ANNA UNIVERSITY OF TECHNOLOGY, MADURAI – 625 002

B.E COMPUTER SCIENCE AND ENGINEERING

3 , 4, 5, 6, 7, 8 th SEMESTER CURRICULAM AND SYLLABI

REGULATION 2010

SEMESTER III

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
10177MA301	Transforms and Partial Differential Equations	3	1	0	4
10144CS302	Data Structures	3	0	0	3
10144CS303	Digital Principles and Systems Design	3	1	0	4
10144CS304	Object Oriented Programming	3	0	0	3
10144CS305	Analog and Digital Communication	3	1	0	4
10177GE001	Environmental Science and Engineering	3	0	0	3
PRACTICAL					
10144CS307	Digital Lab	0	0	3	2
10144CS308	Data Structures Lab	0	0	3	2
10144CS309	Object Oriented Programming Lab	0	0	3	2
	TOTAL	18	3	9	27

SEMESTER IV

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
10177PQ401	Probability and Queuing Theory	3	1	0	4
10144CS402	Design and Analysis of Algorithms	3	1	0	4
10144EC506	Microprocessors and Microcontrollers	3	0	0	3
10144CS404	Computer Organization and Architecture	3	0	0	3
10144CS405	Operating Systems	3	0	0	3
10144CS406	Database Management Systems	3	0	0	3
PRACTICAL					
10144CS407	Operating Systems Lab	0	0	3	2
10144CS408	Data Base Management Systems Lab	0	0	3	2
10144CS409	Microprocessors Lab	0	0	3	2
	TOTAL	18	2	9	26

SEMESTER V

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
10144CS501	Discrete Mathematics	3	0	0	3
10144CS502	Software Engineering	3	1	0	4
10144CS503	Computer Networks	3	0	0	3
10144CS504	Theory of Computation	3	1	0	4
10144CS505	System Software	3	1	0	4
10144CS506	Programming Paradigms with Java	3	0	0	3
PRACTICAL					
10144CS507	Networks Lab	0	0	3	2
10144CS508	System software Lab	0	0	3	2
10144CS509	Java Lab	0	0	3	2
	TOTAL	**18**	**2**	**9**	**27**

SEMESTER VI

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
10144CS601	Artificial Intelligence	3	0	0	3
10144CS602	Principles of Compiler Design	3	0	2	4
10144CS603	Object Oriented Analysis and Design	3	0	0	3
10144CS604	Advanced Computer Architecture	3	0	0	3
E01	Elective- I	3	0	0	3
E02	Elective- II	3	0	0	3
PRACTICAL					
10144CS607	Object Oriented Analysis and Design Lab	0	0	3	2
10177CS608	Internet Programming Lab	1	0	3	2
10177GE002	Communication Skills Lab	0	0	3	2
	TOTAL	**19**	**0**	**11**	**25**

SEMESTER VII

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
10177GE007	Engineering Economics & Financial Accounting	3	0	0	3
10144CS702	Computer Graphics and Multimedia	3	0	0	3
10144CS703	Mobile and Pervasive Computing	3	0	0	3
10144CS704	Soft Computing	3	0	0	3
E03	Elective- III	3	0	0	3
E04	Elective- IV	3	0	0	3
PRACTICAL					
10144CS707	Computer Graphics Lab	0	0	3	2
10144CS708	Open Source Lab	0	0	3	2
		18	**0**	**6**	**22**

SEMESTER VIII

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
10144CS801	Middleware Technologies	3	0	0	3
10144CS802	Web Technology	3	0	0	3
E05	Elective V	3	0	0	3
E06	Elective VI	3	0	0	3
PRACTICAL					
10144CS803	PROJECT WORK	0	0	12	6
	TOTAL	12	0	12	18

LIST OF ELECTIVES
SEMESTER VI – Elective I

CODE NO.	COURSE TITLE	L	T	P	C
10144CSE11	Multi core Programming	3	0	0	3
10144CSE12	Visual Programming	3	0	0	3
10144CSE13	Advanced Java Programming	3	0	0	3
10144CSE14	Parallel Programming	3	0	0	3
10144CSE15	Software Testing	3	0	0	3
10144CSE16	Advanced Digital Design with VHDL	3	0	0	3

SEMESTER VI – Elective II

CODE NO.	COURSE TITLE	L	T	P	C
10144CSE21	Numerical Methods	3	0	0	3
10144CSE22	UNIX Internals	3	0	0	3
10144CSE23	Advanced Database Technology	3	0	0	3
10144CSE24	High Performance Microprocessors	3	0	0	3
10144CSE25	Knowledge Management	3	0	0	3
10144CSE26	Embedded Systems	3	0	0	3

SEMESTER VII – Elective III

CODE NO.	COURSE TITLE	L	T	P	C
10144CSE31	Resource Management Techniques	3	0	0	3
10144CSE32	Data Warehousing & Data Mining	3	0	0	3
10144CSE33	Real Time Systems	3	0	0	3
10144CSE34	TCP /IP Design & Implementation	3	0	0	3
10144CSE35	Natural Language Processing	3	0	0	3
10144CSE36	User Interface Design	3	0	0	3
10144CSE37	Service Oriented Architecture	3	0	0	3

SEMESTER VII – Elective IV

CODE NO.	COURSE TITLE	L	T	P	C
10144CSE41	Advanced Operating Systems	3	0	0	3
10144CSE42	C # and .NET Framework	3	0	0	3
10144CSE43	Wireless Network	3	0	0	3
10177GE004	Total Quality Management	3	0	0	3
10144CSE45	System Modeling & Simulation	3	0	0	3
10144CSE46	Cryptography and Network Security	3	0	0	3
10144CSE47	Network Programming Management	3	0	0	3

SEMESTER VIII – Elective V

CODE NO.	COURSE TITLE	L	T	P	C
10144CSE51	Graph Theory	3	0	0	3
10144CSE52	Software Quality Assurance	3	0	0	3
10144CSE53	Distributed Systems	3	0	0	3
10144CSE54	Knowledge Based Decision Support Systems	3	0	0	3
10144CSE55	Digital Signal Processing	3	0	0	3
10144CSE56	Digital Image Processing	3	0	0	3
10144CSE57	Bio Informatics	3	0	0	3
10144CSE58	Information Security	3	0	0	3
10177GE005	Professional Ethics AND Human Values	3	0	0	3

SEMESTER VIII – Elective VI

CODE NO.	COURSE TITLE	L	T	P	C
10177GE008	Indian Constitution & Society	3	0	0	3
10144CSE62	High Speed Networks	3	0	0	3
10144CSE63	Robotics	3	0	0	3
10144CSE64	Quantum Computing	3	0	0	3
10144CSE65	Grid Computing	3	0	0	3
10144CSE66	Agent Based Intelligent Systems	3	0	0	3
10144CSE67	Cloud Computing	3	0	0	3
10144CSE68	Bio Informatics Computing	3	0	0	3
10144CSE69	Software Project Management	3	0	0	3

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10177MA301 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS   3 1 0 4
        (*Common to all branches*)

OBJECTIVES

The course objective is to develop the skills of the students in the areas of Transforms and Partial Differential Equations. This will be necessary for their effective studies in a large number of engineering subjects like heat conduction, communication systems, electro-optics and electromagnetic theory. The course will also serve as a pre requisite for post graduate and specialized studies and research.

UNIT I FOURIER SERIES   9 + 3

Dirichlet's conditions – General Fourier series – Odd and even functions – Half range sine series – Half range cosine series – Complex form of Fourier Series – Parseval's identity – Harmonic Analysis.

UNIT II FOURIER TRANSFORMS   9 + 3

Fourier integral theorem (without proof) – Fourier transform pair – Sine and Cosine transforms – Properties – Transforms of simple functions – Convolution theorem– Parseval's identity.

UNIT III PARTIAL DIFFERENTIAL EQUATIONS   9 +3

Formation of partial differential equations – Lagrange's linear equation – Solutions of standard types of first order partial differential equations - Linear partial differential equations of second and higher order with constant coefficients.

UNIT IV APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS   9 + 3

Solutions of one dimensional wave equation – One dimensional equation of heat conduction – Steady state solution of two-dimensional equation of heat conduction(Insulated edges excluded) – Fourier series solutions in Cartesian coordinates.

UNIT V Z -TRANSFORMS AND DIFFERENCE EQUATIONS   9 + 3

Z-transforms - Elementary properties – Inverse Z-transform – Convolution theorem -Formation of difference equations – Solution of difference equations using Z-transform.

Lectures : 45 Tutorials : 15 Total : 60

TEXT BOOK

1. Grewal, B.S, *'Higher Engineering Mathematics'* 40th Edition, Khanna Publishers, New Delhi (2007)

REFERENCES

1. Bali.N.P and Manish Goyal *'A Textbook of Engineering Mathematics'*,   VII Edition, Laxmi Publications (P) Ltd. (2007)
2. Ramana.B.V. *'Higher Engineering Mathematics'* Tata Mc-Graw Hill Publishing Company limited, New Delhi (2007).
3. Glyn James, '*Advanced Modern Engineering Mathematics'*, Third edition-Pearson Education (2007).
4. Erwin Kreyszig *'Advanced Engineering Mathematics',* Eighth edition-Wiley India (2007).

10144CS302   DATA STRUCTURES   **3 0 0 3**

Aim: To master the design and applications of linear, tree, balanced tree, hashing, set, and graph structures.

Unit I Linear Structures   **9**

Abstract Data Types (ADT) – List ADT – array-based implementation – linked list implementation – cursor-based linked lists – doubly-linked lists – Circular linked lists - applications of lists –Stack ADT – Queue ADT – circular queue implementation – Applications of stacks and Queues

Unit II Tree Structures   **9**

Tree ADT – tree traversals – left child right sibling data structures for general trees –Binary Tree ADT – expression trees – applications of trees – binary search tree ADT –Threaded Binary Trees

Unit III Balanced Trees   **9**

AVL Trees – Splay Trees – B-Tree - heaps – binary heaps – applications of binary Heaps

Unit IV Hashing and Set   **9**

Hashing – Separate chaining – open addressing – rehashing – extendible hashing -Disjoint Set ADT – dynamic equivalence problem – smart union algorithms – path compression – applications of Set

Unit V Graphs   **9**

Definitions – Topological sort – breadth-first traversal - shortest-path algorithms –minimum spanning tree – Prim's and Kruskal's algorithms – Depth-first traversal – bi connectivity – Euler circuits – applications of graphs

                                                                          Total: 45

TEXT BOOK
1. M. A. Weiss, "Data Structures and Algorithm Analysis in C", Second Edition ,PearsonEducation,2005.

REFERENCES
1. A. V. Aho, J. E. Hopcroft, and J. D. Ullman, "Data Structures and Algorithms", Pearson Education, First Edition Reprint 2003.

2. R. F. Gilberg, B. A. Forouzan, "Data Structures", Second Edition, Thomson India Edition, 2005.

3. Thomas H Cormen, Charles E Leiserson, Ronald L Rivest and Clifford Stenin,   "Introduction to Algorithms – III Edition", PHI Learning, India – 2010

4. R. Krishnamoorthy, "Data structures using C", Tata Mc Graw Hill, Delhi, 2009

5. Samantha, "Classic Data structures", PHI Learning India, II Edition, 2010

10144CS303 DIGITAL PRINCIPLES AND SYSTEM DESIGN 3 1 0 4
(Common to CSE & IT)

AIM

To provide an in-depth knowledge of the design of digital circuits and the use of Hardware Description Language in digital system design.

OBJECTIVES

To understand different methods used for the simplification of Boolean functions
To design and implement combinational circuits
To design and implement synchronous sequential circuits
To design and implement asynchronous sequential circuits
To study the fundamentals of VHDL / Verilog HDL

UNIT I BOOLEAN ALGEBRA AND LOGIC GATES   8

Review of binary number systems - Binary arithmetic – Binary codes – Boolean algebra and theorems - Boolean functions – Simplifications of Boolean functions using Karnaugh map and tabulation methods – Implementation of Boolean functions using logic gates.

UNIT II COMBINATIONAL LOGIC   9

Combinational circuits – Analysis and design procedures - Circuits for arithmetic operations - Code conversion – Introduction to Hardware Description Language (HDL)

UNIT III DESIGN WITH MSI DEVICES   8

Decoders and encoders - Multiplexers and de multiplexers - Memory and programmable logic - HDL for combinational circuits

UNIT IV SYNCHRONOUS SEQUENTIAL LOGIC   10

Sequential circuits – Flip flops – Analysis and design procedures - State reduction and state assignment - Shift registers – Counters – HDL for Sequential Circuits.

UNIT V ASYNCHRONOUS SEQUENTIAL LOGIC   10

Analysis and design of asynchronous sequential circuits - Reduction of state and flow tables – Race-free state assignment – Hazards. ASM Chart.

TUTORIAL = 15 TOTAL : 60

TEXT BOOK
1.M.Morris Mano, "Digital Design", 3rd edition, Pearson Education, India - 2007.
REFERENCES
1. Charles H. Roth, Jr. "Fundamentals of Logic Design", 4th Edition, Jaico Publishing House, Cengage Earning, 5th ed, 2005.
2. Donald D. Givone, "Digital Principles and Design", Tata McGraw-Hill, 2007.
3. Samuel C Lee, "Digital circuits and logic design", PHI Learning India, 2009
4. V.Rajaram and T.Radha krishnan, "Digital Logic and Computer Organization", PHI Learning India, 2009

10144CS304 OBJECT-ORIENTED PROGRAMMING   3 0 0 3
(Common to CSE & IT)

Aim: To understand the concepts of object-oriented programming and master OOP using C++.

UNIT I   **9**

Object oriented programming concepts – objects – classes – methods and messages –abstraction and encapsulation – inheritance – abstract classes – polymorphism. Introduction to C++ – classes – access specifiers – function and data members – default arguments – function overloading – friend functions – const and volatile functions – static members – Objects – pointers and objects – constant objects – nested classes – local classes

UNIT II   **9**

Constructors – default constructor – Parameterized constructors – Constructor with dynamic allocation – copy constructor – destructors – operator overloading –overloading through friend functions – overloading the assignment operator – type conversion – explicit constructor

UNIT III   **9**

Function and class templates - Exception handling – try-catch-throw paradigm –exception specification – terminate and Unexpected functions – Uncaught exception.

UNIT IV   **9**

Inheritance – public, private, and protected derivations – multiple inheritance - virtual base class – abstract class – composite objects Runtime polymorphism – virtual functions – pure virtual functions – RTTI – type id – dynamic casting – RTTI and templates – cross casting – down casting .

UNIT V   **9**

Streams and formatted I/O – I/O manipulators - file handling – random access – object serialization – namespaces - std namespace – ANSI String Objects – standard template library.

Total: 45

TEXT BOOKS:

1. B. Trivedi, "Programming with ANSI C++", Oxford University Press, 2007.

REFERENCES:

1. Ira Pohl, "Object Oriented Programming using C++", Pearson Education, Second Edition Reprint 2004..
2. S. B. Lippman, Josee Lajoie, Barbara E. Moo, "C++ Primer", Fourth Edition Pearson Education, 2005.
3. B. Stroustrup, "The C++ Programming language", Third edition, Pearson Education, 2004.

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10144CS305 ANALOG AND DIGITAL COMMUNICATION   3 1 0 4

UNIT I FUNDAMENTALS OF ANALOG COMMUNICATION   9

Principles of amplitude modulation, AM envelope, frequency spectrum and band width, modulation index and percent modulation, AM Voltage distribution, AM power distribution, Angle modulation - FM and PM waveforms, phase deviation and modulation index, frequency deviation and percent modulation, frequency analysis of angle modulated waves. Bandwidth requirements for Angle modulated waves.

UNIT II DIGITAL COMMUNICATION   9

Introduction, Shannon limit for information capacity, digital amplitude modulation, frequency shift keying, FSK bit rate and baud, FSK transmitter, BW consideration of FSK, FSK receiver, phase shift keying – binary phase shift keying – QPSK, Quadrature Amplitude modulation, bandwidth efficiency, carrier recovery – squaring loop, Cost as loop, DPSK.

UNIT III DIGITAL TRANSMISSION   9

Introduction, Pulse modulation, PCM – PCM sampling, sampling rate, signal toquantization noise rate, companding – analog and digital – percentage error, deltamodulation, adaptive delta odulation,differential pulse code modulation, pulsetransmission – Inter symbol interference, eye patterns.

UNIT IV DATA COMMUNICATIONS   9

Introduction, History of Data communications, Standards Organizations for data communication, data communication circuits, data communication codes, Error control, Error Detection, Error correction, Data communication Hardware, serial and parallel interfaces, data modems, Asynchronous modem, synchronous modem, low-speed modem, medium and high speed modem, modem control.

UNIT V SPREAD SPECTRUM AND MULTIPLE ACCESS TECHNIQUES   9

Introduction, Pseudo-noise sequence, DS spread spectrum with coherent binary PSK, processing gain, FH spread spectrum, multiple access techniques – wireless communication, TDMA and CDMA in wireless communication systems, source coding of speech for wireless communications.

TUTORIAL: 15
TOTAL: 45 +15=60

TEXT BOOKS:

1. Wayne Tomasi, "Advanced Electronic Communication Systems", 6/e, Pearson Education, 2007.
2. Simon Haykin, "Communication Systems", 4th Edition, John Wiley & Sons., 2001.

REFERENCES:

1. H.Taub,D L Schilling ,G Saha ,"Principles of Communication"3/e,2007.
2. B.P.Lathi, "Modern Analog And Digital Communication systems", 3/e, Oxford University Press, 2007
3. Blake, "Electronic Communication Systems", Thomson Delmar Publications, 2002.
4. Martin S.Roden, "Analog and Digital Communication System", 3rd Edition, PHI,2002.
5. B.Sklar, "Digital Communication Fundamentals and Applications",2/e Pearson Education 2007.

10177GE001 ENVIRONMENTAL SCIENCE AND ENGINEERING 3 0 0 3

(Common to Civil, CSE, IT & Biomedical Degree Programmes)

AIM

The aim of this course is to create awareness in every engineering graduate about the importance of environment, the effect of technology on the environment and ecological balance and make them sensitive to the environment problems in every professional Endeavour that they participates.

OBJECTIVE

At the end of this course the student is expected to understand what constitutes the environment, what are precious resources in the environment, how to conserve these resources, what is the role of a human being in maintaining a clean environment and useful environment for the future generations and how to maintain ecological balance and preserve bio-diversity. The role of government and non-government organization in environment managements.

Unit I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY   14

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

Unit II ENVIRONMENTAL POLLUTION   8

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

Unit III NATURAL RESOURCES   10

Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging salinity, case studies – Energy resources: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for

sustainable lifestyles. Field study of local area to document environmental assets – river / forest / grassland /hill / mountain.

Unit IV SOCIAL ISSUES AND THE ENVIRONMENT 7

From unsustainable to sustainable development – urban problems related to energy –water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of nongovernmental organization- environmental ethics: Issues and possible solutions –climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products –environment production act – Air (Prevention and Control of Pollution) act – Water(Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.

Unit V HUMAN POPULATION AND THE ENVIRONMENT 6

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV /AIDS – women and child welfare – role of information technology in environment and human health – Case studies.

Total = 45

TEXT BOOKS

1. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, PHI Learning India, 2009.

2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, (2006).

REFERENCE BOOKS

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media.

2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.

3. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT LTD, New Delhi, 2007.

4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press (2005)

10144CS307   DIGITAL LABORATORY   0 0 3 2
(Common to CSE & IT)

LIST OF EXPERIMENTS

1. Verification of Boolean theorems using digital logic gates

2. Design and implementation of combinational circuits using basic gates for arbitrary functions, code converters, etc.

3. Design and implementation of 4-bit binary adder / subtractor using basic gates and MSI devices

4. Design and implementation of parity generator / checker using basic gates and MSI devices

5. Design and implementation of magnitude comparator

6. Design and implementation of application using multiplexers/De multiplexers

7. Design and implementation of Shift registers

8. Design and implementation of Synchronous and Asynchronous counters

9. Simulation of combinational circuits using Hardware Description Language (VHDL/ Verilog HDL software required)

10. Simulation of sequential circuits using HDL (VHDL/ Verilog HDL software required)

10144CS308 DATA STRUCTURES LAB   **0 0 3 2**

AIM:

To develop programming skills in design and implementation of data structures and

their applications.

1. Implement singly and doubly linked lists.

2. Represent a polynomial as a linked list and write functions for polynomial addition.

3. Implement stack and use it to convert infix to postfix expression

4. Implement a double-ended queue (de queue) where insertion and deletion operations are possible at

both the ends.

5. Implement an expression tree. Produce its pre-order, in-order, and post-order traversals.

6. Implement binary search tree.

7. Implement insertion in AVL trees.

8. Implement priority queue using binary heaps

9. Implement hashing with open addressing.

10. Implement Prim's algorithm using priority queues to find MST of an undirected graph.

Total: 45

10144CS309 OBJECT ORIENTED PROGRAMMING LAB   0 0 3 2
(Common to CSE & IT)

1. Design C++ classes with static members, methods with default arguments, friend functions. (For example, design matrix and vector classes with static allocation, and a friend function to do matrix-vector multiplication)

2. Implement complex number class with necessary operator over loadings and type conversions such as integer to complex, double to complex, complex to double etc.

3. Implement Matrix class with dynamic memory allocation and necessary methods. Give proper constructor, destructor, copy constructor, and overloading of assignment operator.

4. Overload the new and delete operators to provide custom dynamic allocation of memory.

5. Develop a template of linked-list class and its methods.

6. Develop templates of standard sorting algorithms such as bubble sort, insertion sort, merge sort, and quick sort.

7. Design stack and queue classes with necessary exception handling.

8. Define Point class and an Arc class. Define a Graph class which represents graph as a collection of Point objects and Arc objects. Write a method to find a minimum cost spanning tree in a graph.

