ANNA UNIVERSITY CHENNAI:: CHENNAI 600 025
CURRICULUM 2004
B.E. COMPUTER SCIENCE AND ENGINEERING

SEMESTER III

(Applicable to the students admitted from the Academic year 2006 – 2007 onwards)

Code No.	Course Title	L	T	P	M
THEORY					
MA1201	Mathematics III	3	1	0	100
CS1151	Data Structures	3	1	0	100
CS1202	Digital Principles and Systems Design	3	1	0	100
CS1203	System Software	3	0	0	100
CS1204	Object Oriented Programming	3	0	0	100
CY1201	Environmental Science and Engineering	3	0	0	100
PRACTICAL					
CS1205	Object Oriented Programming Lab	0	0	3	100
CS1206	Digital Lab	0	0	3	100
CS1152	Data Structures Lab	0	0	3	100

SEMESTER IV

(Applicable to the students admitted from the Academic year 2006 – 2007 onwards)

Code No.	Course Title	L	T	P	M
THEORY					
MA1252	Probability and Queuing Theory	3	1	0	100
CS1201	Design and Analysis of Algorithms	3	1	0	100
EC1291	Analog and Digital Communication	3	1	0	100
CS1251	Computer Architecture	3	1	0	100
CS1252	Operating Systems	3	0	0	100
CS1253	Visual Programming	3	0	0	100
PRACTICAL					
CS1207	System Software Lab	0	0	3	100
CS1254	Operating Systems Lab	0	0	3	100
CS1255	Visual Programming Lab	0	0	3	100

SEMESTER V

(Applicable to the students admitted from the Academic year 2006 – 2007 onwards)

Code No.	Course Title	L	T	P	M
THEORY					
MG1351	Principles of Management	3	0	0	100
MA1256	Discrete Mathematics	3	1	0	100
CS1301	Database Management Systems	3	1	0	100
CS1302	Computer Networks	3	0	0	100
CS1303	Theory of Computation	3	1	0	100
CS1304	Microprocessors & Micro controllers	3	1	0	100
GE1302	Communication Skill & Seminar**	0	0	3	-
PRACTICAL					
CS1305	Network Lab	0	0	3	100

CS1306	Microprocessors & Micro controllers Lab	0	0	3	100
CS1307	DBMS Lab	0	0	3	100

SEMESTER VI

(Applicable to the students admitted from the Academic year 2006 – 2007 onwards)

Code No.	Course Title	L	T	P	M
THEORY					
CS1351	Artificial Intelligence	3	0	0	100
CS1352	Principles of Compiler Design	3	1	0	100
CS1353	Software Engineering	3	0	0	100
CS1354	Graphics and Multimedia	3	0	0	100
MA1251	Numerical Methods	3	1	0	100
	Elective – I	3	0	0	100
GE1351	Presentation Skill & Seminar**	0	0	3	-
PRACTICAL					
CS1355	Graphics and Multimedia Lab	0	0	3	100
CS1356	Compiler Design Lab	0	0	3	100

SEMESTER VII

(Applicable to the students admitted from the Academic year 2006 – 2007 onwards)

Code No.	Course Title	L	T	P	M
THEORY					
	Elective – II	3	0	0	100
CS1401	Internet Programming	3	0	0	100
CS1402	Object Oriented Analysis and Design	3	1	0	100
IT1252	Digital Signal Processing	3	1	0	100
	Elective III	3	0	0	100
	Elective IV	3	0	0	100
PRACTICAL					
CS1403	Case Tools Lab	0	0	3	100
CS1404	Internet Programming Lab	0	0	3	100

SEMESTER VIII

(Applicable to the students admitted from the Academic year 2006 – 2007 onwards)

Code No.	Course Title	L	T	P	M
THEORY					
IT1402	Mobile Computing	3	0	0	100
	Elective V	3	0	0	100
	Elective VI	3	0	0	100
PRACTICAL					
CS1451	Project Work	0	0	12	200
CS1452	Comprehension**	0	0	2	-

LIST OF ELECTIVES FOR B.E. COMPUTER SCIENCE AND ENGINEERING

SEMESTER VI

Code No.	Course Title	L	T	P	M
CS1001	Resource Management Techniques	3	0	0	100
CS1002	UNIX Internals	3	0	0	100
CS1003	High Performance Microprocessors	3	0	0	100
CS1004	Data Warehousing and Mining	3	0	0	100
CS1005	Advanced JAVA Programming	3	0	0	100
IT1353	Embedded Systems	3	0	0	100
CS1006	Advanced Databases	3	0	0	100
GE1001	Intellectual Property Rights	3	0	0	100
GE1002	Indian Constitution and Society	3	0	0	100

SEMESTER VII

Code No.	Course Title	L	T	P	M
CS1007	Advanced Operating Systems	3	0	0	100
CS1008	Real Time Systems	3	0	0	100
CS1009	TCP/IP Design and Implementation	3	0	0	100
CS1010	C# and .NET Framework	3	0	0	100
CS1011	Systems Modelling & Simulation	3	0	0	100
IT1352	Cryptography and Network Security	3	1	0	100
CS1012	Natural Language Processing	3	0	0	100
CS1013	Advanced Computer Architecture	3	0	0	100
CS1014	Information Security	3	0	0	100
CS1015	User Interface Design	3	0	0	100
CS1016	Graph Theory	3	0	0	100
MG1401	Total Quality Management	3	0	0	100

SEMESTER VIII

Code No.	Course Title	L	T	P	M
CS1017	Parallel Computing	3	0	0	100
CS1018	Soft Computing	3	0	0	100
EC1008	High Speed Networks	3	0	0	100
EC1009	Digital Image Processing	3	0	0	100
CS1019	Robotics	3	0	0	100
IT1401	Component Based Technology	3	0	0	100
CS1020	Software Quality Management	3	0	0	100
CS1021	Quantum Computing	3	0	0	100
CS1022	Knowledge Based Decision Support Systems	3	0	0	100
IT1012	Grid Computing	3	0	0	100
GE1301	Professional Ethics and Human Values	3	0	0	100

MA1201 MATHEMATICS III 3 1 0 100

AIM

The course aims to develop the skills of the students in the areas of boundary value problems and transform techniques. 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 prerequisite for post graduate and specialized studies and research.

OBJECTIVES

At the end of the course the students would

- Be capable of mathematically formulating certain practical problems in terms of partial differential equations, solve them and physically interpret the results.
- Have gained a well founded knowledge of Fourier series, their different possible forms and the frequently needed practical harmonic analysis that an engineer may have to make from discrete data.
- Have obtained capacity to formulate and identify certain boundary value problems encountered in engineering practices, decide on applicability of the Fourier series method of solution, solve them and interpret the results.
- Have grasped the concept of expression of a function, under certain conditions, as a double integral leading to identification of transform pair, and specialization on Fourier transform pair, their properties, the possible special cases with attention to their applications.
- Have learnt the basics of Z – transform in its applicability to discretely varying functions, gained the skill to formulate certain problems in terms of difference equations and solve them using the Z – transform technique bringing out the elegance of the procedure involved.

UNIT I PARTIAL DIFFERENTIAL EQUATIONS 9 + 3

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Solution of standard types of first order partial differential equations – Lagrange's linear equation – Linear partial differential equations of second and higher order with constant coefficients.

UNIT II 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 identify – Harmonic Analysis.

UNIT III BOUNDARY VALUE PROBLEMS 9 + 3

Classification of second order quasi linear partial differential equations – Solutions of one dimensional wave equation – One dimensional heat equation – Steady state solution of two-dimensional heat equation (Insulated edges excluded) – Fourier series solutions in Cartesian coordinates.

UNIT IV FOURIER TRANSFORM 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 V Z -TRANSFORM AND DIFFERENCE EQUATIONS **9 + 3**

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

TUTORIAL 15

TOTAL : 60

TEXT BOOKS

1. Grewal, B.S., "Higher Engineering Mathematics", Thirty Sixth Edition, Khanna Publishers, Delhi, 2001.
2. Kandasamy, P., Thilagavathy, K., and Gunavathy, K., "Engineering Mathematics Volume III", S. Chand & Company ltd., New Delhi, 1996.
3. Wylie C. Ray and Barrett Louis, C., "Advanced Engineering Mathematics", Sixth Edition, McGraw-Hill, Inc., New York, 1995.

REFERENCES

1. Andrews, L.A., and Shivamoggi B.K., "Integral Transforms for Engineers and Applied Mathematicians", Macmillen , New York ,1988.
2. Narayanan, S., Manicavachagom Pillay, T.K. and Ramaniah, G., "Advanced Mathematics for Engineering Students", Volumes II and III, S. Viswanathan (Printers and Publishers) Pvt. Ltd. Chennai, 2002.
3. Churchill, R.V. and Brown, J.W., "Fourier Series and Boundary Value Problems", Fourth Edition, McGraw-Hill Book Co., Singapore, 1987.

CS1201 DESIGN AND ANALYSIS OF ALGORITHMS **3 1 0 100**

AIM

To create analytical skills, to enable the students to design algorithms for various applications, and to analyze the algorithms.

OBJECTIVES

- To introduce basic concepts of algorithms
- To introduce mathematical aspects and analysis of algorithms
- To introduce sorting and searching algorithms
- To introduce various algorithmic techniques
- To introduce algorithm design methods

UNIT I BASIC CONCEPTS OF ALGORITHMS **8**

Introduction – Notion of Algorithm – Fundamentals of Algorithmic Solving – Important Problem types – Fundamentals of the Analysis Framework – Asymptotic Notations and Basic Efficiency Classes.

UNIT II MATHEMATICAL ASPECTS AND ANALYSIS OF ALGORITHMS **8**

Mathematical Analysis of Non-recursive Algorithm – Mathematical Analysis of Recursive Algorithm – Example: Fibonacci Numbers – Empirical Analysis of Algorithms – Algorithm Visualization.

UNIT III ANALYSIS OF SORTING AND SEARCHING ALGORITHMS 10

Brute Force – Selection Sort and Bubble Sort – Sequential Search and Brute-force string matching – Divide and conquer – Merge sort – Quick Sort – Binary Search – Binary tree-Traversal and Related Properties – Decrease and Conquer – Insertion Sort – Depth first Search and Breadth First Search.

UNIT IV ALGORITHMIC TECHNIQUES 10

Transform and conquer – Presorting – Balanced Search trees – AVL Trees – Heaps and Heap sort – Dynamic Programming – Warshall's and Floyd's Algorithm – Optimal Binary Search trees – Greedy Techniques – Prim's Algorithm – Kruskal's Algorithm – Dijkstra's Algorithm – Huffman trees.

UNIT V ALGORITHM DESIGN METHODS 9

Backtracking – n-Queen's Problem – Hamiltonian Circuit problem – Subset-Sum problem – Branch and bound – Assignment problem – Knapsack problem – Traveling salesman problem.

TUTORIAL 15

TOTAL : 60

TEXT BOOKS

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithm", Pearson Education Asia, 2003.

REFERENCES

1. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, "Introduction to Algorithms", PHI Pvt. Ltd., 2001
2. Sara Baase and Allen Van Gelder, "Computer Algorithms - Introduction to Design and Analysis", Pearson Education Asia, 2003.
3. A.V.Aho, J.E. Hopcroft and J.D.Ullman, "The Design and Analysis Of Computer Algorithms", Pearson Education Asia, 2003.

CS1202 DIGITAL PRINCIPLES AND SYSTEM DESIGN 3 1 0 100

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 – 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 demultiplexers - 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 logic circuits, Shift registers and counters.

UNIT V ASYNCHRONOUS SEQUENTIAL LOGIC 10

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

TUTORIAL 15

TOTAL : 60

TEXT BOOKS

1. M.Morris Mano, “Digital Design”, 3rd edition, Pearson Education, 2002.

REFERENCES

1. Charles H.Roth, Jr. “Fundamentals of Logic Design”, 4th Edition, Jaico Publishing House, 2000.
2. Donald D.Givone, “Digital Principles and Design”, Tata McGraw-Hill, 2003.

CS1203 SYSTEM SOFTWARE 3 0 0 100

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 macroprocessors.
- 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.

TOTAL : 45

TEXT BOOK

1. Leland L. Beck, “System Software – An Introduction to Systems Programming”, 3rd Edition, Pearson Education Asia, 2000.

REFERENCES

1. D. M. Dhamdhere, “Systems Programming and Operating Systems”, Second Revised Edition, Tata McGraw-Hill, 1999.
2. John J. Donovan “Systems Programming”, Tata McGraw-Hill Edition, 1972.

CS1204 OBJECT ORIENTED PROGRAMMING 3 0 0 100

AIM

To present the concept of object oriented programming and discuss the important elements of C++ and Java.

OBJECTIVES

Since C++ and Java play a predominant role in software development it is felt that the following objectives can be achieved after studying this subject.

i) Understand the concepts of Object oriented Programming.
ii) Write simple applications using C++ and Java.
iii) Compare and contrast features of C++ and Java.

UNIT I INTRODUCTION 8

Object-oriented paradigm, elements of object oriented programming – Merits and demerits of OO methodology – C++ fundamentals – data types, operators and expressions, control flow, arrays, strings, pointers and functions.

UNIT II PROGRAMMING IN C++ 10

Classes and objects – constructors and destructors, operator overloading – inheritance, virtual functions and polymorphism

UNIT III FILE HANDLING 9

C++ streams – console streams – console stream classes-formatted and unformatted console I/O operations, manipulators - File streams - classes file modes file pointers and manipulations file I/O – Exception handling

UNIT IV JAVA INTRODUCTION 9

An overview of Java, data types, variables and arrays, operators, control statements, classes, objects, methods – Inheritance.

UNIT V JAVA PROGRAMMING 9

Packages and Interfaces, Exception handling, Multithreaded programming, Strings, Input /Output.

TOTAL : 45

TEXT BOOKS

1. K.R.Venugopal, Rajkumar Buyya, T.Ravishankar, "Mastering C++", TMH, 2003 (Unit I, Unit II, Unit III)
2. Herbert Schildt, "the Java 2 : Complete Reference", Fourth edition, TMH, 2002 (Unit IV, Unit-V)(Chapters 1-11,13,17)

REFERENCES

1. Ira Pohl, “Object oriented programming using C++”, Pearson Education Asia, 2003
2. Bjarne Stroustrup, “The C++ programming language”, Addison Wesley, 2000
3. John R.Hubbard, “Progranning with C++”, Schaums outline series, TMH, 2003
4. H.M.Deitel, P.J.Deitel, “Java : how to program”, Fifth edition, Prentice Hall of India private limited.
5. E.Balagurusamy “ Object Oriented Programming with C++”, TMH 2/e

GE1301 PROFESSIONAL ETHICS AND HUMAN VALUES 3 0 0 100

OBJECTIVE

- To create an awareness on Engineering Ethics and Human Values.
- To instill Moral and Social Values and Loyalty
- To appreciate the rights of Others

1. HUMAN VALUES 10

Morals, Values and Ethics – Integrity – Work Ethic – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – caring – Sharing – Honesty – Courage – Valuing Time – Co-operation – Commitment – Empathy – Self-Confidence – Character – Spirituality

2. ENGINEERING ETHICS 9

Senses of 'Engineering Ethics' - variety of moral issued - types of inquiry - moral dilemmas - moral autonomy - Kohlberg's theory - Gilligan's theory - consensus and controversy – Models of

Professional Roles - theories about right action - Self-interest - customs and religion - uses of ethical theories.

3. ENGINEERING AS SOCIAL EXPERIMENTATION 9

Engineering as experimentation - engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger case study

4. SAFETY, RESPONSIBILITIES AND RIGHTS 9

Safety and risk - assessment of safety and risk - risk benefit analysis and reducing risk - the three mile island and chernobyl case studies.
Collegiality and loyalty - respect for authority - collective bargaining - confidentiality - conflicts of interest - occupational crime - professional rights - employee rights - Intellectual Property Rights (IPR) - discrimination.

5. GLOBAL ISSUES 8

Multinational corporations - Environmental ethics - computer ethics - weapons development - engineers as managers-consulting engineers-engineers as expert witnesses and advisors -moral leadership-sample code of Ethics like ASME, ASCE, IEEE, Institution of Engineers (India), Indian Institute of Materials Management, Institution of electronics and telecommunication engineers (IETE),India, etc.

TOTAL : 45

TEXT BOOK

1. Mike Martin and Roland Schinzinger, “Ethics in Engineering”, McGraw-Hill, New York 1996.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, “Engineering Ethics”, Prentice Hall of India, New Delhi, 2004.

REFERENCES

1. Charles D. Fleddermann, “Engineering Ethics”, Pearson Education / Prentice Hall, New Jersey, 2004 (Indian Reprint)
2. Charles E Harris, Michael S. Protchard and Michael J Rabins, “Engineering Ethics – Concepts and Cases”, Wadsworth Thompson Learning, United States, 2000 (Indian Reprint now available)
3. John R Boatright, “Ethics and the Conduct of Business”, Pearson Education, New Delhi, 2003.
4. Edmund G Seebauer and Robert L Barry, “Fundamentals of Ethics for Scientists and Engineers”, Oxford University Press, Oxford, 2001.

