

COMPUTER SCIENCE & ENGINEERING

3RD SEMESTER

Course Code	Course No.	Subject	Teaching Periods			Uty. Exam duration (hours)	Marks			
			L	T	P		Sessional	Theory	Practical	Total
A	RT301	Engineering Mathematics II	3	1	-	3	50	100	-	150
B	R 302	Micro Processor Systems	3	1	-	3	50	100	-	150
C	RT 303	Solid State Electronics	2	1	-	3	50	100	-	150
D	RT 304	Problem Solving and Computer Programming	3	1	-	3	50	100	-	150
E	RT 305	Humanities	2	1	-	3	50	100	-	150
F	R306	Logic System Design	3	1	-		50	100	-	150
G	R 307	Solid State Electronics Lab	0	0	4	3	50	-	100	150
H	R 308	Programming Lab	0	0	4	3	50	-	100	150
		Total	16	6	8	-	400	600	200	1200

4TH SEMESTER

Course Code	Course No.	Subject	Teaching Periods			Uty. Exam duration (hours)	Marks			
			L	T	P		Sessional	Theory	Practical	Total
A	CMEL RPTA 401	Engineering Mathematics III	3	1	-	3	50	100	-	150
B	R 402	Computer Organization	2	1	-	3	50	100	-	150
C	R 403	Object Oriented Programming	2	1	-	3	50	100	-	150
D	R 404	Integrated Circuits	3	1	-	3	50	100	-	150
E	R 405	Data Structures and Programming Methodologies	3	1	-	3	50	100	-	150
F	R406	Advanced Microprocessors and Peripherals	3	1	-	3	50	100	-	150
G	R 407	Integrated Circuits Lab	0	0	4	3	50	-	100	150
H	R 408	Data Structures Lab	0	0	4	3	50	-	100	150
		Total	16	6	8	-	400	600	200	1200

5TH SEMESTER

Course Code	Course No.	Subject	Teaching Periods			Uty. Exam duration (hours)	Marks			
			L	T	P		Sessional	Theory	Practical	Total
A	RT501	Engineering Mathematics IV	3	1	-	3	50	100	-	150
B	R 502	Operating Systems	3	1	-	3	50	100	-	150
C	RT503	Database Management Systems	3	1	-	3	50	100	-	150
D	R 504	File Structures and Algorithms	2	1	-	3	50	100	-	150
E	RT505	Language Processors	3	1	-	3	50	100	-	150
F	RT506	Data Communication	2	1	-	3	50	100	-	150
G	R 507	Microprocessor Lab	0	0	4	3	50	-	100	150
H	R 508	Database Lab	0	0	4	3	50	-	100	150
		Total	16	6	8	-	400	600	200	1200

6TH SEMESTER

Course Code	Course No.	Subject	Teaching Periods			Uty. Exam duration (hours)	Marks			
			L	T	Prac/ Proj.		Sessional	Theory	Practical	Total
A	R 601	PC & PC based Systems	3	1	-	3	50	100	-	150
B	RT602	Software Engineering	2	1	-	3	50	100	-	150
C	R 603	Project Management and Quality Assurance	2	1	-	3	50	100	-	150
D	RT604	Computer Networks	3	1	-	3	50	100	-	150
E	RT605	Network Computing	3	1	-	3	50	100	-	150
F	R 606	Algorithm Analysis and Design	3	1	-	3	50	100	-	150
G	R 607	System Software Lab	0	0	4	3	50	-	100	150
H	R 608	Mini Project	0	0	4	3	50	-	100	150
		Total	16	6	8	-	400	600	200	1200

7TH SEMESTER

Course Code	Course No.	Subject	Teaching Periods			Uty. Exam duration (hours)	Marks			
			L	T	Prac./ Proj.		Sessional	Theory	Practical	Total
A	RT701	Object Oriented Modeling and Design	2	1	-	3	50	100	-	150
B	RT702	Computer Graphics	3	1	-	3	50	100	-	150
C	R 703	Theory of Computation	3	1	-	3	50	100	-	150
D	R 704	Advanced Software Environments	2	1	-	3	50	100	-	150
E	RT705	Web Technologies	2	1	-	3	50	100	-	150
F	R 706	Elective I	3	1	-	3	50	100	-	150
G	R 707	Computer Hardware and Networking Lab	0	0	3	3	50	-	100	150
H	R 708	Network Programming Lab	0	0	3	3	50	-	100	150
I	R709	Project & Seminar	0	0	3	-	-	-	-	-
		Total	15	6	9	-	400	600	200	1200