9. Develop with suitable hierarchy, classes for Point, Shape, Rectangle, Square, Circle, Ellipse, Triangle, Polygon, etc. Design a simple test application to demonstrate dynamic polymorphism and RTTI.

10. Write a C++ program that randomly generates complex numbers (use previously designed Complex class) and writes them two per line in a file along with an operator (+, -, *, or /). The numbers are written to file in the format (a + ib). Write another program to read one line at a time from this file, perform the corresponding operation on the two complex numbers read, and write the result to another file (one per line).

10177PQ401 PROBABILITY AND QUEUEING THEORY 3 1 0 4

(Common to CSE & IT)

AIM

The probabilistic models are employed in countless applications in all areas of science and engineering. Queuing theory provides models for a number of situations that arise in real life. The course aims at providing necessary mathematical support and confidence to tackle real life problems.

OBJECTIVES

At the end of the course, the students would

> have a well – founded knowledge of standard distributions which can describe real life phenomena.
> Acquire skills in handling situations involving more than one random variable and functions of random variables.
> Understand and characterize phenomena which evolve with respect to time in a probabilistic manner.
> Be exposed to basic characteristic features of a queuing system and acquire skills in analyzing queuing models.

UNIT I   RANDOM VARIABLES   **9 + 3**

Discrete and continuous random variables - Moments - Moment generating functions and their properties. Binomial, Poisson ,Geometric ,Negative binomial, Uniform, Exponential, Gamma, and Weibull distributions .

UNIT II TWO DIMENSIONAL RANDOM VARIABLES   **9 + 3**

Joint distributions - Marginal and conditional distributions – Covariance - Correlation and regression - Transformation of random variables - Central limit theorem.

UNIT III MARKOV PROCESSES AND MARKOV CHAINS   **9 +3**

Classification - Stationary process - Markov process - Markov chains – Transition probabilities - Limiting distributions-Poisson process

UNIT IV QUEUEING THEORY   **9 + 3**

Markovian models – Birth and Death Queuing models- Steady state results: Single and multiple server queuing models- queues with finite waiting rooms- Finite source models-Little's Formula

UNIT V NON-MARKOVIAN QUEUES AND QUEUE NETWORKS   **9 + 3**

M/G/1 queue- Pollaczek- Khintchine formula, series queues- open and closed networks

TUTORIAL 15 TOTAL : 60

TEXT BOOKS

1. O.C. Ibe, "Fundamentals of Applied Probability and Random Processes", Elsevier, 1_{st} Indian Reprint, 2007 (For units 1, 2 and 3).
2. D. Gross and C.M. Harris, "Fundamentals of Queuing Theory", Wiley Student edition, 2004 (For units 4 and 5)

3. V.Sundarapandian, "Probability, statistics and Queuing theory", PHI Learning India, 2009

REFERENCES:

1. A.O. Allen, "Probability, Statistics and Queuing Theory with Computer Applications", Elsevier, 2nd Edition, 2005.

2. H.A. Taha, "Operations Research", Pearson Education, Asia, 8th Edition, 2007.

3. K.S. Trivedi, "Probability and Statistics with Reliability, Queuing and Computer Science Applications", PHI Learning India 2009.

10144CS402   DESIGN AND ANALYSIS OF ALGORITHMS   3 1 0 4

UNIT I   **9**

Algorithm Analysis – Time Space Tradeoff – Asymptotic Notations – Conditional asymptotic notation – Removing condition from the conditional asymptotic notation -Properties of big-Oh notation – Recurrence equations – Solving recurrence equations –Analysis of linear search.

UNIT II   **9**

Divide and Conquer: General Method – Binary Search – Finding Maximum and Minimum– Merge Sort – Greedy Algorithms: General Method – Container Loading – Knapsack Problem.

UNIT III   **9**

Dynamic Programming: General Method – Multistage Graphs – All-Pair shortest paths –Optimal binary search trees – 0/1 Knapsack – Traveling sales person problem .

UNIT IV   **9**

Backtracking: General Method – 8 Queens problem – sum of subsets – graph coloring –Hamiltonian problem – knapsack problem.

UNIT V   **9**

Graph Traversals – Connected Components – Spanning Trees – Bi connected components – Branch and Bound: General Methods (FIFO & LC) – 0/1 Knapsack problem – Introduction to NP-Hard and NP-Completeness.

TUTORIAL = 15 Total = 60

TEXT BOOK:

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Computer Algorithms/ C++, Second Edition, Universities Press, 2007. (For Units II to V)
2. K.S. Easwarakumar, Object Oriented Data Structures using C++, Vikas Publishing House pvt. Ltd., 2000 (For Unit I)

REFERENCES:

1. S K Basu, "Design methods and analysis of algorithms", PHI Learning India, 2010.

2. T. H. Cormen, C. E. Leiserson, R.L.Rivest, and C. Stein, "Introduction to Algorithms",Second Edition, PHI Learning India 2010.

3. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "The Design and Analysis of Computer Algorithms", Pearson Education, 1999.

3. Gills Brassard and Paul Bratley, Fundamentals of Algorithmics", PHI Learning India, 2010.

10144CS403   MICROPROCESSORS AND MICROCONTROLLERS   3 0 0 3
(Common to CSE & IT)

UNIT I THE 8085 AND 8086 MICROPROCESSORS   9
8085 Microprocessor architecture-Addressing modes- Instruction set-Programming the 8085

UNIT II 8086 SOFTWARE ASPECTS   9

Intel 8086 microprocessor - Architecture - Signals- Instruction Set-Addressing Modes-Assembler Directives- Assembly Language Programming-Procedures-Macros-Interrupts And Interrupt Service Routines-BIOS function calls.

UNIT III MULTIPROCESSOR CONFIGURATIONS   9

Coprocessor Configuration – Closely Coupled Configuration – Loosely Coupled Configuration –8087 Numeric Data Processor – Data Types – Architecture –8089 I/O Processor –Architecture Communication between CPU and IOP
.
UNIT IV I/O INTERFACING   9

Memory interfacing and I/O interfacing with 8085 – parallel communication interface –serial communication interface – timer-keyboard/display controller – interrupt controller –DMA controller (8237) – applications – stepper motor – temperature control.

UNIT V MICROCONTROLLERS   9

Architecture of 8051 Microcontroller – signals – I/O ports – memory – counters and timers – serial data I/O – interrupts-Interfacing -keyboard, LCD,ADC & DAC

TOTAL: 45

TEXT BOOKS

1. Ramesh S. Gaonkar ,"Microprocessor – Architecture, Programming and Applications with the 8085" Penram International Publisher , 5th Ed.,2006
2. Krishnakant, "Microprocessors and Microcontrollers, Programming and system design", PHI Learning India, 2010
2. Yn-cheng Liu,Glenn A.Gibson, "Microcomputer systems: The 8086 / 8088 Family architecture, Programming and Design", second edition, Prentice Hall of India , 2006 .
3. Kenneth J.Ayala, 'The 8051 microcontroller Architecture, Programming and applications' second edition ,Penram international.

REFERENCES:

1. Douglas V.Hall, " Microprocessors and Interfacing : Programming and Hardware", second edition , Tata Mc Graw Hill ,2006.
2. A.K.Ray & K.M Bhurchandi, "Advanced Microprocessor and Peripherals –Architecture, Programming and Interfacing", Tata Mc Graw Hill , 2006.
3. Peter Abel, " IBM PC Assembly language and programming" , fifth edition, Pearson education / Prentice Hall of India Pvt.Ltd,2007.
4. Mohamed Ali Mazidi,Janice Gillispie Mazidi," The 8051 microcontroller and embedded systems using Assembly and C", second edition, Pearson education /Prentice hall of India , 2007.

10144CS404 COMPUTER ORGANIZATION AND ARCHITECTURE 3 0 0 3
(Common to CSE & IT)

UNIT I BASIC STRUCTURE OF COMPUTERS 9

Functional units – Basic operational concepts – Bus structures – Performance and metrics – Instructions and instruction sequencing – Hardware – Software Interface –Instruction set architecture – Addressing modes – RISC – CISC. ALU design – Fixed point and floating point operations.

UNIT II BASIC PROCESSING UNIT 9

Fundamental concepts – Execution of a complete instruction – Multiple bus organization– Hardwired control – Micro programmed control – Nano programming.

UNIT III PIPELINING 9

Basic concepts – Data hazards – Instruction hazards – Influence on instruction sets –Data path and control considerations – Performance considerations – Exception handling.

UNIT IV MEMORY SYSTEM 9

Basic concepts – Semiconductor RAM – ROM – Speed – Size and cost – Cache memories – Improving cache performance – Virtual memory – Memory management requirements – Associative memories – Secondary storage devices.

UNIT V I/O ORGANIZATION 9

Accessing I/O devices – Programmed Input/Output -Interrupts – Direct Memory Access – Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB), I/O devices and processors.

TOTAL = 45

Text Book:

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, "Computer Organization", Fifth Edition, Tata McGraw Hill, 2002.

REFERENCES:

1. David A. Patterson and John L. Hennessy, "Computer Organization and Design: The Hardware / software interface", Third Edition, Elsevier, 2005.
2. William Stallings, "Computer Organization and Architecture – Designing forPerformance", Sixth Edition, Pearson Education, 2003.
3. John P. Hayes, "Computer Architecture and Organization", Third Edition, TataMcGraw Hill, 1998.
4. V.P. Heuring, H.F. Jordan, "Computer Systems Design and Architecture",Second Edition, Pearson Education, 2004.
5. P.Pal Chaudhuri, "Computer Organization and Design", PHI Learning, India 2010
6. V.Rajaraman and T. Radhakrishnan, "Computer Organization and architecture", PHI Learning India, 2009

10144CS405 OPERATING SYSTEMS   3 0 0 3
(Common to CSE & IT)

Aim: To learn the various aspects of operating systems such as process management, memory management, and I/O management

UNIT I PROCESSES AND THREADS   9

Introduction to operating systems – review of computer organization – operating system structures – system calls – system programs – system structure – virtual machines. Processes: Process concept – Process scheduling – Operations on processes –Cooperating processes – Inter process communication – Communication in client-server systems. Case study: IPC in Linux. Threads: Multi-threading models – Threading issues. Case Study: P threads library

UNIT II PROCESS SCHEDULING AND SYNCHRONIZATION   10

CPU Scheduling: Scheduling criteria – Scheduling algorithms – Multiple-processor scheduling – Real time scheduling – Algorithm Evaluation. Case study: Process scheduling in Linux.
Process Synchronization: The critical-section problem –Synchronization hardware – Semaphores – Classic problems of synchronization –critical regions – Monitors. Deadlock: System model – Deadlock characterization –Methods for handling deadlocks – Deadlock prevention – Deadlock avoidance – Deadlock detection – Recovery from deadlock.

UNIT III STORAGE MANAGEMENT   9

Memory Management: Background – Swapping – Contiguous memory allocation –Paging –Segmentation – Segmentation with paging. Virtual Memory: Background –Demand paging – Process creation – Page replacement – Allocation of frames –Thrashing. Case Study: Memory management in Linux

UNIT IV FILE SYSTEMS   9

File-System Interface: File concept – Access methods – Directory structure – File system mounting – Protection. File-System Implementation : Directory implementation –Allocation methods – Free-space management – efficiency and performance – recovery– log-structured file systems. Case studies: File system in Linux – file system in Windows XP

UNIT V I/O SYSTEMS   8

I/O Systems – I/O Hardware – Application I/O interface – kernel I/O subsystem –streams – performance. Mass-Storage Structure: Disk scheduling – Disk management –Swap-space management – RAID – disk attachment – stable storage – tertiary storage. Case study: I/O in Linux

Total: 45

TEXT BOOK:

1. Silberschatz, Galvin, and Gagne, "Operating System Concepts", Sixth Edition, Wiley India Pvt Ltd, 2003.

REFERENCES:

1. Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, PHI Learning India, 2010.
2. Gary Nutt, "Operating Systems", Third Edition, Pearson Education, 2004.
3. Harvey M. Deital, "Operating Systems", Third Edition, Pearson Education, 2004.

10144CS406 DATABASE MANAGEMENT SYSTEMS 3 0 0 3
(Common to CSE & IT)

UNIT I INTRODUCTION 9

Purpose of Database System -– Views of data – Data Models – Database Languages —Database System Architecture – Database users and Administrator – Entity–Relationship model (E-R model) – E-R Diagrams -- Introduction to relational databases

UNIT II RELATIONAL MODEL 9

The relational Model – The catalog- Types– Keys - Relational Algebra – Domain Relational Calculus – Tuple Relational Calculus - Fundamental operations – Additional Operations- SQL fundamentals - Integrity – Triggers - Security – Advanced SQLfeatures –Embedded SQL– Dynamic SQL- Missing Information– Views – Introduction to Distributed Databases and Client/Server Databases

UNIT III DATABASE DESIGN 9

Functional Dependencies – Non-loss Decomposition – Functional Dependencies – First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form-Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form

UNIT IV TRANSACTIONS 9

Transaction Concepts - Transaction Recovery – ACID Properties – System Recovery – Media Recovery – Two Phase Commit - Save Points – SQL Facilities for recovery –Concurrency – Need for Concurrency – Locking Protocols – Two Phase Locking –Intent Locking – Deadlock- Serializability – Recovery Isolation Levels – SQL Facilities for Concurrency**.**

UNIT V IMPLEMENTATION TECHNIQUES 9

Overview of Physical Storage Media – Magnetic Disks – RAID – Tertiary storage – File Organization – Organization of Records in Files – Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing –Query Processing Overview – Catalog Information for Cost Estimation – Selection Operation – Sorting – Join Operation – Database Tuning.

TOTAL = 45

TEXT BOOKS
1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", Fifth Edition, Tata McGraw Hill, 2006 (Unit I and Unit-V) .
2. C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.(Unit II, III and IV)

REFERENCES
1. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Fourth Edition , Pearson / Addision wesley, 2007.
2. Raghu Ramakrishnan, "Database Management Systems", Third Edition, McGraw Hill, 2003.
3. S.K.Singh, "Database Systems Concepts, Design and Applications", First Edition, Pearson Education, 2006.

10144CS407 OPERATING SYSTEMS LAB 0 0 3 2
(Common to CSE & IT)

(Implement the following on LINUX or other Unix like platform. Use C for high level language implementation)

1. Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close, stat, opendir, readdir

2. Write programs using the I/O system calls of UNIX operating system (open, read,write, etc)

3. Write C programs to simulate UNIX commands like ls, grep, etc.

4. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2 sessions)

5. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2 sessions)

6. Developing Application using Inter Process communication (using shared memory, pipes or message queues)

7. Implement the Producer – Consumer problem using semaphores (using UNIX system calls).

8. Implement some memory management schemes – I

9. Implement some memory management schemes – II

10. Implement any file allocation technique (Linked, Indexed or Contiguous)

Example for exercises 8 & 9 :

Free space is maintained as a linked list of nodes with each node having the starting byte address and the ending byte address of a free block. Each memory request consists of the process-id and the amount of storage space required in bytes. Allocated memory space is again maintained as a linked list of nodes with each node having the process-id, starting byte address and the ending byte address of the allocated space. When a process finishes (taken as input) the appropriate node from the allocated list

should be deleted and this free disk space should be added to the free space list. [Care should be taken to merge contiguous free blocks into one single block. This results in deleting more than one node from the free space list and changing the start and end address in the appropriate node]. For allocation use first fit, worst fit and best fit.

10144CS408 DATA BASE MANAGEMENT SYSTEMS LAB   0 0 3 2

(Common to CSE & IT)

1. Data Definition, Table Creation, Constraints,

2. Insert, Select Commands, Update & Delete Commands.

3. Nested Queries & Join Queries

4. Views

5. High level programming language extensions (Control structures, Procedures and

Functions).

6. Front end tools

7. Forms

8. Triggers

9. Menu Design

10. Reports.

11..Database Design and implementation (Mini Project).

10144CS409 MICROPROCESSORS LABORATORY   0 0 3 2

(Common to CSE & IT)

AIM:

To learn the assembly language programming of 8085,8086 and 8051 and also to give a practical training of interfacing the peripheral devices with the processor.

OBJECTIVES:

To implement the assembly language programming of 8085,8086 and 8051.

 To study the system function calls like BIOS/DOS.

 To experiment the interface concepts of various peripheral device with the processor.

Experiments in the following:

1. Programming with 8085

2. Programming with 8086-experiments including BIOS/DOS calls: Keyboard control, Display, File Manipulation.

3. Interfacing with 8085/8086-8255,8253

4. Interfacing with 8085/8086-8279,8251

5. 8051 Microcontroller based experiments for Control Applications

6. Mini- Project

TOTAL: 45 PERIODS

List of equipments/components for 30 students (two per batch)

1. 8085 Trainer Kit with onboard 8255, 8253, 8279 and 8251 – 15 nos.

2. TASM/MASM simulator in PC (8086 programs) – 30 nos.

3. 8051 trainer kit – 15 nos.

4. Interfacing with 8086 – PC add-on cards with 8255, 8253, 8279 and 8251 – 15nos.

5. Stepper motor interfacing module – 5 nos.

6. Traffic light controller interfacing module – 5 nos.

7. ADC, DAC interfacing module – 5 nos.

8. CRO's – 5 nos.

10144CS501   **DISCRETE MATHEMATICS**   **3 1 0 4**

AIM

To extend student's Logical and Mathematical maturity and ability to deal with abstraction and to introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems.

OBJECTIVES

At the end of the course, students would (i) Have knowledge of the concepts needed to test the logic of a program. (ii) Have an understanding in identifying structures on many levels.(iii)Be aware of a class of functions which transform a finite set into another finite set which relates to input output functions in computer science.(iv) Be aware of the counting principles (v)Be exposed to concepts and properties of algebraic structures such as semi groups, monoids and groups.

UNIT I LOGIC AND PROOFS   **9 + 3**

Propositional Logic – Propositional equivalences-Predicates a
nd quantifiers-Nested Quantifiers-Rules of inference-introduction to Proofs-Proof Methods and strategy

UNIT II COMBINATORICS   **9+3**

Mathematical inductions-Strong induction and well ordering-.The basics of counting-The pigeon hole principle –Permutations and combinations-Recurrence relations-Solving Linear recurrence relations-generating functions-inclusion and exclusion and applications.

UNIT III GRAPHS   **9 + 3**

Graphs and graph models-Graph terminology and special types of graphs-Representing graphs and graph isomorphism -connectivity-Euler and Hamilton paths

UNIT IV ALGEBRAIC STRUCTURES   **9 + 3**

Algebraic systems-Semi groups and monoids-Groups-Subgroups and homo morphisms- Cosets and Lagrange's theorem- Ring & Fields (Definitions and examples)

UNIT V LATTICES AND BOOLEAN ALGEBRA   **9 +3**

Partial ordering-Posets-Lattices as Posets- Properties of lattices-Lattices as Algebraic systems –Sub lattices –direct product and Homomorphism-Some Special lattices- Boolean Algebra

L: 45, T: 15, TOTAL= 60 PERIODS

TEXT BOOKS:
1. Kenneth H.Rosen, "Discrete Mathematics and its Applications", Special Indian edition, Tata McGraw-Hill Pub. Co. Ltd., New Delhi, (2007). (For the units 1 to 3,Sections 1.1 to 1.7 , 4.1 & 4.2, 5.1 to 5.3, 6.1, 6.2, 6.4 to 6.6, 8.1 to 8.5)
2. Trembly J.P and Manohar R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw–Hill Pub. Co. Ltd, New Delhi, 30th Re-print (2007).
(For units 4 & 5 , Sections 2-3.8 & 2-3.9,3-1,3-2 & 3-5, 4-1 & 4-2)
3. Chandrasekaran and UmaParvathi, "Discrete mathematics", PHI Learning India, 2010

25

REFERENCES:

1. Ralph. P. Grimaldi, "Discrete and Combinatorial Mathematics: An Applied Introduction", Fourth Edition, Pearson Education Asia, Delhi, (2002).

2. Thomas Koshy, "Discrete Mathematics with Applications", Elsevier Publications,(2006).

3. Seymour Lipschutz and Mark Lipson, "Discrete Mathematics", Schaum's Outlines, Tata McGraw-Hill Pub. Co. Ltd., New Delhi, Second edition, (2007).

10144CS502 SOFTWARE ENGINEERING   **3 0 0 3**

UNIT I SOFTWARE PRODUCT AND PROCESS   **9**

Introduction – S/W Engineering Paradigm – Verification – Validation – Life Cycle Models – System Engineering – Computer Based System – Business Process Engineering Overview – Product Engineering Overview.

UNIT II SOFTWARE REQUIREMENTS   **9**

Functional and Non-Functional – Software Document – Requirement Engineering Process – Feasibility Studies – Software Prototyping – Prototyping in the Software Process – Data – Functional and Behavioral Models – Structured Analysis and Data Dictionary.

UNIT III ANALYSIS, DESIGN CONCEPTS AND PRINCIPLES   **9**

Systems Engineering - Analysis Concepts - Design Process And Concepts – Modular Design – Design Heuristic – Architectural Design – Data Design – User Interface Design – Real Time Software Design – System Design – Real Time Executives – Data Acquisition System – Monitoring And Control System.

UNIT IV TESTING   **9**

Taxonomy Of Software Testing – Types Of S/W Test – Black Box Testing – Testing Boundary Conditions – Structural Testing – Test Coverage Criteria Based On Data Flow Mechanisms – Regression Testing – Unit Testing – Integration Testing – Validation Testing – System Testing And Debugging – Software Implementation Techniques

UNIT V SOFTWARE PROJECT MANAGEMENT   **9**

Measures And Measurements – ZIPF's Law – Software Cost Estimation – Function Point Models – COCOMO Model – Delphi Method – Scheduling – Earned Value Analysis – Error Tracking – Software Configuration Management – Program Evolution Dynamics – Software Maintenance – Project Planning – Project Scheduling– Risk Management – CASE Tools

                                                                    Total : 45

TEXT BOOKS:
1. Ian Sommerville, "Software engineering", Seventh Edition, Pearson Education Asia, 2007.