CS1205 OBJECT ORIENTED PROGRAMMING LAB EXPERIMENTS 0 0 3 100

C++

1. Programs Using Functions
   - Functions with default arguments
   - Implementation of Call by Value, Call by Address and Call by Reference

2. Simple Classes for understanding objects, member functions and Constructors

- Classes with primitive data members
- Classes with arrays as data members
- Classes with pointers as data members – String Class
- Classes with constant data members
- Classes with static member functions

3. Compile time Polymorphism
   - Operator Overloading including Unary and Binary Operators.
   - Function Overloading
4. Runtime Polymorphism
   - Inheritance
   - Virtual functions
   - Virtual Base Classes
   - Templates
5. File Handling
   - Sequential access
   - Random access

JAVA

6. Simple Java applications
   - for understanding reference to an instance of a class (object), methods
   - Handling Strings in Java
7. Simple Package creation.
   - Developing user defined packages in Java
8. Interfaces
   - Developing user-defined interfaces and implementation
   - Use of predefined interfaces
9. Threading
   - Creation of thread in Java applications
   - Multithreading
10. Exception Handling Mechanism in Java
    - Handling pre-defined exceptions
    - Handling user-defined exceptions

CS1206 DIGITAL LABORATORY 0 0 3 100

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
7. Design and implementation of Shift registers
8. Design and implementation of Synchronous and Asynchronous counters
9. Coding combinational circuits using Hardware Description Language (HDL software required)
10. Coding sequential circuits using HDL (HDL software required)

CS1207 SYSTEM SOFTWARE LAB 0 0 3 100

***(*Using C or 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 macro processor.
6. Implement an absolute loader.
7. Implement a relocating loader.
8. Implement pass one of a direct-linking loader.
9. Implement pass two of a direct-linking loader.
10. Implement a simple text editor with features like insertion / deletion of a character, word, sentence.

(For loader exercises, output the snap shot of the main memory as it would be, after the loading has taken place)

MA1252 PROBABILITY AND QUEUEING THEORY 3 1 0 100

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 fundamental knowledge of the basic probability concepts.
- 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 PROBABILITY AND RANDOM VARIABLE 9 + 3

Axioms of probability - Conditional probability - Total probability – Baye's theorem- Random variable - Probability mass function - Probability density function - Properties - Moments - Moment generating functions and their properties.

UNIT II STANDARD DISTRIBUTIONS 9 +3

Binomial, Poisson, Geometric, Negative Binomial, Uniform, Exponential, Gamma, Weibull and Normal distributions and their properties - Functions of a random variable.

UNIT III TWO DIMENSIONAL RANDOM VARIABLES 9 + 3

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

UNIT IV RANDOM PROCESSES AND MARKOV CHAINS 9 + 3

Classification - Stationary process - Markov process - Poisson process - Birth and death process - Markov chains - Transition probabilities - Limiting distributions.

UNIT V QUEUEING THEORY 9 + 3

Markovian models – M/M/1, M/M/C , finite and infinite capacity - M/M/∞ queues - Finite source model - M/G/1 queue (steady state solutions only) – Pollaczek – Khintchine formula – Special cases.

TUTORIAL 15

TOTAL : 60

TEXT BOOKS

1. Ross, S., “A first course in probability”, Sixth Edition, Pearson Education, Delhi, 2002.
2. Medhi J., “Stochastic Processes”, New Age Publishers, New Delhi, 1994. (Chapters 2, 3, & 4)
3. Taha, H. A., “Operations Research-An Introduction”, Seventh Edition, Pearson Education Edition Asia, Delhi, 2002.

REFERENCES

1. Veerarajan., T., “Probability, Statistics and Random Processes”, Tata McGraw-Hill, Second Edition, New Delhi, 2003.
2. Allen., A.O., “Probability, Statistics and Queuing Theory”, Academic press, New Delhi, 1981.
3. Gross, D. and Harris, C.M., “Fundamentals of Queuing theory”, John Wiley and Sons, Second Edition, New York, 1985.

EE1291 ELECTRICAL ENGINEERING AND CONTROL SYSTEMS

PART – A ELECTRICAL ENGINEERING 4 0 0 100

AIM

To expose the students to the basic concept of circuits and machines.

OBJECTIVES

1. To study Kirchoff’s laws and be able to do simple problems using mesh and nodal analysis.
2. To study the phasor representation, complex power and three phase circuits and do simple problems.
3. To study qualitatively about the construction and principle of operation of D.C. machines and to do simple problems.

4. To study qualitatively the construction and principle of operation of transformers and three phase induction motors and to do simple problems.

5. To study qualitatively the construction details and principle of operation of single-phase induction motor and special machines.

UNIT I D.C. CIRCUITS **6**

Kirchoff's laws – simple resistance circuits – mesh and nodal analysis – simple problems.

UNITII A.C. CIRCUITS **6**

Sinusoidal voltage – RMS ,average and peak values – phasor representation – power factor – single phase RC,RL and RLC circuits – simple series and parallel circuits – complex power – three phase circuits – line and phase values – power measurement – simple problems.

UNIT III D.C. MACHINES (QUALITATIVE TREATMENT ONLY) **6**

Constructional details and operating principle of D.C. generators – emf equation – characteristics – principle of operation of D.C. motors – characteristics – starting.

UNIT IV TRANSFORMERS AND THREE PHASE INDUCTION MOTORS (QUALITATIVE TREATMENT ONLY) **7**

Constructional details and principle of operation of transformers – emf equation – parameters of transformers – regulation, losses and efficiency - introduction to three phase transformers. constructional details and principle of operation of three phase induction motor – characteristics-starting – losses and efficiency.

UNIT V SINGLE PHASE INDUCTION MOTORS AND SPECIAL MACHINES (QUALITATIVE TREATMENT) **5**

Constructional details and principle of operation of single phase induction motors – starting – servomotor, stepper motor, variable reluctance motors.-applications.

L = 30

TEXT BOOK

1. D.P.Kothari and I.J. Nagrath "Basic Electrical Engineering", Tata McGraw Hill Ltd, second edition, 2002.

REFERENCES

1. Stephen J.Chapman "Electrical Machinery Fundamentals", McGraw Hill Publishing Company Ltd, third edition, 1999.

2. K.Murugesh Kumar, "Electric Machines", Vikas Publishing House (P) Ltd, 2002.

PART – B CONTROL SYSTEMS

AIM

1. To expose the students to the basic concepts of control systems.

OBJECTIVES

1. To study control problem, control system dynamics and feedback principles.
2. To study time response of first and second order systems and basic state variable analysis and to do simple problems.
3. To study the concept of stability and criteria for stability and to do simple problems.
4. To study the frequency response through polar plots and Bode plots and Nyquist stability criteria and to do simple problems.
5. To study the different type of control system components.

UNIT I INTRODUCTION 6

The control problem – differential equation of physical systems – control over system dynamics by feedback – regenerative feedback – transfer function – block diagram - algebra – signal flow graphs.

UNIT II TIME RESPONSE ANALYSIS

Time response of first and second order system – steady state errors – error constants – design specification of second order systems – state variable analysis – simple problems.

UNIT III STABILITY 6

Concept of stability – stability conditions and criteria – Hurwitz and Routh criterian – relative Stability analysis.

UNIT IV FREQUENCY RESPONSE

Correlation between time and frequency response – polar plots , Bode plots – stability in frequency domain using Nyquist stability criterion – simple problems.

UNIT V CONTROL SYSTEM COMPONENTS 6

Control components – servomotors , stepper motor – hydraulic and pneumatic systems.

L = 30 Total = 60

TEXT BOOK

1. I.J.Nagrath and M.Gopal “Control system Engineering” New age International Publishing Company Ltd, third edition 2003.

REFERENCES

1. M.Gopal “Control Systems – Principle and Design”, McGraw Hill Publishing Company Ltd, second edition, 2003.
2. Joseph J.Distafeno et-al “Shaums outline series – theory and Problems of Feedback
3. control systems, Tata McGraw Hill publishing company Ltd, 2003.

EXAMINATION PATTERN

In part A there shall be five questions from Electrical Engineering and five questions from control systems (one from each unit). In Part B the compulsory question shall have one

part from Electrical Engineering and another from Control Systems. Each of the 'either or' form question shall have an Electrical Engineering part as well as Control Systems part. For example,

Q 12 (a)(i) pertains to Electrical Engineering
12(a)(ii) pertains to Control Systems

Q 12(b)(i) pertains to Electrical Engineering
Q 12(b)(ii) pertains to Control Systems

The other questions shall be set similarly.

EC1291 ANALOG AND DIGITAL COMMUNICATION 3 1 0 100

AIM

To study about the various modulation techniques like amplitude and angle modulation, that is used for data transmission and reception of analog signals and also to understand about the modulation techniques used for digital transmission along with spread spectrum and multiple access techniques.

OBJECTIVES

- To study about the amplitude modulation techniques.
- To study bout the angle modulation techniques.
- To understand about the modulation techniques used for digital data transmission.
- To have the knowledge about the digital communication.
- To study about the spread spectrum and multiple access techniques.

UNIT I AMPLITUDE MODULATION: TRANSMISSION AND RECEPTION *9*

Principles of amplitude modulation - AM envelope, frequency spectrum and bandwidth, modulation index and percent modulation, AM power distribution, AM modulator circuits – low level AM modulator, medium power AM modulator, AM transmitters – Low level transmitters, high level transmitters, receiver parameters, AM reception – AM receivers – TRF, super heterodyne receiver, double conversion AM receivers.

UNIT II ANGLE MODULATION: TRANSMISSION AND RECEPTION 9

Angle modulation - FM and PM waveforms, phase deviation and modulation index, frequency deviation, phase and frequency modulators and demodulators, frequency spectrum of Angle – modulated waves. Bandwidth requirements for Angle-modulated waves, commercial Broadcast band FM, Average power of an angle-modulated wave, frequency and phase modulators, A direct FM transmitters, Indirect transmitters, Angle modulation Vs amplitude modulation, FM receivers: FM demodulators, PLL FM demodulators, FM noise suppression, frequency verses phase modulation.

UNIT III DIGITAL TRANSMISSION AND DATA COMMUNICATION 9

Introduction, pulse modulation, PCM – PCM sampling, sampling rate, signal to quantization noise rate, companding – analog and digital – percentage error, delta modulation, adaptive delta modulation, differential pulse code modulation, pulse transmission – ISI, eyepattern, Data communication history, standards, data communication circuits, data communication codes, Error control, Hardware, serial and parallel interfaces, data modems, - Asynchronous modem, Synchronous modem, low-speed modem, medium and high speed modem, modem control.

UNIT IV 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, Costas loop, DPSK.

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 FDMA, wireless communication systems, source coding of speech for wireless communications.

TUTORIAL 15

TOTAL : 60

TEXT BOOKS

1. Wayne Tomasi, "Electronic Communication Systems: Fundamentals Through Advanced", Pearson Education, 2001. (UNIT I-IV Chapters- 3,4,6,7,12,13,15).
2. Simon Haykin, "Communication Systems", 4th Edition, John Wiley & Sons., 2001. (Unit V Chapters- 7,8).

REFERENCES

1. Blake, "Electronic Communication Systems", Thomson Delmar Publications, 2002.
2. Martin S.Roden, "Analog and Digital Communication System", 3rd Edition, PHI, 2002.

CS1251 COMPUTER ARCHITECTURE 3 1 0 100

AIM

To discuss the basic structure of a digital computer and to study in detail the organization of the Control unit, the Arithmetic and Logical unit, the Memory unit and the I/O unit.

OBJECTIVES

- To have a thorough understanding of the basic structure and operation of a digital computer.
- To discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division.
- To study in detail the different types of control and the concept of pipelining.

- To study the hierarchical memory system including cache memories and virtual memory.
- To study the different ways of communicating with I/O devices and standard I/O interfaces.

UNIT I BASIC STRUCTURE OF COMPUTERS 10

Functional units - Basic operational concepts - Bus structures - Software performance – Memory locations and addresses – Memory operations – Instruction and instruction sequencing – Addressing modes – Assembly language – Basic I/O operations – Stacks and queues.

UNIT II ARITHMETIC UNIT 8

Addition and subtraction of signed numbers – Design of fast adders – Multiplication of positive numbers - Signed operand multiplication and fast multiplication – Integer division – Floating point numbers and operations.

UNIT III BASIC PROCESSING UNIT 9

Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Microprogrammed control - Pipelining – Basic concepts – Data hazards – Instruction hazards – Influence on Instruction sets – Data path and control consideration – Superscalar operation.

UNIT IV MEMORY SYSTEM 9

Basic concepts – Semiconductor RAMs - ROMs – Speed - size and cost – Cache memories - Performance consideration – Virtual memory- Memory Management requirements – Secondary storage.

UNIT V I/O ORGANIZATION 9

Accessing I/O devices – Interrupts – Direct Memory Access – Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB).

TUTORIAL 15

TOTAL : 60

TEXT BOOKS

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, 5th Edition “Computer Organization”, McGraw-Hill, 2002.

REFERENCES

1. William Stallings, “Computer Organization and Architecture – Designing for Performance”, 6th Edition, Pearson Education, 2003.
2. David A.Patterson and John L.Hennessy, “Computer Organization and Design: The hardware / software interface”, 2nd Edition, Morgan Kaufmann, 2002.
3. John P.Hayes, “Computer Architecture and Organization”, 3rd Edition, McGraw Hill, 1998.

CS1252 OPERATING SYSTEMS 3 0 0 100

AIM

To have a thorough knowledge of processes, scheduling concepts, memory management, I/O and file systems in an operating system.

OBJECTIVES

- To have an overview of different types of operating systems
- To know the components of an operating system.
- To have a thorough knowledge of process management
- To have a thorough knowledge of storage management
- To know the concepts of I/O and file systems.

UNIT I ***9***

Introduction - Mainframe systems – Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real Time Systems – Handheld Systems - Hardware Protection - System Components – Operating System Services – System Calls – System Programs - Process Concept – Process Scheduling – Operations on Processes – Cooperating Processes – Inter-process Communication.

UNIT II **9**

Threads – Overview – Threading issues - CPU Scheduling – Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Multiple-Processor Scheduling – Real Time Scheduling - The Critical-Section Problem – Synchronization Hardware – Semaphores – Classic problems of Synchronization – Critical regions – Monitors.

UNIT III **9**

System Model – Deadlock Characterization – Methods for handling Deadlocks -Deadlock Prevention – Deadlock avoidance – Deadlock detection – Recovery from Deadlocks - Storage Management – Swapping – Contiguous Memory allocation – Paging – Segmentation – Segmentation with Paging.

UNIT IV **9**

Virtual Memory – Demand Paging – Process creation – Page Replacement – Allocation of frames – Thrashing - File Concept – Access Methods – Directory Structure – File System Mounting – File Sharing – Protection

UNIT V **9**

File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free-space Management. Kernel I/O Subsystems - Disk Structure – Disk Scheduling – Disk Management – Swap-Space Management. Case Study: The Linux System, Windows

TOTAL : 45

TEXT BOOK

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, “Operating System Concepts”, Sixth Edition, John Wiley & Sons (ASIA) Pvt. Ltd, 2003.

REFERENCES

1. Harvey M. Deitel, “Operating Systems”, Second Edition, Pearson Education Pvt. Ltd, 2002.
2. Andrew S. Tanenbaum, “Modern Operating Systems”, Prentice Hall of India Pvt. Ltd, 2003.
3. William Stallings, “Operating System”, Prentice Hall of India, 4th Edition, 2003.
4. Pramod Chandra P. Bhatt – “An Introduction to Operating Systems, Concepts and Practice”, PHI, 2003.

CS1253 VISUAL PROGRAMMING 3 0 0 100

AIM

To make the students to understand the windows programming concepts including Microsoft Foundation Classes

OBJECTIVES **9**

- To introduce the concepts of windows programming
- To introduce GUI programming using Microsoft Foundation Classes
- To enable the students to develop programs and simple applications using Visual C++

UNIT I WINDOWS PROGRAMMING **9**

Windows environment – a simple windows program – windows and messages – creating the window – displaying the window – message loop – the window procedure – message processing – text output – painting and repainting – introduction to GDI – device context – basic drawing – child window controls

UNIT II VISUAL C++ PROGRAMMING – INTRODUCTION **9**

Application Framework – MFC library – Visual C++ Components – Event Handling – Mapping modes – colors – fonts – modal and modeless dialog – windows common controls – bitmaps

UNIT III THE DOCUMENT AND VIEW ARCHITECTURE **9**

Menus – Keyboard accelerators – rich edit control – toolbars – status bars – reusable frame window base class – separating document from its view – reading and writing SDI and MDI documents – splitter window and multiple views – creating DLLs – dialog based applications

UNIT IV ACTIVEX AND OBJECT LINKING AND EMBEDDING (OLE) **9**

ActiveX controls Vs. Ordinary Windows Controls – Installing ActiveX controls – Calendar Control – ActiveX control container programming – create ActiveX control at runtime – Component Object Model (COM) – containment and aggregation Vs. inheritance – OLE drag and drop – OLE embedded component and containers – sample applications

UNIT V ADVANCED CONCEPTS **9**

Database Management with Microsoft ODBC – Structured Query Language – MFC ODBC classes – sample database applications – filter and sort strings – DAO concepts – displaying database records in scrolling view – Threading – VC++ Networking issues – Winsock – WinInet – building a web client – Internet Information Server – ISAPI server extension – chat application – playing and multimedia (sound and video) files

TOTAL : 45

TEXT BOOKS

1. Charles Petzold, “Windows Programming”, Microsoft press, 1996 (Unit I – Chapter 1-9)

2. David J.Kruglinski, George Shepherd and Scot Wingo, “Programming Visual C++”, Microsoft press, 1999 (Unit II – V)

REFERENCE

1. Steve Holtzner, “Visual C++ 6 Programming”, Wiley Dreamtech India Pvt. Ltd., 2003.

EE1292 Electrical Engineering and Control Systems Laboratory 0 0 3 100

AIM

To expose the students to basic operations of electric circuits, A.C. and D.C. machines and control systems.

1. Verification of Kirchoff’s laws

Objectives

1. To study and verify the Kirchoff’s current law for simple D.C. circuits.
2. To study and verify kirchoff’s voltage law for simple D.C. circuits.

2.Study of RLC series and parallel circuits

Objective

1. To study RL, RC and RLC series and parallel circuits using simple circuits.

3.Open circuit and load characteristics of self-excited DC generator

Objectives

1. To determine induced emf with respect to field excitation of a self excited D.C. generator.
2. To determine residual voltage and the critical field resistance.
3. To determine the terminal voltage with respect to load current.
4. To determine the variation of induced emf with respect to armature current.