8TH SEMESTER

Course Code	Course No.	Subject	Teaching Periods			Uty. Exam duration (hours)	Marks			
			L	T	Prac./ Proj.		Sessional	Theory	Practical	Total
A	RT801	Security in Computing	2	1	-	3	50	100	-	150
B	R 802	High Performance Computing	2	1	-	3	50	100	-	150
C	R 803	Principles of Programming Languages	3	1	-	3	50	100	-	150
D	RT804	Artificial Intelligence	3	1	-	3	50	100	-	150
E	R 805	Elective II	3	1	-	3	50	100	-	150
F	R 806	Elective III	3	1	-	3	50	100	-	150
G	R 807	Graphics and Multimedia Lab	0	0	4	3	50	-	100	150
H	R 808	Project & Seminar	0	0	4	-	100	-	-	100
I	R809	Viva-Voce	-	-	-	-	-	-	50	50
		Total	16	6	8		450	600	150	1200

**THIRD
SEMESTER**

ENGINEERING MATHEMATICS - II

RT301

3+1+0

Module 1

Mathematical Logic - Statements, connectives - Well formed formulas – Tautologies - Equivalence of formulas - Duality law Tautological implications - Normal forms - the theory of inference for the statement - Calculus - validity, Consistency, Theorem proving - the predicate calculus - Inference Theory of the predicate calculus.

Module 2

Number Theory: Prime and Relatively prime numbers – Modular arithmetic – Fermat's and Euler's Theorems – Testing for Primability – Euclid's Algorithm – Discrete Logarithms
Relations & Functions - Properties of binary relations - Equivalence relations and partitions - Functions and pigeon hole principle.

Module 3

Algebraic systems - general properties - Lattices as a partially ordered set - some properties of lattices - lattices as algebraic systems - sub lattices - direct product - homomorphism - some special lattices.

Module 4

Discrete Numeric Functions & generating Functions, Recurrence relations - Manipulations of Numeric functions - generating functions - Recurrence relations - Linear recurrence relations with constant coefficients - Homogeneous solutions - Particular solutions - Total solutions - solutions by the method of generating functions.

Module 5

Graph Theory: Basic concept of graphs, subgraphs, connected graphs, Paths, Cycles, Multigraph and Weighted graph - Trees - spanning trees.

References

1. Elements of Discrete Mathematics - C.L.Lieu, McGraw Hill.
2. Discrete mathematical structures with applications to Computer Science - J.P. Tremblay, R. Manohar, McGraw Hill.
3. Discrete Mathematics - Richard Johnsonbaugh, Pearson Education Asia
4. Discrete Mathematical Structures - Bernard Kolman, Robert C. Bushy, Sharon Cutler Ross, PHI
5. A first look at Graph Theory - John Clark & Derek Allan Holton, Allied Publishers
6. Cryptography and network security principles and practice - William Stallings, Pearson Education Asia

MICROPROCESSOR SYSTEMS

R302

3+1+0

Module 1

CPU, I/P unit, O/P unit, Memory, Bus organizations, ALU, Control Unit, Registers, Execution of an instruction, Main memory, Addressing, Memory Address Register - Memory Data Register – Memory systems - Architecture of 8085- Pin Diagram - Registers.

Module 2

Instruction set of 8085 - Instruction Types – Arithmetic – Logic data transfer, Branch, Stack, I/O and Machine Control instructions - Addressing Modes - Direct and Indirect Addressing - Immediate Addressing - Implicit Addressing.

Module 3

Subroutines - Stack Operations - Call Return sequence- Programming Examples. CPU of a microcomputer – timing and control unit – The fetch operation – Machine cycle and T- State instruction and data flow.

Module 4

Interrupts of 8085 - Hardware & Software Interrupts – Enabling, Disabling and masking of interrupts – Polling – HALT & HOLD states – Programmable interrupt controller – 8259

Module 5

Interfacing Memory and I/O devices - Address space partitioning - Memory mapped I/O - I/O mapped I/O - Memory interfacing - interfacing EPROM & RAM to 8085 – Data transfer schemes - Programmed data transfer - synchronous and asynchronous transfer - interrupt driven data transfer – DMA data transfer – DMA controller – 8257 – I/O channels.

References

1. Microprocessor Architecture, Programming and Applications with the 8085 - Gaonkar, New Age International
2. Microprocessors, interfacing and Applications - Renu Singh, B. P. Singh, New Age International
3. Microprocessors - B. Ram
4. Introduction to Microprocessors Systems - Adithya P. Mathur, PHI
5. Microprocessors Peripherals and Applications - Gilmore

SOLID STATE ELECTRONICS

RT303

2+1+0

Module 1

Transistor – Biasing - Stability - Thermal runaway. Transistor As an amplifier - RC coupled amplifier, Frequency Response, Gain Bandwidth relation - Cascading of transistors - cascade Darlington pair - emitter follower

Module 2

FET, FET amplifier – MOSFET, depletion and enhancement type - source drain characteristics and transfer characteristics.