2. Roger S. Pressman, "Software Engineering – A practitioner's Approach", Sixth Edition, McGraw-Hill International Edition, 2005.

REFERENCES

1. Watts S.Humphrey,"A Discipline for Software Engineering", Pearson Education,2007.
2. James F.Peters and Witold Pedrycz,"Software Engineering, An Engineering Approach", Wiley-India, 2007.
3. Stephen R.Schach, " Software Engineering", Tata McGraw-Hill Publishing Company Limited, 2007.
4. S.A.Kelkar,"Software Engineering", Prentice Hall of India Pvt, 2007.

10144CS503 COMPUTER NETWORKS   3 0 0 3

UNIT I   **9**

Network architecture – layers – Physical links – Channel access on links – Hybrid multiple access techniques - Issues in the data link layer - Framing – Error correction and detection – Link-level Flow Control

UNIT II   **9**

Medium access – CSMA – Ethernet – Token ring – FDDI - Wireless LAN – Bridges and Switches

UNIT III   **9**

Circuit switching vs. packet switching / Packet switched networks – IP – ARP – RARP –DHCP – ICMP – Queueing discipline – Routing algorithms – RIP – OSPF – Subnetting– CIDR – Interdomain routing – BGP – Ipv6 – Multicasting – Congestion avoidance in network layer

UNIT IV   **9**

UDP – TCP – Adaptive Flow Control – Adaptive Retransmission - Congestion control –Congestion avoidance – QoS

UNIT V   **9**

Email (SMTP, MIME, IMAP, POP3) – HTTP – DNS- SNMP – Telnet – FTP – Security –PGP – SSH

TOTAL= 45 PERIODS

TEXT BOOK:

1. Larry L. Peterson, Bruce S. Davie, "Computer Networks: A Systems Approach", Fourth Edition, Morgan Kauffmann Publishers Inc., 2009, Elsevier.

REFERENCES:

1. James F. Kuross, Keith W. Ross, "Computer Networking, A Top-Down Approach Featuring the Internet", Third Edition, Addison Wesley, 2004.

2. Nader F. Mir, "Computer and Communication Networks", Pearson Education, 2007

3. Comer, "Computer Networks and Internets with Internet Applications", Fourth Edition, Pearson Education, 2005.

4. Andrew S. Tanenbaum, "Computer Networks", Sixth Edition, 2003, PHI Learning.

5. William Stallings, "Data and Computer Communication", Sixth Edition, Pearson Education, 2000

6. P.C.Gupta, "Data communications and Computer Networks", PHI Learning India, 2008

10144CS504   **THEORY OF COMPUTATION**   **3 1 0 4**

UNIT I AUTOMATA   9

Introduction to formal proof – Additional forms of proof – Inductive proofs –Finite Automata (FA) – Deterministic Finite Automata (DFA) – Non-deterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions.

UNIT II REGULAR EXPRESSIONS AND LANGUAGES   9

Regular Expression – FA and Regular Expressions – Proving languages not to be regular – Closure properties of regular languages – Equivalence and minimization of Automata.

UNIT III CONTEXT-FREE GRAMMARS AND LANGUAGES   9

Context-Free Grammar (CFG) – Parse Trees – Ambiguity in grammars and languages –Definition of the Pushdown automata – Languages of a Pushdown Automata –Equivalence of Pushdown automata and CFG– Deterministic Pushdown Automata.

UNIT IV PROPERTIES OF CONTEXT-FREE LANGUAGES   9

Normal forms for CFG – Pumping Lemma for CFL – Closure Properties of CFL – Turing Machines – Programming Techniques for TM.

UNIT V UNDECIDABALITY   9

A language that is not Recursively Enumerable (RE) – An undecidable problem that is RE – Undecidable problems about Turing Machine – Post's Correspondence Problem – The classes P and NP.

L: 45, T: 15, TOTAL= 60 PERIODS

TEXT BOOK

1. J.E. Hopcroft, R. Motwani and J.D. Ullman, "Introduction to Automata Theory, Languages and Computations", Second Edition, Pearson Education, 2007.
2. Mishra and Chandrasekaran, "Theory of Computer Science – Automata, Languages and Computation", Third Edition, PHI Learning India, 2009

REFERENCES:

1. H.R. Lewis and C.H. Papadimitriou, "Elements of the theory of Computation", Second Edition, Pearson Education, 2003.
2. Thomas A. Sudkamp," An Introduction to the Theory of Computer Science, Languages and Machines", Third Edition, Pearson Education, 2007.
3. Raymond Greenlaw an H.James Hoover, " Fundamentals of Theory of Computation, Principles and Practice", Morgan Kaufmann Publishers, 1998.
4. Micheal Sipser, "Introduction of the Theory and Computation", Thomson Brokecole,1997.
5. J. Martin, "Introduction to Languages and the Theory of computation" Third Edition, Tata Mc Graw Hill, 2007

10144CS505   SYSTEM SOFTWARE   3 1 0 4

AIM
To have an understanding of foundations of design of assemblers, loaders, linkers, and macro processors.

OBJECTIVES
 To understand the relationship between system software and machine architecture.
 To know the design and implementation of assemblers
 To know the design and implementation of linkers and loaders.
 To have an understanding of macro processors.
 To have an understanding of system software tools.

UNIT I INTRODUCTION   8

System software and machine architecture – The Simplified Instructional Computer (SIC) - Machine architecture - Data and instruction formats - addressing modes -instruction sets - I/O and programming.

UNIT II ASSEMBLERS   10

Basic assembler functions **-** A simple SIC assembler – Assembler algorithm and data structures - Machine dependent assembler features **-** Instruction formats and addressing modes – Program relocation - Machine independent assembler features - Literals –Symbol-defining statements – Expressions - One pass assemblers and Multi pass assemblers - Implementation example - MASM assembler.

UNIT III LOADERS AND LINKERS   9

Basic loader functions **-** Design of an Absolute Loader – A Simple Bootstrap Loader - Machine dependent loader features - Relocation – Program Linking – Algorithm and Data Structures for Linking Loader - Machine-independent loader features **–** Automatic Library Search – Loader Options - Loader design options - Linkage Editors – Dynamic Linking – Bootstrap Loaders - Implementation example - MSDOS linker.

UNIT IV MACRO PROCESSORS   9

Basic macro processor functions - Macro Definition and Expansion – Macro Processor Algorithm and data structures - Machine-independent macro processor features -Concatenation of Macro Parameters – Generation of Unique Labels – Conditional Macro Expansion – Keyword Macro Parameters-Macro within Macro-Implementation example - MASM Macro Processor – ANSI C Macro language.

UNIT V SYSTEM SOFTWARE TOOLS   9

Text editors - Overview of the Editing Process - User Interface – Editor Structure. - Interactive debugging systems **-** Debugging functions and capabilities – Relationship with other parts of the system – User-Interface Criteria.

                                          L: 45, T: 15, TOTAL= 60 PERIODS

TEXT BOOK
1. Leland L. Beck, "System Software – An Introduction to Systems Programming", 3rd Edition, Pearson Education Asia, 2006.

REFERENCES
1. D. M. Dhamdhere, "Systems Programming and Operating Systems", Second Revised Edition, Tata McGraw-Hill, 2000.

2. John J. Donovan "Systems Programming", Tata McGraw-Hill Edition, 2000.

3. John R. Levine, Linkers & Loaders – Harcourt India Pvt. Ltd., Morgan Kaufmann Publishers, 2000.

10144CS506   PROGRAMMING PARADIGMS WITH JAVA   3 0 0 3

AIM:
To understand the concepts of object-oriented, event driven, and concurrent programming paradigms and develop skills in using these paradigms using Java.

UNIT I OBJECT-ORIENTED PROGRAMMING – FUNDAMENTALS   9

Review of OOP - Objects and classes in Java – defining classes – methods – access specifiers – static members – constructors – finalize method – Arrays – Strings - Packages – JavaDoc comments

UNIT II OBJECT-ORIENTED PROGRAMMING – INHERITANCE   10

Inheritance – class hierarchy – polymorphism – dynamic binding – final keyword – abstract classes – the Object class – Reflection – interfaces – object cloning – inner classes – proxies
UNIT III EVENT-DRIVEN PROGRAMMING   10

Graphics programming – Frame – Components – working with 2D shapes – Using color, fonts, and images - Basics of event handling – event handlers – adapter classes – actions – mouse events – AWT event hierarchy – introduction to Swing – Model-View-Controller design pattern – buttons – layout management – Swing Components

UNIT IV GENERIC PROGRAMMING   8

Motivation for generic programming – generic classes – generic methods – generic code and virtual machine – inheritance and generics – reflection and generics – exceptions –exception hierarchy – throwing and catching exceptions – Stack Trace Elements -assertions – logging

UNIT V MULTI THREADED PROGRAMMING   8

Multi-threaded programming – interrupting threads – thread states – thread properties –thread synchronization – thread-safe Collections – Executors – synchronizers – threads and event-driven programming

                TOTAL=45 PERIODS
TEXT BOOK
1.Cay S. Horstmann and Gary Cornell, "Core Java: Volume I – Fundamentals", Eighth Edition, Sun Microsystems Press, 2008.
2.Paul Deitel and Harvey Deitel, "Java – How to Program", Eighth Edition, PHI Learning India, 2010

REFERENCES

1. K. Arnold and J. Gosling, "The JAVA programming language", Third edition, Pearson Education, 2000.
2. Timothy Budd, "Understanding Object-oriented programming with Java", Updated Edition, Pearson Education, 2000.
3. C. Thomas Wu, "An introduction to Object-oriented programming with Java", Fourth Edition, Tata McGraw-Hill Publishing company Ltd., 2006.

10144CS507   **NETWORK LAB**   **0 0 3 2**

1. Programs using TCP Sockets (like date and time server & client, echo server & client, etc..)

2. Programs using UDP Sockets (like simple DNS)

3. Programs using Raw sockets (like packet capturing and filtering)

4. Programs using RPC

5. Simulation of sliding window protocols Experiments using simulators (like OPNET)

6. Performance comparison of MAC protocols

7. Implementing Routing Protocols

8. Performance comparison of Routing protocols

9. Study of UDP performance

10. Study of TCP performance.

10144CS508   **SYSTEM SOFTWARE LAB**   **0 0 3 2**

(Using C)

1. Implement a symbol table with functions to create, insert, modify, search, and display.

2. Implement pass one of a two pass assembler.

3. Implement pass two of a two pass assembler.

4. Implement a single pass assembler.

5. Implement a two pass macro processor

6. Implement a single pass macro processor.

7. Implement an absolute loader.

8. Implement a relocating loader.

9. Implement pass one of a direct-linking loader.

10. Implement pass two of a direct-linking loader.

11. Implement a simple text editor with features like insertion / deletion of a character,word, and entence.

12. Implement a symbol table with suitable hashing

(For loader exercises, output the snap shot of the main memory as it would be, after the

loading has taken place)

                                            TOTAL=45 PERIODS

10144CS509   JAVA PROGRAMMING LAB   0 0 3 2

1. Develop Rational number class in Java. Use JavaDoc comments for documentation. Your implementation should use efficient representation for a rational number, i.e.(500 / 1000) should be represented as (½).

2. Develop Date class in Java similar to the one available in java.util package. Use JavaDoc comments.

3. Implement Lisp-like list in Java. Write basic operations such as 'car', 'cdr', and 'cons'. If L is a list [3, 0, 2, 5], L.car() returns 3, while L.cdr() returns [0,2,5].

4. Design a Java interface for ADT Stack. Develop two different classes that implement this interface, one using array and the other using linked-list. Provide necessary exception handling in both the implementations.

5. Design a Vehicle class hierarchy in Java. Write a test program to demonstrate polymorphism.

6. Design classes for Currency, Rupee, and Dollar. Write a program that randomly generates Rupee and Dollar objects and write them into a file using object serialization. Write another program to read that file, convert to Rupee if it reads a Dollar, while leave the value as it is if it reads a Rupee.

7. Design a scientific calculator using event-driven programming paradigm of Java.

8. Write a multi-threaded Java program to print all numbers below 100,000 that are both prime and fibonacci number (some examples are 2, 3, 5, 13, etc.). Design a thread that generates prime numbers below 100,000 and writes them into a pipe.

Design another thread that generates fibonacci numbers and writes them to another pipe. The main thread should read both the pipes to identify numbers common to both.

9. Develop a simple OPAC system for library using even-driven and concurrent programming paradigms of Java. Use JDBC to connect to a back-end database.

10. Develop multi-threaded echo server and a corresponding GUI client in Java.

11. [Mini-Project] Develop a programmer's editor in Java that supports syntax highlighting, compilation support, debugging support, etc.

TOTAL= 45 PERIODS

10144CS601   ARTIFICIAL INTELLIGENCE   3 0 0 3

AIM:

To learn the basics of designing intelligent agents that can solve general purpose problems, represent and process knowledge, plan and act, reason under uncertainty and can learn from experiences

UNIT I PROBLEM SOLVING   9

Introduction – Agents – Problem formulation – uninformed search strategies – heuristics – informed search strategies – constraint satisfaction

UNIT II LOGICAL REASONING   9

Logical agents – propositional logic – inferences – first-order logic – inferences in first order logic – forward chaining – backward chaining – unification – resolution

UNIT III PLANNING   9

Planning with state-space search – partial-order planning – planning graphs – planning and acting in the real world

UNIT IV UNCERTAIN KNOWLEDGE AND REASONING   9

Uncertainty – review of probability - probabilistic Reasoning – Bayesian networks – inferences in Bayesian networks – Temporal models – Hidden Markov models

UNIT V LEARNING   9

Learning from observation - Inductive learning – Decision trees – Explanation based learning – Statistical Learning methods - Reinforcement Learning

                                                TOTAL: 45PERIODS

TEXT BOOK

1. S. Russel and P. Norvig, "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Education, 2003.

REFERENCES

1. David Poole, Alan Mack worth, Randy Goebel, "Computational Intelligence : a logical approach", Oxford University Press, 2004.

2. G. Luger, "Artificial Intelligence: Structures and Strategies for complex problem solving", Fourth Edition, Pearson Education, 2002.

3. J. Nilsson, "Artificial Intelligence: A new Synthesis", Elsevier Publishers, 1998.

4. R.B.Mishra, "Artificial Intelligence", PHI Learning India, 2011

Smile

10144CS602 PRINCIPLES OF COMPILER DESIGN   3 0 2 4

UNIT I   LEXICAL ANALYSIS   9

Introduction to Compiling- Compilers-Analysis of the source program-The phases- Cousins-The grouping of phases-Compiler construction tools. The role of the lexical analyzer- Input buffering-Specification of tokens-Recognition of tokens-A language for specifying lexical analyzer.

UNIT II SYNTAX ANALYSIS and RUN-TIME ENVIRONMENTS   9

Syntax Analysis- The role of the parser-Context-free grammars-Writing a grammar-Top down parsing-Bottom-up Parsing-LR parsers-Constructing an SLR(1) parsing table. Type Checking- Type Systems-Specification of a simple type checker. Run-Time Environments-Source language issues-Storage organization-Storage-allocation strategies.

UNIT III INTERMEDIATE CODE GENERATION   9

Intermediate languages-Declarations-Assignment statements - Boolean expressions- Case statements-Back patching-Procedure calls

UNIT IV CODE GENERATION   9

Issues in the design of a code generator- The target machine-Run-time storage management-Basic blocks and flow graphs- Next-use information-A simple code generator-Register allocation and assignment-The dag representation of basic blocks - Generating code from dags.

UNIT V   CODE OPTIMIZATION   9

Introduction-The principle sources of optimization-Peephole optimization- Optimization of basic blocks-Loops in flow graphs- Introduction to global data-flow analysis-Code improving transformations.

**   TOTAL: 75 PERIODS**

TEXT BOOK

1. Alfred V. Aho, Ravi Sethi Jeffrey D. Ullman, "Compilers- Principles, Techniques, and Tools", Pearson Education Asia, 2007.

REFERENCES

1. David Galles, "Modern Compiler Design", Pearson Education Asia, 2007

2. Steven S. Muchnick, "Advanced Compiler Design & Implementation", Morgan Kaufmann Publishers, 2000.

3. C. N. Fisher and R. J. LeBlanc "Crafting a Compiler with C", Pearson Education, 2000.

4. Allen I Holub, " Compiler Design in C", PHI Learning India, 2010

5. Vinu V Das, "Compiler Design using FLEX and YACC", PHI Learning India, 2008

10144CS603 OBJECT ORIENTED ANALYSIS AND DESIGN   3 0 0 3

OBJECTIVES:
1. To learn basic OO analysis and design skills through an elaborate case study
2. To use the UML design diagrams
3. To apply the appropriate design patterns

UNIT I   **9**
Introduction to OOAD – What is OOAD? – What is UML? What are the United process(UP) phases - Case study – the Next Gen POS system, Inception -Use case Modeling - Relating Use cases – include, extend and generalization.

UNIT II   **9**
Elaboration - Domain Models - Finding conceptual classes and description classes – Associations – Attributes – Domain model refinement – Finding conceptual class hierarchies- Aggregation and Composition- UML activity diagrams and modeling

UNIT III   **9**
System sequence diagrams - Relationship between sequence diagrams and use cases Logical architecture and UML package diagram – Logical architecture refinement – UML class diagrams - UML interaction diagrams

UNIT IV   **9**
GRASP: Designing objects with responsibilities – Creator – Information expert – Low Coupling – controller – High Cohesion – Designing for visibility - Applying GoF design patterns – adapter, singleton, factory and observer patterns.

UNIT V   **9**
UML state diagrams and modeling - Operation contracts- Mapping design to code –UML deployment and component diagrams

                                                                                          TOTAL: 45 PERIODS

TEXT BOOK :

1.Craig Larman," Applying UML and Patterns: An Introduction to object-oriented Analysis and Design and iterative development", Third Edition, Pearson Education, 2005

2. Mahesh P Matha, Object Oriented Analysis and Design using UML", PHI Learning India, 2010

REFERENCES:

1. Mike O'Docherty, "Object-Oriented Analysis & Design: Understanding System Development with UML 2.0", John Wiley & Sons, 2005.

2. James W- Cooper, Addison-Wesley, "Java Design Patterns – A Tutorial", 2000.
3. Micheal Blaha, James Rambaugh, "Object-Oriented Modeling and Design with UML", Second Edition, Prentice Hall of India Private Limited, 2007

4. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, **"**Design patterns: Elements of Reusable object-oriented software", Addison-Wesley, 1995.

10144CS604   ADVANCED COMPUTER ARCHITECTURE   3 0 0 3

UNIT I INSTRUCTION LEVEL PARALLELISM   9

ILP – Concepts and challenges – Hardware and software approaches – Dynamic scheduling – Speculation - Compiler techniques for exposing ILP – Branch prediction.

UNIT II MULTIPLE ISSUE PROCESSORS   9

VLIW & EPIC – Advanced compiler support – Hardware support for exposing parallelism – Hardware versus software speculation mechanisms – IA 64 and Itanium processors –
Limits on ILP.

UNIT III MULTIPROCESSORS AND THREAD LEVEL PARALLELISM   9

Symmetric and distributed shared memory architectures – Performance issues –Synchronization – Models of memory consistency – Introduction to Multithreading.

UNIT IV MEMORY AND I/O   9

Cache performance – Reducing cache miss penalty and miss rate – Reducing hit time –Main memory and performance – Memory technology. Types of storage devices –Buses – RAID – Reliability, availability and dependability – I/O performance measures –Designing an I/O system.

UNIT V MULTI-CORE ARCHITECTURES   9

Software and hardware multithreading – SMT and CMP architectures – Design issues –Case studies – Intel Multi-core architecture – SUN CMP architecture – heterogeneous multi-core processors – case study: IBM Cell Processor.

TOTAL: 45 PERIODS

TEXT BOOKS

1. John L. Hennessey and David A. Patterson, " Computer architecture – A quantitative approach", Morgan Kaufmann / Elsevier Publishers, 4th. edition, 2007.

REFERENCES

1. David E. Culler, Jaswinder Pal Singh, "Parallel computing architecture: A hardware/software approach" , Morgan Kaufmann /Elsevier Publishers, 1999.

2. Kai Hwang and Zhi.Wei Xu, "Scalable Parallel Computing", Tata McGraw Hill, New Delhi, 2003.

10144CS607 **OOAD LAB** **0 0 3 2**

OBJECTIVE: To develop a mini-project following the 12 exercises listed below.

1. To develop a problem statement.
2. Develop an IEEE standard SRS document. Also develop risk management and project plan (Gantt chart).
3. Identify Use Cases and develop the Use Case model.
4. Identify the business activities and develop an UML Activity diagram.
5. Identity the conceptual classes and develop a domain model with UML Class diagram.
6. Using the identified scenarios find the interaction between objects and represent them using UML Interaction diagrams.
7. Draw the State Chart diagram.
8. Identify the User Interface, Domain objects, and Technical services. Draw the partial layered, logical architecture diagram with UML package diagram notation.
9. Implement the Technical services layer.
10. Implement the Domain objects layer.
11. Implement the User Interface layer.
12. Draw Component and Deployment diagrams.

Suggested domains for Mini-project.
1. Passport automation system.
2. Book bank
3. Exam Registration
4. Stock maintenance system.
5. Online course reservation system
6. E-ticketing
7. Software personnel management system
8. Credit card processing
9. e-book management system
10. Recruitment system
11. Foreign trading system
12. Conference Management System
13. BPO Management System

Suggested Software Tools

Argo UML, Eclipse IDE, Visual Paradigm, Visual case, and Rational Suite

TOTAL: 45 PERIODS

Requirement for a batch of 30 students
S. No. Description of Equipment Quantity
Required
1. *Software Tools*
Argo UML, Eclipse IDE, Visual
Paradigm, Visual case and Rational
Suite
30 user License
2. PC's 30

10144CS608   INTERNET PROGRAMMING LAB   1 0 3 2

LIST OF EXPERIMENTS

1.Create a web page with the following using HTML

i) To embed an image map in a web page

ii) To fix the hot spots

iii) Show all the related information when the hot spots are clicked.