4.Load test on D.C. shunt motor

Objectives

1. To obtain the variation of torque, speed, efficiency and line current with respect to the output.
2. To obtain the variation of torque, speed and efficiency with respect to the input line current.
3. To obtain the variation of torque with respect to speed.

5.Speed control of D.C. shunt motor and Swinburne’s test

Objectives

1. To obtain the variation of speed with respect to field excitation for a given armature voltage.

2. To obtain the variation of speed with respect to armature voltage for a given field excitation.

3. To determine the constant losses of a D.C. shunt machine.

4. To predetermine the efficiency characteristics when working as a motor and as a generator.

6.Load test on single phase transformer

Objective

1. To determine the variation of efficiency and voltage regulation for a resistance load.

7.Load test on three phase induction motor

Objective

1. To obtain the variation of efficiency, torque, slip, line current and power factor with respect to output.

2. To obtain the variation of efficiency, torque, slip and power factor with respect to line current.

3. To obtain the variation of torque with respect to slip.

8.Load test on single-phase induction motor

Objectives

1. To obtain the variation of efficiency, torque, slip, line current and power factor with respect to output.

2. To obtain the variation of efficiency, torque, slip and power factor with respect to line current.

3. To obtain the variation of torque with respect to slip.

9.Transfer function of separately excited D.C. generator

Objectives

1. To determine the transfer function of a separately excited D.C. generator.
2. To determine resistance and Inductance of the field coil.
3. To study the steady state response for a given step input.

10.Transfer function of armature and field controlled D.C. motor

Objectives

1. To determine transfer function for armature and field controlled D.C. motor.
2. To determine the resistance, inductance of both armature and field.\
3. To determine the torque constant for both methods.

4. To determine the moment of Inertia and friction co-efficient.
5. To study the steady state response for a given step input.

11.Transfer function of A.C. servo motor and compensating network

Objectives

1. To determine the transfer function.
2. To determine the various parameters associated with the transfer function.
3. To study the steady state response for a step input.
4. To derive the transfer function of Lag and Lead compensating networks.
5. To study the steady state response of both the networks for a step input.

P = 45 Total = 45

CS1254 OPERATING SYSTEM LAB 0 0 3 100

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

1. Shell programming
   - command syntax
   - write simple functions
   - basic tests
2. Shell programming
   - loops
   - patterns
   - expansions
   - substitutions
3. Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close, stat, opendir, readdir
4. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc)
5. Write C programs to simulate UNIX commands like ls, grep, etc.
6. 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
7. 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
8. Implement the Producer – Consumer problem using semaphores.
9. Implement some memory management schemes – I
10. Implement some memory management schemes – II

Example for expt 9 & 10 :
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.

CS1255 VISUAL PROGRAMMING LAB 0 0 3 100

LIST OF EXPERIMENTS

Windows SDK / Visual C++

1. Writing code for keyboard and mouse events.
2. Dialog Based applications
3. Creating MDI applications

Visual C++

4. Threads
5. Document view Architecture, Serialization
6. Dynamic controls
7. Menu, Accelerator, Tool tip, Tool bar
8. Creating DLLs and using them
9. Data access through ODBC
10. Creating ActiveX control and using it

MG1351 PRINCIPLES OF MANAGEMENT 3 0 0 100

(Common to all Branches)

OBJECTIVE

Knowledge on the principles of management is essential for all kinds of people in all kinds of organizations. After studying this course, students will be able to have a clear understanding of the managerial functions like planning, organizing, staffing, leading and controlling. Students will also gain some basic knowledge on international aspect of management.

1. HISTORICAL DEVELOPMENT 9

Definition of Management – Science or Art – Management and Administration – Development of Management Thought – Contribution of Taylor and Fayol – Functions of Management – Types of Business Organisation.

2. PLANNING 9

Nature & Purpose – Steps involved in Planning – Objectives – Setting Objectives – Process of Managing by Objectives – Strategies, Policies & Planning Premises- Forecasting – Decision-making.

3. ORGANISING *9*

Nature and Purpose – Formal and informal organization – Organization Chart – Structure and Process – Departmentation by difference strategies – Line and Staff authority – Benefits and Limitations – De-Centralization and Delegation of Authority – Staffing – Selection Process - Techniques – HRD – Managerial Effectiveness.

4. DIRECTING *9*

Scope – Human Factors – Creativity and Innovation – Harmonizing Objectives – Leadership – Types of Leadership Motivation – Hierarchy of needs – Motivation theories – Motivational Techniques – Job Enrichment – Communication – Process of Communication – Barriers and Breakdown – Effective Communication – Electronic media in Communication.

5. CONTROLLING *9*

System and process of Controlling – Requirements for effective control – The Budget as Control Technique – Information Technology in Controlling – Use of computers in handling the information – Productivity – Problems and Management – Control of Overall Performance – Direct and Preventive Control – Reporting – The Global Environment – Globalization and Liberalization – International Management and Global theory of Management.

TOTAL : 45

TEXT BOOKS

1. Harold Kooritz & Heinz Weihrich “Essentials of Management”, Tata McGraw-Hill, 1998.
2. Joseph L Massie “Essentials of Management”, Prentice Hall of India, (Pearson) Fourth Edition, 2003.

REFERENCES

1 Tripathy PC And Reddy PN, “ Principles of Management”, Tata McGraw-Hill, 1999.
2. Decenzo David, Robbin Stephen A, ”Personnel and Human Reasons Management”, Prentice Hall of India, 1996
3. JAF Stomer, Freeman R. E and Daniel R Gilbert Management, Pearson Education, Sixth Edition, 2004.
4. Fraidoon Mazda, “Engineering Management”, Addison Wesley, 2000.

MA1256 DISCRETE MATHEMATICS 3 1 0 100

AIM

To extend student’s 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

- Have knowledge of the concepts needed to test the logic of a program.
- Have gained knowledge which has application in expert system, in data base and a basic for the prolog language.
- Have an understanding in identifying patterns on many levels.

- 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.
- Be exposed to concepts and properties of algebraic structures such as semigroups, monoids and groups.

UNIT I PROPOSITIONAL CALCULUS 10 + 3

Propositions – Logical connectives – Compound propositions – Conditional and biconditional propositions – Truth tables – Tautologies and contradictions – Contrapositive – Logical equivalences and implications – DeMorgan's Laws - Normal forms – Principal conjunctive and disjunctive normal forms – Rules of inference – Arguments - Validity of arguments.

UNIT II PREDICATE CALCULUS 9 + 3

Predicates – Statement function – Variables – Free and bound variables – Quantifiers – Universe of discourse – Logical equivalences and implications for quantified statements – Theory of inference – The rules of universal specification and generalization – Validity of arguments.

UNIT III SET THEORY 10 + 3

Basic concepts – Notations – Subset – Algebra of sets – The power set – Ordered pairs and Cartesian product – Relations on sets –Types of relations and their properties – Relational matrix and the graph of a relation – Partitions – Equivalence relations – Partial ordering – Poset – Hasse diagram – Lattices and their properties – Sublattices – Boolean algebra – Homomorphism.

UNIT IV FUNCTIONS 7 + 3

Definitions of functions – Classification of functions –Type of functions - Examples – Composition of functions – Inverse functions – Binary and n-ary operations – Characteristic function of a set – Hashing functions – Recursive functions – Permutation functions.

UNIT V GROUPS 9 + 3

Algebraic systems – Definitions – Examples – Properties – Semigroups – Monoids – Homomorphism – Sub semigroups and Submonoids - Cosets and Lagrange's theorem – Normal subgroups – Normal algebraic system with two binary operations - Codes and group codes – Basic notions of error correction - Error recovery in group codes.

TUTORIAL 15

TOTAL : 60

TEXT BOOKS

1. Trembly J.P and Manohar R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw–Hill Pub. Co. Ltd, New Delhi, 2003.
2. Ralph. P. Grimaldi, "Discrete and Combinatorial Mathematics: An Applied Introduction", Fourth Edition, Pearson Education Asia, Delhi, 2002.

REFERENCES

1. Bernard Kolman, Robert C. Busby, Sharan Cutler Ross, "Discrete Mathematical Structures", Fourth Indian reprint, Pearson Education Pvt Ltd., New Delhi, 2003.
2. Kenneth H.Rosen, "Discrete Mathematics and its Applications", Fifth Edition, Tata McGraw – Hill Pub. Co. Ltd., New Delhi, 2003.

3. Richard Johnsonbaugh, “Discrete Mathematics”, Fifth Edition, Pearson Education Asia, New Delhi, 2002.

CS1301 DATABASE MANAGEMENT SYSTEMS 3 1 0 100

AIM

To provide a strong foundation in database technology and an introduction to the current trends in this field.

OBJECTIVES

- To learn the fundamentals of data models and to conceptualize and depict a database system using ER diagram.
- To make a study of SQL and relational database design.
- To understand the internal storage structures using different file and indexing techniques which will help in physical DB design.
- To know the fundamental concepts of transaction processing- concurrency control techniques and recovery procedure.
- To have an introductory knowledge about the emerging trends in the area of distributed DB- OO DB- Data mining and Data Warehousing and XML.

UNIT I INTRODUCTION AND CONCEPTUAL MODELING 9

Introduction to File and Database systems- Database system structure – Data Models – Introduction to Network and Hierarchical Models – ER model – Relational Model – Relational Algebra and Calculus.

UNIT II RELATIONAL MODEL 9

SQL – Data definition- Queries in SQL- Updates- Views – Integrity and Security – Relational Database design – Functional dependences and Normalization for Relational Databases (up to BCNF).

UNIT III DATA STORAGE AND QUERY PROCESSING 9

Record storage and Primary file organization- Secondary storage Devices- Operations on Files- Heap File- Sorted Files- Hashing Techniques – Index Structure for files –Different types of Indexes- B-Tree - B+Tree – Query Processing.

UNIT IV TRANSACTION MANAGEMENT 9

Transaction Processing – Introduction- Need for Concurrency control- Desirable properties of Transaction- Schedule and Recoverability- Serializability and Schedules – Concurrency Control – Types of Locks- Two Phases locking- Deadlock- Time stamp based concurrency control – Recovery Techniques – Concepts- Immediate Update- Deferred Update - Shadow Paging.

UNIT V CURRENT TRENDS 9

Object Oriented Databases – Need for Complex Data types- OO data Model- Nested relations- Complex Types- Inheritance Reference Types - Distributed databases- Homogenous and Heterogenous- Distributed data Storage – XML – Structure of XML- Data- XML Document- Schema- Querying and Transformation. – Data Mining and Data Warehousing.

TUTORIAL 15

TOTAL : 60

TEXT BOOKS

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan- "Database System Concepts", Fourth Edition, McGraw-Hill, 2002.

REFERENCES

1. Ramez Elmasri and Shamkant B. Navathe, "Fundamental Database Systems", Third Edition, Pearson Education, 2003.
2. Raghu Ramakrishnan, "Database Management System", Tata McGraw-Hill Publishing Company, 2003.
3. Hector Garcia–Molina, Jeffrey D.Ullman and Jennifer Widom- "Database System Implementation"- Pearson Education- 2000.
4. Peter Rob and Corlos Coronel- "Database System, Design, Implementation and Management", Thompson Learning Course Technology- Fifth edition, 2003.

CS1302 COMPUTER NETWORKS 3 0 0 100

AIM

To introduce the concepts, terminologies and technologies used in modern days data communication and computer networking.

OBJECTIVES

- To understand the concepts of data communications.
- To study the functions of different layers.
- To introduce IEEE standards employed in computer networking.
- To make the students to get familiarized with different protocols and network components.

UNIT I DATA COMMUNICATIONS 8

Components – Direction of Data flow – networks – Components and Categories – types of Connections – Topologies –Protocols and Standards – ISO / OSI model – Transmission Media – Coaxial Cable – Fiber Optics – Line Coding – Modems – RS232 Interfacing sequences.

UNIT II DATA LINK LAYER 10

Error – detection and correction – Parity – LRC – CRC – Hamming code – low Control and Error control - stop and wait – go back-N ARQ – selective repeat ARQ- sliding window – HDLC. - LAN - Ethernet IEEE 802.3 - IEEE 802.4 - IEEE 802.5 - IEEE 802.11 – FDDI - SONET – Bridges.

UNIT III NETWORK LAYER 10

Internetworks – Packet Switching and Datagram approach – IP addressing methods – Subnetting – Routing – Distance Vector Routing – Link State Routing – Routers.

UNIT IV TRANSPORT LAYER 9

Duties of transport layer – Multiplexing – Demultiplexing – Sockets – User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) – Congestion Control – Quality of services (QOS) – Integrated Services.

UNIT V APPLICATION LAYER 8

Domain Name Space (DNS) – SMTP – FTP – HTTP - WWW – Security – Cryptography.

TOTAL : 45

TEXT BOOKS

1. Behrouz A. Forouzan, "Data communication and Networking", Tata McGraw-Hill, 2004.

REFERENCES

1. James F. Kurose and Keith W. Ross, "Computer Networking: A Top-Down Approach Featuring the Internet", Pearson Education, 2003.
2. Larry L.Peterson and Peter S. Davie, "Computer Networks", Harcourt Asia Pvt. Ltd., Second Edition.
3. Andrew S. Tanenbaum, "Computer Networks", PHI, Fourth Edition, 2003.
4. William Stallings, "Data and Computer Communication", Sixth Edition, Pearson Education, 2000.

CS1303 THEORY OF COMPUTATION 3 1 0 100

AIM

To have a introductory knowledge of automata, formal language theory and computability.

OBJECTIVES

- To have an understanding of finite state and pushdown automata.
- To have a knowledge of regular languages and context free languages.
- To know the relation between regular language, context free language and corresponding recognizers.
- To study the Turing machine and classes of problems.

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 GRAMMAR 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 UNDECIDABILITY 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.

TUTORIAL 15

TOTAL : 60

TEXT BOOK

1. J.E.Hopcroft, R.Motwani and J.D Ullman, "Introduction to Automata Theory, Languages and Computations", Second Edition, Pearson Education, 2003.

REFERENCES

1. H.R.Lewis and C.H.Papadimitriou, "Elements of The theory of Computation", Second Edition, Pearson Education/PHI, 2003
2. J.Martin, "Introduction to Languages and the Theory of Computation", Third Edition, TMH, 2003.
3. Micheal Sipser, "Introduction of the Theory and Computation", Thomson Brokecole, 1997.

CS1304 MICROPROCESSORS AND MICROCONTROLLERS 3 1 0 100

AIM

To have an in depth knowledge of the architecture and programming of 8-bit and 16-bit Microprocessors, Microcontrollers and to study how to interface various peripheral devices with them.

OBJECTIVE

- To study the architecture and Instruction set of 8085 and 8086
- To develop assembly language programs in 8085 and 8086.
- To design and understand multiprocessor configurations
- To study different peripheral devices and their interfacing to 8085/8086.
- To study the architecture and programming of 8051 microcontroller.

UNIT I THE 8085 MICROPROCESSOR 9

Introduction to 8085 – Microprocessor architecture – Instruction set – Programming the 8085 – Code conversion.

UNIT II 8086 SOFTWARE ASPECTS 9

Intel 8086 microprocessor – Architecture – Instruction set and assembler directives – Addressing modes – Assembly language programming – Procedures – Macros – Interrupts and interrupt service routines.

UNIT III 8086 SYSTEM DESIGN 9

8086 signals and timing – MIN/MAX mode of operation – Addressing memory and I/O – Multiprocessor configurations – System design using 8086

UNIT IV I/O INTERFACING 9

Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications.

UNIT V MICROCONTROLLERS 9

Architecture of 8051 – Signals – Operational features – Memory and I/O addressing – Interrupts – Instruction set – Applications.

TUTORIAL 15

TOTAL : 60

TEXT BOOKS

1. Ramesh S.Gaonkar, "Microprocessor - Architecture, Programming and Applications with the 8085", Penram International publishing private limited, fifth edition.
   (UNIT-1: – Chapters 3,5,6 and programming examples from chapters 7-10)
2. A.K. Ray & K.M.Bhurchandi, "Advanced Microprocessors and peripherals- Architectures, Programming and Interfacing", TMH, 2002 reprint.
   (UNITS 2 to 5: – Chapters 1-6, 7.1-7.3, 8, 16)

REFERENCES

1. Douglas V.Hall, "Microprocessors and Interfacing: Programming and Hardware", TMH, Third edition
2. Yu-cheng Liu, Glenn A.Gibson, "Microcomputer systems: The 8086 / 8088 Family architecture, Programming and Design", PHI 2003
3. Mohamed Ali Mazidi, Janice Gillispie Mazidi, "The 8051 microcontroller and embedded systems", Pearson education, 2004.

CS1305 NETWORK LAB 0 0 3 100

(All the programs are to be written using C)

1. Simulation of ARP / RARP.
2. Write a program that takes a binary file as input and performs bit stuffing and CRC Computation.
3. Develop an application for transferring files over RS232.
4. Simulation of Sliding-Window protocol.
5. Simulation of BGP / OSPF routing protocol.
6. Develop a Client – Server application for chat.
7. Develop a Client that contacts a given DNS Server to resolve a given host name.
8. Write a Client to download a file from a HTTP Server.

9 &10 Study of Network Simulators like NS2/Glomosim / OPNET .

CS1306 MICROPROCESSORS AND MICROCONTROLLERS LAB 0 0 3 100

LIST OF EXPERIMENTS

1. Programming with 8085 – 8-bit / 16-bit multiplication/division using repeated addition/subtraction
2. Programming with 8085-code conversion, decimal arithmetic, bit manipulations.
3. Programming with 8085-matrix multiplication, floating point operations
4. Programming with 8086 – String manipulation, search, find and replace, copy operations, sorting. (PC Required)
5. Using BIOS/DOS calls: Keyboard control, display, file manipulation. (PC Required)
6. Using BIOS/DOS calls: Disk operations. (PC Required)
7. Interfacing with 8085/8086 – 8255, 8253
8. Interfacing with 8085/8086 – 8279,8251
9. 8051 Microcontroller based experiments – Simple assembly language programs (cross assembler required).