Module 3

Oscillators - Concept of feed back - Transistorised phase shift oscillator - Wien bridge Oscillator – Hartley Oscillator - Colpits Oscillator (Operation and Expression for frequency)

Module 4

Clipping, Clamping, Integration, Differentiation - Astable, Bistable and Monostable Multivibrators - Sweep generators, Simple Bootstrap sweep generators.

Module 5

Power supplies & Special semi conductor devices - Regulator power supplies – IC regulated Power supplies, 7805, 7905, LM317 – LED, LCD, Photodiode, Photo transistor, opto coupler. Seven segment display, SCR, UJT (basic concepts only), DIAC, TRIAC.

References

1. Integrated Electronics - Millman and Halkias, McGraw Hill
2. Pulse Digital and Switching wave forms - Millman and Taub, McGraw Hill
3. Electronics Devices & Circuits - Boylsted & Neshelsky, Pearson Education

PROBLEM SOLVING AND COMPUTER PROGRAMMING

RT 304

3+1+0

Module 1

Problem solving with digital Computer - Steps in Computer programming - Features of a good program - Modular Programming - Structured - Object Oriented - Top down and bottom up approaches - Algorithms - Flowchart - Pseudocode, examples

Module2

C fundamentals: Identifiers, keywords, data types, operators, expressions, data Input and Output statements, simple programming in C.

Module 3

Control statements & Functions: If - else, for, while, do - while, switch, break & continue statements, nested loops. Functions - parameter passing - void functions Recursion – Macros.

Module 4

Structured data types: Single dimensional arrays - multidimensional arrays, strings, structures & unions - Program for bubble sort.

Module 5

Pointers & files - Declaration, passing pointers to a functions- Accessing array elements using pointers - Operations on pointers - Opening & Closing a file - Creating & Processing a file, Command line arguments.

Text Book

1. Programming with C - Byron S. Gottfried, Tata McGraw Hill

References

1. Computer Programming in C - Kernighan & Ritchie, PHI
2. Programming with ANSI and Turbo C - Ashok N. Kamthan, Pearson Education
3. Let us - Yeaswanth Khanetkar, BPB
4. Programming in C - Stephen C. Kochan, CBS publishers
5. Using C in Program Design - Ronald Leach, Prism Books Pvt. Ltd, Bangalore
6. Mastering Turbo C - Bootle, BPB Publications
7. Programming and Problem Solving with PASCAL - Micheal Schneider, Wiley Eastern Ltd.
8. Pointers in C - Yeaswanth Khanetkar, PBP
9. C Programming - A Modern Approach - K.N. Iling W.W. Norton & Company Newyork
10. Structured and Object Oriented Problem Solving using C++ - Andrew C Staugaard Jr., PHI

HUMANITIES

RT305

2+1+0

PART A: PRINCIPLES OF MANAGEMENT

Module 1

Scientific Management – Evolution of management theory – Contributions of Taylor, Gilbreth, Gantt, Emerson – Definition and functions of management – Authority, Responsibility, Delegation and Span of control – Types of structures of Organisation – Types of Business firms – Job evaluation and merit rating – Wages – Types of incentives.

Module 2

Procedure for ISO and ISI certification – Design, Development and implementation of re-engineering – Inspection – SQC control charts – quality assurance – TQM – Zero defects.

PART B: ENGINEERING ECONOMICS

Module 3

The Indian financial system – Reserve bank of India – functions – commercial banking system – profitability of public sector banks – development financial institutions – IDBI, ICICI, SIDBI, IRBI – Investment institutions – UTI, Insurance companies – The stock market – functions – Recent trends.

Module 4

Indian Industries – Industrial pattern – structural transformation – industrial growth – inadequacies of the programme of industrialization – Large and small scale industries – industrial sickness and government policy – industrial labour – influence of trade unions.

Module 5

The tax framework – Direct and Indirect taxes – Impact and incidence – Progressive and regressive – functions of the tax system – Black money – magnitude and consequences – Public debt – Debt position of the central and state governments – Deficit financing – revenue deficit and fiscal deficit – Problems associated with deficit financing.

References

1. Management- Stoner, Freeman and Gilbert, PHI
2. Engineering Management- Mazda, Pearson Education
3. Indian Economy - Ruddar Datt, S Chand and Company Ltd.
4. Indian Economy – Problems of Development and Planning - A. N. Agarwal, Wishwa Prakashan.

LOGIC SYSTEM DESIGN

R306

3+1+0

Module 1

Addition, Subtraction, Multiplication & division of binary nos, BCD nos, excess-3 code, gray code, alphanumeric codes, error detection using parity bits - error correcting codes, haming code.

