. Lithography: Photolithography, e-beam lithography, X ray Lithography.

Section-B

Reactive Plasma Etching: Plasma Properties, Feature Size control and anisotropic etching, Plasma etching techniques and equipment. Di-electric and Poly-Silicon Film Deposition: Deposition Processes for Poly-Si, SiO₂, Si₃N₄; Plasma assisted Depositions.

Section-C

Diffusion: A Qualitative view of atomic diffusion in Solids, diffusion mechanisms, Fick's one dimensional diffusion equation, constant source and limited source diffusion, diffusion of Grp3 and 5 impurities in Silicon Impurity sources, diffusion apparatus, Characterization of diffused layers. Ion Implantation: Introduction, Range Theory, Implantation Equipment Annealing.

Section-D

Metallization: Metallization applications, Choices, Physical Vapour Deposition. Sputtering, Metallization Problems. Assembly & Packaging: Package Types, design considerations, Package fabrication technologies, Future trends.

Isolation techniques: Bipolar IC fabrication Process Sequence. n MOS IC fabrication Process Sequence.

TEXT BOOKS:

1. VLSI Technology, S.M. Sze, 1998, MGH
2. VLSI Fabrication Principles, S.K. Ghandhi

L T P
33 1 0

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

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Section-A

Components of natural language processing: lexicography, syntax, semantics, pragmatics: word level representation of natural languages prosody & natural languages.

Formal languages and grammars: chomsky hierarchy, Left-Associative grammars, ambiguous grammars, resolution of ambiguities.

Section-B

Computation linguistics: recognition and parsing of natural language structures: ATN & RTN, General techniques of parsing: CKY, Earley & Tomita algorithm.

Section-C

Semantics-knowledge representation semantic networks logic and inference pragmatics, graph models and optimization, prolog for natural language semantic.

Section-D

Application of NLP: intelligent work processors: Machine translation, user interfaces, Man- Machine interfaces, natural language querying, tutoring and authoring systems, speech recognition, commercial use of NLP.

TEXT BOOK:

1. "Natural Language Understanding" James Allen, Benjamin-1995, Cummings Pub. Comp. Ltd.

REFERENCE BOOKS:

1. "Language as a cognitive process", Terry Winograd 1983, AW
 2. "Natural Language processing in prolog" G. Gazder, 1989, Addison Wesley.
- " Introduction of Formal Language Theory, Mdlj Arbib & Kfaury, 1988, Springer Verlag.

L T P
3 1 -

Class work Marks: 50
Theory Marks : 100
Total Marks : 150
Time duration : 3 Hrs

NOTE: For setting up the questions paper, Questions No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common questions, which is compulsory, and one questions from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

Introduction: Digital IC, Digital Combinational and sequential circuit, issue in digital IC design, Quality metrics of Digital Design Designing Combinational Logic Gate in CMOS : Static C-MOS Inverter and its characteristics, CMOS Design consideration Transistor Sizing, Power Dissipation, Design Margining, Ratioed Logic, Pass Transistor Logic.

Section-B

Dynamic C-MOS design, basic principle, speed and power Dissipation of Dynamic Logic, Signal Integrity in Dynamic Design, Cascaded Dynamic. Designing Sequential Logic Circuits Introduction ,Static Latches and registrars, Dynamic Latches and Registers, Alternative Register Styles, Pipelining.

Section-C

Implementation Strategies for Digital ICS: Custom, Semi custom Circuit Design, Cell –Based Design Methodology, Array Based Implementation Approach, Layout Designing Memory: Memory Classification, Memory Architecture and Building Block,Read only Memories, Nonvolatile Read Write Memories, Read-Write Memories, Memory Peripheral Circuits.

Section-D

Programmable logic devices: Introduction to PLA, PAL, PLD/CPLD, PGA/ FPGA, ASIC their applications and Architecture.

REFERENCE BOOKS:

1. J.M. Rabaey, A. Chandrakasan and B. Nikolic: Digital Integrated Circuits- A Design Perspective, 2nd ed., PHI, 2003
2. D.A. Pucknell and K. Eshraghian, Basic VLSI Design, PHI, 1995
3. E.D. Fabricius, Introduction to VLSI Design, McGraw Hill, 1991
4. N.H.E. Weste and K. Eshraghian, Principles of CMOS VLSI Design - a System Perspective, 2nd ed., Pearson Education Asia, 2002
5. S.M. Kang and Y. Leblevici, CMOS Digital Integrated Circuits Analysis and Design, 3rd ed., McGraw Hill, 2003
6. J. P. Uyemura, Introduction to VLSI Circuits and Systems, John Wiley & Sons (Asia) Pte Ltd, 2002
7. W. Wolf, Modern VLSI Design - System on Chip design, 3rd ed., Pearson Education, 2004
8. R. Jacob Baker, CMOS Circuit Design, Layout, and Simulation, IEEE Press, 1997

L T P
3 1 0

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

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

Overview of biological neurons: Structure of biological neurons relevant to ANNs.

Fundamental concepts of Artificial Neural Networks: Models of ANNs; Feedforward & feedback networks; learning rules; Hebbian learning rule, perception learning rule, delta learning rule, Widrow-Hoff learning rule, correction learning rule, Winner-take-all learning rule, etc.

Section-B

Single layer Perception Classifier: Classification model, Features & Decision regions; training & classification using discrete perceptron, algorithm, single layer continuous perceptron networks for linearly separable classifications.