10. 8051 Microcontroller based experiments – Simple control applications (cross assembler required).

CS1307 DATABASE MANAGEMENT SYSTEMS LAB 0 0 3 100

LIST OF EXPERIMENTS

1. Data Definition Language (DDL) commands in RDBMS.
2. Data Manipulation Language (DML) and Data Control Language (DCL) commands in RDBMS.
3. High-level language extension with Cursors.
4. High level language extension with Triggers
5. Procedures and Functions.
6. Embedded SQL.
7. Database design using E-R model and Normalization.
8. Design and implementation of Payroll Processing System.
9. Design and implementation of Banking System.
10. Design and implementation of Library Information System.

CS1351 ARTIFICIAL INTELLIGENCE 3 0 0 100

AIM

Artificial Intelligence aims at developing computer applications, which encompasses perception, reasoning and learning and to provide an in-depth understanding of major techniques used to simulate intelligence.

OBJECTIVE

- To provide a strong foundation of fundamental concepts in Artificial Intelligence
- To provide a basic exposition to the goals and methods of Artificial Intelligence
- To enable the student to apply these techniques in applications which involve perception, reasoning and learning.

UNIT I INTRODUCTION 8

Intelligent Agents – Agents and environments - Good behavior – The nature of environments – structure of agents - Problem Solving - problem solving agents – example problems – searching for solutions – uniformed search strategies - avoiding repeated states – searching with partial information.

UNIT II SEARCHING TECHNIQUES 10

Informed search and exploration – Informed search strategies – heuristic function – local search algorithms and optimistic problems – local search in continuous spaces – online search agents and unknown environments - Constraint satisfaction problems (CSP) – Backtracking search and Local search for CSP – Structure of problems - Adversarial Search – Games – Optimal decisions in games – Alpha – Beta Pruning – imperfect real-time decision – games that include an element of chance.

UNIT III KNOWLEDGE REPRESENTATION 10

First order logic – representation revisited – Syntax and semantics for first order logic – Using first order logic – Knowledge engineering in first order logic - Inference in First order logic – prepositional versus first order logic – unification and lifting – forward chaining – backward chaining - Resolution - Knowledge representation - Ontological Engineering - Categories and objects – Actions - Simulation and events - Mental events and mental objects

UNIT IV LEARNING 9

Learning from observations - forms of learning - Inductive learning - Learning decision trees - Ensemble learning - Knowledge in learning – Logical formulation of learning – Explanation based learning – Learning using relevant information – Inductive logic programming - Statistical learning methods - Learning with complete data - Learning with hidden variable - EM algorithm - Instance based learning - Neural networks - Reinforcement learning – Passive reinforcement learning - Active reinforcement learning - Generalization in reinforcement learning.

UNIT V APPLICATIONS 8

Communication – Communication as action – Formal grammar for a fragment of English – Syntactic analysis – Augmented grammars – Semantic interpretation – Ambiguity and disambiguation – Discourse understanding – Grammar induction - Probabilistic language processing - Probabilistic language models – Information retrieval – Information Extraction – Machine translation.

TOTAL : 45

TEXT BOOK

1. Stuart Russell, Peter Norvig, “Artificial Intelligence – A Modern Approach”, 2nd Edition, Pearson Education / Prentice Hall of India, 2004.

REFERENCES

1. Nils J. Nilsson, “Artificial Intelligence: A new Synthesis”, Harcourt Asia Pvt. Ltd., 2000.
2. Elaine Rich and Kevin Knight, “Artificial Intelligence”, 2nd Edition, Tata McGraw-Hill, 2003.
3. George F. Luger, “Artificial Intelligence-Structures And Strategies For Complex Problem Solving”, Pearson Education / PHI, 2002.

CS1352 PRINCIPLES OF COMPILER DESIGN 3 1 0 100

AIM

At the end of the course the student will be able to design and implement a simple compiler.

OBJECTIVES

- To understand, design and implement a lexical analyzer.
- To understand, design and implement a parser.
- To understand, design code generation schemes.
- To understand optimization of codes and runtime environment.

UNIT I INTRODUCTION TO COMPILING 9

Compilers – Analysis of the source program – Phases of a compiler – Cousins of the Compiler – Grouping of Phases – Compiler construction tools – Lexical Analysis **–** Role of Lexical Analyzer – Input Buffering – Specification of Tokens.

UNIT II SYNTAX ANALYSIS 9

Role of the parser –Writing Grammars –Context-Free Grammars – Top Down parsing **–** Recursive Descent Parsing – Predictive Parsing – Bottom-up parsing **–** Shift Reduce Parsing – Operator Precedent Parsing – LR Parsers **–** SLR Parser – Canonical LR Parser – LALR Parser.

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 code generator – The target machine – Runtime Storage management – Basic Blocks and Flow Graphs – Next-use Information – A simple Code generator – DAG representation of Basic Blocks – Peephole Optimization.

UNIT V CODE OPTIMIZATION AND RUN TIME ENVIRONMENTS 9

Introduction– Principal Sources of Optimization – Optimization of basic Blocks – Introduction to Global Data Flow Analysis – Runtime Environments – Source Language issues – Storage Organization – Storage Allocation strategies – Access to non-local names – Parameter Passing.

TUTORIAL 15

TOTAL : 60

TEXT BOOK

1. Alfred Aho, Ravi Sethi, Jeffrey D Ullman, “Compilers Principles, Techniques and Tools”, Pearson Education Asia, 2003.

REFERENCES

1. Allen I. Holub “Compiler Design in C”, Prentice Hall of India, 2003.
2. C. N. Fischer and R. J. LeBlanc, “Crafting a compiler with C”, Benjamin Cummings, 2003.
3. J.P. Bennet, “Introduction to Compiler Techniques”, Second Edition, Tata McGraw-Hill, 2003.
4. Henk Alblas and Albert Nymeyer, “Practice and Principles of Compiler Building with C”, PHI, 2001.
5. Kenneth C. Louden, “Compiler Construction: Principles and Practice”, Thompson Learning, 2003

CS1353 SOFTWARE ENGINEERING 3 0 0 100

AIM

To introduce the methodologies involved in the development and maintenance of software (i.e) over its entire life cycle.

OBJECTIVE

To be aware of

- Different life cycle models
- Requirement dictation process
- Analysis modeling and specification
- Architectural and detailed design methods
- Implementation and testing strategies
- Verification and validation techniques
- Project planning and management
- Use of CASE tools

UNIT I SOFTWARE PROCESS 9

Introduction –S/W Engineering Paradigm – life cycle models (water fall, incremental, spiral, WINWIN spiral, evolutionary, prototyping, object oriented) - system engineering – computer based system – verification – validation – life cycle process – development process –system engineering hierarchy.

UNIT II SOFTWARE REQUIREMENTS 9

Functional and non-functional - user – system –requirement engineering process – feasibility studies – requirements – elicitation – validation and management – software prototyping – prototyping in the software process – rapid prototyping techniques – user interface prototyping - S/W document. Analysis and modeling – data, functional and behavioral models – structured analysis and data dictionary.

UNIT III DESIGN CONCEPTS AND PRINCIPLES 9

Design process and concepts – modular design – design heuristic – design model and document. Architectural design – software architecture – data design – architectural design – transform and transaction mapping – user interface design – user interface design principles. Real time systems - Real time software design – system design – real time executives – data acquisition system - monitoring and control system. SCM – Need for SCM – Version control – Introduction to SCM process – Software configuration items.

UNIT IV TESTING 9

Taxonomy of software testing – levels – test activities – types of s/w test – black box testing – testing boundary conditions – structural testing – test coverage criteria based on data flow mechanisms – regression testing – testing in the large. S/W testing strategies – strategic approach and issues - unit testing – integration testing – validation testing – system testing and debugging.

UNIT V SOFTWARE PROJECT MANAGEMENT 9

Measures and measurements – S/W complexity and science measure – size measure – data and logic structure measure – information flow measure. Software cost estimation – function point models – COCOMO model- Delphi method.- Defining a Task Network – Scheduling – Earned Value Analysis – Error Tracking - Software changes – program evolution dynamics – software maintenance – Architectural evolution. Taxonomy of CASE tools.

TOTAL : 45

TEXT BOOK

1. Roger S.Pressman, Software engineering- A practitioner's Approach, McGraw-Hill International Edition, 5th edition, 2001.

REFERENCES

1. Ian Sommerville, Software engineering, Pearson education Asia, 6th edition, 2000.
2. Pankaj Jalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997.
3. James F Peters and Witold Pedryez, "Software Engineering – An Engineering Approach", John Wiley and Sons, New Delhi, 2000.
4. Ali Behforooz and Frederick J Hudson, "Software Engineering Fundamentals", Oxford University Press, New Delhi, 1996.

CS1354 GRAPHICS AND MULTIMEDIA 3 0 0 100

AIM

To impart the fundamental concepts of Computer Graphics and Multimedia.

OBJECTIVES

- To study the graphics techniques and algorithms.
- To study the multimedia concepts and various I/O technologies.
- To enable the students to develop their creativity

UNIT I OUTPUT PRIMITIVES 9

Introduction - Line - Curve and Ellipse Drawing Algorithms – Attributes – Two-Dimensional Geometric Transformations – Two-Dimensional Clipping and Viewing.

UNIT II THREE-DIMENSIONAL CONCEPTS 9

Three-Dimensional Object Representations – Three-Dimensional Geometric and Modeling Transformations – Three-Dimensional Viewing – Color models – Animation.

UNIT III MULTIMEDIA SYSTEMS DESIGN 9

An Introduction – Multimedia applications – Multimedia System Architecture – Evolving technologies for Multimedia – Defining objects for Multimedia systems – Multimedia Data interface standards – Multimedia Databases.

UNIT IV MULTIMEDIA FILE HANDLING 9

Compression & Decompression – Data & File Format standards – Multimedia I/O technologies - Digital voice and audio – Video image and animation – Full motion video – Storage and retrieval Technologies.

UNIT V HYPERMEDIA 9

Multimedia Authoring & User Interface – Hypermedia messaging - Mobile Messaging – Hypermedia message component – Creating Hypermedia message – Integrated multimedia message standards – Integrated Document management – Distributed Multimedia Systems.

TOTAL : 45

TEXT BOOKS

1. Donald Hearn and M.Pauline Baker, "Computer Graphics C Version", Pearson Education, 2003.

(UNIT I : Chapters 1 to 6; UNIT 2: Chapter 9 – 12, 15, 16)

2. Prabat K Andleigh and Kiran Thakrar, "Multimedia Systems and Design", PHI, 2003. (UNIT 3 to 5)

REFERENCES

1. Judith Jeffcoate, "Multimedia in practice technology and Applications", PHI, 1998.
2. Foley, Vandam, Feiner, Huges, "Computer Graphics: Principles & Practice", Pearson Education, second edition 2003.

MA1251 NUMERICAL METHODS 3 1 0 100

AIM

With the present development of the computer technology, it is necessary to develop efficient algorithms for solving problems in science, engineering and technology. This course gives a complete procedure for solving different kinds of problems occur in engineering numerically.

OBJECTIVES

At the end of the course, the students would be acquainted with the basic concepts in numerical methods and their uses are summarized as follows:

- The roots of nonlinear (algebraic or transcendental) equations, solutions of large system of linear equations and eigenvalue problem of a matrix can be obtained numerically where analytical methods fail to give solution.
- When huge amounts of experimental data are involved, the methods discussed on interpolation will be useful in constructing approximate polynomial to represent the data and to find the intermediate values.
- The numerical differentiation and integration find application when the function in the analytical form is too complicated or the huge amounts of data are given such as series of measurements, observations or some other empirical information.
- Since many physical laws are couched in terms of rate of change of one/two or more independent variables, most of the engineering problems are characterized in the form of either nonlinear ordinary differential equations or partial differential equations. The methods introduced in the solution of ordinary differential equations and partial differential equations will be useful in attempting any engineering problem.

UNIT I SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 9+3

Linear interpolation methods (method of false position) – Newton's method – Statement of Fixed Point Theorem – Fixed point iteration: x=g(x) method – Solution of linear system by Gaussian elimination and Gauss-Jordon methods- Iterative methods: Gauss Jacobi and Gauss-Seidel methods- Inverse of a matrix by Gauss Jordon method – Eigenvalue of a matrix by power method.

UNIT II INTERPOLATION AND APPROXIMATION 9+ 3

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

UNIT III NUMERICAL DIFFERENTIATION AND INTEGRATION 9+ 3

Derivatives from difference tables – Divided differences and finite differences –Numerical integration by trapezoidal and Simpson's 1/3 and 3/8 rules – Romberg's method – Two and Three point Gaussian quadrature formulas – Double integrals using trapezoidal and Simpson's rules.

UNIT IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS 9+ 3

Single step methods: Taylor series method – Euler and modified Euler methods – 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+ 3

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.

TUTORIAL 15

TOTAL : 60

TEXT BOOKS

1. Gerald, C.F, and Wheatley, P.O, "Applied Numerical Analysis", Sixth Edition, Pearson Education Asia, New Delhi, 2002.
2. Balagurusamy, E., "Numerical Methods", Tata McGraw-Hill Pub.Co.Ltd, New Delhi, 1999.

REFERENCES

1. Kandasamy, P., Thilagavathy, K. and Gunavathy, K., "Numerical Methods", S.Chand Co. Ltd., New Delhi, 2003.
2. Burden, R.L and Faires, T.D., "Numerical Analysis", Seventh Edition, Thomson Asia Pvt. Ltd., Singapore, 2002.

CS1355 GRAPHICS AND MULTIMEDIA LAB 0 0 3 100

1. To implement Bresenham's algorithms for line, circle and ellipse drawing
2. To perform 2D Transformations such as translation, rotation, scaling, reflection and sharing.
3. To implement Cohen-Sutherland 2D clipping and window-viewport mapping
4. To perform 3D Transformations such as translation, rotation and scaling.
5. To visualize projections of 3D images.
6. To convert between color models.
7. To implement text compression algorithm
8. To implement image compression algorithm
9. To perform animation using any Animation software
10. To perform basic operations on image using any image editing software

CS1356 COMPILER DESIGN LAB 0 0 3 100

1 & 2 Implement a lexical analyzer in "C".
3. Use LEX tool to implement a lexical analyzer.
4. Implement a recursive descent parser for an expression grammar that generates arithmetic expressions with digits, + and *.
5. Use YACC and LEX to implement a parser for the same grammar as given in problem
6. Write semantic rules to the YACC program in problem 5 and implement a calculator that takes an expression with digits, + and * and computes and prints its value.

7 & 8. Implement the front end of a compiler that generates the three address code for a simple language with: one data type integer, arithmetic operators, relational operators, variable declaration statement, one conditional construct, one iterative construct and assignment statement.

9 &10. Implement the back end of the compiler which takes the three address code generated in problems 7 and 8, and produces the 8086 assembly language instructions that can be assembled and run using a 8086 assembler. The target assembly instructions can be simple move, add, sub, jump. Also simple addressing modes are used.

MG1401 TOTAL QUALITY MANAGEMENT 3 0 0 100

OBJECTIVE

- To understand the Total Quality Management concept and principles and the various tools available to achieve Total Quality Management.
- To understand the statistical approach for quality control.
- To create an awareness about the ISO and QS certification process and its need for the industries.

1. INTRODUCTION 9

Definition of Quality, Dimensions of Quality, Quality Planning, Quality costs - Analysis Techniques for Quality Costs, Basic concepts of Total Quality Management, Historical Review, Principles of TQM, Leadership – Concepts, Role of Senior Management, Quality Council, Quality Statements, Strategic Planning, Deming Philosophy, Barriers to TQM Implementation.

2. TQM PRINCIPLES 9

Customer satisfaction – Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Employee Involvement – Motivation, Empowerment, Teams, Recognition and Reward, Performance Appraisal, Benefits, Continuous Process Improvement – Juran Trilogy, PDSA Cycle, 5S, Kaizen, Supplier Partnership – Partnering, sourcing, Supplier Selection, Supplier Rating, Relationship Development, Performance Measures – Basic Concepts, Strategy, Performance Measure.

9

3. STATISTICAL PROCESS CONTROL (SPC)

The seven tools of quality, Statistical Fundamentals – Measures of central Tendency and Dispersion, Population and Sample, Normal Curve, Control Charts for variables and attributes, Process capability, Concept of six sigma, New seven Management tools.

4. TQM TOOLS 9

Benchmarking – Reasons to Benchmark, Benchmarking Process, Quality Function Deployment (QFD) – House of Quality, QFD Process, Benefits, Taguchi Quality Loss Function, Total Productive Maintenance (TPM) – Concept, Improvement Needs, FMEA – Stages of FMEA.

5. QUALITY SYSTEMS 9

Need for ISO 9000 and Other Quality Systems, ISO 9000:2000 Quality System – Elements, Implementation of Quality System, Documentation, Quality Auditing, TS 16949, ISO 14000 – Concept, Requirements and Benefits.

TOTAL : 45

TEXT BOOK

1. Dale H.Besterfiled, et al., Total Quality Management, Pearson Education, Inc. 2003. (Indian reprint 2004). ISBN 81-297-0260-6.

REFERENCES

1. James R.Evans & William M.Lidsay, The Management and Control of Quality, (5th Edition), South-Western (Thomson Learning), 2002 (ISBN 0-324-06680-5).
2. Feigenbaum.A.V. "Total Quality Management, McGraw-Hill, 1991.
3. Oakland.J.S. "Total Quality Management Butterworth – Hcinemann Ltd., Oxford. 1989.
4. Narayana V. and Sreenivasan, N.S. Quality Management – Concepts and Tasks, New Age International 1996.
5. Zeiri. "Total Quality Management for Engineers Wood Head Publishers, 1991.