2. Create a web page with all types of Cascading style sheets.

3. Client Side Scripts for Validating Web Form Controls using DHTML

4. Write programs in Java to create applets incorporating the following features:

5. Create a color palette with matrix of buttons Set background and foreground of the control text area by selecting a color from color palette.

In order to select Foreground or background use check box control as radio buttons To set background images

6. Write programs in Java using Servlets: To invoke servlets from HTML forms To invoke servlets from Applets

7. Write programs in Java to create three-tier applications using JSP and Databases

for conducting on-line examination. for displaying student mark list. Assume that student information is available in a database which has been stored in a database server.

8. Programs using XML – Schema – XSLT/XSL

9. Programs using AJAX

10. Consider a case where we have two web Services- an airline service and a travel agent and the travel agent is searching for an airline. Implement this scenario using Web Services and Data base.

                                                        TOTAL 15 + 45 = 60 PERIODS

TEXT BOOK

   1.   Robert W. Sebesta, "Programming the world wide web", Pearson Education, 2006.

REFERENCES

1. Deitel, "Internet and world wide web, How to Program", PHI, 3rd Edition, 2005

10177GE002   COMMUNICATION SKILLS LABORATORY   0 0 3 2

(Fifth / Sixth Semester)

Globalization has brought in numerous opportunities for the teeming millions, with more focus on the students' overall capability apart from academic competence. Many students, particularly those from non-English medium schools, find that they are not preferred due to their inadequacy of communication skills and soft skills, despite possessing sound knowledge in their subject area along with technical capability. Keeping in view their pre-employment needs and career requirements, this course on Communication Skills Laboratory will prepare students to adapt themselves with ease to the industry environment, thus rendering them as prospective assets to industries. The course will equip the students with the necessary communication skills that would go a long way in helping them in their profession.

OBJECTIVES:
 (i)To equip students of engineering and technology with effective speaking and listening skills in English.(ii) To help them develop their soft skills and interpersonal skills, which will make the transition from   college to workplace smoother and help them excel in their job.(iii) To enhance the performance of students at Placement Interviews, Group (iv)Discussions and other recruitment exercises.

A. English Language Lab (18 Periods)
1. Listening Comprehension: (6)
Listening and typing – Listening and sequencing of sentences – Filling in the blanks -Listening and answering questions.
2. Reading Comprehension: (6)
Filling in the blanks - Close exercises – Vocabulary building - Reading and answering questions.
3. Speaking: (6)
Phonetics: Intonation – Ear training - Correct Pronunciation – Sound recognition exercises – Common Errors in English.
Conversations: Face to Face Conversation – Telephone conversation – Role play activities (Students take on roles and engage in conversation)
B. Discussion of audio-visual materials (6 periods)
(Samples are available to learn and practice)
1. Resume / Report Preparation / Letter Writing (1)
Structuring the resume / report - Letter writing / Email Communication - Samples.
2. Presentation skills: (1)
Elements of effective presentation – Structure of presentation - Presentation tools –Voice Modulation – Audience analysis - Body language – Video samples
3. Soft Skills: (2)
Time management – Articulateness – Assertiveness – Psychometrics –Innovation and Creativity - Stress Management & Poise - Video Samples
4. Group Discussion: (1)
Why is GD part of selection process ? - Structure of GD – Moderator – led and other GDs - Strategies in GD – Team work - Body Language - Mock GD -Video samples
5. Interview Skills: (1)
Kinds of interviews – Required Key Skills – Corporate culture – Mock interviews- Video samples.
I. PC based session (Weightage 40%) 24 periods
II. Practice Session (Weightage – 60%) 24 periods
20
1. Resume / Report Preparation / Letter writing: Students prepare their **(2)**
own resume and report.
2. Presentation Skills: Students make presentations on given topics. **(8)**

3. Group Discussion: Students participate in group discussions. **(6)**
4. Interview Skills: Students participate in Mock Interviews **(8)**

REFERENCES:

1. Anderson, P.V, **Technical Communication**, Thomson Wadsworth, Sixth Edition, New Delhi, 2007.

2. Prakash, P, **Verbal and Non-Verbal Reasoning**, Macmillan India Ltd., Second . Edition, New Delhi, 2004.

3. John Seely, **The Oxford Guide to Writing and Speaking**, Oxford University Press, New Delhi, 2004.

4. Evans, D, **Decision maker**, Cambridge University Press, 1997.

5. Thorpe, E, and Thorpe, S, **Objective English**, Pearson Education, Second Edition, New Delhi, 2007.

   1. Turton, N.D and Heaton, J.B, **Dictionary of Common Errors**, Addison Wesley Longman Ltd., Indian reprint 1998.

Lab Requirements:

1. Teacher console and systems for students.

2. English Language Lab Software

3. Career Lab Software

10177GE007 ENGINEERING ECONOMICS AND FINANCIAL ACCOUNTING   **3 0 0 3**

UNIT I   INTRODUCTION   **6**

Managerial Economics - Relationship with other disciplines - Firms: Types, objectives and goals - Managerial decisions - Decision analysis.

UNIT II   DEMAND AND SUPPLY ANALYSIS   **10**

Demand - Types of demand - Determinants of demand - Demand function – Demand elasticity - Demand forecasting - Supply - Determinants of supply - Supply function -Supply elasticity.

UNIT III   PRODUCTION AND COST ANALYSIS   **10**

Production function - Returns to scale - Production optimization - Least cost input -Isoquants -Managerial uses of production function. Cost Concepts - Cost function – Types of Cost - Determinants of cost - Short run and Long run cost curves - Cost Output Decision - Estimation of Cost.

UNIT IV PRICING   **9**

Determinants of Price - Pricing under different objectives and different market structures - Price discrimination - Pricing methods in practice – role of Government in pricing control.

UNIT V FINANCIAL ACCOUNTING (ELEMENTARY TREATMENT)   **10**

Balance sheet and related concepts - Profit & Loss Statement and related concepts - Financial Ratio Analysis - Cash flow analysis - Funds flow analysis – Comparative financial statements - Analysis & Interpretation of financial statements. Investments - Risks and return evaluation of investment decision - Average rate of return - Payback Period - Net Present Value - Internal rate of return.

                                               TOTAL= 45 PERIODS

TEXT BOOKS:

1. McGuigan, Moyer and Harris, 'Managerial Economics; Applications, Strategy and Tactics', Thomson South Western, 10th Edition, 2005.

2. Prasanna Chandra. 'Fundamentals of Financial Management', Tata McGraw Hill Publishing Ltd., 4th edition, 2005.

REFERENCES:

1. Samuelson. Paul A and Nordhaus W.D., 'Economics', Tata McGraw Hill Publishing Company Limited, New Delhi, 2004.

2. Paresh Shah, 'Basic Financial Accounting for Management', Oxford University Press, New Delhi,2007.

3. Salvatore Dominick, 'Managerial Economics in a global economy'. Thomson South Western, 4th Edition, 2001.
4. Pannerselvam, "Engineering Economics", PHI Learning India, 2010
5. Narayanasamy, "Financial Accounting", PHI Learning India, 2010

10144CS702 COMPUTER GRAPHICS AND MULTI MEDIA   **3 0 0 3**

UNIT I   2D PRIMITIVES   **9**

Output primitives – Line, Circle and Ellipse drawing algorithms - Attributes of output primitives – Two dimensional Geometric transformation - Two dimensional viewing –Line, Polygon, Curve and Text clipping algorithms

UNIT II   3D CONCEPTS   **9**

Parallel and Perspective projections - Three dimensional object representation –Polygons, Curved lines, Splines, Quadric Surfaces,- Visualization of data sets - 3D transformations – Viewing -Visible surface identification.

UNIT III   GRAPHICS PROGRAMMING   **9**

Color Models – RGB, YIQ, CMY, HSV – Animations – General Computer Animation, Raster, Key frame - Graphics programming using OPENGL – Basic graphics primitives –Drawing three dimensional objects - Drawing three dimensional scenes

UNIT IV   MULTIMEDIA SYSTEM DESIGN   **9**

Multimedia basics – Multimedia applications – Multimedia system architecture – Evolving technologies for multi media – defining objects for multi media systems – Multi media data interface standards – Multi media data bases.

UNIT V   MULTI MEDIA FILE HANDLING   **9**

Compression and decompression – Data and file format standards – Multimedia I/O technologies – Digital voice and audio – Video image and animation – Full motion video – Storage and retrieval technologies.

                       TOTAL = 45 PERIODS

TEXT BOOKS:

1. Donald Hearn, Pauline Baker, Computer Graphics – C Version, second edition, Pearson ducation,2004.
2. F.S. Hill, Computer Graphics using OPENGL, Second edition, Pearson Education,2003.
3. Andleigh and Thakrar, "Multi Media System Design", PHI Learning India, 2009

REFERENCES

1. James D. Foley, Andries Van Dam, Steven K. Feiner, John F. Hughes, Computer Graphics-Principles and practice, Second Edition in C, Pearson Education, 2007.
2. Malay K Pakhira, "Computer Graphics, Multimedia and Animation", PHI Learning India, 2010

10144CS703   MOBILE AND PERVASIVE COMPUTING   3 0 0 3

UNIT I MOBILE NETWORKS

9

Cellular Wireless Networks – GSM – Architecture – Protocols – Connection Establishment – Frequency Allocation – Routing – Mobility Management – Security – GPRS.

UNIT II WIRELESS NETWORKS

9

Wireless LANs and PANs – IEEE 802.11 Standard – Architecture – Services –Network – Hiper LAN – Blue Tooth- Wi-Fi – Wi MAX

UNIT III ROUTING

9

Mobile IP – DHCP – AdHoc– Proactive and Reactive Routing Protocols – Multicast Routing.

UNIT IV TRANSPORT AND APPLICATION LAYERS   9

Mobile TCP– WAP – Architecture – WWW Programming Model– WDP – WTLS – WTP – WSP – WAE – WTA Architecture – WML – WML Scripts.

UNIT V PERVASIVE COMPUTING   9

Pervasive computing infrastructure-applications- Device Technology - Hardware, Human-machine Interfaces, Biometrics, and Operating systems– Device Connectivity – Protocols, Security, and Device Management- Pervasive Web Application architecture- Access from PCs and PDAs - Access via WAP

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Jochen Schiller, "Mobile Communications", PHI, Second Edition, 2003.
2. Jochen Burkhardt, Pervasive Computing: Technology and Architecture of Mobile Internet Applications, Addison-Wesley Professional; 3rd edition, 2007

REFERENCES:

1. Frank Adelstein, Sandeep KS Gupta, Golden Richard, Fundamentals of Mobile and Pervasive Computing, McGraw-Hill 2005
2. Debashis Saha, Networking Infrastructure for Pervasive Computing: Enabling Technologies, Kluwer Academic Publisher, Springer; First edition, 2002
3. Introduction to Wireless and Mobile Systems by Agrawal and Zeng, Brooks/ Cole (Thomson Learning), First edition, 2002
4. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, Principles of Mobile Computing, Springer, New York, 2003.

10144CS704   SOFT COMPUTING   3 0 0 3

UNIT I   FUZZY SET THEORY   10
Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set-theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If-Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

UNIT II   OPTIMIZATION   8
Derivative-based Optimization – Descent Methods – The Method of Steepest Descent – Classical Newton's Method – Step Size Determination – Derivative-free Optimization –Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search.

UNIT III   GENETIC ALGORITHMS   10
Introduction, - Biological background – Creation of off springs – Encoding – binary, octal, hexa decimal, permutation, value and tree encoding. Fitness function- reproduction – Roulette-wheel, Boltzmann, tournament, rank, steady state selection – Generation gap and steady state replacement – Genetic modeling – Inheritance operators – Cross over –single site –two point – multi point , uniform cross over- Inversion and deletion –duplication – regeneration – segregation – mutation operator – bitwise operators – Generational cycle – Convergence of GA – Applications – Multi level optimization – Advances in GA.

UNIT IV NEURO FUZZY MODELING   9
Adaptive Neuro-Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm –Learning Methods that Cross-fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

UNIT V APPLICATIONS OF COMPUTATIONAL INTELLIGENCE   8
Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.

TOTAL: 45 PERIODS

TEXT BOOKS:
1. J.S.R.Jang, C.T.Sun and E.Mizutani, "Neuro-Fuzzy and Soft Computing", PHI, 2004, Pearson Education 2004.
2. N.P.Padhy, "Artificial Intelligence and Intelligent Systems", Oxford University Press,2006.

REFERENCES:
1. Elaine Rich & Kevin Knight, Artificial Intelligence, Second Edition, Tata McGraw Hill Publishing Comp., 2006, New Delhi.
2. Timothy J.Ross, "Fuzzy Logic with Engineering Applications", McGraw-Hill, 1997.
3. Davis E.Goldberg, "Genetic Algorithms: Search, Optimization and Machine Learning",Addison Wesley, N.Y., 1989.
4. S. Rajasekaran and G.A.Vijayalakshmi Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI Learning, 2010.
5. R.Eberhart, P.Simpson and R.Dobbins, "Computational Intelligence - PC Tools", AP Professional, Boston, 1996.
6. Amit Konar, "Artificial Intelligence and Soft Computing Behaviour and Cognitivemodel of the human brain", CRC Press, 2008.

10144CS707   COMPUTER GRAPHICS LABORATORY   0 0 3 2

1. Implementation of Bresenhams Algorithm – Line, Circle, Ellipse.

2. Implementation of Line, Circle and ellipse Attributes

3. Two Dimensional transformations - Translation, Rotation, Scaling, Reflection,

Shear.

4. Composite 2D Transformations

5. Cohen Sutherland 2D line clipping and Windowing

6. Sutherland – Hodgeman Polygon clipping Algorithm

7. Three dimensional transformations - Translation, Rotation, Scaling

8. Composite 3D transformations

9. Drawing three dimensional objects and Scenes

10. Generating Fractal images

TOTAL: 45 PERIODS

LIST OF EQUIPMENTS:

1) Turbo C

2) Visual C++ with OPENGL

3) Any 3D animation software like 3DSMAX, Maya, Blender

10144CS708   OPEN SOURCE LAB   0 0 3 2

OBJECTIVE:
To expose students to FOSS environment and introduce them to use open source packages
1. **Kernel configuration, compilation and installation :** Download / access the latest kernel source code from kernel.org,compile the kernel and install it in the local system. Try to view the source code of the kernel
2. **Virtualisation environment** (e.g., xen, kqemu or lguest) to test an applications, ew kernels and isolate applications. It could also be used to expose students to other alternate OSs like *BSD
3. **Compiling from source** : learn about the various build systems used like the auto* family, cmake, ant etc. instead of just running the commands. This could involve the full process like fetching from a cvs and also include autoconf, automake etc.,
4. **Introduction to packet management system :** Given a set of RPM or DEB, how to build and maintain, serve packages over http or ftp. and also how do you configure client systems to access the package repository.
5. **Installing various software packages**
Either the package is yet to be installed or an older version is existing. The student can practice installing the latest version. Of course, this might need internet access.
 Install samba and share files to windows
 Install Common Unix Printing System(CUPS)
6. **Write userspace drivers using fuse** -- easier to debug and less dangerous to the system (Writing full-fledged drivers is difficult at student level)
7. **GUI programming : a sample programme** – using Gambas since the students have VB knowledge. However, one should try using GTK or QT
8. **Version Control System setup and usage** using RCS, CVS, SVN
9. **Text processing with Perl:** simple programs, connecting with database e.g., MYSQL
10. **Running PHP** : simple applications like login forms after setting up a LAMP stack
11. **Running Python** : some simple exercise – e.g. Connecting with MySql database
12. **Set up the complete network interface** usinf ifconfig command liek setting gateway, DNS, IP tables, etc.,
Resources :
An environment like **FOSS Lab Server** (developed by NRCFOSS containing the various packages)
OR
Equivalent system with Linux distro supplemented with relevant packages
Note:
Once the list of experiments are finalized, NRCFOSS can generate full lab manuals
complete with exercises, necessary downloads, etc. These could be made available on
NRCFOSS web portal.

TOTAL: 45 PERIODS

LIST OF EQUIPMENTS:
Hardware:
Minimum Requirements:
- 700 Mhz X86 Processor
- 384 MB of system memory (RAM)
- 40 GB of disk space
- Graphics card capable of 1024*768 resolution
- Sound Card
- Network or Internet Connection
Software:
Latest distribution of Linux **27**

10144CS801 MIDDLEWARE TECHNOLOGIES   3 0 0 3

UNIT I   CLIENT / SERVER CONCEPTS   9

Client-Server - File server - Database server - Group server - Object server – Web server - Middleware - General middleware - Service specific middleware - Client / server building blocks - RPC - Messaging - Peer-to-Peer.

UNIT II   EJB ARCHITECTURE   9

EJB - EJB architecture - Overview of EJB software architecture - View of EJB - Conversation - Building and deploying EJBs - Roles in EJB.

UNIT III   EJB APPLICATIONS   9

EJB session beans - EJB entity beans - EJB clients - EJB deployment - Building an application with EJB.

UNIT IV   CORBA   9

CORBA - Distributed systems - Purpose - Exploring CORBA alternatives - Architecture overview - CORBA and networking Model - CORBA object model - IDL - ORB - Building an application with CORBA.

UNIT V   COM   9

COM - Data types - Interfaces - Proxy and stub - Marshalling – Implementing Server/Client - Interface pointers - Object creation - Invocation - Destruction - Comparison COM and CORBA - Introduction to .NET - Overview of .NET architecture - Marshalling - Remoting.

Total: 45

TEXT BOOKS

1. Robert Orfali, Dan Harkey and Jeri Edwards, "The Essential Client/Server Survival Guide", Galgotia Publications Pvt. Ltd., 2002.

2. Tom Valesky, "Enterprise Java Beans", Pearson Education, 2002

3. Jason Pritchard, "COM and CORBA side by side", Addison Wesley, 2000

4. Jesse Liberty, "Programming C#", 2nd Edition, O'Reilly Press, 2002.

REFERENCES

1. Mowbray, "Inside CORBA", Pearson Education, 2002.

2. Puder, "Distributed System Architecture – A Middleware Approach", Elsevier, 2008.

10144CS802   **WEB TECHNOLOGY**   **3 0 0 3**
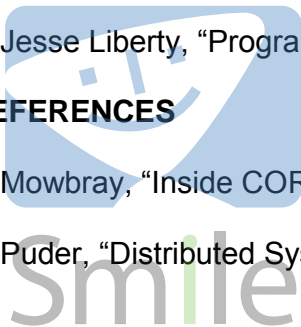
UNIT I   **9**
Web Essentials: Clients, Servers, and Communication. The Internet-Basic Internet Protocols -The World Wide Web-HTTP request message-response message-Web Clients Web Servers-Case Study. Markup Languages: XHTML. An Introduction to HTML History-Versions-Basic XHTML Syntax and Semantics-Some Fundamental HTML Elements-Relative URLs-Lists-tables-Frames-Forms-XML Creating HTML Documents - Case Study.

UNIT II   **9**
Style Sheets: CSS-Introduction to Cascading Style Sheets-Features-Core Syntax-Style Sheets and HTML Style Rle Cascading and Inheritance-Text Properties-Box Model Normal Flow Box Layout-Beyond the Normal Flow-Other Properties-Case Study. Client-Side Programming: The JavaScript Language-History and Versions Introduction JavaScript in Perspective-Syntax-Variables and Data Types-Statements-operators- Literals-Functions-Objects-Arrays-Built-in Objects-JavaScript Debuggers.

UNIT III   **9**
Host Objects : Browsers and the DOM-Introduction to the Document Object Model DOM History and Levels-Intrinsic Event Handling-Modifying Element Style-The Document Tree-DOM Event Handling-Accommodating Noncompliant Browsers Properties of window-Case Study. Server-Side Programming: Java Servlets - Architecture -Overview- A Servlet-Generating Dynamic Content-Life Cycle- Parameter Data-Sessions-Cookies- URL Rewriting-Other Capabilities-Data Storage Servlets and Concurrency-Case Study- Related Technologies.

UNIT IV   **9**
Representing Web Data: XML-Documents and Vocabularies-Versions and Declaration- Namespaces JavaScript and XML: Ajax-DOM based XML processing Event-oriented Parsing: SAX-Transforming XML Documents-Selecting XML Data: XPATH-Template based Transformations: XSLT-Displaying XML Documents in Browsers-Case Study- Related Technologies. Separating Programming and Presentation: JSP Technology Introduction-JSP and Servlets-Running JSP Applications Basic JSP-JavaBeans Classes and JSP-Tag Libraries and Files-Support for the Model-View-Controller Paradigm-Case Study-Related Technologies.

UNIT V   **9**
Web Services: JAX-RPC-Concepts-Writing a Java Web Service-Writing a Java Web Service Client-Describing Web Services: WSDL- Representing Data Types: XML Schema-Communicating Object Data: SOAP Related Technologies-Software Installation-Storing Java Objects as Files-Databases and Java Servlets.

                                                                              TOTAL: 45 PERIODS

TEXT BOOK:
1. Jeffrey C. Jackson, "Web Technologies--A Computer Science Perspective", Pearson Education, 2006.

REFERENCES:
1. Robert. W. Sebesta, "Programming the World Wide Web", Fourth Edition, Pearson Education, 2007 .
2. Deitel, Deitel, Goldberg, "Internet & World Wide Web How To Program", Third Edition, Pearson Education, 2006.
3. Marty Hall and Larry Brown, "Core Web Programming" Second Edition, Volume I and II, Pearson Education, 2001.
4. Bates, "Developing Web Applications", Wiley, 2006.