Section-C

Multi-layer Feed forward Networks: linearly non-separable pattern classification, Delta learning rule for multi-perceptron layer, generalized delta learning rule, Error back propagation training, learning factors, Examples.

Single layer feed back Networks: Basic Concepts, Hopfield networks, Training & Examples.

Section-D

Associative memories: Linear Association, Basic Concepts of recurrent Auto associative memory: retrieval algorithm, storage algorithm; by directional associative memory, Architecture, Association encoding & decoding, Stability.

Self organizing networks: UN supervised learning of clusters, winner-take-all learning, recall mode, Initialization of weights, separability limitations

TEXT BOOK:

1. Introduction to Artificial Neural systems by Jacek M. Zurada, 1994, Jaico Publ. House.

REFERENCE BOOKS:

1. "Neural Networks: A Comprehensive formulation", Simon Haykin, 1998, AW
2. "Neural Networks", Kosko, 1992, PHI.
3. "Neural Network Fundamentals" – N.K. Bose, P. Liang, 2002, T.M.H

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3 1 0

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

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

Brief Review of Graphs, Sets and disjoint sets, union, sorting and searching algorithms and their analysis in terms of space and time complexity.

Divide and Conquer: General method, binary search, merge sort, quick sort, selection sort, Strassen's matrix multiplication algorithms and analysis of algorithms for these problems.

Section-B

Greedy Method: General method, knapsack problem, job sequencing with dead lines, minimum spanning trees, single source paths and analysis of these problems.

Dynamic Programming: General method, optimal binary search trees, 0/1 knapsack, the traveling salesperson problem.

Section-C

Back Tracking: General method, 8 queen's problem, graph colouring, Hamiltonian cycles, analysis of these problems.

Branch and Bound: Method, 0/1 knapsack and traveling salesperson problem, efficiency considerations. Techniques for algebraic problems, some lower bounds on parallel computations.

Section-D

NP Hard and NP Complete Problems: Basic concepts, Cook's theorem, NP hard graph and NP scheduling problems some simplified NP hard problems.

TEXT BOOKS:

1. Fundamental of Computer algorithms, Ellis Horowitz and Sartaj Sahni,1978, Galgotia Publ.,
2. Introduction To Algorithms, Thomas H Cormen, Charles E Leiserson And Ronald L Rivest: 1990, TMH

REFERENCE BOOKS:

1. The Design and Analysis of Computer Algorithm, Aho A.V. Hopcroft J.E., 1974, Addison Wesley.
2. Algorithms-The Construction, Proof and Analysis of Programs, Berlion, P.Bizard, P., 1986. Johan Wiley & Sons,
3. Writing Efficient Programs, Bentley, J.L., PHI
4. Introduction to Design and Analysis of Algorithm, Goodman, S.E. & Hedetniemi, 1997, MGH.
5. Introduction to Computers Science- An algorithms approach , Jean Paul Trembley, Richard B.Bunt, 2002, T.M.H.
6. Fundamentals of Algorithms: The Art of Computer Programming Voll, Knuth, D.E.:1985, Naresh Publ.

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3 1 -

Theory : 100 Marks
Class work: 50 Marks
Total : 150 Marks

NOTE: For setting up the questions paper, Questions No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common questions, which is compulsory, and one questions from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

PRINCIPLES OF SATELLITE COMMUNICATION : Evolution & growth of communication satellite, Synchronous satellite, Satellite frequency allocation & Band spectrum, Advantages of satellite communication, Active & Passive satellite, Modem & Codec. Applications of satellite communication.

COMMUNICATION SATELLITE LINK DESIGN: Introduction, General link design equations, System noise temperature, C/N & G/T ratio, Atmospheric & Ionospheric effects on link design, Complete link design, Earth station parameters.

Section-B

ANALOG SATELLITE COMMUNICATION: Introduction, Baseband analog(Voice) signal, FDM techniques, S/N & C/N ratio in frequency modulation in satellite link, S/N ratio in FM with multiplexed telephone signal in satellite link, Single channel per carrier(SCPC) systems, Companded single sideband (CSSB) systems, Analog FM/FDM TV satellite link, Intermodulation products & their effects in FM/FDM systems, Energy disposal in FM/FDM systems.

DIGITAL SATELLITE COMMUNICATION : Advantages of digital communication, Elements of digital satellite communication systems, Digital baseband signals, Digital modulation techniques, Satellite digital link design, Time Division Multiplexing.

Section-C

MULTIPLE ACCESS TECHNIQUES: Introduction, TDMA, TDMA-Frame structure, TDMA-Burst structure, TDMA-Frame efficiency, TDMA-superframe, TDMA-Frame acquisition & Synchronization, TDMA compared to FDMA, TDMA Burst Time Plan, Multiple Beam (Satellite switched) TDMA satellite system, Beam Hopping(Transponder Hopping) TDMA, CDMA & hybrid access techniques.

SATELLITE ORBITS: Introduction, Synchronous orbit, Orbital parameters, Satellite location with respect to earth, Look angles, Earth coverage & slant range, Eclipse effect, Satellite placement in geostationary orbit, station keeping, Satellite stabilization.

Section-D

SPECIAL PURPOSE COMMUNICATION SATELLITES: BDS, INMARSAT, INTELSAT, VSAT(data broadband satellite), MSAT(Mobile Satellite Communication technique), Sarsat(Search & Rescue satellite) & LEOs (Lower earth orbit satellite), Satellite communication with respect to Fiber Optic Communication, LANDSAT, Defense satellite.