CS1401 INTERNET PROGRAMMING 3 0 0 100

AIM

To explain Internet Programming concepts and related programming and scripting languages.

OBJECTIVES

- To describe basic Internet Protocols.
- Explain JAVA and HTML tools for Internet programming.
- Describe scripting languages – Java Script.
- Explain dynamic HTML programming.
- Explain Server Side Programming tools.

UNIT I BASIC NETWORK AND WEB CONCEPTS 9

Internet standards – TCP and UDP protocols – URLs – MIME – CGI – Introduction to SGML.

UNIT II JAVA PROGRAMMING 9

Java basics – I/O streaming – files – Looking up Internet Address - Socket programming – client/server programs – E-mail client – SMTP - POP3 programs – web page retrieval – protocol handlers – content handlers - applets – image handling - Remote Method Invocation.

UNIT III SCRIPTING LANGUAGES 9

HTML – forms – frames – tables – web page design - JavaScript introduction – control structures – functions – arrays – objects – simple web applications

UNIT IV DYNAMIC HTML 9

Dynamic HTML – introduction – cascading style sheets – object model and collections – event model – filters and transition – data binding – data control – ActiveX control – handling of multimedia data

UNIT V SERVER SIDE PROGRAMMING 9

Servlets – deployment of simple servlets – web server (Java web server / Tomcat / Web logic) – HTTP GET and POST requests – session tracking – cookies – JDBC – simple web applications – multi-tier applications.

TOTAL : 45

TEXT BOOKS

1. Deitel, Deitel and Nieto, "Internet and World Wide Web – How to program", Pearson Education Publishers, 2000.
2. Elliotte Rusty Harold, "Java Network Programming", O'Reilly Publishers, 2002

REFERENCES

1. R. Krishnamoorthy & S. Prabhu, "Internet and Java Programming", New Age International Publishers, 2004.
2. Thomno A. Powell, "The Complete Reference HTML and XHTML", fourth edition, Tata McGraw Hill, 2003.
3. Naughton, "The Complete Reference – Java2", Tata McGraw-Hill, 3rd edition, 1999.

CS1402 OBJECT ORIENTED ANALYSIS AND DESIGN 3 1 0 100

AIM

To understand the concepts of object oriented analysis and design.

OBJECTIVES

- To understand the object oriented life cycle.
- To know how to identify objects, relationships, services and attributes through UML.
- To understand the use-case diagrams.
- To know the Object Oriented Design process.
- To know about software quality and usability.

UNIT I INTRODUCTION 8

An Overview of Object Oriented Systems Development - Object Basics – Object Oriented Systems Development Life Cycle.

UNIT II OBJECT ORIENTED METHODOLOGIES 12

Rumbaugh Methodology - Booch Methodology - Jacobson Methodology - Patterns – Frameworks – Unified Approach – Unified Modeling Language – Use case - class diagram - Interactive Diagram - Package Diagram - Collaboration Diagram - State Diagram - Activity Diagram.

UNIT III OBJECT ORIENTED ANALYSIS 9

Identifying use cases - Object Analysis - Classification – Identifying Object relationships - Attributes and Methods.

UNIT IV OBJECT ORIENTED DESIGN 8

Design axioms - Designing Classes – Access Layer - Object Storage - Object Interoperability.

UNIT V SOFTWARE QUALITY AND USABILITY 8

Designing Interface Objects – Software Quality Assurance – System Usability - Measuring User Satisfaction

TUTORIAL 15

TOTAL : 60

TEXT BOOKS

1. Ali Bahrami, "Object Oriented Systems Development", Tata McGraw-Hill, 1999 (Unit I, III, IV, V).
2. Martin Fowler, "UML Distilled", Second Edition, PHI/Pearson Education, 2002. (UNIT II)

REFERENCES

1. Stephen R. Schach, "Introduction to Object Oriented Analysis and Design", Tata McGraw-Hill, 2003.
2. James Rumbaugh, Ivar Jacobson, Grady Booch "The Unified Modeling Language Reference Manual", Addison Wesley, 1999.
3. Hans-Erik Eriksson, Magnus Penker, Brain Lyons, David Fado, "UML Toolkit", OMG Press Wiley Publishing Inc., 2004.

IT1252 DIGITAL SIGNAL PROCESSING 3 1 0 100

AIM

To review signals and systems, study DFT and FFT, discuss the design of IIR & FIR filters and study typical applications of digital signal processing.

OBJECTIVES

- To have an overview of signals and systems.
- To study DFT & FFT
- To study the design of IIR filters.
- To study the design of FIR filters.
- To study the effect of finite word lengths & applications of DSP

UNIT I SIGNALS AND SYSTEMS 9

Basic elements of digital signal Processing –Concept of frequency in continuous time and discrete time signals –Sampling theorem –Discrete time signals. Discrete time systems –Analysis of Linear time invariant systems –Z transform –Convolution and correlation.

UNIT II FAST FOURIER TRANSFORMS 9

Introduction to DFT – Efficient computation of DFT Properties of DFT – FFT algorithms – Radix-2 and Radix-4 FFT algorithms – Decimation in Time – Decimation in Frequency algorithms – Use of FFT algorithms in Linear Filtering and correlation.

UNIT III IIR FILTER DESIGN 9

Structure of IIR – System Design of Discrete time IIR filter from continuous time filter – IIR filter design by Impulse Invariance. Bilinear transformation – Approximation derivatives – Design of IIR filter in the Frequency domain.

UNIT IV FIR FILTER DESIGN 9

Symmetric & Antisymteric FIR filters – Linear phase filter – Windowing technique – Rectangular, Kaiser windows – Frequency sampling techniques – Structure for FIR systems.

UNIT V FINITE WORD LENGTH EFFECTS 9

Quantization noise – derivation for quantization noise power – Fixed point and binary floating point number representation – comparison – over flow error – truncation error – co-efficient quantization error - limit cycle oscillation – signal scaling – analytical model of sample and hold operations – Application of DSP – Model of Speech Wave Form – Vocoder.

TUTORIAL15

TOTAL : 60

TEXT BOOK

1. John G Proakis and Dimtris G Manolakis, "Digital Signal Processing Principles, Algorithms and Application", PHI/Pearson Education, 2000, 3rd Edition.

REFERENCES

1. Alan V Oppenheim, Ronald W Schafer and John R Buck, "Discrete Time Signal Processing", PHI/Pearson Education, 2000, 2nd Edition.
2. Johny R.Johnson, "Introduction to Digital Signal Processing", Prentice Hall of India/Pearson Education, 2002.
3. Sanjit K.Mitra, "Digital Signal Processing: A Computer – Based Approach", Tata McGraw-Hill, 2001, Second Edition.

CS1403 CASE TOOLS LAB 0 3 100

1. Prepare the following documents for two or three of the experiments listed below and develop the software engineering methodology.
2. Program Analysis and Project Planning.
   Thorough study of the problem – Identify project scope, Objectives, Infrastructure.
3. Software requirement Analysis
   Describe the individual Phases / Modules of the project, Identify deliverables.
4. Data Modeling
   Use work products – Data dictionary, Use diagrams and activity diagrams, build and test lass diagrams, Sequence diagrams and add interface to class diagrams.
5. Software Development and Debugging
6. Software Testing
   Prepare test plan, perform validation testing, Coverage analysis, memory leaks, develop test case hierarchy, Site check and Site monitor.

SUGGESTED LIST OF APPLICATIONS

1. Student Marks Analyzing System
2. Quiz System
3. Online Ticket Reservation System
4. Payroll System
5. Course Registration System
6. Expert Systems
7. ATM Systems
8. Stock Maintenance
9. Real-Time Scheduler
10. Remote Procedure Call Implementation

CS1404 INTERNET PROGRAMMING LABORATORY 0 3 100

LIST OF EXPERIMENTS

1. Write programs in Java to demonstrate the use of following components Text fields, buttons, Scrollbar, Choice, List and Check box
2. Write Java programs to demonstrate the use of various Layouts like Flow Layout, Border Layout, Grid layout, Grid bag layout and card layout
3. Write programs in Java to create applets incorporating the following features:
   - 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
4. Write programs in Java to do the following.
   - Set the URL of another server.
   - Download the homepage of the server.
   - Display the contents of home page with date, content type, and Expiration date. Last modified and length of the home page.
5. Write programs in Java using sockets to implement the following:
   - HTTP request
   - FTP
   - SMTP
   - POP3
6. Write a program in Java for creating simple chat application with datagram sockets and datagram packets.
7. Write programs in Java using Servlets:
   - To invoke servlets from HTML forms
   - To invoke servlets from Applets
8. Write programs in Java to create three-tier applications using servlets
   - 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.
9. Create a web page with the following using HTML
   i) To embed a map in a web page
   ii) To fix the hot spots in that map
   iii) Show all the related information when the hot spots are clicked.
10. Create a web page with the following.
    i) Cascading style sheets.
    ii) Embedded style sheets.
    iii) Inline style sheets.
    iv) Use our college information for the web pages.

IT1402 MOBILE COMPUTING 3 0 0 100

AIM

To provide basics for various techniques in Mobile Communications and Mobile Content services.

OBJECTIVES

- To learn the basics of Wireless voice and data communications technologies.

- To build working knowledge on various telephone and satellite networks.
- To study the working principles of wireless LAN and its standards.
- To build knowledge on various Mobile Computing algorithms.
- To build skills in working with Wireless application Protocols to develop mobile content applications.

UNIT I WIRELESS COMMUNICATION FUNDAMENTALS 9

Introduction – Wireless transmission – Frequencies for radio transmission – Signals – Antennas – Signal Propagation – Multiplexing – Modulations – Spread spectrum – MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks.

UNIT II TELECOMMUNICATION NETWORKS 11

Telecommunication systems – GSM – GPRS – DECT – UMTS – IMT-2000 – Satellite Networks **-** Basics – Parameters and Configurations – Capacity Allocation – FAMA and DAMA – Broadcast Systems – DAB - DVB.

UNIT III WIRLESS LAN 9

Wireless LAN – IEEE 802.11 - Architecture – services – MAC – Physical layer – IEEE 802.11a - 802.11b standards – HIPERLAN – Blue Tooth.

UNIT IV MOBILE NETWORK LAYER 9

Mobile IP – Dynamic Host Configuration Protocol - Routing – DSDV – DSR – Alternative Metrics.

UNIT V TRANSPORT AND APPLICATION LAYERS 7

Traditional TCP – Classical TCP improvements – WAP, WAP 2.0.

TOTAL : 45

TEXT BOOKS

1. Jochen Schiller, “Mobile Communications”, PHI/Pearson Education, Second Edition, 2003.
   (Unit I Chap 1,2 &3- Unit II chap 4,5 &6-Unit III Chap 7.Unit IV Chap 8- Unit V Chap 9&10.)
2. William Stallings, “Wireless Communications and Networks”, PHI/Pearson Education, 2002. (Unit I Chapter – 7&10-Unit II Chap 9)

REFERENCES

1. Kaveh Pahlavan, Prasanth Krishnamoorthy, “Principles of Wireless Networks”, PHI/Pearson Education, 2003.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, “Principles of Mobile Computing”, Springer, New York, 2003.
3. Hazysztof Wesolowshi, “Mobile Communication Systems”, John Wiley and Sons Ltd, 2002.

CS1001 RESOURCE MANAGEMENT TECHNIQUES 3 0 0 100

1. LINEAR PROGRAMMING: 9

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

2. 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.

3. INTEGER PROGRAMMING: 9

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

4. CLASSICAL OPTIMISATION THEORY: 9

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

5. OBJECT SCHEDULING: 9

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

TOTAL = 45

REFERNECES:

1. Anderson 'Quantitative Methods for Business', 8th Edition, Thomson Learning, 2002.
2. Winston 'Operation Research', Thomson Learning, 2003.
3. H.A.Taha, 'Operation Research', Prentice Hall of India, 2002.
4. Vohra, 'Quantitative Techniques in Management', Tata McGraw Hill, 2002.
5. Anand Sarma, 'Operation Research', Himalaya Publishing House, 2003.

CS1002 UNIX INTERNALS 3 0 0 100

AIM

To understand the kernel, I/O & files, process control, scheduling and memory management policies in unix.

OBJECTIVES

- To get thorough understanding of the kernel..
- To understand the file organization and management.
- To know the various system calls.
- To have a knowledge of process architecture, process control & scheduling and memory management.

UNIT I GENERAL OVERVIEW OF THE SYSTEM 9

History – System structure – User perspective – Operating system services – Assumptions about hardware. Introduction to the Kernel : Architecture of the UNIX operating system – Introduction to system concepts – Kernel data structures – System administration – Summary and Preview.

UNIT II BUFFER CACHE 9

Buffer headers – Structure of the buffer pool – Advantages and disadvantages of the buffer cache. Internal representation of files : Inodes – Structure of a regular file – Directories – Conversion of a path name to an Inode – Super block – Other file types.

UNIT III SYSTEM CALLS FOR FILE SYSTEM 9

Open – Read – Write – File and record locking – Adjusting the position of file I/O –LSEEK – Close – File creation – Creation of special files – Pipes – Dup – Mounting and unmounting file systems

UNIT IVTHE STRUCTURE OF PROCESSES 9

Process states and transitions – Layout of system memory – The context of a process – Saving the context of a process. Process Control: Process creation – Signals – Process termination – Awaiting process termination – Invoking other programs – The shell – System boot and the INIT process.

UNIT V PROCESS SCHEDULING AND MEMORY MANAGEMENT POLICIES 9

Process Scheduling – Memory Management Policies : Swapping – A hybrid system with swapping and demand paging. The I/O Subsystem : Driver Interfaces– Disk Drivers-Terminal Drivers.

TOTAL : 45

TEXT BOOK

1. Maurice J. Bach, “The Design of the Unix Operating System”, Prentice Hall of India, 2004.

REFERENCE

1. Vahalia, “Unix Internals: The New Frontiers”, Pearson Education Inc, 2003.

CS1003 HIGH PERFORMANCE MICROPROCESSORS 3 0 0 100

AIM

To do a detailed study of CISC and RISC principles, study the architecture & special features of the Pentium processors and typical RISC processors and to study the architecture of special purpose processors.

OBJECTIVES

- To study the principles of CISC
- To study the Pentium processor family
- To study the principles of RISC
- To study the architecture & special features of typical RISC processors.
- To study the architecture & function of special purpose processors.

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 RS/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

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.

CS1004 DATA WAREHOUSING AND MINING 3 0 0 100

AIM

To serve as an introductory course to under graduate students with an emphasis on the design aspects of Data Mining and Data Warehousing

OBJECTIVE

This course has been designed with the following objectives:

- To introduce the concept of data mining with in detail coverage of basic tasks, metrics, issues, and implication. Core topics like classification, clustering and association rules are exhaustively dealt with.
- To introduce the concept of data warehousing with special emphasis on architecture and design.

UNIT I INTRODUCTION AND DATA WAREHOUSING 8

Introduction, Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Implementation, Further Development, Data Warehousing to Data Mining

UNIT II DATA PREPROCESSING, LANGUAGE, ARCHITECTURES, CONCEPT DESCRIPTION 8

Why Preprocessing, Cleaning, Integration, Transformation, Reduction, Discretization, Concept Hierarchy Generation, Data Mining Primitives, Query Language, Graphical User Interfaces, Architectures, Concept Description, Data Generalization, Characterizations, Class Comparisons, Descriptive Statistical Measures.

UNIT III ASSOCIATION RULES 9

Association Rule Mining, Single-Dimensional Boolean Association Rules from Transactional Databases, Multi-Level Association Rules from Transaction Databases

UNIT IV CLASSIFICATION AND CLUSTERING 12

Classification and Prediction, Issues, Decision Tree Induction, Bayesian Classification, Association Rule Based, Other Classification Methods, Prediction, Classifier Accuracy, Cluster Analysis, Types of data, Categorisation of methods, Partitioning methods, Outlier Analysis.

UNIT V RECENT TRENDS 8

Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Databases, Multimedia Databases, Time Series and Sequence Data, Text Databases, World Wide Web, Applications and Trends in Data Mining

TOTAL : 45

TEXT BOOK

1. J. Han, M. Kamber, “Data Mining: Concepts and Techniques”, Harcourt India / Morgan Kauffman, 2001.

REFERENCES

1. Margaret H.Dunham, “Data Mining: Introductory and Advanced Topics”, Pearson Education 2004.
2. Sam Anahory, Dennis Murry, “Data Warehousing in the real world”, Pearson Education 2003.
3. David Hand, Heikki Manila, Padhraic Symth, “Principles of Data Mining”, PHI 2004.
4. W.H.Inmon, “Building the Data Warehouse”, 3rd Edition, Wiley, 2003.
5. Alex Bezon, Stephen J.Smith, “Data Warehousing, Data Mining & OLAP”, MeGraw-Hill Edition, 2001.
6. Paulraj Ponniah, “Data Warehousing Fundamentals”, Wiley-Interscience Publication, 2003.

CS1005 ADVANCED JAVA PROGRAMMING 3 0 0 100

AIM

To enable the students to design and develop enterprise strength distributed and multi-tier applications – Using Java Technology.

OBJECTIVES

- To learn advanced Java programming concepts like reflection, native code interface, threads, etc.

- To develop network programs in Java
- To understand Concepts needed for distributed and multi-tier applications
- To understand issues in enterprise applications development.

UNIT I JAVA FUNDAMENTALS 9

Java I/O streaming – filter and pipe streams – Byte Code interpretation - reflection – Dynamic Reflexive Classes – Threading – Java Native Interfaces- 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 – Using BLOB and CLOB objects – storing Multimedia data into 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 – Transactions.