10144CSE11   MULTICORE PROGRAMMING   3 0 0 3

UNIT I INTRODUCTION TO MULTIPROCESSORS AND SCALABILITY ISSUES   9

Scalable design principles – Principles of processor design – Instruction Level Parallelism, Thread level parallelism. Parallel computer models –- Symmetric and distributed shared memory architectures – Performance Issues – Multi-core Architectures - Software and hardware multithreading – SMT and CMP architectures – Design issues – Case studies – Intel Multi-core architecture – SUN CMP architecture**.**

UNIT II PARALLEL PROGRAMMING   9

Fundamental concepts – Designing for threads – scheduling - Threading and parallel programming constructs – Synchronization – Critical sections – Deadlock. Threading APIs.

UNIT III   OPEN MP PROGRAMMING   9

OpenMP – Threading a loop – Thread overheads – Performance issues – Library functions. Solutions to parallel programming problems – Data races, deadlocks and live locks – Non-blocking algorithms – memory and cache related issues.

UNIT IV   MPI PROGRAMMING   9

MPI Model – collective communication – data decomposition – communicators and topologies – point-to-point communication – MPI Library.

UNIT V MULTITHREADED APPLICATION DEVELOPMENT   9

Algorithms, program development and performance tuning.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Shameem Akhter and Jason Roberts, "Multi-core Programming", Intel Press, 2006.
2. Michael J Quinn, Parallel programming in C with MPI and OpenMP, Tata Mc Graw Hill, 2003.

REFERENCES:

1. John L. Hennessey and David A. Patterson, " Computer architecture – A quantitative approach", Morgan Kaufmann/Elsevier Publishers, 4th. edition, 2007.

2. David E. Culler, Jaswinder Pal Singh, "Parallel computing architecture : A hardware/ software approach" , Morgan Kaufmann/Elsevier Publishers, 1999.

Smile

10144CSE12　　VISUAL PROGRAMMING　　　　3 0 0 3

UNIT I　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　**9**

Windows Programming Fundamentals – MFC – Windows – Graphics – Menus – Mouse and keyboard – Bitmaps – Palettes – Device-Independent Bitmaps

UNIT II　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　**9**

Controls – Modal and Modeless Dialog – Property – Data I/O – Sound – Timer

UNIT III　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　**9**

Memory management – SDI – MDI – MFC for Advanced windows user Interface – status bar and Toolbars – Tree view – List view – Threads

UNIT IV　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　**9**

ODBC – MFC Database classes – DAO - DLLs – Working with Images

UNIT V　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　**9**

COM Fundamentals – ActiveX control – ATL – Internet Programming

TOTAL: 45 PERIODS

TEXT BOOK

1. Richard C.Leinecker and Tom Archer, "Visual C++ 6 Programming Bible", Wiley Dream Tech Press, 2006.

REFERENCES

1. Lars Klander, "Core Visual C++ 6", Pearson Education, 2000
2. Deital, DEital, Liperi and Yaeger "Visual V++ .NET How to Program" , Pearson Education, 2004.

10144CSE13   ADVANCED JAVA PROGRAMMING   3 0 0 3

UNIT I JAVA FUNDAMENTALS   **9**

Java I/O streaming – filter and pipe streams – Byte Code interpretation - Threading – Swing.

UNIT II NETWORK PROGRAMMING IN JAVA   **9**

Sockets – secure sockets – custom sockets – UDP datagrams – multicast sockets – URL classes – Reading Data from the server – writing data – configuring the connection– Reading the header – telnet application – Java Messaging services

UNIT III APPLICATIONS IN DISTRIBUTED ENVIRONMENT   **9**

Remote method Invocation – activation models – RMI custom sockets – Object Serialization – RMI – IIOP implementation – CORBA – IDL technology – Naming Services – CORBA programming Models - JAR file creation

UNIT IV MULTI-TIER APPLICATION DEVELOPMENT   **9**

Server side programming – servlets – Java Server Pages - Applet to Applet communication – applet to Servlet communication - JDBC – Applications on databases – Multimedia streaming applications – Java Media Framework.

UNIT V ENTERPRISE APPLICATIONS   **9**

Server Side Component Architecture – Introduction to J2EE – Session Beans – Entity Beans – Persistent Entity Beans .

                                                                          TOTAL: 45 PERIODS

TEXT BOOKS

1. Elliotte Rusty Harold, " Java Network Programming", O'Reilly publishers, 2000 (UNIT II)

2. Ed Roman, "Mastering Enterprise Java Beans", John Wiley & Sons Inc., 1999. (UNIT III and UNIT V)

3. Hortsmann & Cornell, "CORE JAVA 2 ADVANCED FEATURES, VOL II", Pearson Education, 2002. (UNIT I and UNIT IV)

REFERENCES

1. Web reference: http://java.sun.com.

2. Patrick Naughton, "COMPLETE REFERENCE: JAVA2", Tata McGraw-Hill, 2003.

10144CSE14   PARALLEL PROGRAMMING   3 0 0 3

UNIT I   PARALLEL PROGRAMMING   9

Introduction to parallel programming – data parallelism – functional parallelism – pipelining – Flynn's taxonomy – parallel algorithm design – task/channel model – Foster's design methodology – case studies: boundary value problem – finding the maximum – n-body problem – Speedup and efficiency – Amdahl's law – Gustafson- Barsis's Law – Karp-Flatt Metric – Iso efficiency metric

UNIT II MESSAGE-PASSING PROGRAMMING   9

The message-passing model – the message-passing interface – MPI standard – basic concepts of MPI: MPI_Init, MPI_Comm_size, MPI_Comm_rank, MPI_Send, MPI_Recv, MPI_Finalize – timing the MPI programs: MPI_Wtime, MPI_Wtick – collective communication: MPI_Reduce, MPI_Barrier, PI_Bcast, MPI_Gather, MPI_Scatter – case studies: the sieve of Eratosthenes, Floyd's algorithm, Matrix-vector multiplication

UNIT III SHARED-MEMORY PROGRAMMING   9

Shared-memory model – OpenMP standard – parallel *for* loops – *parallel for* pragma –private variables – critical sections – reductions – parallel loop optimizations – general data parallelism – functional parallelism – case studies: the sieve of Eratosthenes, Floyd's algorithm, matrix-vector multiplication – distributed shared-memory programming – DSM primitives

UNIT IV PARALLEL ALGORITHMS – I   9

Monte Carlo methods – parallel random number generators – random number distributions – case studies – Matrix multiplication – row wise block-stripped algorithm – Cannon's algorithm – solving linear systems – back substitution – Gaussian elimination – iterative methods – conjugate gradient method

UNIT V PARALLEL ALGORITHMS – II   9

Sorting algorithms – quick sort – parallel quick sort – hyper quick sort – sorting by regular sampling – Fast Fourier transform – combinatorial search – divide and conquer – parallel backtrack search – parallel branch and bound – parallel alpha-beta search.

TOTAL: 45 PERIODS

TEXT BOOK:

Michael J. Quinn, "Parallel Programming in C with MPI and OpenMP", Tata McGraw-Hill Publishing Company Ltd., 2003.

REFERENCES:

1. B. Wilkinson and M. Allen, "Parallel Programming – Techniques and applications using networked workstations and parallel computers", Second Edition, Pearson Education, 2005.

2. M. J. Quinn, "Parallel Computing – Theory and Practice", Second Edition, Tata McGraw-Hill Publishing Company Ltd., 2002.

10144CSE15   **SOFTWARE TESTING**   **3 0 0 3**

UNIT I   INTRODUCTION   9

Testing as an Engineering Activity – Role of Process in Software Quality – Testing as a Process – Basic Definitions – Software Testing Principles – The Tester's Role in a Software Development Organization – Origins of Defects – Defect Classes – The Defect Repository and Test Design – Defect Examples – Developer/Tester Support for Developing a Defect Repository.

UNIT II   TEST CASE DESIGN   9

Introduction to Testing Design Strategies – The Smarter Tester – Test Case Design Strategies – Using Black Box Approach to Test Case Design Random Testing –Requirements based testing – positive and negative testing -–– Boundary Value Analysis – decision tables - Equivalence Class Partitioning state-based testing– cause effect graphing – error guessing - compatibility testing – user documentation testing –domain testing Using White–Box Approach to Test design – Test Adequacy Criteria – static testing vs. structural testing – code functional testing - Coverage and Control Flow Graphs – Covering Code Logic – Paths – Their Role in White–box Based Test Design – code complexity testing – Evaluating Test Adequacy Criteria.

UNIT III   LEVELS OF TESTING   9

The Need for Levels of Testing – Unit Test – Unit Test Planning –Designing the Unit Tests. The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – scenario testing – defect bash elimination -System Testing – types of system testing - Acceptance testing – performance testing - Regression Testing – internationalization testing – ad-hoc testing - Alpha – Beta Tests – testing OO systems – usability and accessibility testing

UNIT IV TEST MANAGEMENT   9

People and organizational issues in testing – organization structures for testing teams – testing services - Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management – test process - Reporting Test Results – The role of three groups in Test Planning and Policy development – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group.

UNIT V   CONTROLLING AND MONITORING   9

Software test automation – skills needed for automation – scope of automation – design and architecture for automation – requirements for a test tool – challenges in automation - Test metrics and measurements –project, progress and productivity metrics – Status Meetings – Reports and Control Issues – Criteria for Test Completion – SCM – Types of reviews – Developing a review program – Components of Review Plans– Reporting Review Results. – evaluating software quality – defect prevention – testing maturity model

TOTAL: 45 PERIODS

TEXT BOOKS:
1. Srinivasan Desikan and Gopalaswamy Ramesh, " Software Testing – Principles and Practices", Pearson education, 2006.
2. Aditya P.Mathur, "Foundations of Software Testing", Pearson Education,2008.

REFERENCES:
1. Boris Beizer, "Software Testing Techniques", Second Edition, Dream tech, 2003
2. Elfriede Dustin, "Effective Software Testing", First Edition, Pearson Education, 2003.
3. Renu Rajani, Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", Tata McGraw Hill, 2004.

10144CSE16 ADVANCED DIGITAL DESIGN WITH VHDL   3 0 0 3

UNIT – I   INTRODUCTION   9

Digital Design Methodology – Combinational Logic and Boolean Algebra-Theorem s for Boolean Algebric Minimization-Representation of Combinational Logic – Simplification of Boolean Expression – Glitches and Hazards – Building blocks for Logic Design – Storage Elements - Flip-Flops – Busses and Three state devices – Design of sequential machines – State – Transition graphs – Serial – line code converter for data transmission-state reduction and equivalent states.

UNIT-II   LOGIC DESIGN   9

Structural models of combinational logic – Logic simulation –design verification-test methodology-propagation delay-Truth table models – Behavioral modeling – Data types –Boolean equations – Propagation delay and continuous assignments –Latches and level-sentitive circuits in verilog-Cyclic behavioral models of flip-flop and latches-Comparison of styles – Data flow models of linear feed back shift registers –Machines with multi-cycle operations-ASMD charts-Behavioral model of counters.

UNIT-III COMBINATIONAL AND SEQUENTIAL LOGIC   9

Introduction to synthesis –Synthesis of combinational logic - Synthesis of sequential logic with latches and flip-flops – Synthesis of three state devices, bus interfaces – Synthesis of explicit and Implicit state machines, registers and counters-Registered logic – state encoding – Resets – Anticipating the results of synthesis-Synthesis of loops – Divide and conquer.

UNIT – IV DATA PATH CONTROLLERS, LOGIC AND STORAGE DEVICE   9

Partitioned sequential machines-Design and Synthesis of a RISC stored program machine – UART – Storage devices – Programmable Logic Array(PLA)-PAL – PLD and CPLD – Altera MAX 7000 CPLD – Field-programmable gate arrays – Embeddable and programmable IP core for SoC – Synthesis with FPGAs.

UNIT-V DIGITAL AND ARITHMETIC PROCESSOR   9

Algorithms, Nested loop programs and data flow graphs – Digital filters and signal processor – Building blocks – Pipelined architecture – circular buffer –FIFO –Number representation – Functional units for arithmetic operations – Multiplication of signed binary and fractions – post synthesis design validation and timing verification – Elimination of ASIC timing violations – False path System tasks for timing verification – Fault simulation and testing – Fault simulation with verifault –XL.

TOTAL : 45 PERIODS

TEXT BOOK :

1.Michael D.Ciletti " Advanced Digital Design With the Verilog HDL ",PHI Learning,New Delhi-1,2009
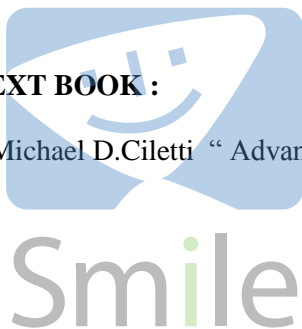
10144CSE21   NUMERICAL METHODS   3 1 0 4

UNIT I SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS   9

Solution of equation –Fixed point iteration: x=g(x) method - Newton's method – Solution of linear system by Gaussian elimination and Gauss-Jordon method– Iterative method -Gauss-Seidel method - Inverse of a matrix by Gauss Jordon method – Eigen value of a matrix by power method and by Jacobi method for symmetric matrix.

UNIT II INTERPOLATION AND APPROXIMATION   9

Lagrangian Polynomials – Divided differences – Interpolating with a cubic spline –Newton's forward and backward difference formulas.

UNIT III NUMERICAL DIFFERENTIATION AND INTEGRATION   9

Differentiation using interpolation formulae –Numerical integration by trapezoidal and Simpson's 1/3 and 3/8 rules – Romberg's method – Two and Three point Gaussian quadrature formulae – Double integrals using trapezoidal and Simpsons's rules.

UNIT IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS 9

Single step methods: Taylor series method – Euler method for first order equation – Fourth order Runge – Kutta method for solving first and second order equations – Multistep methods: Milne's and Adam's predictor and corrector methods.

UNIT V BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS   9

Finite difference solution of second order ordinary differential equation – Finite difference solution of one dimensional heat equation by explicit and implicit methods – One dimensional wave equation and two dimensional Laplace and Poisson equations.

L : 45 , T : 15 ,TOTAL = 60 PERIODS

TEXT BOOKS:

1. Veerarajan, T and Ramachandran, T. 'Numerical methods with programming in 'C',Second Editiion, Tata McGraw-Hill Publishing.Co.Ltd. (2007).
2. Sankara Rao K, 'Numerical Methods for Scientists and Engineers", PHI Learning India 2010.

REFERENCES:

1. Chapra, S. C and Canale, R. P. "Numerical Methods for Engineers", 5th Edition, Tata McGraw-Hill, New Delhi, 2007.
2. Gerald, C. F. and Wheatley, P.O., "Applied Numerical Analysis", 6th Edition, Pearson Education Asia, New Delhi, 2006.
3. Grewal, B.S. and Grewal,J.S., " Numerical methods in Engineering and Science", 6th Edition, Khanna Publishers, New Delhi, 2004
4. S.S.Sasthry, "Numerical Analysis", PHI Learning India, 2010

10144CSE22   **UNIX INTERNALS**   **3 0 0 3**

UNIT I   **9**

General Review of the System-History-System structure-User Perspective-Operating System Services-Assumptions About Hardware. Introduction to the Kernel-Architecture System Concepts-Data Structures-System Administration.

UNIT II   **9**

The Buffer Cache-Headers-Buffer Pool-Buffer Retrieval-Reading and Writing Disk Blocks-Advantages and Disadvantages. Internal Representation of Files-Inodes- Structure-Directories-Path Name to Inode-Super Block-Inode Assignment-Allocation of Disk Blocks -Other File Types.

UNIT III   **9**

System Calls for the File System-Open-Read-Write-Lseek-Close-Create-Special files Creation-Change Directory and Change Root-Change Owner and Change Mode- Stat - Fstat – Pipes – Dup – Mount - Unmount-Link-Unlink - File System Abstraction- Maintenance.

UNIT IV   **9**

The System Representation of Processes-States-Transitions-System Memory-Context of a Process-Saving the Context-Manipulation of a Process Address Space-Sleep Process Control-signals-Process termination-Awaiting-Invoking other Programs-The Shell-System Boot and the INIT Process.

UNIT V   **9**

Memory Management Policies-Swapping-Demand Paging-a Hybrid System- I/OSubsystem-Driver Interfaces- Disk Drivers - Terminal Drivers.

TOTAL: 45 PERIODS

TEXTBOOK

1**.** Maurice J. Bach, "The Design of the Unix Operating System", PHI Learning India, 2010.

REFERENCES

1. Uresh Vahalia, "UNIX Internals: The New Frontiers", Prentice Hall, 2000.

2. John Lion, "Lion's Commentary on UNIX", 6th edition, Peer-to-Peer Communications, 2004.

3. Daniel P. Bovet & Marco Cesati, "Understanding the Linux Kernel", O'REILLY, Shroff Publishers &Distributors Pvt. Ltd, 2000.

4. M. Beck et al, "Linux Kernel Programming", Pearson Education Asia, 2002

10144CSE23   ADVANCED DATABASE TECHNOLOGY   3 0 0 3

UNIT I   RELATIONAL MODEL ISSUES   9

ER Model - Normalization – Query Processing – Query Optimization – Transaction Processing - Concurrency Control – Recovery - Database Tuning.

UNIT II   DISTRIBUTED DATABASES   9

Parallel Databases – Inter and Intra Query Parallelism – Distributed Database Features – Distributed Database Architecture – Fragmentation – Distributed Query Processing – Distributed Transactions Processing – Concurrency Control – Recovery – Commit Protocols.

UNIT III OBJECT ORIENTED DATABASES   9

Introduction to Object Oriented Data Bases - Approaches - Modeling and Design - Persistence – Query Languages - Transaction - Concurrency – Multi Version Locks – Recovery – POSTGRES – JASMINE – GEMSTONE - ODMG Model.

UNIT IV   EMERGING SYSTEMS   9

Enhanced Data Models - Client/Server Model - Data Warehousing and Data Mining - Web Databases – Mobile Databases- XML and Web Databases.

UNIT V CURRENT ISSUES   9

Rules - Knowledge Bases - Active and Deductive Databases - Multimedia Databases–Multimedia Data Structures – Multimedia Query languages - Spatial Databases.

TOTAL: 45 PERIODS

TEXT BOOK:

1. Thomas Connolly and Carlolyn Begg, "Database Systems, A Practical Approach to Design, Implementation and Management", Third Edition, Pearson Education 2003.

REFERENCES:

1. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education, 2006.

2. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", Fifth Edition, Tata McGraw Hill, 2006.

3. C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems",Eighth Edition, Pearson Education, 2006.

10144CSE24 HIGH PERFORMANCE MICROPROCESSORS 3 0 0 3

UNIT I CISC PRINCIPLES 9

Classic CISC microprocessors, Intel x86 Family: Architecture - register set – Data formats - Addressing modes - Instruction set - Assembler directives – Interrupts -Segmentation, Paging, Real and Virtual mode execution – Protection mechanism, Task management 80186, 286, 386 and 486 architectures.

UNIT II PENTIUM PROCESSORS 10

Introduction to Pentium microprocessor – Special Pentium Registers – Pentium Memory Management – New Pentium instructions – Introduction to Pentium Pro and its special features – Architecture of Pentium-II, Pentium-III and Pentium4 microprocessors.

UNIT III RISC PRINCIPLES 10

RISC Vs CISC – RISC properties and evaluation – On chip register File Vs Cache evaluation – Study of a typical RISC processor – The PowerPC – Architecture & special features – Power PC 601 – IBM S/6000, Sun SPARC Family – Architecture – Super SPARC.

UNIT IV RISC PROCESSOR 8

MIPS Rx000 family – Architecture – Special features – MIPS R4000 and R4400 – Motorola 88000 Family – Architecture – MC 88110 – MC 88100 and MC 88200.

UNIT V SPECIAL PURPOSE PROCESSORS 8

EPIC Architecture – ASIPs – Network Processors – DSPs – Graphics / Image Processors.

TOTAL: 45 PERIODS

TEXT BOOK:

1. Daniel Tabak, "Advanced Microprocessors", Tata McGraw-Hill, 1995, 2nd Edition.

REFERENCES:

1. www.intel.com/products/server/processors/server/itanium2 (Unit V:EPIC)

2. www.hpl.hp.com/techreports/1999/HPL-1999-111.html (Unit V: Network Processor)

3. www.intel.com/design/network/products/npfamily (Unit V: Network Processor)

4. www.national.com/appinfo/imaging/processors.html(Unit V: Image Processor)

5. Barry B.Brey, "The Intel Microprocessors, 8086/8088, 80186/80188, 80286, 80386,80486, Pentium, PentiumPro Processor, PentiumII, PentiumIII, PentiumIV,Architecture, Programming & Interfacing", 6th Edition, Pearson Education/PHI, 2002.

10144CSE25   KNOWLEDGE MANAGEMENT   3 0 0 3

UNIT I KNOWLEDGE MANAGEMENT   9

KM Myths – KM Life Cycle – Understanding Knowledge – Knowledge, intelligence – Experience – Common Sense – Cognition and KM – Types of Knowledge – Expert Knowledge – Human Thinking and Learning.

UNIT II KNOWLEDGE MANAGEMENT SYSTEM LIFE CYCLE   9

Challenges in Building KM Systems – Conventional Vrs KM System Life Cycle (KMSLS) – Knowledge Creation and Knowledge Architecture – Nonaka's Model of Knowledge Creation and Transformation. Knowledge Architecture.

UNIT III CAPTURING KNOWLEDGE   9

Evaluating the Expert – Developing a Relationship with Experts – Fuzzy Reasoning and the Quality of Knowledge – Knowledge Capturing Techniques, Brain Storming – Protocol Analysis – Consensus Decision Making – Repertory Grid- Concept Mapping – Black boarding.