LASER SATELLITE COMMUNICATION: Introduction, Link analysis, Optical satellite link transmitter, Optical satellite link receiver, Satellite Beam Acquisition, Tracking & Positioning, Deep Space Optical Communication Link

TEXT BOOK:

1. Satellite Communication: D.C. Aggarwal ; Khanna.

REFERENCE BOOK :

1. Satellite Communication: Gagliardi; CBS

EC-815-F

SATELLITE COMMUNICATION LAB

L T P
0 0 2

Theory : 50 Marks
Class work : 50 Marks
Total : 100Marks

LIST OF EXPERIMENTS:

1. To set up a active and passive satellite communication link and study their difference.
2. To measure the base-band analog (voice) signal parameters in the satellite link.
3. To measure C/N ratio.
4. To transmit and receive the function generator waveforms through a Sat.Com. link.
5. To measure the digital baseband signal parameters in Sat.Com. link.
6. To send telecommand and receive the telemetry data.
7. To set a PC to PC Sat. Com. Link using RS-232 ports.
8. To measure the propagation delay of signal in a Sat. Com. Link.
9. To measure fading of a received signal.
10. To measure the parameters in an analog FM/FDM TV Sat.Com. link.
11. To measure the S/N ratio.
12. To calculate the figure of merit and FM deviation.

NOTE: Ten experiments are to be performed, out of which at least 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.

CSIT-410-F**SEMINAR**

L T P
0 0 2

Class Work Marks: 50
Total Marks: 50

Resume / Report Preparation /Letter writing: Students prepare their own resume and report.

Presentation Skills: Students make presentations on given topics. Every student will be required to present a seminar talk on a topic approved by the department. The committee constituted by the Head of the Department will evaluate the presentation.

Group Discussion: Students participate in group discussions.

Interview Skills: Students participate in Mock interviews.

Note: Classroom sessions are practice sessions.

L T P
3 1 0

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

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

The real challenge before the students starts when they cross the threshold of the college after completing their degree. They, all of a sudden, find themselves competing for job/P.G. Degrees, through various entrance tests and interviews. Verbal ability forms a major portion of these tests. Without sound language skills and its semantic-syntactic know-how, the students with engineering background find themselves almost under-prepared for such tests. With this difficulty of students in mind, this course is proposed to make them technically proficient in handling the language skills required in competitive exams. The course would expose students to almost all variety of items, the common run of such tests as CAT, GMAT etc. And in the context of LPG, this cutting edge competence becomes imperative, and no professional education can afford to overlook this aspect.

Section A

Remedial English : Parts of speech, Gerunds, Participles and infinitives; Clauses; Sentence-constructions (unity; avoidance of choppy and rambling sentences, logic and consistency, conciseness, sequencing of ideas); Sentence errors-agreement between verb and subject, pronoun and antecedents, sequence of tenses, problems involving modifiers (dangling and misplaced modifiers); Shifts in point of view consistency of number and person, tense, mood, voice and subject; Parallelism; Omissions and mixed constructions.

Section B

Vocabulary : Methods of building vocabulary-etymological roots, prefixes and suffixes; Commonly used foreign words and phrases; spelling; words often confused synonyms and homonyms; one word substitutes; verbal idioms.

Section C

Punctuation and Mechanics: End Punctuation; internal Punctuation; Word Punctuation.
Comprehension: Abstracting; Summarizing; Observation, Findings and Conclusions; Illustration and Inductive Logic; Deduction and Analogy.

Section D

Presentation: Oral presentation- Extempore, discussion on topics of contemporary relevance, Interviews.

TEXT BOOKS:

1. Working with words by R. Gairns and S. Redman, Cambridge University Press, London.
2. Meanings into Words-Upper Intermediate Students Book, Deff/Jones, Foundation Books (Cambridge University Press), Delhi.
3. A Practical English Grammar by A.J. Thomson and A.V. Martinet, OUP, Delhi.
4. Examine your English by Margaret M. Maison, Orient Longman, New Delhi.
5. A Practical Guide to Colloquial Idiom by W.J. Ball. Longman.
6. A guide to correct English by L.A. ill, Oxford.
7. Structural Essentials of english by H.whitehall, Longman.
8. Advanced English Practice by B.D. Graver, OUP, Delhi
9. Public Speaking, Sudha Publication Pvt. Ltd., New Delhi.
10. Group Discussion, Sudha Publication Pvt. Ltd., New Delhi.

CSE-442-F

HUMAN COMPUTER INTERACTION

L T P
3 1 0

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

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

Introductions & overview of HCI: History of computer user interfaces, HCI – history and intellectual root Human information processing limitations, human decision making.

1. Human cognitive and sensory limits
2. Human memory
3. Human problem solving
4. Skill acquisition
5. Users' conceptual models (mental models)
6. Decision making

Computer systems and user interfaces, human-system interaction:

Input and output devices, Mechanics of particular devices, Speech input, sound and speech output, Computer architecture, Performance characteristics of humans and systems, Color issues, Computer graphics , Color representation, color maps, color range of devices

Section-B

Interaction models and metaphors:

Use of abstract metaphors for describing interface behavior, Use of metaphors to support user understanding, Dialog input and output techniques and purposes , Screen layout issues, Dialog interaction: types and techniques, navigation and orientation, multimedia and non graphical dialogues.