TOTAL : 45

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.

IT1353 EMBEDDED SYSTEMS **3 0 0 100**

AIM

To give sufficient background for undertaking embedded systems design.

OBJECTIVES

- To introduce students to the embedded systems, its hardware and software.

- To introduce devices and buses used for embedded networking.
- To explain programming concepts and embedded programming in C and C++.
- To explain real time operating systems, inter-task communication and an exemplary case of MUCOS – IIRTOS.

UNIT I INTRODUCTION TO EMBEDDED SYSTEMS 9

Definition and Classification – Overview of Processors and hardware units in an embedded system – Software embedded into the system – Exemplary Embedded Systems – Embedded Systems on a Chip (SoC) and the use of VLSI designed circuits

UNIT II DEVICES AND BUSES FOR DEVICES NETWORK 9

I/O Devices - Device I/O Types and Examples – Synchronous - Iso-synchronous and Asynchronous Communications from Serial Devices - Examples of Internal Serial-Communication Devices - UART and HDLC - Parallel Port Devices - Sophisticated interfacing features in Devices/Ports- Timer and Counting Devices - '12C', 'USB', 'CAN' and advanced I/O Serial high speed buses- ISA, PCI, PCI-X, cPCI and advanced buses.

UNIT III PROGRAMMING CONCEPTS AND EMBEDDED PROGRAMMING IN C, C++ 9

Programming in assembly language (ALP) vs. High Level Language - C Program Elements, Macros and functions -Use of Pointers - NULL Pointers - Use of Function Calls – Multiple function calls in a Cyclic Order in the Main Function Pointers – Function Queues and Interrupt Service Routines Queues Pointers – Concepts of EMBEDDED PROGRAMMING in C++ - Objected Oriented Programming – Embedded Programming in C++, 'C' Program compilers – Cross compiler – Optimization of memory codes.

UNIT IV REAL TIME OPERATING SYSTEMS – PART - 1 9

Definitions of process, tasks and threads – Clear cut distinction between functions – ISRs and tasks by their characteristics – Operating System Services- Goals – Structures- Kernel - Process Management – Memory Management – Device Management – File System Organisation and Implementation – I/O Subsystems – Interrupt Routines Handling in RTOS, REAL TIME OPERATING SYSTEMS : RTOS Task scheduling models - Handling of task scheduling and latency and deadlines as performance metrics – Co-operative Round Robin Scheduling – Cyclic Scheduling with Time Slicing (Rate Monotonics Co-operative Scheduling) – Preemptive Scheduling Model strategy by a Scheduler – Critical Section Service by a Preemptive Scheduler – Fixed (Static) Real time scheduling of tasks - INTER PROCESS COMMUNICATION AND SYNCHRONISATION – Shared data problem – Use of Semaphore(s) – Priority Inversion Problem and Deadlock Situations – Inter Process Communications using Signals – Semaphore Flag or mutex as Resource key – Message Queues – Mailboxes – Pipes – Virtual (Logical) Sockets – Remote Procedure Calls (RPCs).

UNIT V REAL TIME OPERATING SYSTEMS – PART - 2 9

Study of Micro C/OS-II or Vx Works or Any other popular RTOS – RTOS System Level Functions – Task Service Functions – Time Delay Functions – Memory Allocation Related Functions – Semaphore Related Functions – Mailbox Related Functions – Queue Related Functions – Case Studies of Programming with RTOS – Understanding Case Definition – Multiple Tasks and their functions – Creating a list of tasks – Functions and IPCs – Exemplary Coding Steps.

TOTAL: 45

TEXT BOOKS

1. Rajkamal, Embedded Systems Architecture, Programming and Design, TATA McGraw-Hill, First reprint Oct. 2003

REFERENCES

1. Steve Heath, Embedded Systems Design, Second Edition-2003, Newnes,
2. David E.Simon, An Embedded Software Primer, Pearson Education Asia, First Indian Reprint 2000.
3. Wayne Wolf, Computers as Components; Principles of Embedded Computing System Design – Harcourt India, Morgan Kaufman Publishers, First Indian Reprint 2001
4. Frank Vahid and Tony Givargis, Embedded Systems Design – A unified Hardware / Software Introduction, John Wiley, 2002.

CS1006 ADVANCED DATABASES 3 0 0 100

AIM

Advanced database aims at developing computer application with different kinds of data models. It is also deals with the Transaction management of these different databases.

OBJECTIVES

- To study the needs of different databases.
- To understand about different data models that can be used for these databases.
- To make the students to get familiarized with transaction management of the database
- To develop in-depth knowledge about web and intelligent database.
- To provide an introductory concept about the way in which data can be stored in geographical information systems etc.,

UNIT I DISTRIBUTED DATABASES 9

Distributed DBMS Concepts and Design – Introduction – Functions and Architecture of DDBMS – Distributed Relational Database Design – Transparency in DDBMS – Distributed Transaction Management – Concurrency control – Deadlock Management – Database recovery – The X/Open Distributed Transaction Processing Model – Replication servers – Distributed Query Optimisation - Distribution and Replication in Oracle.

UNIT II OBJECT ORIENTED DATABASES 9

Object Oriented Databases – Introduction – Weakness of RDBMS – Object Oriented Concepts Storing Objects in Relational Databases – Next Generation Database Systems – Object Oriented Data models – OODBMS Perspectives – Persistence – Issues in OODBMS – Object Oriented Database Management System Manifesto – Advantages and Disadvantages of OODBMS – Object Oriented Database Design – OODBMS Standards and Systems – Object Management Group – Object Database Standard ODMG – Object Relational DBMS –Postgres - Comparison of ORDBMS and OODBMS.

UNIT III WEB DATABASES 9

Web Technology And DBMS – Introduction – The Web – The Web as a Database Application Platform – Scripting languages – Common Gateway Interface – HTTP Cookies – Extending the Web Server – Java – Microsoft's Web Solution Platform – Oracle Internet Platform – Semi structured Data and XML – XML Related Technologies – XML Query Languages

UNIT IV INTELLIGENT DATABASES 9

Enhanced Data Models For Advanced Applications – Active Database Concepts And Triggers – Temporal Database Concepts – Deductive databases – Knowledge Databases.

UNIT V CURRENT TRENDS 9

Mobile Database – Geographic Information Systems – Genome Data Management – Multimedia Database – Parallel Database – Spatial Databases - Database administration – Data Warehousing and Data Mining.

TOTAL : 45

TEXT BOOK

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

REFERENCES

1. Ramez Elmasri & Shamkant B.Navathe, "Fundamentals of Database Systems", Fourth Edition , Pearson Education , 2004.
2. M.Tamer Ozsu , Patrick Ualduriel, "Principles of Distributed Database Systems", Second Edition, Pearso nEducation, 2003.
3. C.S.R.Prabhu, "Object Oriented Database Systems", PHI, 2003.
4. Peter Rob and Corlos Coronel, "Database Systems – Design, Implementation and Management", Thompson Learning, Course Technology, 5th Edition, 2003.

CS1007 ADVANCED OPERATING SYSTEMS 3 0 0 100

AIM

To understand the principles in the design of modern operating systems, distributed and multiprocessor operating systems

OBJECTIVES

- To get a comprehensive knowledge of the architecture of distributed systems.
- To understand the deadlock and shared memory issues and their solutions in distributed environments.
- To know the security issues and protection mechanisms for distributed environments.
- To get a knowledge of multiprocessor operating system and database operating systems.

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

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

CS1008 REAL TIME SYSTEMS **3 0 0 100**

AIM

To understand the basic concepts, design and integration of Real Time Systems.

OBJECTIVES

- To know about the specification and design techniques of a Real Time System.
- To understand about real time task communication and synchronization
- To have a vast knowledge of queuing models and Real Time System integration.

UNIT I BASIC REAL TIME CONCEPTS 9

Basic computer architecture – some terminology - real time design issues – example real time systems – input and output – other devices – language features.

UNIT II REAL TIME SPECIFICATION AND DESIGN TECHNIQUES 9

Natural languages – mathematical specification – flow charts – structured charts – pseudocode and programming design languages – finite state automata – data flow diagrams – petri nets – Warnier Orr notation – state charts – polled loop systems – phase / sate driven code – coroutines – interrupt – driven systems – foreground/background system – full featured real time operating systems

UNIT III INTERTASK COMMUNICATION AND SYNCHRONIZATION 9

Buffering data – mailboxes – critical regions – semaphores – deadlock – process stack management – dynamic allocation – static schemes – response time calculation – interrupt latency – time loading and its measurement – scheduling is NP complete – reducing response times and time loading – analysis of memory requirements – reducing memory loading – I/O performance

UNIT IV QUEUING MODELS 9

Probability functions – discrete- basic buffering calculation – classical queuing theory – little's law – erlong's formula – faults, failures, bugs and effects – reliability-testing – fault tolerance – classification of architecture – distributing systems – Non Von Neuman architecture

UNIT V HARDWARE/SOFTWARE INTEGRATION 9

Goals of real time system integration – tools - methodology -software Heinsberg uncertainity principle – real time applications

TOTAL : 45

TEXT BOOK

1. Philip A.Laplante, “Real time system design and analysis – an engineer's handbook

REFERENCES

1. C.M.Krishna and Kang G Shin, "Real time systems", TMH, 1997
2. Stuart Bennelt, "Real time computer control – and introduction", Pearson education, 2003.
3. Allen Burns, Andy Wellings, “Real Time Systems and Programming Languages”, Pearson Education, 2003.

CS1009 TCP / IP DESIGN AND IMPLEMENTATION 3 0 0 100

AIM

Having learned about computer networks, this subject helps the students to learn TCP/IP protocol indepth considering design alternatives and implementation techniques.

OBJECTIVES

- To understand the internals of the TCP/IP protocols
- To understand how TCP/IP is actually implemented

- To understand the interaction among the protocols in a protocol stack.

UNIT I INTRODUCTION 9

Internetworking concepts and architectural model- classful Internet address – CIDR-Subnetting and Supernetting –ARP- 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 - keepalive 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

TEXT BOOKS

1. Douglas E.Comer – "Internetworking with TCP/IP Principles, Protocols and Architecture", Vol. 1 & 2 fourth edition, Pearson Education Asia, 2003
   (Unit I in Comer Vol. I, Units II, IV & V – Comer Vol. II)
2. W.Richard Stevens "TCP/IP illustrated" Volume 1 Pearson Education, 2003 (Unit II)

REFERENCES

1. TCP/IP protocol suite, Forouzan, 2nd edition, TMH, 2003
2. W.Richard Stevens "TCP/IP illustrated" Volume 2 Pearson Education 2003.

CS1010 C # AND . NET FRAMEWORK 3 0 0 100

AIM

To cover the fundamental concepts of the C# language and the .NET framework.

OBJECTIVE

- The student will gain knowledge in the concepts of the .NET framework as a whole and the technologies that constitute the framework.
- The student will gain programming skills in C# both in basic and advanced levels.
- By building sample applications, the student will get experience and be ready for large-scale projects.

UNIT I INTRODUCTION TO C# 8

Introducing C#, Understanding .NET, Overview of C#, Literals, Variables, Data Types, Operators, Expressions, Branching, Looping, Methods, Arrays, Strings, Structures, Enumerations.

UNIT II OBJECT ORIENTED ASPECTS OF C# 9

Classes, Objects, Inheritance, Polymorphism, Interfaces, Operator Overloading, Delegates, Events, Errors and Exceptions.

UNIT III APPLICATION DEVELOPMENT ON .NET 8

Building Windows Applications, Accessing Data with ADO.NET.

UNIT IV WEB BASED APPLICATION DEVELOPMENT ON .NET 8

Programming Web Applications with Web Forms, Programming Web Services.

UNIT V THE CLR AND THE .NET FRAMEWORK 12

Assemblies, Versioning, Attributes, Reflection, Viewing MetaData, Type Discovery, Reflecting on a Type, Marshaling, Remoting, Understanding Server Object Types, Specifying a Server with an Interface, Building a Server, Building the Client, Using SingleCall, Threads.

TOTAL : 45

TEXT BOOKS

1. E. Balagurusamy, “Programming in C#”, Tata McGraw-Hill, 2004. (Unit I, II)
2. J. Liberty, “Programming C#”, 2nd ed., O’Reilly, 2002. (Unit III, IV, V)

REFERENCES

1. Herbert Schildt, “The Complete Reference: C#”, Tata McGraw-Hill, 2004.
2. Robinson et al, “Professional C#”, 2nd ed., Wrox Press, 2002.
3. Andrew Troelsen, “C# and the .NET Platform”, A! Press, 2003.
4. S. Thamarai Selvi, R. Murugesan, “A Textbook on C#”, Pearson Education, 2003.

CS1011 SYSTEM MODELING AND SIMULATION 3 0 0 100

AIM

To build knowledge on system modeling and system study on various applications.

OBJECTIVES

- To provide a strong foundation on concept of simulation, and modeling.
- To understand the techniques of random number generations.
- To understand the techniques of testing randomness.
- To design simulation models for various case studies like inventory, traffic flow networks, etc.
- To practice on simulation tools and impart knowledge on building simulation systems.

1. INTRODUCTION 8

Systems, modeling, general systems theory, Concept of simulation, Simulation as a decision making tool, types of simulation.

2. RANDOM NUMBERS 9

Pseudo random numbers, methods of generating random variables, discrete and continuous distributions, testing of random numbers.

3. DESIGN OF SIMULATION EXPERIMENTS 10

Problem formulation, data collection and reduction, time flow mechanism, key variables, logic flow chart, starting condition, run size, experimental design consideration, output analysis and interpretation validation.

4. SIMULATION LANGUAGES 8

Comparison and selection of simulation languages, study of anyone simulation language.

5. CASE STUDIES 10

Development of simulation models using simulation language studied for systems like queuing systems, Production systems, Inventory systems, maintenance and replacement systems and Investment analysis.

TOTAL : 45

TEXT BOOKS

1. Geoffrey Gordon, "System Simulation", 2nd Edition, Prentice Hall, India, 2002.
2. Narsingh Deo, "System Simulation with Digital Computer, "Prentice Hall, India, 2001.

REFERENCES

1. Jerry Banks and John S.Carson, Barry L. Nelson, David M.Nicol, "Discrete Event System Simulation", 3rd Edition, Prentice Hall, India, 2002.
2. Shannon, R.E. Systems simulation, The art and science, Prentice Hall, 1975.
3. Thomas J. Schriber, Simulation using GPSS, John Wiley, 1991.

IT1352 CRYPTOGRAPHY AND NETWORK SECURITY 3 1 0 100

AIM

To understand the principles of encryption algorithms; conventional and public key cryptography. To have a detailed knowledge about authentication, hash functions and application level security mechanisms.

OBJECTIVES

- To know the methods of conventional encryption.
- To understand the concepts of public key encryption and number theory
- To understand authentication and Hash functions.
- To know the network security tools and applications.

- To understand the system level security used.

UNIT I INTRODUCTION 10

OSI Security Architecture - Classical Encryption techniques – Cipher Principles – Data Encryption Standard – Block Cipher Design Principles and Modes of Operation - Evaluation criteria for AES – AES Cipher – Triple DES – Placement of Encryption Function – Traffic Confidentiality

UNIT II PUBLIC KEY CRYPTOGRAPHY 10

Key Management - Diffie-Hellman key Exchange – Elliptic Curve Architecture and Cryptography - Introduction to Number Theory – Confidentiality using Symmetric Encryption – Public Key Cryptography and RSA.

UNIT III AUTHENTICATION AND HASH FUNCTION 9

Authentication requirements – Authentication functions – Message Authentication Codes – Hash Functions – Security of Hash Functions and MACs – MD5 message Digest algorithm - Secure Hash Algorithm – RIPEMD – HMAC Digital Signatures – Authentication Protocols – Digital Signature Standard

UNIT IV NETWORK SECURITY 8

Authentication Applications: Kerberos – X.509 Authentication Service – Electronic Mail Security – PGP – S/MIME - IP Security – Web Security.

UNIT V SYSTEM LEVEL SECURITY 8

Intrusion detection – password management – Viruses and related Threats – Virus Counter measures – Firewall Design Principles – Trusted Systems.

TUTORIAL 15

TOTAL : 60

TEXT BOOK

1. William Stallings, “Cryptography And Network Security – Principles and Practices”, Prentice Hall of India, Third Edition, 2003.

REFERENCES

1. Atul Kahate, “Cryptography and Network Security”, Tata McGraw-Hill, 2003.
2. Bruce Schneier, “Applied Cryptography”, John Wiley & Sons Inc, 2001.
3. Charles B. Pfleeger, Shari Lawrence Pfleeger, “Security in Computing”, Third Edition, Pearson Education, 2003.

CS1012 NATURAL LANGUAGE PROCESSING 3 0 0 100

AIM

The aim is to expose the students to the basic principles of language processing and typical applications of natural language processing systems

OBJECTIVE

- To provide a general introduction including the use of state automata for language processing
- To provide the fundamentals of syntax including a basic parse
- To explain advanced feature like feature structures and realistic parsing methodologies
- To explain basic concepts of remotes processing
- To give details about a typical natural language processing applications

UNIT I INTRODUCTION 6

Introduction: Knowledge in speech and language processing – Ambiguity – Models and Algorithms – Language, Thought and Understanding. Regular Expressions and automata: Regular expressions – Finite-State automata. Morphology and Finite-State Transducers: Survey of English morphology – Finite-State Morphological parsing – Combining FST lexicon and rules – Lexicon-Free FSTs: The porter stammer – Human morphological processing

UNIT II SYNTAX 10

Word classes and part-of-speech tagging: English word classes – Tagsets for English – Part-of-speech tagging – Rule-based part-of-speech tagging – Stochastic part-of-speech tagging – Transformation-based tagging – Other issues. Context-Free Grammars for English: Constituency – Context-Free rules and trees – Sentence-level constructions – The noun phrase – Coordination – Agreement – The verb phase and sub categorization – Auxiliaries – Spoken language syntax – Grammars equivalence and normal form – Finite-State and Context-Free grammars – Grammars and human processing. Parsing with Context-Free Grammars: Parsing as search – A Basic Top-Down parser – Problems with the basic Top-Down parser – The early algorithm – Finite-State parsing methods.