UNIT IV KNOWLEDGE CODIFICATION   9

Modes of Knowledge Conversion – Codification Tools and Procedures – Knowledge Developer's Skill Sets – System Testing and Deployment – Knowledge Testing – Approaches to Logical Testing, User Acceptance Testing – KM System Deployment Issues – User Training – Post implementation.

UNIT V KNOWLEDGE TRANSFER AND SHARING   9

Transfer Methods – Role of the Internet – Knowledge Transfer in e-world – KM System Tools – Neural Network – Association Rules – Classification Trees – Data Mining and Business Intelligence – Decision Making Architecture – Data Management – Knowledge Management Protocols – Managing Knowledge Workers.

                                                                    TOTAL: 45 PERIODS

TEXT BOOK:

1. Elias.M. Award & Hassan M. Ghaziri – "Knowledge Management" Pearson Education 2003.

REFERENCES:

1. Guus Schreiber, Hans Akkermans, Anjo Anjewierden, Robert de Hoog, Nigel Shadbolt, Walter Van de Velde and Bob Wielinga, "Knowledge Engineering and Management", Universities Press, 2001.

2. C.W. Holsapple, "Handbooks on Knowledge Management", International Handbook on Information Systems, Vol 1 and 2, 2003

10144CSE26   **EMBEDDED SYSTEMS**   **3 0 0 3**

UNIT I   EMBEDDED COMPUTING   9

Challenges of Embedded Systems – Embedded system design process. Embedded processors – 8051 Microcontroller, ARM processor – Architecture, Instruction sets and programming.

UNIT II   MEMORY AND INPUT / OUTPUT MANAGEMENT   9

Programming Input and Output – Memory system mechanisms – Memory and I/O devices and interfacing – Interrupts handling.

UNIT III   PROCESSES AND OPERATING SYSTEMS   9

Multiple tasks and processes – Context switching – Scheduling policies – Inter process communication mechanisms – Performance issues.

UNIT IV   EMBEDDED SOFTWARE   9

Programming embedded systems in assembly and C – Meeting real time constraints –Multi-state systems and function sequences. Embedded software development tools –Emulators and debuggers.

UNIT V   EMBEDDED SYSTEM DEVELOPMENT   9

Design issues and techniques – Case studies – Complete design of example embedded systems.

TOTAL = 45 PERIODS

TEXT BOOK:

1. Wayne Wolf, "Computers as Components: Principles of Embedded Computer System Design", Elsevier, 2006.

2. Michael J. Pont, "Embedded C", Pearson Education , NewDelhi 2007.

REFERENCES:

1. Steve Heath, "Embedded System Design", Elsevier, 2005.

2. Muhammed Ali Mazidi, Janice Gillispie Mazidi and Rolin D. McKinlay, "The 8051 Microcontroller and Embedded Systems", Pearson Education, Second edition, 2007.

3. Santanu Chattopathyay, Embedded System Design", PHI Learning, India 2010

4. Daniel Lewis, "Embedded software", PHI Learning India, 2009

10144CSE31 RESOURCE MANAGEMENT TECHNIQUES 3 0 0 3

UNIT I LINEAR PROGRAMMING 9

Principal components of decision problem – Modeling phases – LP Formulation and graphic solution – Resource allocation problems – Simplex method – Sensitivity analysis.

UNIT II DUALITY AND NETWORKS 9

Definition of dual problem – Primal – Dual relation ships – Dual simplex methods – Post optimality analysis – Transportation and assignment model shortest route problem.

UNIT III NTEGER PROGRAMMING 9

Cutting plan algorithm – Branch and bound methods, Multistage (Dynamic) programming.

UNIT IV CLASSICAL OPTIMISATION THEORY 9

Unconstrained external problems, Newton – Ralphson method – Equality constraints – Jacobean methods – Lagrangian method – Kuhn – Tucker conditions – Simple problems.

UNIT V OBJECT SCHEDULING: 9

Network diagram representation – Critical path method – Time charts and resource leveling – PERT.

TOTAL: 45 PERIODS

TEXT BOOK:

1. H.A.Taha, 'Operation Research', Pearson Education, 2002.

2. Paneer Selvam, 'Operations Research', Prentice Hall of India Learning. New Delhi - 2010

REFERENCES:

1. Anderson 'Quantitative Methods for Business', 8th Edition, Thomson Learning, 2002.

2. Winston 'Operation Research', Thomson Learning, 2003.

3. Vohra, 'Quantitative Techniques in Management', Tata McGraw Hill, 2002.

4. Anand Sarma, 'Operation Research', Himalaya Publishing House, 2003.

10144CSE32   DATA WAREHOUSING AND DATA MINING   3 0 0 3

UNIT I DATA WAREHOUSING 10

Data warehousing Components –Building a Data warehouse –- Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support –Data Extraction, Cleanup, and Transformation Tools –Metadata.

UNIT II BUSINESS ANALYSIS 8

Reporting and Query tools and Applications – Tool Categories – The Need for Applications – Cognos Impromptu – Online Analytical Processing (OLAP) – Need –Multidimensional Data Model – OLAP Guidelines – Multidimensional versus Multi relational OLAP – Categories of Tools – OLAP Tools and the Internet.

UNIT III DATA MINING 8

Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse – Issues –Data Preprocessing.

UNIT IV ASSOCIATION RULE MINING AND CLASSIFICATION 11

Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining Various Kinds of Association Rules – Correlation Analysis – Constraint Based Association Mining – Classification and Prediction - Basic Concepts - Decision Tree Induction - Bayesian Classification – Rule Based classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction

UNIT V CLUSTERING AND APPLICATIONS AND TRENDS IN DATA MINING 8

Cluster Analysis - Types of Data – Categorization of Major Clustering Methods – K means – Partitioning Methods – Hierarchical Methods - Density-Based Methods –Grid Based Methods – Model-Based clustering Methods – Clustering High Dimensional Data - Constraint – Based Cluster Analysis – Outlier Analysis – Data Mining Applications.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Alex Berson and Stephen J. Smith, " Data Warehousing, Data Mining & OLAP", Tata McGraw – Hill Edition, Tenth Reprint 2007.
2. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Second Edition, Elsevier, 2007.

REFERENCES:
1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, " Introduction To Data Mining", Pearson Education, 2007.
2. K.P. Soman, Shyam Diwakar and V. Ajay ", Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta, " Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006.
4. Daniel T.Larose, "Data Mining Methods and Models", Wile-Inter science, 2006.

10144CSE33   **REAL TIME SYSTEMS**   **3 0 0 3**

UNIT I   INTRODUCTION   9

Introduction - Issues in Real Time Computing, Structure of a Real Time System. Task Classes, Performance Measures for Real Time Systems, Estimating Program Run times. Task Assignment and Scheduling - Classical Uni processor scheduling algorithms, Uni Processor scheduling of IRIS Tasks, Task Assignment, Mode Changes, and Fault Tolerant Scheduling.

UNIT II   PROGRAMMING LANGUAGES AND TOOLS   9

Programming Language and Tools – Desired Language characteristics, Data Typing, Control structures, Facilitating Hierarchical Decomposition, Packages, Run-time (Exception) Error handling, Overloading and Generics, Multitasking, Low Level programming, Task scheduling, Timing Specifications, Programming Environments, Run-time Support.

UNIT III   REAL TIME DATABASES   9

Real time Databases - Basic Definition, Real time Vs General Purpose Databases, Main Memory Databases, Transaction priorities, Transaction Aborts, Concurrency Control Issues, Disk Scheduling Algorithms, Two-phase Approach to improve Predictability, Maintaining Serialization Consistency, Databases for Hard Real Time systems.

UNIT IV   COMMUNICATION   9

Real-Time Communication - Communications Media, Network Topologies Protocols, Fault Tolerant Routing. Fault Tolerance Techniques - Fault Types, Fault Detection. Fault Error containment Redundancy, Data Diversity, Reversal Checks, Integrated Failure handling.

UNIT V EVALUATION TECHNIQUES   9

Reliability Evaluation Techniques - Obtaining Parameter Values, Reliability Models for Hardware Redundancy, Software Error models. Clock Synchronization - Clock, A Non fault-Tolerant synchronization Algorithm, Impact of Faults, Fault Tolerant Synchronization in Hardware, Fault Tolerant Synchronization in Software.

                                                      TOTAL= 45 PERIODS

TEXT BOOKS:

1. C.M. Krishna, Kang G. Shin, "Real-Time Systems", McGraw-Hill International Editions, 1997.

REFERENCES:

1. Stuart Bennett, "Real Time Computer Control-An Introduction", Second edition, Prentice Hall PTR, 1994.
2. Peter D. Lawrence, "Real time Micro Computer System Design – An Introduction", McGraw Hill, 1988.
3. S.T. Allworth and R.N. Zobel, "Introduction to real time software design", Mac millan, II Edition, 1987.
4. R.J.A Buhur, D.L. Bailey, " An Introduction to Real-Time Systems", Prentice-Hall International, 1999.
5. Philip.A.Laplante "Real Time System Design and Analysis" PHI , III Edition, April 2004.

10144CSE34   TCP/IP DESIGN AND IMPLEMENTATION   3 0 0 3

UNIT I   INTRODUCTION   9

Internetworking concepts and architecture model – classful Internet address – CIDR – Subnetting and Supernetting – AARP – RARP- IP- IP Routing – ICMP – IPV6.

UNIT II   TCP   9

Services – header – connection establishment and termination – interactive data flow – bulk data flow – timeout and retransmission – persist timer – keep alive timer – futures and performance.

UNIT III IP IMPLEMENTATION   9

IP global software organization – routing table – routing algorithms – fragmentation and reassembly – error processing (ICMP) – Multicast Processing (IGMP).

UNIT IV TCP IMPLEMENTATION I   9

Data structure and input processing – transmission control blocks – segment format – comparison – finite state machine implementation – Output processing – mutual exclusion – computing the TCP Data length.

UNIT V TCP IMPLEMENTATION II   9

Timers – events and messages – timer process – deleting and inserting timer event – flow control and adaptive retransmission – congestion avoidance and control – urgent data processing and push function.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Douglas E Comer, "Inter networking with TCP/IP Principles, Protocols and Architecture", Vol 1 and 2, Vth Edition, PHI Learning India, Delhi - 2010

2. W.Richard Stevans "TCP/IP Illustrated" Vol 1.2003.

REFERENCES:

1. Forouzan, " TCP/IP Protocol Suite" Second Edition, Tate MC Graw Hill, 2003.

2. W.Richard Stevens "TCP/IP Illustrated" Volume 2, Pearson Education 2003

10144CSE35   **NATURAL LANGUAGE PROCESSING**   **3 0 0 3**

UNIT I   **9**

Introduction – Models -and Algorithms - The Turing Test -Regular Expressions Basic Regular Expression Patterns -Finite State Automata -Regular Languages and FSAs – Morphology -Inflectional Morphology - Derivational Morphology -Finite-State Morphological Parsing - Combining an FST Lexicon and Rules - Porter Stemmer

UNIT II   **9**

N-grams Models of Syntax - Counting Words - Unsmoothed N-grams – Smoothing- Backoff - Deleted Interpolation – Entropy - English Word Classes - Tagsets for English -Part of Speech Tagging -Rule-Based Part of Speech Tagging - Stochastic Part of Speech Tagging - Transformation-Based Tagging -

UNIT III   **9**

Context Free Grammars for English Syntax- Context-Free Rules and Trees - Sentence-Level constructions –Agreement – Sub Categorization – Parsing – Top-down – Early Parsing -Feature Structures - Probabilistic Context-Free Grammars

UNIT IV   **9**

Representing Meaning - Meaning Structure of Language - First Order Predicate Calculus- Representing Linguistically Relevant Concepts -Syntax-Driven Semantic Analysis -Semantic Attachments - Syntax-Driven Analyzer - Robust Analysis - Lexemes and Their Senses - Internal Structure - Word Sense Disambiguation -Information Retrieval

UNIT V   **9**

Discourse -Reference Resolution - Text Coherence -Discourse Structure - Dialog and Conversational Agents - Dialog Acts – Interpretation – Coherence –Conversational Agents - Language Generation – Architecture -Surface Realizations – Discourse Planning – Machine Translation -Transfer Metaphor – Interlingua – Statistical Approaches

TOTAL: 45 PERIODS

TEXT BOOKS:

1. D. Jurafsky and J. Martin "Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition",

2. C. Manning and H. Schutze, "Foundations of Statistical Natural Language Processing",

REFERENCE:

1. James Allen. "Natural Language Understanding", Addison Wesley, 1994.

10144CSE36   **USER INTERFACE DESIGN**   **3 0 0 3**

UNIT I INTRODUCTION   8

Human–Computer Interface – Characteristics Of Graphics Interface –Direct Manipulation Graphical System – Web User Interface –Popularity –Characteristic & Principles.

UNIT II HUMAN COMPUTER INTERACTION   10

User Interface Design Process – Obstacles –Usability –Human Characteristics In Design – Human Interaction Speed –Business Functions –Requirement Analysis – Direct –Indirect Methods – Basic Business Functions – Design Standards – System Timings –Human Consideration In Screen Design – Structures Of Menus – Functions Of Menus– Contents Of Menu– Formatting – Phrasing The Menu – Selecting Menu Choice–Navigating Menus– Graphical Menus.

UNIT III WINDOWS   9

Characteristics– Components– Presentation Styles– Types– Managements– Organizations– Operations– Web Systems– Device– Based Controls Characteristics–Screen – Based Controls – Operate Control – Text Boxes– Selection Control–Combination Control– Custom Control– Presentation Control.

UNIT IV MULTIMEDIA   9

Text For Web Pages – Effective Feedback– Guidance & Assistance–Internationalization– Accesssibility– Icons– Image– Multimedia – Coloring.

UNIT V WINDOWS LAYOUT– TEST   9

Prototypes – Kinds Of Tests – Retest – Information Search – Visualization –Hypermedia – WWW– Software Tools.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Wilbent. O. Galitz ,"The Essential Guide To User Interface Design", John Wiley& Sons, 2001.
2. Ben Sheiderman, "Design The User Interface", Pearson Education, 1998.

REFERENCES:

1. Alan Cooper, "The Essential Of User Interface Design", Wiley – Dream Tech Ltd., 2002.

10144CSE37   SERVICE ORIENTED ARCHITECTURE   3 0 0 3

UNIT I   9

Roots of SOA – Characteristics of SOA - Comparing SOA to client-server and distributed internet architectures – Anatomy of SOA- How components in an SOA interrelate - Principles of service orientation

UNIT II   9

Web services – Service descriptions – Messaging with SOAP –Message exchange Patterns – Coordination –Atomic Transactions – Business activities – Orchestration – Choreography - Service layer abstraction – Application Service Layer – Business Service Layer – Orchestration Service Layer.

UNIT III   9

Service oriented analysis – Business-centric SOA – Deriving business services- service modeling - Service Oriented Design – WSDL basics – SOAP basics – SOA composition guidelines – Entity-centric business service design – Application service design – Task centric business service design

UNIT IV   9

SOA platform basics – SOA support in J2EE – Java API for XML-based web services (JAX-WS) - Java architecture for XML binding (JAXB) – Java API for XML Registries (JAXR) - Java API for XML based RPC (JAX-RPC)- Web Services Interoperability Technologies (WSIT) - SOA support in .NET – Common Language Runtime - ASP.NET web forms – ASP.NET web services – Web Services Enhancements (WSE)

UNIT V   9

WS-BPEL basics – WS-Coordination overview - WS-Choreography, WS-Policy, W S Security

TOTAL: 45 PERIODS

TEXT BOOK:

1. Thomas Erl**, "**Service-Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2005.

REFERENCES:

1. Thomas Erl, "SOA Principles of Service Design "(The Prentice Hall Service-Oriented Computing Series from Thomas Erl), 2005.

2. Newcomer, Lomow, "Understanding SOA with Web Services", Pearson Education, 2005.

3. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services, An Architect's Guide", Pearson Education, 2005.

4. Dan Woods and Thomas Mattern, " Enterprise SOA Designing IT for Business Innovation", REILLY, First Edition, 2006.

10144CSE41   ADVANCED OPERATING SYSTEMS   3 0 0 3

UNIT I   **9**

Architectures of Distributed Systems - System Architecture types - issues in distributed operating systems - communication networks – communication primitives. Theoretical Foundations - inherent limitations of a distributed system – lamp ports logical clocks – vector clocks – casual ordering of messages – global state – cuts of a distributed computation – termination detection. Distributed Mutual Exclusion – introduction – the classification of mutual exclusion and associated algorithms – a comparative performance analysis.

UNIT II   **9**

Distributed Deadlock Detection -Introduction - deadlock handling strategies in distributed systems – issues in deadlock detection and resolution – control organizations for distributed deadlock detection – centralized and distributed deadlock detection algorithms –hierarchical deadlock detection algorithms. Agreement protocols – introduction-the system model, a classification of agreement problems, solutions to the Byzantine agreement problem, applications of agreement algorithms. Distributed resource management: introduction-architecture – mechanism for building distributed file systems – design issues – log structured file systems.

UNIT III   **9**

Distributed shared memory-Architecture– algorithms for implementing DSM – memory coherence and protocols – design issues. Distributed Scheduling – introduction – issues in load distributing – components of a load distributing algorithm – stability – load distributing algorithm – performance comparison – selecting a suitable load sharing algorithm – requirements for load distributing -task migration and associated issues. Failure Recovery and Fault tolerance: introduction– basic concepts – classification of failures – backward and forward error recovery, backward error recovery- recovery in concurrent systems – consistent set of check points – synchronous and asynchronous check pointing and recovery – check pointing for distributed database systems- recovery in replicated distributed databases.

UNIT IV   **9**

Protection and security -preliminaries, the access matrix model and its implementations.- safety in matrix model- advanced models of protection. Data security – cryptography: Model of cryptography, conventional cryptography- modern cryptography, private key cryptography, data encryption standard-public key cryptography – multiple encryption – authentication in distributed systems.

UNIT V   **9**

Multiprocessor operating systems - basic multiprocessor system architectures – inter connection networks for multiprocessor systems – caching – hypercube architecture. Multiprocessor Operating System - structures of multiprocessor operating system, operating system design issues- threads- process synchronization and scheduling. Database Operating systems :Introduction- requirements of a database operating system Concurrency control : theoretical aspects – introduction, database systems – a concurrency control model of database systems- the problem of concurrency control – serializability theory- distributed database systems, concurrency control algorithms – introduction, basic synchronization primitives, lock based algorithms-timestamp based algorithms, optimistic algorithms – concurrency control algorithms, data replication.

                                                                                               TOTAL: 45 PERIODS

TEXT BOOK:
1. Mukesh Singhal, Niranjan G.Shivaratri, "Advanced concepts in operating systems: Distributed, database and multiprocessor operating systems", TMH, 2001
REFERENCES:
1. Andrew S.Tanenbaum, "Modern operating system", PHI, 2003
2. Pradeep K.Sinha, "Distributed operating system-Concepts and design", PHI, 2003.
3. Andrew S.Tanenbaum, "Distributed operating system", Pearson education, 2003

| 10144CSE42 | C# AND .NET FRAMEWORK | 3 0 0 3 |

UNIT I   9

Review of OOP Concepts - Overview of .NET Framework - Basic Elements of C# - Program Structure and simple Input and Output Operations – Operators and Expressions – Statements – Arrays and Structures.

UNIT II   9

Inheritance - Namespace – Polymorphism – Interface and Overloading – Multiple Inheritance – Property – Indexes – Delegates – Publish/Subscribe Design Patterns- Operator Overloading-Method Overloading

UNIT III   9
C# Concepts for creating Data Structures - File Operation – File Management systems – Stream Oriented Operations- Multitasking – Multithreading – Thread Operation – Synchronization.

UNIT IV   9

Working with XML – Techniques for Reading and Writing XML Data - Using X Path and Search XML - ADO.NET Architecture – ADO.NET Connected and Disconnected Models – XML and ADO.NET – Simple and Complex Data Binding– Data Grid View Class.

UNIT V   9

Application Domains – Remoting – Leasing and Sponsorship - .NET Coding Design - Guidelines – Assemblies – Security – Application Development – Web Services - Building an XML Web Service - Web Service Client – WSDL and SOAP – Web Service with Complex Data Types – Web Service Performance.

TOTAL : 45 PERIODS

TEXT BOOKS:

1. S. Thamarai Selvi and R. Murugesan "A Textbook on C# ", Pearson Education,2003.

2. Stephen C. Perry " Core C# and .NET", Pearson Education,2006.

3. Sathiaseelan JGR and N Sasikaladevi, "Programming with C# and .NET", PHI Learning, India 2009

REFERENCES:

1. Jesse Liberty, "Programming C#", Second Edition, O'Reilly Press, 2002.

2. Robinson et al, "Professional C#", Fifth Edition, Wrox Press, 2002.

3. Herbert Schildt, "The Complete Reference: C#", Tata McGraw Hill, 2004.

4. Andrew Troelsen, "C# and the .NET Platform", A Press, 2003.

5. Thuan Thai and Hoang Q. Lam, ". NET Framework Essentials", Second Edition, O'Reilly, 2002.

10144CSE43   WIRELESS NETWORKS   3 0 0 3

UNIT I WIRELESS COMMUNICATION   7

Cellular systems- Frequency Management and Channel Assignment- types of handoff and their characteristics, dropped call rates & their evaluation - MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks

UNIT II WIRELESS LAN   9

IEEE 802.11 Standards – Architecture – Services – Mobile Ad hoc Networks- WiFi and WiMAX - Wireless Local Loop

UNIT III MOBILE COMMUNICATION SYSTEMS   11

GSM-architecture-Location tracking and call setup- Mobility management- Handover- Security-GSM SMS –International roaming for GSM- call recording functions-subscriber and service data mgt –-Mobile Number portability -VoIP service for Mobile Networks – GPRS –Architecture-GPRS procedures-attach and detach procedures-PDP context procedure-combined RA/LA update procedures-Billing

UNIT IV MOBILE NETWORK AND TRANSPORT LAYERS   9

Mobile IP – Dynamic Host Configuration Protocol-Mobile Ad Hoc Routing Protocols– Multicast routing-TCP over Wireless Networks – Indirect TCP – Snooping TCP – Mobile TCP – Fast Retransmit / Fast Recovery – Transmission/Timeout Freezing-Selective Retransmission – Transaction Oriented TCP- TCP over 2.5 / 3G wireless Networks

UNIT V APPLICATION LAYER   9

WAP Model- Mobile Location based services -WAP Gateway –WAP protocols – WAP user agent profile- caching model-wireless bearers for WAP - WML – WML Scripts – WTA - iMode- SyncML

TOTAL : 45 PERIODS

TEXT BOOKS:
1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education, 2003.