Dialog issues: response time, control, standards, look and feel , Layers model of architecture of design and windowing systems, Windows manager models, e.g., X, Macintosh, MS Windows, Hypermedia and WWW

Section-C

Principles guiding well-designed human-system interaction: Paradigms for interaction, Principles to support usability, Accounting for users with disabilities

The design process – overview: The typical software development lifecycle (idealized vs. actual), User-centered design overview, “Three pillars of design”, Usability engineering overview, Reconciling UCD and usability testing

The design process - task and user needs analysis: Task analysis definition, Techniques for task analysis, Sources of information

Section-D

The design process – making use of task and user data for system design.

Use cases, scenarios, Structuring the information, Information architecture, User and process flows, Wireframes, Mockups, comps, Other methods of conveying structure and function

Designing for universal access: What is accessibility? What is accessible software, Examples of accessibility adaptations, what’s driving software accessibility, Implications for software organizations?

Speech user interfaces: Attributes of speech user interfaces, Evaluating speech user interface quality

HCI in mission-critical and high-risk environments: Safety implications of human-computer interaction, Effects of automation, addressing the effects

TEXT BOOKS:

1. Hackos, J.T. & Redish, J.C. (1998). User and task analysis for interface design. John New York: Wiley & Sons.
2. Norman, D. (1988). The design of everyday things. New York: Basic Books.

REFERENCE BOOKS:

1. Designing the User Interface: Strategy for Effective Human Computer Interaction, 3rd edition, Bel Shneiderman, Perason Edu. Publ. 2000.
2. Human Computer Interaction Dix, A et al. Prentice Hall 1993
3. Graphical User Interface Design and Evaluation Redmond-Pyle, D. & Moore, A. Prentice Hall 1995
4. The Art of Human-Computer Interface Design Laurel, B Addison-Wesley 1990

EC-818-F

**TELECOMMUNICATION –SWITCHING
AND NETWORKS**

L T P
3 1 -

Class work Marks: 50
Theory Marks : 100
Total Marks : 150
Time duration : 3 Hrs

NOTE: For setting up the questions paper, Questions No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common questions, which is compulsory, and one questions from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

Telecommunications Transmission: Basic Switching System, Simple Tele-phone Communication, evolution of switching systems -Stronger switching systems Switching Used in telecommunications cross bar switching, Electronic Switching – Space Division Switching.

Section-B

Time Division Switching –Time Division space switching, Time Division Time Switching, Time multiplexed space switching, Time multiplexed Time Switching, Combination Switching Control of Switching Systems: Call processing functions, common control, stored program control (For all type of switching systems)

Section-C

Speech Digitization and Transmission: Quantization Noise, Companding, Differential Coding, Vocoders, Pulse Transmission, Line Coding, NRZ and RZ Codes, Manchester Coding, AMI Coding, Walsh Codes, TDM. Traffic Engineering: Grade of Service and Blocking Probability– Telephone Networks, Subscriber Loops, Switching Hierchy and Routing, Transmission Plans and Systems, Signaling Techniques, In Channel, Common Channel.

Section-D

Telephone Networks and Signaling: Introduction, subscriber loops systems, switching hierarchy, transmission and numbering plans, common channel signaling principles, CCITT signaling systems. Data Networks: Data transmission in PSTNs, Switching Techniques for data transmission, Data communication architecture, Satellite based Data networks.

REFERENCE BOOKS:

1. Flood J E, “Telecommunications switching, traffic and networks” first Indian reprint, Pearson education Asia, (2001).
2. Viswanathan T, “Telecommunication switching systems and networks” 17th Indian reprint, PHI, India, (2003).
3. Bosse J G van, Bosse John G., “Signaling in Telecommunication Networks“ Wiley, John & Sons, (1997).
4. Bruce S. Davie, Paul Doolan, Yakov Rekhtor, “Switching in IP Networks: IP Switching, Tag Switching, and Related Technologies” Elsevier Science & Technology Books, (1998).
5. Joseph Yu Hui, “Switching and Traffic Theory for Integrated Broadband Networks”, Kluwer Academic Publishers, (1990).

EC-819-F

MIXED SIGNAL IC DESIGN

L T P
3 1 -

Class work Marks: 50
Theory Marks : 100
Total Marks : 150
Time duration : 3 Hrs

NOTE: For setting up the questions paper, Questions No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common questions, which is compulsory, and one questions from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

Introduction: Introduction to analog VLSI and mixed signal issues in CMOS technologies
MOS transistor: Introduction, Short channel effects, current source and current mirror, C-MOS circuit Basic Integrated Circuit Devices and Modeling: MOS and BJT transistor modeling, CMOS and bipolar processing – CMOS and analog layout consideration MOS and CMOS sample and hold circuit – bipolar and BiCMOS sample and hold – switched capacitor circuits – data converters

Section-B

D/A and A/D converters : introduction A/D and D/A, various type of A/D converter, ADCs, ramp, tracking, dual slope, successive approximation and flash types, Multi-stage flash type ADCs OP-AMP : Op-amp- analysis, approximations and modelling; Ideal op-amp building blocks.

Section-C

Open loop op-amp configurations, Practical op-amp- Offset voltage analysis and compensation, Input bias and offset current analysis and compensation, frequency response, slew rate, Block diagram representations and analysis of configurations using negative feedback, Designing of Op-amp.

Section-D

Specialized IC's: 555 Timer-Monostable, multivibrator, astable multivibrator, Applications and Phase locked loop-Operating principles and applications of PLL.