UNIT III ADVANCED FEATURES AND SYNTAX 11

Features and Unification: Feature structures – Unification of feature structures – Features structures in the grammar – Implementing unification – Parsing with unification constraints – Types and Inheritance. Lexicalized and Probabilistic Parsing: Probabilistic context-free grammar – problems with PCFGs – Probabilistic lexicalized CFGs – Dependency Grammars – Human parsing.

UNIT IV SEMANTIC 10

Representing Meaning: Computational desiderata for representations – Meaning structure of language – First order predicate calculus – Some linguistically relevant concepts – Related representational approaches – Alternative approaches to meaning. Semantic Analysis: Syntax-Driven semantic analysis – Attachments for a fragment of English – Integrating semantic analysis into the early parser – Idioms and compositionality – Robust semantic analysis. Lexical semantics: relational among lexemes and their senses – WordNet: A database of lexical relations – The Internal structure of words – Creativity and the lexicon.

UNIT V APPLICATIONS 8

Word Sense Disambiguation and Information Retrieval: Selectional restriction-based disambiguation – Robust word sense disambiguation – Information retrieval – other information retrieval tasks. Natural Language Generation: Introduction to language generation – Architecture for generation – Surface realization – Discourse planning – Other issues. Machine Translation: Language similarities and differences – The transfer metaphor – The interlingua idea: Using meaning – Direct translation – Using statistical techniques – Usability and system development.

TOTAL : 45

TEXT BOOK

1. Daniel Jurafsky & James H.Martin, " Speech and Language Processing", Pearson Education (Singapore) Pte. Ltd., 2002.

REFERENCE

1. James Allen, "Natural Language Understanding", Pearson Education, 2003.

CS1013 ADVANCED COMPUTER ARCHITECTURE 3 0 0 100

AIM

To do an advanced study of the Instruction Set Architecture, Instruction Level Parallelism with hardware and software approaches, Memory and I/O systems and different multiprocessor architectures with an analysis of their performance.

OBJECTIVES

- To study the ISA design, instruction pipelining and performance related issues.
- To do a detailed study of ILP with dynamic approaches.
- To do a detailed study of ILP with software approaches.
- To study the different multiprocessor architectures and related issues.
- To study the Memory and I/O systems and their performance issues.

UNIT I INTRODUCTION 9

Fundamentals of Computer Design – Measuring and reporting performance – Quantitative principles of computer design. Instruction set principles – Classifying ISA – Design issues. Pipelining – Basic concepts – Hazards – Implementation – Multicycle operations.

UNIT II INSTRUCTION LEVEL PARALLELISM WITH DYNAMIC APPROACHES 9

Concepts – Dynamic Scheduling – Dynamic hardware prediction – Multiple issue – Hardware based speculation – Limitations of ILP.

UNIT III INSTRUCTION LEVEL PARALLELISM WITH SOFTWARE APPROACHES 9

Compiler techniques for exposing ILP – Static branch prediction – VLIW – Advanced compiler support – Hardware support for exposing more parallelism – Hardware versus software speculation mechanisms.

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 MULTIPROCSSORS AND THREAD LEVEL PARALLELISM 9

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

TOTAL : 45

TEXT BOOK

1. John L. Hennessey and David A. Patterson, ”Computer Architecture: A Quantitative Approach”, Morgan Kaufmann, 2003, Third Edition.

REFERENCES

1. D.Sima, T.Fountain and P.Kacsuk, ”Advanced Computer Architectures: A Design Space Approach”, Addison Wesley, 2000.
2. Kai Hwang and Zhi.Wei Xu, “Scalable Parallel Computing”, Tata McGraw-Hill, New Delhi, 2003.

CS1014 INFORMATION SECURITY 3 0 0 100

AIM

To study the critical need for ensuring Information Security in Organizations

OBJECTIVES

1. To understand the basics of Information Security
2. To know the legal, ethical and professional issues in Information Security
3. To know the aspects of risk management
4. To become aware of various standards in this area
5. To know the technological aspects of Information Security

UNIT 1 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 Poicy, 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

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.

CS1015 USER INTERFACE DESIGN 3 0 0 100

AIM

To implement the basics and in-depth knowledge about UID. It enables the students to take up the design the user interface, design, menu creation and windows creation and connection between menu and windows.

OBJECTIVES

- To study the concept of menus, windows, interfaces.
- To study about business functions.
- To study the characteristics and components of windows.
- To study the various controls for the windows.
- To study about various problems in windows design with color, text, graphics.
- To study the testing methods

UNIT I 8

Introduction-Importance-Human-Computer interface-characteristics of graphics interface-Direct manipulation graphical system - web user interface-popularity-characteristic & principles.

UNIT II 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 9

Windows: 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 9

Text for web pages - effective feedback-guidance & assistance-Internationalization-accesssibility-Icons-Image-Multimedia -coloring.

UNIT V **9**

Windows layout-test :prototypes - kinds of tests - retest - Information search - visualization - Hypermedia - www - Software tools.

TOTAL : 45

TEXT BOOK

1. Wilbent. O. Galitz ,"The Essential Guide to User Interface Design", John Wiley& Sons, 2001.

REFERENCES

1. Ben Sheiderman, "Design the User Interface", Pearson Education, 1998.
2. Alan Cooper, "The Essential of User Interface Design", Wiley – Dream Tech Ltd., 2002.

CS1016 GRAPH THEORY 3 0 0 100

AIM

To provide fundamental ideas on graph theory required for the study of Computer Science.

OBJECTIVES

- Understand basic notions of Graph Theory
- Knowing Fundamental Theorems in Graph Theory
- Study of algorithmic Graph Theory

UNIT I **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 **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 **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 **9**

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

UNIT V **9**

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

TOTAL : 45

TEXT BOOK

1. Narsingh Deo, “Graph Theory: With Application to Engineering and Computer Science”, PHI, 2003.

REFERENCE

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

CS1017 PARALLEL COMPUTING 3 0 0 100

AIM

To study the scalability & clustering issues, understand the technologies used for parallel computation, study the different inter connection networks and the different software programming models.

OBJECTIVES

- To study the scalability and clustering issues and the technology necessary for them.
- To understand the technologies enabling parallel computing.
- To study the different types of interconnection networks.
- To study the different parallel programming models.
- To study the software support needed for shared memory programming.

UNIT I SCALABILITY AND CLUSTERING 9

Evolution of Computer Architecture – Dimensions of Scalability – Parallel Computer Models – Basic Concepts Of Clustering – Scalable Design Principles – Parallel Programming Overview – Processes, Tasks and Threads – Parallelism Issues – Interaction / Communication Issues – Semantic Issues In Parallel Programs.

UNIT II ENABLING TECHNOLOGIES 9

System Development Trends – Principles of Processor Design – Microprocessor Architecture Families – Hierarchical Memory Technology – Cache Coherence Protocols – Shared Memory Consistency – Distributed Cache Memory Architecture – Latency Tolerance Techniques – Multithreaded Latency Hiding.

UNIT III SYSTEM INTERCONNECTS 9

Basics of Interconnection Networks – Network Topologies and Properties – Buses, Crossbar and Multistage Switches, Software Multithreading – Synchronization Mechanisms.

UNIT IV PARALLEL PROGRAMMING 9

Paradigms And Programmability – Parallel Programming Models – Shared Memory Programming.

UNIT V MESSAGE PASSING PROGRAMMING 9

Message Passing Paradigm – Message Passing Interface – Parallel Virtual Machine.

TOTAL : 45

TEXT BOOK

1. Kai Hwang and Zhi.Wei Xu, “Scalable Parallel Computing”, Tata McGraw-Hill, New Delhi, 2003.

REFERENCES

1. David E. Culler & Jaswinder Pal Singh, “Parallel Computing Architecture: A Hardware/Software Approach”, Morgan Kaufman Publishers, 1999.
2. Michael J. Quinn, “Parallel Programming in C with MPI & OpenMP”, Tata McGraw-Hill, New Delhi, 2003.
3. Kai Hwang, “Advanced Computer Architecture” Tata McGraw-Hill, New Delhi, 2003.

CS1018 SOFT COMPUTING 3 0 0 100

AIM

To introduce the techniques of soft computing and adaptive neuro-fuzzy inferencing systems which differ from conventional AI and computing in terms of its tolerance to imprecision and uncertainty.

OBJECTIVES

- To introduce the ideas of fuzzy sets, fuzzy logic and use of heuristics based on human experience
- To become familiar with neural networks that can learn from available examples and generalize to form appropriate rules for inferencing systems
- To provide the mathematical background for carrying out the optimization associated with neural network learning
- To familiarize with genetic algorithms and other random search procedures useful while seeking global optimum in self-learning situations
- To introduce case studies utilizing the above and illustrate the intelligent behavior of programs based on soft computing

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 NEURAL NETWORKS 10

Supervised Learning Neural Networks – Perceptrons - Adaline – Backpropagation Mutilayer Perceptrons – Radial Basis Function Networks – Unsupervised Learning Neural Networks – Competitive Learning Networks – Kohonen Self-Organizing Networks – Learning Vector Quantization – Hebbian Learning.

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

TEXT BOOK

1. J.S.R.Jang, C.T.Sun and E.Mizutani, "Neuro-Fuzzy and Soft Computing", PHI, 2004, Pearson Education 2004.

REFERENCES

1. Timothy J.Ross, "Fuzzy Logic with Engineering Applications", McGraw-Hill, 1997.
2. Davis E.Goldberg, "Genetic Algorithms: Search, Optimization and Machine Learning", Addison Wesley, N.Y., 1989.
3. S. Rajasekaran and G.A.V.Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, 2003.
4. R.Eberhart, P.Simpson and R.Dobbins, "Computational Intelligence - PC Tools", AP Professional, Boston, 1996.

EC1008 HIGH SPEED NETWORKS 3 0 0 100

AIM

To highlight the features of different technologies involved in High Speed Networking and their performance.

OBJECTIVES

- Students will get an introduction about ATM and Frame relay.
- Students will be provided with an up-to-date survey of developments in High Speed Networks.
- Enable the students to know techniques involved to support real-time traffic and congestion control.
- Students will be provided with different levels of quality of service (Q.S) to different applications.

UNIT I HIGH SPEED NETWORKS 8

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: 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

TEXTBOOK

1. William Stallings, "HIGH SPEED NETWORKS AND INTERNET", Pearson Education, Second Edition, 2002. [Chapter – 4-6, 8, 10, 12, 13, 17,18]

REFERENCES

1. Warland & Pravin Varaiya, "HIGH PERFORMANCE COMMUNICATION NETWORKS", Jean Harcourt Asia Pvt. Ltd., II Edition, 2001.
2. Irvan Pepelnjk, Jim Guichard and Jeff Apcar, "MPLS and VPN architecture", Cisco Press, Volume 1 and 2, 2003

EC1009 DIGITAL IMAGE PROCESSING 3 0 0 100

AIM

To introduce the student to various image processing techniques.

OBJECTIVES

- To study the image fundamentals and mathematical transforms necessary for image processing.
- To study the image enhancement techniques
- To study image restoration procedures.
- To study the image compression procedures.
- To study the image segmentation and representation techniques.

UNIT I DIGITAL IMAGE FUNDAMENTALS AND TRANSFORMS 9

Elements of visual perception – Image sampling and quantization Basic relationship between pixels – Basic geometric transformations-Introduction to Fourier Transform and DFT – Properties of 2D Fourier Transform – FFT – Separable Image Transforms -Walsh – Hadamard – Discrete Cosine Transform, Haar, Slant – Karhunen – Loeve transforms.

UNIT II IMAGE ENHANCEMENT TECHNIQUES 9

Spatial Domain methods: Basic grey level transformation – Histogram equalization – Image subtraction – Image averaging –Spatial filtering: Smoothing, sharpening filters – Laplacian filters – Frequency domain filters : Smoothing – Sharpening filters – Homomorphic filtering.

UNIT III IMAGE RESTORATION: 9

Model of Image Degradation/restoration process – Noise models – Inverse filtering -Least mean square filtering – Constrained least mean square filtering – Blind image restoration – Pseudo inverse – Singular value decomposition.

UNIT IV IMAGE COMPRESSION 9

Lossless compression: Variable length coding – LZW coding – Bit plane coding- predictive coding-DPCM.
Lossy Compression: Transform coding – Wavelet coding – Basics of Image compression standards: JPEG, MPEG,Basics of Vector quantization.

UNIT V IMAGE SEGMENTATION AND REPRESENTATION 9

Edge detection –Thresholding - Region Based segmentation – Boundary representation: chair codes- Polygonal approximation –Boundary segments –boundary descriptors: Simple descriptors-Fourier descriptors - Regional descriptors –Simple descriptors- Texture

TOTAL : 45

TEXT BOOKS

1. Rafael C Gonzalez, Richard E Woods 2nd Edition, Digital Image Processing - Pearson Education 2003.

REFERENCES

1. William K Pratt, Digital Image Processing John Willey (2001)
2. Image Processing Analysis and Machine Vision – Millman Sonka, Vaclav hlavac, Roger Boyle, Broos/colic, Thompson Learniy (1999).
3. A.K. Jain, PHI, New Delhi (1995)-Fundamentals of Digital Image Processing.
4. Chanda Dutta Magundar – Digital Image Processing and Applications, Prentice Hall of India, 2000

CS1019 ROBOTICS 3 0 0 100

AIM

Robots are slowly and steadily replacing human beings in many fields. The aim of this course is to introduce the students into this area so that they could use the same when they enter the industries.

OBJECTIVE

The course has been so designed to give the students an overall view of the mechanical

components

- The mathematics associated with the same.
- Actuators and sensors necessary for the functioning of the robot.

UNIT I ROBOTIC MANIPULATION 8

Robotic manipulation – Automation and Robots – Robot Classification – Applications – Robot Specifications – Notation. Direct Kinematics: The ARM Equation – Dot and Cross products – Coordinate frames – Rotations – Homogeneous coordinates – Link coordinates – The arm equation – A five-axis articulated robot (Rhino XR-3) – A four-axis SCARA Robot (Adept One) – A six-axis articulated Robot (Intelledex 660). Inverse Kinematics: Solving the arm equation – The inverse kinematics problem – General properties of solutions – Tool configuration – Inverse kinematics of a five-axis articulated robot (Rhino XR-3) – Inverse kinematics of a four-axis SCARA robot (Adept one) - Inverse kinematics of a six-axis articulated robot (Intelledex 660) - Inverse kinematics of a three-axis articulated robot – A robotic work cell.

UNIT II DYNAMIC OF ROBOTS 12

Workspace analysis and trajectory planning: Workspace analysis – Work envelop of a five-axis articulated robot – Work envelope of a four-axis SCARA robot – Workspace fixtures – The pick-and-place operation – Continuous-path motion – Interpolated motion – Straight-line motion. Differential motion and statics: The tool-configuration Jacobian matrix – Joint-space singularities – Generalized Inverses – Resolved-Motion rate control:n<=6 – Rate control of redundant robots:n>6 – rate control using {1}-inverses – The manipulator Jacobian – Induced joint torques and forces. Manipulator Dynamics: Lagrange's equation – Kinetic and Potential energy – Generalized force – Lagrange -Euler dynamic model – Dynamic model of a two-axis planar articulated robot - Dynamic model of a three-axis SCARA robot – Direct and Inverse dynamics – Recursive Newton-Euler formulation – Dyamic model of a one-axis robot.

UNIT III ROBOT CONTROL 6

Robot control: The control problem – State equation – Constant solutions – Linear feedback systems - Single-axis PID control – PD-Gravity control – Computed-Torque control – Variable-Structure control – Impedance control

UNIT IV SENSORS AND ACTUATORS 9

Actuators - Introduction – Characteristics of actuating systems – Comparison of actuating systems – Hydraulic devices – Pneumatic devices – Electric motors – Microprocessor control of electric motors – Magnetostricitve actuators – Shape-memory type metals – Speed reduction. Sensors – Introduction – Sensor characteristics – Position sensors – Velocity sensors – Acceleration sensors – Force and pressure sensors – Torque sensors – Microswitches – Light and Infrared sensors – Touch and Tactile sensors – Proximity sensors – Range-finders – Sniff sensors – Vision systems – Voice Recognition devices – Voice synthesizers – Remote center compliance device.

UNIT V VISION AND TASK PLANNING 9

Robot vision – Image representation – Template matching – Polyhedral objects – Shape analysis – Segmentation – Iterative processing – Perspective Transformations – Structured illumination – Camera calibration. Task planning: Task-level programming – Uncertainty – Configuration space

– Gross-Motion planning – Grasp planning – Fine-Motion planning – Simulation of planar motion – A task-planning problem.

TOTAL : 45

TEXT BOOKS

1. Robert J.Schilling, "Fundamentals of Robotics – Analysis & Control", Prentice Hall of India Pvt. Ltd., 2002. (Chapters 1 to 9 – Unit I, II, III, V)
2. Saeed B.Niku, "Introduction to Robotics – Analysis, Systems, Applications", Prentice Hall of India Pvt. Ltd., 2003. (Chapters 6 & 7 – Unit IV)

IT1401 COMPONENT BASED TECHNOLOGY 3 0 0 100

AIM

To introduce different software components and their application.

OBJECTIVE

- Introduces in depth JAVA, Corba and .Net Components
- Deals with Fundamental properties of components, technology and architecture and middleware.
- Component Frameworks and Development are covered indepth.