2. William Stallings, "Wireless Communications and Networks", Pearson Education,2002.

REFERENCES:

1. Kaveh Pahlavan, P Krishnamoorthy, "Principles of Wireless Networks", PHI Learning India, 2009.

2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, 2003.

3. C.K.Toh, "AdHoc Mobile Wireless Networks", First Edition, Pearson Education, 2002.

10177GE004   **TOTAL QUALITY MANAGEMENT**   **3 0 0 3**

UNIT I   INTRODUCTION   **9**

Introduction - Need for quality - Evolution of quality - Definition of quality - Dimensions of manufacturing and service quality - Basic concepts of TQM - Definition of TQM – TQM Framework - Contributions of Deming, Juran and Crosby – Barriers to TQM.

UNIT II   TQM PRINCIPLES   **9**

Leadership – Strategic quality planning, Quality statements - Customer focus – Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Employee involvement – Motivation, Empowerment, Team and Teamwork, Recognition and Reward, Performance appraisal - Continuous process improvement – PDSA cycle, 5s, Kaizen - Supplier partnership – Partnering, Supplier selection, Supplier Rating.

UNIT III TQM TOOLS & TECHNIQUES I   **9**

The seven traditional tools of quality – New management tools – Six-sigma: Concepts, methodology, applications to manufacturing, service sector including IT – Bench marking– Reason to bench mark, Bench marking process – FMEA – Stages, Types.

UNIT IV TQM TOOLS & TECHNIQUES II   **9**

Quality circles – Quality Function Deployment (QFD) – Taguchi quality loss function – TPM – Concepts, improvement needs – Cost of Quality – Performance measures.

UNIT V QUALITY SYSTEMS   **9**
Need for ISO 9000- ISO 9000-2000 Quality System – Elements, Documentation, Quality auditing- QS 9000 – ISO 14000 – Concepts, Requirements and Benefits – Case studies of TQM implementation in manufacturing and service sectors including IT.

TOTAL: 45 PERIODS

TEXT BOOK:

1. Dale H.Besterfiled, et at., "Total Quality Management", Pearson Education Asia, 3rdEdition, Indian Reprint (2006).

REFERENCES:

1. James R. Evans and William M. Lindsay, "The Management and Control of Quality",6th Edition, South-Western (Thomson Learning), 2005.
2. Oakland, J.S., "TQM – Text with Cases", Butterworth – Heinemann Ltd., Oxford, 3rdEdition, 2003.
3. Suganthi,L and Anand Samuel, "Total Quality Management", Prentice Hall (India) Pvt. Ltd.,2006.
4. Janakiraman, B and Gopal, R.K, "Total Quality Management – Text and Cases", Prentice Hall (India) Pvt. Ltd., 2006.

10144CSE45 SYSTEM   MODELING AND SIMULATION   3 0 0 3

UNIT I INTRODUCTION TO SIMULATION   9

Introduction – Simulation Terminologies- Application areas – Model Classification –Types of Simulation- Steps in a Simulation study- Concepts in Discrete Event Simulation - Simulation Examples

UNIT II MATHEMATICAL MODELS   9

Statistical Models - Concepts – Discrete Distribution- Continuous Distribution – Poisson Process- Empirical Distributions- Queueing Models – Characteristics- Notation –Queuing Systems – Markovian Models- Properties of random numbers- Generation of Pseudo Random numbers- Techniques for generating random numbers-Testing random number generators- Generating Random-Variates- Inverse Transform technique – Acceptance- Rejection technique – Composition & Convolution Method.

UNIT III ANALYSIS OF SIMULATION DATA   9

Input Modeling - Data collection - Assessing sample independence – Hypothesizing distribution family with data - Parameter Estimation - Goodness-of-fit tests – Selecting input models in absence of data- Output analysis for a Single system – Terminating Simulations – Steady state simulations.

UNIT IV VERIFICATION AND VALIDATION   9

Model Building – Verification of Simulation Models – Calibration and Validation of Models – Validation of Model Assumptions – Validating Input – Output Transformations.

UNIT V SIMULATION OF COMPUTER SYSTEMS AND CASE STUDIES   9

Simulation Tools – Model Input – High level computer system simulation – CPU –Memory Simulation – Comparison of systems via simulation – Simulation Programming techniques - Development of Simulation models.

TOTAL: 45 PERIODS

TEXT BOOKS:
1. Jerry Banks and John Carson, " Discrete Event System Simulation", Fourth Edition, PHI, 2005.
2. Geoffrey Gordon, "System Simulation", Second Edition, PHI, 2006 (Unit – V).

REFERENCES:

1. Frank L. Severance, " System Modeling and Simulation", Wiley, 2001.

2. Averill M. Law and W.David Kelton, " Simulation Modeling and Analysis, Third Edition, McGraw Hill, 2006.

3. Jerry Banks, "Handbook of Simulation: Principles, Methodology, Advances, Applications and Practice", Wiley, 1998.

75

10144CSE46   CRYPTOGRAPHY AND NETWORK SECURITY   3 0 0 3

UNIT I   9

Security trends – Attacks and services – Classical crypto systems – Different types of ciphers – LFSR sequences – Basic Number theory – Congruences – Chinese Remainder theorem –Modular exponentiation – Fermat and Euler's theorem – Legendre and Jacobi symbols – Finite fields – continued fractions.

UNIT II   9

Simple DES – Differential crypto analysis – DES – Modes of operation – Triple DES – AES – RC4 – RSA – Attacks – Primality test – factoring.

UNIT III   9

Discrete Logarithms – Computing discrete logs – Diffie-Hellman key exchange –ElGamal Public key cryptosystems – Hash functions – Secure Hash – Birthday attacks -MD5 – Digital signatures – RSA – ElGamal – DSA.

UNIT IV   9

Authentication applications – Kerberos, X.509, PKI – Electronic Mail security – PGP,S/MIME – IP security – Web Security – SSL, TLS, SET.

UNIT V   9

System security – Intruders – Malicious software – viruses – Firewalls – Security Standards.

                                                                                                TOTAL = 60 PERIODS

TEXT BOOKS:

1. Wade Trappe, Lawrence C Washington, " Introduction to Cryptography with coding theory", 2nd ed, Pearson, 2007.

2. William Stallings, "Cryptography and Network security Principles and Practices", Pearson /PHI, 4th ed, 2006.

3. VK Pachghare, "Cryptography and Information Security", PHI Learning India, 2010

REFERENCES:

1. W. Mao, "Modern Cryptography – Theory and Practice", Pearson Education, Second Edition, 2007.

2. Charles P. Pfleeger, Shari Lawrence Pfleeger – Security in computing Third Edition –Prentice Hall of India, 2006.

10144CSE47   NETWORK PROGRAMMING AND MANAGEMENT   3 0 0 3

UNIT I ELEMENTARY TCP SOCKETS   9

Introduction to Socket Programming – Overview of TCP/IP Protocols –Introduction to Sockets – Socket address Structures – Byte ordering functions – address conversion functions – Elementary TCP Sockets – socket, connect, bind, listen, accept, read, write, close functions – Iterative Server – Concurrent Server.

UNIT II APPLICATION DEVELOPMENT   9

TCP Echo Server – TCP Echo Client – Posix Signal handling – Server with multiple clients – boundary conditions: Server process Crashes, Server host Crashes, Server Crashes and reboots, Server Shutdown – I/O multiplexing – I/O Models – select function – shutdown function – TCP echo Server (with multiplexing) – poll function – TCP echo Client (with Multiplexing).

UNIT III SOCKET OPTIONS, ELEMENTARY UDP SOCKETS   9

Socket options – getsocket and setsocket functions – generic socket options – IP socket options – ICMP socket options – TCP socket options – Elementary UDP sockets – UDP echo Server – UDP echo Client – Multiplexing TCP and UDP sockets – Domain name system – gethostbyname function – Ipv6 support in DNS – gethostbyadr function – getservbyname and getservbyport functions.

UNIT IV ADVANCED SOCKETS   9

Ipv4 and Ipv6 interoperability – threaded servers – thread creation and termination – TCP echo server using threads – Mutexes – condition variables – raw sockets – raw socket creation – raw socket output – raw socket input – ping program – trace route program.

UNIT V SIMPLE NETWORK MANAGEMENT   9

SNMP network management concepts – SNMP management information – standard MIB's – SNMPv1 protocol and Practical issues – introduction to RMON, SNMPv2 and SNMPv3.

TOTAL : 45 PERIODS

TEXT BOOKS:

1. W. Richard Stevens, "Unix Network Programming Vol-I", II Edition, PHI Learning, India, 2010 .

2. Mani Subramaniam, "Network Management: Principles and Practice", Addison Wesley", First Edition, 2001.

REFERENCES:

1. D.E. Comer, "Internetworking with TCP/IP Vol- III", (BSD Sockets Version), Second Edition, Pearson Education, 2003.

2. William Stallings, "SNMP, SNMPv2, SNMPv3 and RMON 1 and 2", Third Edition, Addison Wesley, 1999.

10144CSE51   **GRAPH THEORY**   **3 0 0 3**

UNIT I   INTRODUCTION   9

Graphs – Introduction – Isomorphism – Sub graphs – Walks, Paths, Circuits – Connectedness – Components – Euler Graphs – Hamiltonian Paths and Circuits – Trees– Properties of trees – Distance and Centers in Tree – Rooted and Binary Trees.

UNIT II   TREES, CONNECTIVITY, PLANARITY   9

Spanning trees – Fundamental Circuits – Spanning Trees in a Weighted Graph – Cut Sets – Properties of Cut Set – All Cut Sets – Fundamental Circuits and Cut Sets –Connectivity and Separability – Network flows – 1-Isomorphism – 2-Isomorphism – Combinational and Geometric Graphs – Planer Graphs – Different Representation of a Planer Graph.

UNIT III   MATRICES, COLOURING AND DIRECTED GRAPH   9

Incidence matrix – Submatrices – Circuit Matrix – Path Matrix – Adjacency Matrix –Chromatic Number – Chromatic partitioning – Chromatic polynomial – Matching –Covering – Four Color Problem – Directed Graphs – Types of Directed Graphs –Digraphs and Binary Relations – Directed Paths and Connectedness – Euler Graphs –Adjacency Matrix of a Digraph.

UNIT IV   ALGORITHMS   9

Algorithms: Connectedness and Components – Spanning tree – Finding all SpanningTrees of a Graph – Set of Fundamental Circuits – Cut Vertices and Separability –Directed Circuits.

UNIT V   ALGORITHMS   9

Algorithms: Shortest Path Algorithm – DFS – Planarity Testing – Isomorphism.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Narsingh Deo, "Graph Theory: With Application to Engineering and Computer Science", Prentice Hall of India, 2003.

REFERENCES:

1. R.J. Wilson, "Introduction to Graph Theory", Fourth Edition, Pearson Education, 2003.

10144CSE52   SOFTWARE QUALITY ASSURANCE   3 0 0 3

UNIT I FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE   9

The Role of SQA – SQA Plan – SQA considerations – SQA people – Quality Management – Software Configuration Management

UNIT II MANAGING SOFTWARE QUALITY   9

Managing Software Organizations – Managing Software Quality – Defect Prevention –   Software Quality Assurance Management

UNIT III SOFTWARE QUALITY ASSURANCE METRICS   9

Software Quality – Total Quality Management (TQM) – Quality Metrics – Software Quality Metrics Analysis

UNIT IV SOFTWARE QUALITY PROGRAM   9

Software Quality Program Concepts – Establishment of a Software Quality Program –Software Quality Assurance Planning – An Overview – Purpose & Scope.

UNIT V SOFTWARE QUALITY ASSURANCE STANDARDIZATION   9

Software Standards–ISO 9000 Quality System Standards - Capability Maturity Model and the Role of SQA in Software Development Maturity – SEI CMM Level 5 – Comparison of ISO 9000 Model with SEI's CMM

TOTAL : 45 PERIODS

TEXT BOOKS:

1. Mordechai Ben-Menachem / Garry S Marliss, "Software Quality", Vikas Publishing House, Pvt, Ltd., New Delhi.(UNIT III to V)

2. Watts S Humphrey, " Managing the Software Process", Pearson Education Inc.(UNIT I and II)

REFERENCES:

1. Gordon G Schulmeyer, "Handbook of Software Quality Assurance", Third Edition, Artech House Publishers 2007

2. Nina S Godbole, "Software Quality Assurance: Principles and Practice", Alpha Science International Ltd, 2004

10144CSE53   DISTRIBUTED SYSTEMS   3 0 0 3

UNIT I   **9**

Characterization of Distributed Systems-Introduction-Examples-Resource Sharing and the Web-Challenges. System Models-Architectural-Fundamental. Inter process Communication-Introduction-API for Internet protocols-External data representation and marshalling--Client-server communication-Group communication- Case study: Inter process Communication in UNIX.

UNIT II   **9**

Distributed Objects and Remote Invocation-Introduction-Communication between distributed objects-Remote procedure calls-Events and notifications-Case study: Java RMI. Operating System Support-Introduction-OS layer-Protection-Processes and threads- Communication and invocation OS architecture.

UNIT III   **9**

Distributed File Systems-Introduction-File service architecture- Case Study: Sun Network File System-Enhancements and further developments. Name Services-Introduction-Name Services and the Domain Name System-Directory Services-Case Study: Global Name Service.

UNIT IV   **9**

Time and Global States-Introduction-Clocks, events and process states-Synchronizing physical clocks-Logical time and logical clocks-Global states-Distributed debugging. Coordination and Agreement-Introduction-Distributed mutual exclusion-Elections- Multicast communication-Consensus and related problems.

UNIT V   **9**

Distributed Shared Memory-Introduction-Design and implementation issues-Sequential consistency and Ivy case study Release consistency and Munin case study-Other consistency models. CORBA Case Study- Introduction-CORBA RMI-CORBA services.

                                                                                    TOTAL: 45 PERIODS

TEXT BOOK:

George Coulouris, Jean Dollimore, Tim Kindberg, , "Distributed Systems: Concepts and Design", 4th Edition, Pearson Education, 2005.

REFERENCES:

1. A. S. Tanenbaum and M. V. Steen, "Distributed Systems: Principles and Paradigms", Second Edition, Prentice Hall, 2006.

2. M.L.Liu, "Distributed Computing Principles and Applications", Pearson Addison Wesley, 2004.

3. Mukesh Singhal, "Advanced Concepts In Operating Systems", McGrawHill Series in Computer Science, 1994.

4. Nancy A. Lynch, "Distributed Algorithms", The Morgan Kaufmann Series in Data Management System, Morgan Kaufmann Publishers, 2000.

10144CSE54   KNOWLEDGE BASED DECISION SUPPORT SYSTEM   3 0 0 3

UNIT I   **9**

Decision Making and computerized support: Management support systems. Decision making systems modeling- support.

UNIT II   **9**

Decision Making Systems – Modeling and Analysis – Business Intelligence – Data Warehousing, Data Acquisition - Data Mining. Business Analysis – Visualization - Decision Support System Development.

UNIT III   **9**

Collaboration, Communicate Enterprise Decision Support System & Knowledge management – Collaboration Com Technologies Entreprise information system – knowledge management.
[
UNIT IV   **9**

Intelligent Support Systems – AI & Expert Systems – Knowledge based Systems – Knowledge Acquisition , Representation & Reasoning, Advanced intelligence system –Intelligence System over internet.

UNIT V   **9**

Implementing MSS in the E-Business ERA – Electronic Commerce – integration, Impacts and the future management support systems.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Decision Support Systems & Intelligent Systems – Seventh edition Efraim Turban & Jay E. Aronson Ting-Peng Liang - Pearson/prentice Hall

2. Decision support Systems – Second Edition – George M Marakas – Pearson / Prentice Hall.

REFERENCES:

1. Decision Support Systems – V.S. Janakiraman & K. Sarukesi

2. Decision Support systems and Data warehouse Systems by Efrem G Mallach- McGraw Hill

10144CSE55 DIGITAL SIGNAL PROCESSING   3 0 0 3

UNIT I   SIGNALS AND SYSTEMS   9

Basic elements of DSP – concepts of frequency in Analog and Digital Signals – sampling theorem – discrete – time signals, systems – Analysis of discrete time LTI systems – Z transform – Convolution (linear and circular) – Correlation.

UNIT II   FREQUENCY TRANSFORMATIONS   9

Introduction to DFT – Properties of DFT – Filtering methods based on DFT – FFT Algorithms decimation – in – time Algorithms, Decimation – in – frequency Algorithms –Use of FFT in Linear Filtering – DCT.

UNIT III   IIR FILTER DESIGN
                                                    9
Structures of IIR – Analog filter design – Discrete time IIR filter from analog filter – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives – (HPF, BPF, BRF) filter design using frequency translation

UNIT IV   FIR FILTER DESIGN
                                                    9
Structures of FIR – Linear phase FIR filter – Filter design using windowing techniques, Frequency sampling techniques – Finite word length effects in digital Filters

UNIT V   APPLICATIONS
                                                    9
Multirate signal processing – Speech compression – Adaptive filter – Musical sound processing – Image enhancement.

                                                    TOTAL: 45 PERIODS

TEXT BOOKS:

1. John G. Proakis & Dimitris G.Manolakis, "Digital Signal Processing – Principles, Algorithms & Applications", Fourth edition, Pearson education / Prentice Hall, 2007.

2. Emmanuel C..Ifeachor, & Barrie.W.Jervis, "Digital Signal Processing", Second edition, Pearson Education / Prentice Hall, 2002.

REFERENCES:

1. Alan V.Oppenheim, Ronald W. Schafer & Hohn. R.Back, "Discrete Time Signal Processing", Pearson Education, 2nd edition, 2005.

2. Andreas Antoniou, "Digital Signal Processing", Tata McGraw Hill, New Delhi 2001

10144CSE56   **DIGITAL IMAGE PROCESSING**   **3 0 0 3**

UNIT I FUNDAMENTALS OF IMAGE PROCESSING   9

Introduction – Steps in Image Processing Systems – Image Acquisition – Sampling and Quantization – Pixel Relationships – Color Fundamentals and Models, File Formats, Image operations – Arithmetic, Geometric and Morphological.

UNIT II IMAGE ENHANCEMENT   9

Spatial Domain Gray level Transformations Histogram Processing Spatial Filtering –Smoothing and Sharpening. Frequency Domain : Filtering in Frequency Domain – DFT,FFT, DCT – Smoothing and Sharpening filters – Homomorphic Filtering.
.

UNIT III IMAGE SEGMENTATION AND FEATURE ANALYSIS   9

Detection of Discontinuities – Edge Operators – Edge Linking and Boundary Detection –Thresholding – Region Based Segmentation – Morphological Water Sheds – Motion Segmentation, Feature Analysis and Extraction.

UNIT IV MULTI RESOLUTION ANALYSIS AND COMPRESSIONS   9

Multi Resolution Analysis : Image Pyramids – Multi resolution expansion – Wavelet Transforms.
Image Compression : Fundamentals – Models – Elements of Information Theory – Error Free Compression – Lossy Compression – Compression Standards.

UNIT V APPLICATIONS OF IMAGE PROCESSING   9

Image Classification – Image Recognition – Image Understanding – Video Motion Analysis – Image Fusion – Steganography – Digital Compositing – Mosaics – Colour Image Processing..

                                                              TOTAL : 45 PERIODS

TEXT BOOKS:

1. Rafael C.Gonzalez and Richard E.Woods, "Digital Image Processing" Second Edition, Pearson Education, 2003.

REFERENCES:

1**.** Milan Sonka, Vaclav Hlavac and Roger Boyle, "Image Processing, Analysis and Machine Vision", Second Edition, Thomson Learning, 2001

2. Anil K.Jain, "Fundamentals of Digital Image Processing", PHI, 2006.

3. Sanjit K. Mitra, & Giovanni L. Sicuranza, "Non Linear Image Processing", Elsevier, 2007.

4. Richard O. Duda, Peter E. HOF, David G. Stork, "Pattern Classification" Wiley Student Edition, 2006.

10144CSE57   BIO INFORMATICS   3 0 0 3

UNIT I   **9**

Introduction to molecular biology – the genetic material – gene structure – protein structure – chemical bonds – molecular biology tools – genomic information content

UNIT II   **9**

Data searches – simple alignments – gaps – scoring matrices – dynamic programming – global and local alignments – database searches – multiple sequence alignments Patterns for substitutions – estimating substitution numbers – evolutionary rates – molecular clocks – evolution in organelles

UNIT III   **9**

Phylo genetics – history and advantages – phylo genetic trees – distance matrix methods – maximum likelihood approaches – multiple sequence alignments – Parsimony – ancestral sequences – strategies for faster searches – consensus trees – tree confidence – comparison of phylo genetic methods – molecular phylogenies.