REFERENCE BOOKS:

1. D. A. Johns and K. Martin, Analog Integrated Circuit Design, Wiley Student Edition, 2002.
2. P. R. Gray and R. G. Meyer, Analysis and design of Analog Integrated circuits 4th Edition, Wiley Student Edition, 2001.
2. R.Jacob Baker,H.W.Li, and D.E. Boyce CMOS Circuit Design ,Layout and Simulation, Prentice-Hall of India,1998
3. Mohammed Ismail and Terri Faiz Analog VLSI Signal and Information Process, McGraw-Hill Book company,1994
4. Paul R. Gray and R.G.Meyer, Analysis and design of Analog Integrated circuits John Wiley and sons,USA,(3rd Edition),1993
5. B. Razavi, RF Microelectronics, Prentice-Hall PTR,1998
6. P. E. Allen and D. R. Holberg, CMOS Analog Circuit Design, 2nd edition, Oxford University Press, 1997.

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3 1 -

Class work Marks: 50
Theory Marks : 100
Total Marks : 150
Time duration : 3 Hrs

NOTE: For setting up the questions paper, Questions No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common questions, which is compulsory, and one questions from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

Introduction to Low-Power VLSI Design, sources of Dissipation in Digital Integrated circuit, Degree of freedom, Recurring Themes in Low power, Low Power Approaches Device and Technology Impact on Low Power Electronics Dynamic Dissipation in CMOS, Effect on speed, Constrictions on Reduction.

Section-B

Transistor Sizing and Gate oxide Thickness, Impact of Technology Scaling Low Power Circuit Techniques Power consumption in circuits, Flip-Flop and Latches.

Section-C

Logic, High Capacitance Nodes Low Power Clock Distribution Power Dissipation in clock Distribution, Single Driver vs Distributed Buffer, Zero Skew vs Tolerable Skew, Chip and Package Co-Design of clock.

Section-D

Logic Synthesis for low power: Power Estimation Technique, power Minimization Technique Low power Memory Design Sources of power dissipation in D-RAM and S-RAM, Low power DRAM circuit, Low power SRAM circuit

REFERENCE BOOKS:

1. Jan M.Rabay and Massoud Pedram "Low Power Design Methodology" Kluwer Academic Publishers 1996
2. Gary K. Yeap, "Practical Low Power Digital VLSI Design", KAP, 2002
3. Rabaey, Pedram, "Low power design methodologies" Kluwer Academic, 1997
4. Kaushik Roy, Sharat Prasad, "Low-Power CMOS VLSI Circuit Design" Wiley, 2000
5. J.M. Rabaey, A. Chandrakasan and B. Nikolic: Digital Integrated Circuits- A Design Perspective, 2nd ed., PHI, 2003

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3 1 -

Class work Marks: 50
Theory Marks : 100
Total Marks : 150
Time duration : 3 Hrs

NOTE: For setting up the questions paper, Questions No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common questions, which is compulsory, and one questions from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

Fundamentals of Bioinformatics and Information Technology: Introduction to bioinformatics, Experimental sources of biological data, publicly available databases, Operating systems - including Windows and UNIX, Networks - including the Intranets and the Internet.

Section-B

Analytical Science and Bioinformatics High throughput sequencing, Experimental determination of protein structures, Gene expression monitoring, Proteomics, Metabolomics Statistical Methods in Bioinformatics Basic mathematics, Vectors and matrices, Multivariate statistics - particularly exploratory methods and pattern recognition Bioinformatics Algorithms and Tools: Visualization of sequence data, Sequence alignment, Homology searching - including BLAST, Gene expression informatics

Section-C

Introduction to gene finding Applications and Commercial Aspects of Bioinformatics: Visualization of sequence data, Drug discovery, Genetic basis of disease, Personalized medicine and gene-based diagnostics, Legal, ethical and commercial ramifications of bioinformatics; Bioinformatics The Business of Research, Research methodology (focusing on computer-based research), Case studies of areas of current bioinformatics research Routes to research funding (academic and commercial), Bioinformatics business models, Intellectual property rights

Section-D

Software Engineering in Bioinformatics: Advanced programming using Java and BioJava, Advanced database work using SQL, Interfacings programs with databases. Data interoperability using XML Principles of Programming and Databases using Java and SQL: Fundamental principles of programming, Object-oriented programming using Java, Introduction to databases using Oracle. PERL programming: Data manipulation, File maintenance, Pipelining Packaging and interfacing system facilities

REFERENCE BOOKS:

1. Bioinformatics for Dummies, Jean-Michel Claverie, Cedric Notredame, 2003, John Wiley & Sons
2. Bioinformatics Computing, Bryan P. Bergeron, 2002, Prentice Hall
3. Introduction to Bioinformatics, Teresa Attwood, David Parry-Smith, 2001, Prentice Hall
4. Beginning Perl for Bioinformatics, James Tisdall, 2001, O'reilly
5. Developing Computer Skills, Cynthia Gibas, PerJambeck, 2001, O'reilly

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3 1 -

Class work Marks: 50
Theory Marks : 100
Total Marks : 150
Time duration : 3 Hrs

NOTE: For setting up the questions paper, Questions No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common questions, which is compulsory, and one questions from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

Review of MOS Devices: MOS transistor models. NMOS, PMOS, CMOS, Introduction to analog VLSI and mixed signal issues in CMOS technologies Basics of system hardware design methodology Hierarchical design using top-down and bottom-up methodology.

Section-B

Basic Electrical Properties And Circuit Concepts: Basic Electrical Properties of MOS circuits: MOS transistor operation in linear and saturated regions, MOS transistor threshold voltage MOS switch and inverter, latch-up in CMOS inverter; sheet resistance and area capacitances of layers, wiring capacitances MOS models, SPICE Models Circuit Characterization.