UNIT I INTRODUCTION 9

Software Components – objects – fundamental properties of Component technology – modules – interfaces – callbacks – directory services – component architecture – components and middleware

UNIT II JAVA BASED COMPONENT TECHNOLOGIES 9

Threads – Java Beans – Events and connections – properties – introspection – JAR files – reflection – object serialization – Enterprise Java Beans – Distributed Object models – RMI and RMI-IIOP

UNIT III CORBA COMPONENT TECHNOLOGIES 9

Java and CORBA – Interface Definition language – Object Request Broker – system object model – portable object adapter – CORBA services – CORBA component model – containers – application server – model driven architecture

UNIT IV . NET BASED COMPONENT TECHNOLOGIES 9

COM – Distributed COM – object reuse – interfaces and versioning – dispatch interfaces – connectable objects – OLE containers and servers – Active X controls – .NET components - assemblies – appdomains – contexts – reflection – remoting

UNIT V COMPONENT FRAMEWORKS AND DEVELOPMENT 9

Connectors – contexts – EJB containers – CLR contexts and channels – Black Box component framework – directory objects – cross-development environment – component-oriented programming – Component design and implementation tools – testing tools - assembly tools

TOTAL : 45

TEXT BOOK

1. Clemens Szyperski, “Component Software: Beyond Object-Oriented Programming”, Pearson Education publishers, 2003

REFERENCES

1. Ed Roman, “Mastering Enterprise Java Beans”, John Wiley & Sons Inc., 1999.
2. Mowbray, “Inside CORBA”, Pearson Education, 2003.
3. Freeze, “Visual Basic Development Guide for COM & COM+”, BPB Publication, 2001.
4. Hortsamann, Cornell, “CORE JAVA Vol-II” Sun Press, 2002.

CS1020 SOFTWARE QUALITY MANAGEMENT 3 0 0 100

AIM

To introduce an integrated approach to software development incorporating quality management methodologies.

OBJECTIVE

- Software quality models
- Quality measurement and metrics
- Quality plan, implementation and documentation
- Quality tools including CASE tools
- Quality control and reliability of quality process
- Quality management system models
- Complexity metrics and Customer Satisfaction
- International quality standards – ISO, CMM

UNIT I INTRODUCTION TO SOFTWARE QUALITY 9

Software Quality – Hierarchical models of Boehm and McCall – Quality measurement – Metrics measurement and analysis – Gilb’s approach – GQM Model

UNIT II SOFTWARE QUALITY ASSURANCE 9

Quality tasks – SQA plan – Teams – Characteristics – Implementation – Documentation – Reviews and Audits

UNIT III QUALITY CONTROL AND RELIABILITY 9

Tools for Quality – Ishikawa’s basic tools – CASE tools – Defect prevention and removal – Reliability models – Rayleigh model – Reliability growth models for quality assessment

UNIT IV QUALITY MANAGEMENT SYSTEM 9

Elements of QMS – Rayleigh model framework – Reliability Growth models for QMS – Complexity metrics and models – Customer satisfaction analysis.

UNIT V QUALITY STANDARDS 9

Need for standards – ISO 9000 Series – ISO 9000-3 for software development – CMM and CMMI – Six Sigma concepts.

TOTAL : 45

TEXT BOOKS

1. Allan C. Gillies, “Software Quality: Theory and Management”, Thomson Learning, 2003. (UI : Ch 1-4 ; UV : Ch 7-8)
2. Stephen H. Kan, “Metrics and Models in Software Quality Engineering”, Pearson Education (Singapore) Pte Ltd., 2002. (UI : Ch 3-4; UIII : Ch 5-8 ; UIV : Ch 9-11)

REFERENCES

1. Norman E. Fenton and Shari Lawrence Pfleeger, “Software Metrics” Thomson, 2003
2. Mordechai Ben – Menachem and Garry S.Marliss, “*Software Quality*”, Thomson Asia Pte Ltd, 2003.
3. Mary Beth Chrissis, Mike Konrad and Sandy Shrum, “*CMMI*”, Pearson Education (Singapore) Pte Ltd, 2003.
4. ISO 9000-3 “*Notes for the application of the ISO 9001 Standard to software development*”.

CS1021 QUANTUM COMPUTING 3 0 0 100

AIM

To understand the fundamental principles of quantum computing.

OBJECTIVES

- To understand the building blocks of a quantum computer.
- To understand the principles, quantum information and limitation of quantum operations formalizing.
- To understand the quantum error and its correction.

UNIT I FUNDAMENTAL CONCEPTS 9

Global Perspectives, Quantum Bits, Quantum Computation, Quantum Algorithms, Quantum Information, Postulates of Quantum Mechanisms.

UNIT II QUANTUM COMPUTATION 9

Quantum Circuits – Quantum algorithms, Single Orbit operations, Control Operations, Measurement, Universal Quantum Gates, Simulation of Quantum Systems, Quantum Fourier transform, Phase estimation, Applications, Quantum search algorithms – Quantum counting – Speeding up the solution of NP – complete problems – Quantum Search for an unstructured database.

UNIT III QUANTUM COMPUTERS 9

Guiding Principles, Conditions for Quantum Computation, Harmonic Oscillator Quantum Computer, Optical Photon Quantum Computer – Optical cavity Quantum electrodynamics, Ion traps, Nuclear Magnetic resonance.

UNIT IV QUANTUM INFORMATIONS 9

Quantum noise and Quantum Operations – Classical Noise and Markov Processes, Quantum Operations, Examples of Quantum noise and Quantum Operations – Applications of Quantum operations, Limitations of the Quantum operations formalism, Distance Measures for Quantum information.

UNIT V QUANTUM ERROR CORRECTION 9

Introduction, Shor code, Theory of Quantum Error –Correction, Constructing Quantum Codes, Stabilizer codes, Fault – Tolerant Quantum Computation, Entropy and information – Shannon Entropy, Basic properties of Entropy, Von Neumann, Strong Sub Additivity, Data Compression, Entanglement as a physical resource.

TOTAL : 45

TEXT BOOK

1. Micheal A. Nielsen. & Issac L. Chiang, "Quantum Computation and Quantum Information", Cambridge University Press, Fint South Asian edition, 2002.

CS1022 KNOWLEDGE BASED DECISION SUPPORT SYSTEM 3 0 0 100

AIM

There has been a radical shift in the management parlance. Organizations can use Intranets and Internets to analyze various aspects about the performance and predict the future. This course aims at exposing the student to one of the important applications of the computer.

OBJECTIVE

The course has been so designed as to include.

- Development of support system
- Methods of managing knowledge
- Intelligent decision system development

UNIT I INTRODUCTION 9

Decision making, Systems, Modeling, and support – Introduction and Definition – Systems – Models – Modeling process – Decision making: The intelligence phase – The design phase - The choice phase – Evaluation: The implementation phase –Alternative Decision – Making models – Decision support systems – Decision makers - Case applications.

UNIT II DECISION SUPPORT SYSTEM DEVELOPMENT 9

Decision Support System Development**:** Introduction - Life cycle – Methodologies – prototype – Technology Levels and Tools – Development platforms – Tool selection – Developing DSS
Enterprise systems: Concepts and Definition – Evolution of information systems – Information needs – Characteristics and capabilities – Comparing and Integrating EIS and DSS – EIS data access, Data Warehouse, OLAP, Multidimensional analysis, Presentation and the web – Including soft information enterprise on systems - Organizational DSS – supply and value chains and decision support – supply chain problems and solutions – computerized systems MRP, ERP, SCM – frontline decision support systems.

UNIT III KNOWLEDGE MANAGEMENT 9

Introduction – Organizational learning and memory – Knowledge management –Development – methods, Technologies, and Tools – success –Knowledge management and Artificial intelligence – Electronic document management.
Knowledge acquisition and validation: Knowledge engineering – Scope – Acquisition methods - Interviews – Tracking methods – Observation and other methods – Grid analysis – Machine Learning: Rule induction, case-based reasoning – Neural computing – Intelligent agents – Selection of an appropriate knowledge acquisition methods – Multiple experts – Validation and verification of the knowledge base – Analysis, coding, documenting, and diagramming – Numeric and documented knowledge acquisition – Knowledge acquisition and the Internet/Intranets.

Knowledge representation: Introduction – Representation in logic and other schemas – Semantic networks – Production rules – Frames – Multiple knowledge representation – Experimental knowledge representations - Representing uncertainty.

UNIT IV INTELLIGENT SYSTEM DEVELOPMENT 9

Inference Techniques: Reasoning in artificial intelligence – Inference with rules: The Inference tree – Inference with frames – Model-based and case-based reasoning - Explanation and Meta knowledge – Inference with uncertainty – Representing uncertainty – Probabilities and related approaches – Theory of certainty – Approximate reasoning using fuzzy logic.
Intelligent Systems Development: Prototyping: Project Initialization – System analysis and design – Software classification: Building expert systems with tools – Shells and environments – Software selection – Hardware –Rapid prototyping and a demonstration prototype - System development –Implementation – Post implementation.

UNIT V MANAGEMENT SUPPORT SYSTEMS 9

Implementing and integrating management support systems – Implementation: The major issues - Strategies – System integration – Generic models MSS, DSS, ES – Integrating EIS, DSS and ES, and global integration – Intelligent DSS – Intelligent modeling and model management – Examples of integrated systems – Problems and issues in integration.
Impacts of Management Support Systems – Introduction – overview – Organizational structure and related areas – MSS support to business process reengineering – Personnel management issues – Impact on individuals – Productivity, quality, and competitiveness – decision making and the manager manager's job – Issues of legality, privacy, and ethics – Intelligent systems and employment levels – Internet communication – other societal impacts – managerial implications and social responsibilities –

TOTAL : 45

TEXT BOOK

1. Efrain Turban, Jay E.Aronson, "Decision Support Systems and Intelligent Systems" 6th Edition, Pearson Education, 2001.

REFERENCES

1. Ganesh Natarajan, Sandhya Shekhar, "Knowledge management – Enabling Business Growth", Tata McGraw-Hill, 2002.
2. George M.Marakas, "Decision Support System", Prentice Hall, India, 2003.
3. Efrem A.Mallach, "Decision Support and Data Warehouse Systems", Tata McGraw-Hill, 2002.

IT1012 GRID COMPUTING 3 0 0 100

AIM

To understand the technology application and tool kits for grid computing

OBJECTIVES

- To understand the genecise of grid computing
- To knoew the application of grid computing
- To understanding the technology and tool kits to facilitated the grid computing

UNIT I GRID COMPUTING **9**

Introduction - Definition and Scope of grid computing

UNIT II GRID COMPUTING INITIALIVES **9**

Grid Computing Organizations and their roles – Grid Computing analog – Grid Computing road map.

UNIT III GRID COMPUTING APPLICATIONS **9**

Merging the Grid sources – Architecture with the Web Devices Architecture.

UNIT IV TECHNOLOGIES **9**

OGSA – Sample use cases – OGSA platform components – OGSI – OGSA Basic Services.

UNIT V GRID COMPUTING TOOL KITS **9**

Globus GT 3 Toolkit – Architecture, Programming model, High level services – OGSI .Net middleware Solutions.

TOTAL : 45 HRS

TEXTBOOK

1. Joshy Joseph & Craig Fellenstein, "Grid Computing", Pearson/PHI PTR-2003.

REFERENCE BOOK

1. Ahmar Abbas, "Grid Computing: A Practical Guide to technology and Applications", Charles River media – 2003.

GE 1001 INTELLECTUAL PROPERTY RIGHTS (IPR) **3 0 0 100**

UNIT I

Introduction – Invention and Creativity – Intellectual Property (IP) – Importance – Protection of IPR – Basic types of property (i. Movable Property ii. Immovable Property and iii. Intellectual Property). **5**

UNIT II

IP – Patents – Copyrights and related rights – Trade Marks and rights arising from Trademark registration – Definitions – Industrial Designs and Integrated circuits – Protection of Geographical Indications at national and International levels – Application Procedures. **10**

UNIT III

International convention relating to Intellectual Property – Establishment of WIPO – Mission and Activities – History – General Agreement on Trade and Tariff (GATT). **10**

UNIT IV

Indian Position Vs WTO and Strategies – Indian IPR legislations – commitments to WTO-Patent Ordinance and the Bill – Draft of a national Intellectual Property Policy – Present against unfair competition. **10**

UNIT V

Case Studies on – Patents (Basumati rice, turmeric, Neem, etc.) – Copyright and related rights – Trade Marks – Industrial design and Integrated circuits – Geographic indications – Protection against unfair competition. **10**

TEXT BOOK

1. Subbaram N.R. " Handbook of Indian Patent Law and Practice ", S. Viswanathan (Printers and Publishers) Pvt. Ltd., 1998.

REFERENCES

1. Eli Whitney, United States Patent Number : 72X, Cotton Gin, March 14, 1794.
2. Intellectual Property Today : Volume 8, No. 5, May 2001, [www.iptoday.com].
3. Using the Internet for non-patent prior art searches, Derwent IP Matters, July 2000. [www.ipmatters.net/features/000707_gibbs.html.

GE 1002 INDIAN CONSTITUTION AND SOCIETY 3 0 0 100

UNIT I

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. **9**

UNIT II

Union Government – Structures of the Union Government and Functions – President – Vice President – Prime Minister – Cabinet – Parliament – Supreme Court of India – Judicial Review. **9**

UNIT III

State Government – Structure and Functions – Governor – Chief Minister – Cabinet – State Legislature – Judicial System in States – High Courts and other Subordinate Courts. **9**

UNIT IV

Indian Federal System – Center – State Relations – President's Rule – Constitutional Amendments – Constitutional Functionaries - Assessment of working of the Parliamentary System in India. **9**

UNIT V

Society : Nature, Meaning and definition; Indian Social Structure; Castle, 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. **9**

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, " (1998) Indian Political System ", New Academic Publishing House, Jalaendhar.
3. R.N. Sharma, " Indian Social Problems ", Media Promoters and Publishers Pvt. Ltd.
4. Yogendra Singh, " (1997) Social Stratification and Charge in India ", Manohar, New Delhi.

CS1151 DATA STRUCTURES 3 1 0 100

AIM

To provide an in-depth knowledge in problem solving techniques and data structures.

OBJECTIVES

- To learn the systematic way of solving problems
- To understand the different methods of organizing large amounts of data
- To learn to program in C
- To efficiently implement the different data structures
- To efficiently implement solutions for specific problems

UNIT I PROBLEM SOLVING 9

Problem solving – Top-down Design – Implementation – Verification – Efficiency – Analysis – Sample algorithms.

UNIT II LISTS, STACKS AND QUEUES 8

Abstract Data Type (ADT) – The List ADT – The Stack ADT – The Queue ADT

UNIT III TREES 10

Preliminaries – Binary Trees – The Search Tree ADT – Binary Search Trees – AVL Trees – Tree Traversals – Hashing – General Idea – Hash Function – Separate Chaining – Open Addressing – Linear Probing – Priority Queues (Heaps) – Model – Simple implementations – Binary Heap

UNIT IV SORTING 9

Preliminaries – Insertion Sort – Shellsort – Heapsort – Mergesort – Quicksort – External Sorting

UNIT V GRAPHS 9

Definitions – Topological Sort – Shortest-Path Algorithms – Unweighted Shortest Paths – Dijkstra's Algorithm – Minimum Spanning Tree – Prim's Algorithm – Applications of Depth-First Search – Undirected Graphs – Biconnectivity – Introduction to NP-Completeness

TUTORIAL 15

TOTAL : 60

TEXT BOOKS

1. R. G. Dromey, "How to Solve it by Computer" (Chaps 1-2), Prentice-Hall of India, 2002.
2. M. A. Weiss, "Data Structures and Algorithm Analysis in C", 2nd ed, Pearson Education Asia, 2002. (chaps 3, 4.1-4.4 (except 4.3.6), 4.6, 5.1-5.4.1, 6.1-6.3.3, 7.1-7.7 (except 7.2.2, 7.4.1, 7.5.1, 7.6.1, 7.7.5, 7.7.6), 7.11, 9.1-9.3.2, 9.5-9.5.1, 9.6-9.6.2, 9.7)

REFERENCES

1. Y. Langsam, M. J. Augenstein and A. M. Tenenbaum, "Data Structures using C", Pearson Education Asia, 2004
2. Richard F. Gilberg, Behrouz A. Forouzan, "Data Structures – A Pseudocode Approach with C", Thomson Brooks / COLE, 1998.

3.Aho, J. E. Hopcroft and J. D. Ullman, "Data Structures and Algorithms", Pearson education Asia, 1983.

CS1152 DATA STRUCTURES LAB 0 0 3 100

AIM

To teach the principles of good programming practice and to give a practical training in writing efficient programs in C

OBJECTIVES

- To teach the students to write programs in C
- To implement the various data structures as Abstract Data Types
- To write programs to solve problems using the ADTs

Implement the following exercises using C:

1. Array implementation of List Abstract Data Type (ADT)
2. Linked list implementation of List ADT
3. Cursor implementation of List ADT
4. Array implementations of Stack ADT
5. Linked list implementations of Stack ADT

The following three exercises are to be done by implementing the following source files

(a) Program for 'Balanced Paranthesis'
(b) Array implementation of Stack ADT
(c) Linked list implementation of Stack ADT
(d) Program for 'Evaluating Postfix Expressions'

An appropriate header file for the Stack ADT should be #included in (a) and (d)

6. Implement the application for checking 'Balanced Paranthesis' using array implementation of Stack ADT (by implementing files (a) and (b) given above)
7. Implement the application for checking 'Balanced Paranthesis' using linked list implementation of Stack ADT (by using file (a) from experiment 6 and implementing file (c))
8. Implement the application for 'Evaluating Postfix Expressions' using array and linked list implementations of Stack ADT (by implementing file (d) and using file (b), and then by using files (d) and (c))
9. Queue ADT
10. Search Tree ADT - Binary Search Tree
11. Heap Sort
12. Quick Sort