UNIT IV   **9**

Genomics – prokaryotic genomes: prokaryotic gene structure – GC content – gene density – eukaryotic genomes: gene structure – open reading frames – GC content – gene expression – transposition – repeated elements – gene density

UNIT V   **9**

Amino acids – polypeptide composition – secondary structure – tertiary and quaternary structure – algorithms for modeling protein folding – structure prediction – predicting RNA secondary structures
Proteomics – protein classification – experimental techniques – inhibitors and drug design – ligand screening – NMR structures – empirical methods and prediction techniques – post-translational modification prediction

TOTAL: 45 PERIODS

TEXT BOOK

1. D. E. Krane and M. L. Raymer, "Fundamental concepts of Bio informatics", Pearson Education, 2003.

REFERENCES

1. S.C. Rastogi, N.Mendiratta and P.Rastogi, "Bioinformatics – methods and applications", PHI Learning India, 2010

2. Arthur M. Lesk, "Introduction to Bioinformatics", Second Edition, Oxford University Press, 2005.

3. T. K. Attwood, D. J. Parry-Smith, and S. Phukan, "Introduction to Bio informatics", Pearson Education, 1999.

4. Vittal R. Srinivas, "Bioinformatics – A Modern Approach", Prentice-Hall of India Pvt. Ltd., 2005.

10144CSE58   **INFORMATION SECURITY**   **3 0 0 3**

UNIT I   **INTRODUCTION**

9

History, What is Information Security?, Critical Characteristics of Information, NSTISSC Security Model, Components of an Information System, Securing the Components, Balancing Security and Access, The SDLC, The Security SDLC

UNIT II SECURITY INVESTIGATION   **9**

Need for Security, Business Needs, Threats, Attacks, Legal, Ethical and Professional Issues

UNIT III SECURITY ANALYSIS   **9**

Risk Management: Identifying and Assessing Risk, Assessing and Controlling Risk

UNIT IV LOGICAL DESIGN   **9**

Blueprint for Security, Information Security Policy, Standards and Practices, ISO 17799/BS 7799, NIST Models, VISA International Security Model, Design of Security Architecture, Planning for Continuity

UNIT V PHYSICAL DESIGN   **9**

Security Technology, IDS, Scanning and Analysis Tools, Cryptography, Access Control Devices, Physical Security, Security and Personnel

     TOTAL: 45 PERIODS

TEXT BOOK:

1. Michael E Whitman and Herbert J Mattord, "Principles of Information Security", Vikas Publishing House, New Delhi, 2003

REFERENCES:

1. Micki Krause, Harold F. Tipton, " Handbook of Information Security Management", Vol 1-3 CRC Press LLC, 2004.

2. Stuart Mc Clure, Joel Scrambray, George Kurtz, "Hacking Exposed", Tata McGraw- Hill, 2003

3. Matt Bishop, " Computer Security Art and Science", Pearson/PHI, 2002.

10177GE005   PROFESSIONAL ETHICS AND HUMAN VALUES   3 0 0 3

UNIT I   ENGINEERING ETHICS   9

Senses of 'Engineering Ethics' – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Professions and Professionalism – Professional Ideals and Virtues – Uses of Ethical Theories.

61

UNIT II ENGINEERING AS SOCIAL EXPERIMENTATION   9

Engineering as Experimentation – Engineers as responsible Experimenters – Research Ethics - Codes of Ethics – Industrial Standards - A Balanced Outlook on Law – The Challenger Case Study

UNIT III ENGINEER'S RESPONSIBILITY FOR SAFETY   9

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis – Reducing Risk – The Government Regulator's Approach to Risk - Chernobyl Case Studies and Bhopal

UNIT IV RESPONSIBILITIES AND RIGHTS   9

Collegiality and Loyalty – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination.

UNIT V GLOBAL ISSUES   9

Multinational Corporations – Business Ethics - Environmental Ethics – Computer Ethics - Role in Technological Development – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Honesty – Moral Leadership – Sample Code of Conduct

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw Hill, New York, 2005.

2. Charles E Harris, Michael S Pritchard and Michael J Rabins, "Engineering Ethics –Concepts and Cases", Thompson Learning, 2000.

REFERENCES:

1. Charles D Fleddermann, "Engineering Ethics", Prentice Hall, New Mexico,1999.
2. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, 2003
3. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, 2001.
4. Prof. (Col) P S Bajaj and Dr. Raj Agrawal, "Business Ethics – An Indian Perspective", Biztantra, New Delhi, 2004.
5. David Ermann and Michele S Shauf, "Computers, Ethics and Society", Oxford University Press, (2003)

10177GE008 **INDIAN CONSTITUTION AND SOCIETY**   **3 0 0 3**

UNIT I   **9**

Historical Background – Constituent Assembly of India – Philosophical foundations of the Indian constitution – Preamble – Fundamental Rights – Directive Principles of State Policy – Fundamental Duties – Citizenship – Constitutional Remedies for citizens.

UNIT II   **9**

Union Government – Structures of the Union Government and Functions – President – Vice President – Prime Minister – Cabinet – Parliament – Supreme Court of India –Judicial Review.

UNIT III   **9**

State Government – Structure and Functions – Governor – Chief Minister – Cabinet – State Legislature – Judicial System in States – High Courts and other Subordinate Courts.

UNIT IV   **9**

Indian Federal System – Center – State Relations – President's Rule – Constitutional Amendments – Constitutional Functionaries - Assessment of working of the Parliamentary System in India.

UNIT V   **9**

Society : Nature, Meaning and definition; Indian Social Structure; Caste, Religion, Language in India; Constitutional Remedies for citizens – Political Parties and Pressure Groups; Right of Women, Children and Scheduled Castes and Scheduled Tribes and other Weaker Sections.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Durga Das Basu, " Introduction to the Constitution of India ", Prentice Hall of India, New Delhi.
2. R.C.Agarwal, (1997) "Indian Political System", S.Chand and Company, New Delhi.
3. Maciver and Page, " Society: An Introduction Analysis ", Mac Milan India Ltd., New Delhi.
4. K.L.Sharma, (1997) "Social Stratification in India: Issues and Themes", Jawaharlal Nehru University, New Delhi.

REFERENCES:

1. Sharma, Brij Kishore, " Introduction to the Constitution of India:, Prentice Hall of India, New Delhi.
2. U.R.Gahai, "Indian Political System ", New Academic Publishing House, Jalaendhar.
3. R.N. Sharma, "Indian Social Problems ", Media Promoters and Publishers Pvt. Ltd.

10144CSE62 HIGH SPEED NETWORKS 3 0 0 3

UNIT I HIGH SPEED NETWORKS 9

Frame Relay Networks – Asynchronous transfer mode – ATM Protocol Architecture, ATM logical Connection – ATM Cell – ATM Service Categories – AAL. High Speed LAN's: Fast Ethernet – Gigabit Ethernet– Fibre Channel – Wireless LAN's, WiFi and WiMax Networks applications, requirements – Architecture of 802.11.

UNIT II CONGESTION AND TRAFFIC MANAGEMENT 8

Queuing Analysis – Queuing Models – Single Server Queues – Effects of Congestion –Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.

UNIT III TCP AND ATM CONGESTION CONTROL 12

TCP Flow control – TCP Congestion Control – Retransmission – Timer Management – Exponential RTO backoff – KARN's Algorithm – Window management – Performance of TCP over ATM. Traffic and Congestion control in ATM – Requirements – Attributes – Traffic Management Frame work, Traffic Control – ABR traffic Management – ABR rate control, RM cell formats – ABR Capacity allocations – GFR traffic management.

UNIT IV INTEGRATED AND DIFFERENTIATED SERVICES 8

Integrated Services Architecture – Approach, Components, Services- Queuing Discipline – FQ – PS – BRFQ – GPS – WFQ – Random Early Detection – Differentiated Services.

UNIT V PROTOCOLS FOR QOS SUPPORT 8

RSVP – Goals & Characteristics, Data Flow, RSVP operations – Protocol Mechanisms – Multiprotocol Label Switching – Operations, Label Stacking – Protocol details – RTP – Protocol Architecture – Data Transfer Protocol– RTCP.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. William Stallings, "High speed networks and internet", Second Edition, Pearson Education, 2002.

REFERENCES:

1. Warland, Pravin Varaiya, "High performance communication networks", Second Edition , Jean Harcourt Asia Pvt. Ltd., , 2001.

2. Irvan Pepelnjk, Jim Guichard, Jeff Apcar, "MPLS and VPN architecture", Cisco Press, Volume 1 and 2, 2003.

3. Abhijit S. Pandya, Ercan Sea, "ATM Technology for Broad Band Telecommunication Networks", CRC Press, New York, 2004.

10144CSE63   ROBOTICS   3 0 0 3

UNIT I   SCOPE OF ROBOTS AND INTELLIGENCE   9

The scope of industrial Robots - Definition of an industrial robot - Need for industrial robots - applications. Robot Intelligence – State Space Search – Problem Reduction –Use of Predicate – logic – means Ends Analysis – Problem Solving – Robot Learning –Robot Task Planning – Basic Problems in Task Planning.

UNIT II   ROBOT COMPONENTS   9

Fundamentals of Robot Technology - Automation and Robotics - Robot anatomy - Work volume - Precision of movement - End effectors - Sensors.

UNIT III   ROBOT PROGRAMMING   9

Robot Programming - Methods - interlocks textual languages. Characteristics of Robot level languages, characteristic of task level languages.

UNIT IV   ROBOT WORK CELL   9

Robot Cell Design and Control - Remote Center compliance - Safety in Robotics.

UNIT V   FUTURE TRENDS   9

Advanced robotics, Advanced robotics in Space - Specific features of space robotics systems - long-term technical developments, Advanced robotics in under – water operations. Robotics Technology of the Future - Future Applications.

TOTAL: 45 PERIODS

TEXTBOOK:

1.   Barry Leatham - Jones, "Elements of industrial Robotics" PITMAN Publishing, 1987.

REFERENCES:

1. Mikell P.Groover, Mitchell Weiss, Roger N.Nagel Nicholas G.Odrey, "Industrial Robotics Technology, Programming and Applications ", McGraw Hill Book Company 1986.

2. Fu K.S. Gonzalez R.C. and Lee C.S.G., "Robotics Control Sensing, Vision and Intelligence (chapter 10) " McGraw Hill International Editions, 1987.

3. Bernard Hodges and Paul Hallam, " Industrial Robotics", British Library Cataloging in Publication 1990.

4. Deb, S.R. Robotics Technology and flexible automation, Tata Mc Graw Hill, 1994.
5.Schilling R J, "Fundamentals of Robotics- Analysis and controls", PHI Learning India 2010
6. Saeed B.Niku, "Introduction to Robotics", PHI Learning India 2009

10144CSE64   QUANTUM COMPUTING   3 0 0 3

UNIT I FOUNDATION   9

Overview of traditional computing – Church-Turing thesis – circuit model of computation – reversible computation – quantum physics – quantum physics and computation – Dirac notation and Hilbert Spaces – dual vectors – operators – the spectral theorem –functions of operators – tensor products – Schmidt decomposition theorem.

UNIT II QUBITS AND QUANTUM MODEL OF COMPUTATION   9

State of a quantum system – time evolution of a closed system – composite systems – measurement – mixed states and general quantum operations – quantum circuit model – quantum gates – universal sets of quantum gates – unitary transformations – quantum circuits

UNIT III QUANTUM ALGORITHMS – I   9

Superdense coding – quantum teleportation – applications of teleportation – probabilistic versus quantum algorithms – phase kick-back – the Deutsch algorithm – the Deutsch-Jozsa algorithm – Simon's algorithm – Quantum phase estimation and quantum Fourier Transform – eigen value estimation

UNIT IV QUANTUM ALGORITHMS – II   9

Order-finding problem – eigen value estimation approach to order finding – Shor's algorithm for order finding – finding discrete logarithms – hidden subgroups – Grover's quantum search algorithm – amplitude amplification – quantum amplitude estimation –quantum counting – searching without knowing the success probability.

UNIT V QUANTUM COMPUTATIONAL COMPLEXITY AND ERROR CORRECTION
9

Computational complexity – black-box model – lower bounds for searching – general black-box lower bounds – polynomial method – block sensitivity – adversary methods –classical error correction – classical three-bit code – fault tolerance – quantum error correction – three- and nine-qubit quantum codes – fault-tolerant quantum computation

TOTAL: 45 PERIODS

TEXT BOOK:

P. Kaye, R. Laflamme, and M. Mosca, "An introduction to Quantum Computing", Oxford University Press, 1999.

REFERENCES

V. Sahni, "Quantum Computing", Tata McGraw-Hill Publishing Company, 2007.

Smile

10144CSE65   **GRID COMPUTING**   **3 0 0 3**

UNIT I   CONCEPTS AND ARCHITECTURE   9

Introduction-Parallel and Distributed Computing-Cluster Computing-Grid Computing- Anatomy and Physiology of Grid-Review of Web Services-OGSA-WSRF.

UNIT II   GRID MONITORING   9

Grid Monitoring Architecture (GMA) - An Overview of Grid Monitoring Systems- GridICE – JAMM - MDS-Network Weather Service-R-GMA-Other Monitoring Systems- Ganglia and GridMon

UNIT III   GRID SECURITY AND RESOURCE MANAGEMENT   9

Grid Security-A Brief Security Primer-PKI-X509 Certificates-Grid Security-Grid Scheduling and Resource Management-Scheduling Paradigms- Working principles of Scheduling -A Review of Condor, SGE, PBS and LSF-Grid Scheduling with QoS.

UNIT IV   DATA MANAGEMENT AND GRID PORTALS   9

Data Management-Categories and Origins of Structured Data-Data Management Challenges-Architectural Approaches-Collective Data Management Services-Federation Services-Grid Portals-First-Generation Grid Portals-Second-Generation Grid Portals.

UNIT V   GRID MIDDLEWARE   9

List of globally available Middle wares - Case Studies-Recent version of Globus Toolkit and gLite - Architecture, Components and Features.

                                        TOTAL: 45 PERIODS

TEXT BOOK:

1. Maozhen Li, Mark Baker, The Grid Core Technologies, John Wiley & Sons ,2005.

REFERENCES:

1. Ian Foster & Carl Kesselman, The Grid 2 – Blueprint for a New Computing Infrastructure , Morgan Kaufman – 2004

2. Joshy Joseph & Craig Fellenstein, "Grid Computing", Pearson Education 2004.

3. Fran Berman,Geoffrey Fox, Anthony J.G.Hey, "Grid Computing: Making the Global Infra structure a reality", John Wiley and sons, 2003.

10144CSE66   AGENT BASED INTELLIGENT SYSTEMS   3 0 0 3

UNIT I INTRODUCTION   9

Definitions - Foundations - History - Intelligent Agents-Problem Solving-Searching - Heuristics - Constraint Satisfaction Problems - Game playing.

UNIT II KNOWLEDGE REPRESENTATION AND REASONING   9

Logical Agents-First order logic-First Order Inference-Unification-Chaining- Resolution Strategies-Knowledge Representation-Objects-Actions-Events

UNIT III PLANNING AGENTS   9

Planning Problem-State Space Search-Partial Order Planning-Graphs-Nondeterministic Domains-Conditional Planning-Continuous Planning-Multi Agent Planning.

UNIT IV AGENTS AND UNCERTAINITY   9

Acting under uncertainty – Probability Notation-Bayes Rule and use – Bayesian Networks-Other Approaches-Time and Uncertainty-Temporal Models- Utility Theory - Decision Network – Complex Decisions.

UNIT V HIGHER LEVEL AGENTS   9

Knowledge in Learning-Relevance Information-Statistical Learning Methods- Reinforcement Learning-Communication-Formal Grammar-Augmented Grammars- Future of AI.

TOTAL: 45 PERIODS

TEXT BOOK:

1. Stuart Russell and Peter Norvig, "Artificial Intelligence - A Modern Approach",2nd Edition, Prentice Hall, 2002

REFERENCES:

1. Michael Wooldridge, "An Introduction to Multi Agent System", John Wiley, 2002.

2. Patrick Henry Winston, Artificial Intelligence, 3rd Edition, AW, 1999.

3. Nils.J.Nilsson, Principles of Artificial Intelligence, Narosa Publishing House, 1992

10144CSE67   CLOUD COMPUTING   **3 0 0 3**

Aim :   To understand the technology behind cloud computing, the benefits and applications

Objectives:

To understand the basic concepts and the technology involved in cloud computing

To understand the implementation and service models available for cloud computing

To realize the benefits and advantages of cloud computing

UNIT –I   CLOUD COMPUTING BASICS   9

History of cloud computing – Client/Server computing – Peer – peer computing – Distributed computing – Collaborative computing – Cloud computing – next step – cloud computing working – cloud architecture – understanding the cloud storage and services – Companies in the cloud – Cloud components – Infrastructure – Services and applications – Storage – Database services – Intranets and the cloud – Components – Hypervisor applications – Use of cloud computing – Benefits – Limitations – Security concerns – Regulatory issues.

UNIT – II   BUSINESS CASE FOR CLOUD   9

Cloud computing titans – Cloud computing services – Infrastructure as a service – Platform as a service – Software as a service – Software plus services – Business application benefits – Operational benefits – Economic benefits – Evaluating SaaS – Staffing benefits – Deleting data center.

UNIT – III CLOUD COMPUTING TECHNOLOGY   9

Hardware and infrastructure – Clients – Security – Network – Services – Accessing the Cloud – Platforms – Web applications – Web APIs – Web browser – Cloud storage – standards – Application – clients – Infrastructures – Services.

UNIT – IV   CLOUD COMPUTING AT WORK   9

Software as a service – Overview – driving forces – Company offerings – Industries – Software plus services – Overview – Mobile device integration – Providers – Microsoft online – Developing applications.

UNIT – V   THIN CLIENT - CLOUD COMPUTING   9

Local clouds and thin clients – virtualization in organization – server solutions – Thin clients – Migrating to the cloud – Cloud services for individuals – Cloud services for mid-market – Enterprise class cloud offerings – Migration – Best practices and future of cloud computing.

Total: 45 Periods

TEXT BOOK

1. Antony T Velte, Toby J. Velte and Robert ElsenPeter, "Cloud computing: A practical approach", Tat McGraw Hill, NewDelhi - 2010

10144CSE68   BIO INFORMATICS COMPUTING   **3   0   0   3**

UNIT – I INTRODUCTION   9

Parallel universe – killer application- Watson definition – Top down verses bottom up – Information flow – from data to knowledge – convergence – control – archiving – numerical processing – communications. Databases – data management - - complexity – Data life cycle – data creation and acquisition – use – data modification - archiving – repurposing – disposal – managing the life cycle – Database technology – architecture – DBMS – Interfaces and Implementation – infrastructure.

UNIT - II NETWORKS and SEARCH ENGINES   9

Communications models – transmission technology – Protocols – bandwidths – Topology – Hardware – media – network electronics – Contents – security – Antiviral utilities – authentication – Firewalls – Encryption – Process – Ownership and Implementation – Management. Search Engines - The search process – Search engine technology – Intelligent agents – Portals – User interface tools – Utilities – Searching and Information theory – Computational methods – Search algorithms – Approximate searches – Search engines and knowledge management.

UNIT – III DATA VISUALIZATION AND STATISTICS   9

Sequence visualization – Structure visualization – visualization tools - Rendering tools – User Interface – display architecture – animation and simulation – Technologies. Statistical concepts - Micro arrays and imperfect data – Basics – Randomness – variability – approximation – interface noise – sampling and distributions – Hypothesis testing – Quantifying randomness – Data analysis and tool selection – Statistics of alignment – Clustering and classification.

UNIT - IV DATA MINING AND PATTERN MATCHING   9

Data mining methods – selection and sampling – Preprocessing - Transformation and reduction – evaluation and visualization – designing new queries – Technology overview – infra structure – Pattern recognition and discovery - Machine learning – Inductive logic programming – Genetic algorithms – Neural networks – Statistical methods and decision trees – Hidden Markov Models – Text mining – Natural Language Processing – Text summarization-tools. Pattern Matching – Pair wise sequence alignment – multiple sequence alignment - computational methods – Dot matrix analysis – Substitution matrices – dynamic programming – Word – Bayesian methods - Multiple sequence alignment – dynamic programming – progressive – iterative strategies – Tools – Nucleotide – Polypeptide pattern matching – Utilities – sequence databases.

UNIT –V MODELING, SIMULATION AND COLLABORATION   9

Drug discovery – modeling - components – process – perspectives – algorithms and hardware – Protein structure – Ab Initio and heuristic methods. – Collaboration and communications Asynchronous and synchronous communication and collaborations – Standards and issues – Platform dependence and security Intellectual property and economics.

Total : 45 Periods

TEXT BOOK:

1. Bryan Bergeron M.D, "Bio Informatics Computing", PHI Learning India, 2009

10144CSE69   SOFTWARE PROJECT MANAGEMENT   3 0 0 3

UNIT I INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT   9

Project Definition – Contract Management – Activities Covered By Software Project Management – Overview Of Project Planning – Stepwise Project Planning.

UNIT II   PROJECT EVALUATION   9

Strategic Assessment – Technical Assessment – Cost Benefit Analysis –Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation.

UNIT III ACTIVITY PLANNING   9

Objectives – Project Schedule – Sequencing and Scheduling Activities –Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity on Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard identification – Hazard Analysis – Risk Planning And Control.

UNIT IV MONITORING AND CONTROL   9

Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring –Earned Value – Priortizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types Of Contract – Stages In Contract Placement – Typical Terms Of A Contract – Contract Management – Acceptance.

UNIT V MANAGING PEOPLE AND ORGANIZING TEAMS   9

Introduction – Understanding Behavior – Organizational Behaviour:A Background – Selecting The Right Person For The Job – Instruction In The Best Methods – Motivation– The Oldman – Hackman Job Characteristics Model – Working In Groups – Becoming A Team –Decision Making – Leadership – Organizational Structures – Stress –Health And Safety – Case Studies.

TOTAL: 45 PERIODS

TEXT BOOK:

1. Bob Hughes, Mikecotterell, "Software Project Management", Third Edition, Tata McGraw Hill, 2004.

REFERENCES:

1. Ramesh, Gopalaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.

2. Royce, "Software Project Management", Pearson Education, 1999.

3. Jalote, "Software Project Manangement in Practive", Pearson Education, 2002.