Section-C

Performance Estimation: Estimation of R, C, L, Switching Characteristics-delay models. Power dissipation. ; MOSFET scaling - constant-voltage and constant-field scaling CMOS Analog blocks: Current Sources and Voltage references. Differential amplifier and OPAMP design.

Section-D

Practical Aspects and Design Verification Semi-custom and cell library based design. Design of Hardware description languages for high level design. Logic, circuit and layout verification. Analog Testing and Layout issues. Introduction to different tool used in Analog design

REFERENCE BOOKS:

1. Weste N and Eshraghian K, "Principles of CMOS VLSI Design", Pearson Education Asia (2001).
2. Glaser L and Dobberpuhl D, "The Design and Analysis of VLSI Circuits", Addison Wesley (1985).
3. Rabaey J, "Digital Integrated Circuits: Design perspective", Prentice Hall India (1997).
4. Perry D, "VHDL", 2ndEd., McGraw-Hill International (1995).
5. Pucknell D A and Eshraghian K, "Basic VLSI Design", Prentice Hall India, New Delhi (2003).
6. D. A. Johns and K. Martin, Analog Integrated Circuit Design, Wiley Student Edition, 2002
7. P. R. Gray and R. G. Meyer, Analysis and design of Analog Integrated circuits 4th Edition, Wiley Student Edition, 2001.
8. B. Razavi, RF Microelectronics, Prentice-Hall, 1998.
9. P. E. Allen and D. R. Holberg, CMOS Analog Circuit Design, 2nd edition, Oxford University Press, 1997.

EC-823-F

MEMS

L T P
3 1 -

Class work Marks: 50
Theory Marks : 100
Total Marks : 150
Time duration : 3 Hrs

NOTE: For setting up the questions paper, Questions No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common questions, which is compulsory, and one questions from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

Introduction to Microelectromechanical Systems (MEMS) and MEMS Fabrication Technologies, Materials and Substrates for MEMS, Processes for Micromachining - Basic Process Tools, Advanced Process Tools MEMS Structure and Systems: General Design Methodology, Techniques for Sensing and Actuation, Passive MEM Structures, Sensors. Actuators, Mechanical Vibrations.

Section-B

Computer-Aided Design of MEMS and tools, Applications of MEMS in RF/Microwave – The MEMS Switch and its Design Consideration.

Section-C

The MEM Resonator and its Design Considerations, Micromachining-Enhanced Planar Microwave Passive Elements. Other MEMS Based RF/Microwave Circuits and Systems

Section-D

Packaging & Reliability for MEMS - Key Design and Packaging Considerations. Die-Attach Processes. Wiring and Interconnects. Types of Packaging Solutions. Reliability and Failure Analysis

REFERENCE BOOKS:

1. Nadim Maluf and Kirt Williams, “An Introduction to Microelectromechanical Systems Engineering”, Artech, 2004 Second Edition
2. Hector J. De Los Santos, “ Introduction to Microelectromechanical Microwave Systems”, Artech, 2004, Second Edition

CSE-444-F

FUZZY LOGIC

L T P
3 1 0

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

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, α -cuts, Properties of α -cuts, Decomposition, Theorems, Extension Principle, Operations on Fuzzy Sets: Complement, Intersections, Unions, Combinations of Operations, Aggregation Operations

Section-B

Fuzzy Arithmetic: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations.

Fuzzy Relations: Crisp & Fuzzy Relations, Projections & Cylindric Extensions, Binary Fuzzy Relations, Binary Relations on single set, Equivalence, Compatibility & Ordering Relations, Morphisms, Fuzzy Relation Equations.

Section-C

Possibility Theory: Fuzzy Measures, Evidence & Possibility Theory, Possibility versus Probability Theory.

Fuzzy Logic: Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers, Linguistic Hedges.

Section-D

Uncertainty based Information: Information & Uncertainty, Nonspecificity of Fuzzy & Crisp sets, Fuzziness of Fuzzy Sets.

Applications of Fuzzy Logic in soft computing.

TEXT / REFERENCE BOOKS:

1. Fuzzy Sets, Uncertainty & Information by G.J.Klir & T.A. Folyger, PHI, 1988.
2. Fuzzy sets & Fuzzy logic by G.J.Klir & B.Yuan, PHI, 1995.

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

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Section-A

Introduction to Parallel Processing: Criteria for judging the architecture, Architectural classification schemes, Trends towards parallel processing, Parallelism in uni processor systems, Parallel Computer Structure, Applications of parallel processing Principles of Pipelining - Principles of Linear and non-linear pipelining, classification of pipeline processors, general pipelines and reservation tables, Interleaved memory organization .

Section-B

Structures and algorithms for Array Processors: SIMD array processors: SIMD computer organization, Masking and data routing mechanisms, SIMD interconnection networks: static v/s dynamic, mesh connected ILLIAC network, Barrel Shifter network, Shuffle-exchange and omega network.

Section-C

Multiprocessor Architecture: Functional structures, UMA & NUMA multiprocessors. Interconnection Networks: Time shared or common buses, Bus arbitration algorithm, Cross bar switch and multiport memories, Comparison of multiprocessor interconnection structure, multistage networks for multiprocessors, Algorithm Analysis – Mathematical background, what to analyze, Running time calculation, Logarithms in Running time

Section-D

Algorithm design techniques: Greedy algorithms, Simple Scheduling algorithms, Multiprocessor case, Huffman code analysis, Bin packing algorithms, Back tracking algorithms, Turnpike reconstruction algorithm Parallel processing terminology - Speed up, scaled speed up and parallelizability.

Elementary parallel algorithms: Hypercube SIMD model, Shuffle-exchange SIMD model, 2-D mesh SIMD, UMA multiprocessor, Broadcast Matrix multiplication - Algorithms for Processor arrays, Algorithms for multiprocessors and multicomputers. Sorting - Lower bounds on parallel sorting, Odd-Even transposition sort.

TEXT BOOKS:

1. Kai Hwang and Faye A. Briggs, Computer Architecture and Parallel Processing McGraw Hill Series.
2. Kai Hwang, Advanced Computer Architecture, Parallelism, Scalability, Programmability.
3. Michael J. Quinn, Parallel Computing – Theory and Practice – TMH Publication.
4. Mark Allen Weiss, Data Structures and Algorithm Analysis in C, Benjamin/Cummings Publication.

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Section-A

Introduction to Software Project Management (SPM): Definition of a Software Project (SP), SP Vs. other types of projects activities covered by SPM, categorizing SPs, project as a system, management control, requirement specification, information and control in organization.

Stepwise Project planning: Introduction, selecting a project, identifying project scope and objectives, identifying project infrastructure, analyzing project characteristics, identifying project products and activities, estimate efforts each activity, identifying activity risk, allocate resources, review/ publicize plan.

Section-B

Project Evaluation & Estimation: Cost benefit analysis, cash flow forecasting, cost benefit evaluation techniques, risk evaluation. Selection of an appropriate project report; Choosing technologies, choice of process model, structured methods, rapid application development, water fall, V-process, spiral models. Prototyping, delivery. Albrecht function point analysis.

Activity planning & Risk Management: Objectives of activity planning, project schedule, projects and activities, sequencing and scheduling activities, network planning model, representation of lagged activities, adding the time dimension, backward and forward pass, identifying critical path, activity throat, shortening project , precedence networks.

Risk Management: Introduction, the nature of risk, managing risk, risk identification, risk analysis, reducing the risks, evaluating risks to the schedule, calculating the z values..

Section-C

Resource allocation &Monitoring the control: Introduction, the nature of resources, identifying resource requirements, scheduling resources creating critical paths, counting

the cost, being specific, publishing the resource schedule, cost schedules, the scheduling sequence.

Monitoring the control: Introduction, creating the frame work, collecting the data, visualizing progress, cost monitoring, earned value, prioritizing monitoring, getting the project back to target, change control.

Managing contracts and people: Introduction, types of contract, stages in contract, placement, typical terms of a contract, contract management, acceptance, Managing people and organizing terms: Introduction, understanding behavior,

Section-D

Organizational behavior: a back ground, selecting the right person for the job, instruction in the best methods, motivation, working in groups, becoming a team, decision making, leadership, organizational structures, conclusion, further exercises.

Software quality: Introduction, the place of software quality in project planning, the importance of software quality, defining software quality, ISO 9126, Practical software quality measures, product versus process quality management, external standards, techniques to help enhance software quality.

Study of Any Software Project Management software: viz Project 2000 or equivalent

TEXT BOOK:

1. Software Project Management (2nd Edition), by Bob Hughes and Mike Cotterell, 1999, TMH.

REFERENCE BOOKS:

1. Software Engineering – A Practitioner’s approach, Roger S. Pressman (5th ed), 2001, MGH
2. Software Project Management, Walker Royce, 1998, Addison Wesley.
3. Project Management 2/c. Maylor
4. Managing Global software Projects, Ramesh, 2001, TMH.

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Class Work Marks: 50
Exam Marks: 100
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Section A

Foundation of Information System : Introduction to Information System and MIS, Decision support and decision making systems, systems approach, the systems view of business, MIS organization within company, Management information and the systems approach.

Section B

Conceptual system design: Define the problems, set systems objects, establish system constraints, determine information needs determine information sources, develop alternative conceptual design and select one document the system concept, prepare the conceptual design report.

Detailed system design: Inform and involve the organization, aim of detailed design, project management of MIS detailed design, identify dominant and trade of criteria, define the sub systems, sketch the detailed operating sub systems and information flow, determine the degree of automation of each operation, inputs outputs and processing, early system testing, software, hardware and tools propose an organization to operate the system, document the detailed design revisit the manager user.

Section C

Implementation evaluation and maintenance of the MIS : Plan the implementation, acquire floor space and plan space layouts, organize for implementation, develop procedures for implementation, train the operating personnel, computer related acquisitions, develop forms for data collection and information dissemination, develop the files test the system cut-over, document the system, evaluate the MIS control and maintain the system. Pitfalls in MIS development.

Section D

Information Technology: Computer hardware & software, DBMS, RDBMS and Telecommunication.

Advanced Concepts in Information Systems: Enterprise Resources Management (ERP), Supply Chain Management, CRM, Procurement Management System.

Text Books:

- Management Information System by W.S. Jawadekar, 2002, Tata McGraw Hill.
- Information System for Modern Management (3rd edition)- Robert G. Murdick, Loel E. Ross & James R. Claggett. PHI.

Reference Books:

- Management Information System; O Brian; TMH
- Management Information System by Davis Olson Mac Graw Hill.
- Management Information System by Staslings, (Maxwell Mc Millman Publishers).
- Information System; a Management Perspective; Alter Addison Wesley.
- Introduction to Information System; McGraw Hill.

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Section-A

Introduction: Codes and Ciphers – Some Classical systems – Statistical theory of cipher systems- Complexity theory of crypto systems – Stream ciphers, Block ciphers. Stream Ciphers: Rotor based system – shift register based systems – Design considerations for stream ciphers – Cryptanalysis of stream ciphers – Combined encryption and encoding. Block Ciphers – DES and variant, modes of use of DES.

Section-B

Public key systems – Knacksack systems – RSK – Diffie Hellman Exchange – Authentication and Digital signatures, Elliptic curve based systems. System Identification and clustering: Cryptology of speech signals – narrow band and wide band systems – Analogue & Digital Systems of speech encryption.

Section-C

Security: Hash function – Authentication: Protocols – Digital Signature standards. Electronics Mail Security – PGP (Pretty Good Privacy) MIME, data Compression technique. IP Security: Architecture, Authentication Header, Encapsulating security Payload – Key Management. Web security: Secure Socket Layer & Transport Layer security, Secure electronics transactions. Firewalls Design principle, established systems.

Section-D

Telecommunication Network Architecture, TMN management layers, Management information Model, Management servicing and functions, Structure of management information and TMN information model, SNMP v1, SNMP2 & SNMP3, RMON1 & 2, Broadband Network Management (ATM, HFC, DSL), ASN

TEXT BOOKS:

1. Cryptography and Network Security: Principles & Practices, 2nd Edition by Upper Saddle River, PHI
2. Network Management Principles & Practices by Subramanian, Mani (AWL)
3. SNMP, Stallings, William (AWL)

REFERENCE BOOKS:

1. SNMP: A Guide to Network Management (MGH)
2. Telecom Network Management by H.H. Wang (MGH)
3. Network Management by U. Dlack (MGH)

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Section-A

Architecture And Machines: Some definition and terms, interpretation and microprogramming. The instruction set, Basic data types, Instructions, Addressing and Memory. Virtual to real mapping. Basic Instruction Timing.

Time, Area and Instruction Sets: Time, cost-area, technology state of the Art, The Economics of a processor project: A study, Instruction sets, Professor Evaluation Matrix

Section-B

Cache Memory Notion: Basic Notion, Cache Organization, Cache Data, adjusting the data for cache organization, write policies, strategies for line replacement at miss time, Cache Environment, other types of Cache. Split I and D-Caches, on chip caches, two level Caches, write assembly Cache, Cache references per instruction, technology dependent Cache considerations, virtual to real translation, overlapping the T-cycle in V-R Translation, studies. Design summary.

Section-C

Memory System Design: The physical memory, models of simple processor memory interaction, processor memory modeling using queuing theory, open, closed and mixed queue models, waiting time, performance, and buffer size, review and selection of queuing models, processors with cache.

Section-D

Concurrent Processors: Vector Processors, Vector Memory, Multiple Issue Machines, Comparing vector and Multiple Issue processors. Shared Memory Multiprocessors: Basic issues, partitioning, synchronization and coherency, Type of shared Memory multiprocessors, Memory Coherence in shared Memory Multiprocessors.

TEXT BOOKS:

1. Advance computer architecture by Hwang & Briggs, 1993, TMH.
2. Pipelined and Parallel processor design by Michael J. Flynn – 1995, Narosa.

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Section-A

Introduction to Distributed System, Goals of Distributed system, Hardware and Software concepts, Design issues. Communication in distributed system: Layered protocols, ATM networks, Client – Server model, Remote Procedure Calls and Group Communication. Middleware and Distributed Operating Systems.

Section-B

Synchronization in Distributed System: Clock synchronization, Mutual Exclusion, Election algorithm, the Bully algorithm, a Ring algorithm, Atomic Transactions, Deadlock in Distributed Systems, Distributed Deadlock Prevention, Distributed Deadlock Detection.

Section-C

Unit-3: Processes and Processors in distributed systems: Threads, System models, Processors Allocation, Scheduling in Distributed System, Real Time Distributed Systems.

Unit-4: Distributed file systems: Distributed file system Design, Distributed file system Implementation, Trends in Distributed file systems.

Section-D

Distributed Shared Memory: What is shared memory, Consistency models, Page based distributed shared memory, shared variables distributed shared memory.

Case study MACH: Introduction to MACH, process management in MACH, communication in MACH, UNIX emulation in MACH.

Text Book:

1. Distributed Operating System – Andrew S. Tanenbaum, PHI.

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Section A

Waster Water & its treatment Processes: Waster-water characteristics, effluent standards, primary treatment, secondary treatment-aerobic (activated sludge, aerated lagoons, trickling filter, roughing filter, rotating biological contactor) anaerobic (contact process, UASB).

Section B

Air Pollution: Classification of air Pollutants Particulates: Physical characteristics, mode of formation, setting properties, Control measures.
Hydrocarbons : Nature; sources, control Carbon
Monoxide : Source, harmful effects on human health, control measure. Oxides of Sulphur and Nitrogen Sources, effects on human health and plants. Control measure.

Section C

Solid Waste : Types, sources and properties of solid waste, solid waste management-Generation, Collection and techniques for ultimate disposal, Elementary discussion on resource and energy recovery.

Section D

Nuclear Pollution: Elementary treatment of nuclear pollution, metal pollution, noise pollution their effects & control.

Text Books:

1. Environmental Engg. by Howard S. Peavy & Others, MGH International.
2. Metacaf-EDDY-Waste-water engineering revised by George Teholonobus (TMH).
3. Environmental Chemistry by B.K. Sharma, Goel Publishing, Meerut.
4. Environmental Chemistry, A.K. DE, Wiley Eastern.
5. Air Pollution: H.C. Perking-McGraw Hill.