Module 2

Postulates of boolean algebra - basic theorems - Logic functions - truth tables - canonical forms - SOP, POS - methods of minimization of logic functions - K maps & quine mccliskey method - realization using logic gates - NAND NOR gates - universal gates - don't care combinations - formation of switching function - from word statements.

Module3

Sequential logic - flip flops - SR, JK, T & D flip flops - master slave JK flip flop, Counters - asynchronous, binary decade, and up/down counters - synchronous binary decade, and up/down counters.

Module4

Adders - design - Half adder, Full adder, Half subtractor & Full subtractor - Carry look ahead adder, carry save adder, carry propagation adder.

Module 5

Registers - serial in & parallel in shift registers - left & right shift registers - static shift registers - typical IC's - counters using shift registers - ring counter, Johnson counter.

References

1. An introduction to digital computer design - Rajaraman & Radhakrishnan, PHI
2. Logic and Computer Design – M. Moris Mano, Charles R. Kime Pearson Education
3. Switching & finite automata theory - Zvi Kohavi, Tata McGraw Hill
4. Digital computer fundamentals - Thomas C. Bartee, Tata McGraw Hill.
5. Digital Computer Design - Malvino, Tata McGraw Hill.
6. Digital Design - Morris Mano, Pearson Education
7. Digital Design Principles & Practice – John F. Wakerly, Pearson Education

SOLID STATE ELECTRONICS LAB

R307

0+0+4

1. Characteristics of Silicon, Germanium, Zener diodes.
2. Characterisctics of CE, CB configurations of transistors; Characteristics of FET.

3. Clipping and clamping Circuits - RC differentiating and Integrating Circuits.
4. Half wave and full wave an Bridge rectifiers.
5. Single stage RC coupled amplifiers - Frequency response
6. Astable multivibrators using BJT.
7. Sweep Generator (Simple sweep)
8. Oscillators - Rc phase shift oscillator.

PROGRAMMING LAB

R308

0+0+4

1. Familiarisation with computer system microprocessor - peripherals - memory card etc.
2. Familiarisation of operating system - DOS Windows etc. (use of files, directories, internal commands, external commands, compilers, file manager, program manager, control panel etc.)
3. Familiarisation with word processing packages like wordstar and Msword
4. Progrmming experiments in C to cover control structures - functions - arrays - Structures - pointers and files.
5. Familiarisation of C++ and Visual tools.

Any experiment according to the syllabus of RT304 problem solving and Computer Programming can be included.

**FOURTH
SEMESTER**

ENGINEERING MATHEMATICS - III

CMELRPTA 401

3+1+0

Module 1

Ordinary Differential Equations: Linear Differential equations with constant coefficients - Finding P.I. by the method of variation of parameters – Cauchy's equations- Linear Simultaneous eqns- simple applications in engineering problems.

Module 2

Partial Differential Equations - formation by eliminating arbitrary constants and arbitrary Functions - solution of Lagrange Linear Equations – Charpits Method – solution of homogeneous linear partial differential equation with constant coefficients – solution of one dimensional wave equation and heat equation using method of separation of variables – Fourier solution of one dimensional wave equation.

Module 3

Fourier Transforms: - Statement of Fourier Integral Theorems – Fourier Transforms – Fourier Sine & Cosine transforms - inverse transforms - transforms of derivatives – Convolution Theorem (no proof) – Parseval's Identity - simple problems.

Module 4

Probability and statistics: Binomial law of probability - The binomial distribution, its mean and variance - poisson distribution as a limiting case of binomial distribution - its mean and variance - fitting of binomial & poisson distributions - normal distribution - properties of normal curve - standard normal curve - simple problems in binomial, poisson and normal distributions.

Module 5

Population & Samples: Sampling distribution of mean (σ known) – Sampling distribution of variance, F and Chi square test – Level of significance - Type 1 and Type 2 errors – Test of hypothesis – Test of significance for large samples – Test of significance for single proportion, difference proportion, single mean and difference of mean (proof of theorems not expected)

References

1. Higher Engineering Mathematics - B.S. Grewal, Khanna Publishers
2. Engineering Mathematics Vol. II -3rd year Part A & B - M.K. Venkataraman, National Publishing Company
3. Elements of Partial Differential Equations - Ian N.Sneddon.,McGrawhill International Edn.
4. Miller and Fread's Probability and statistics for engineers – Richard A Johnson, Pearson Education Asia / PHI

5. A text book of Engineering Mathematics (Volume II) – Bali and Iyengar, Laxmi Publications Ltd.
6. Advanced Engg. Mathematics - Erwin Kreyszig, Wiley Eastern Ltd.
7. Probability and statistical inferences – Hogg and Tanis, Pearson Education Asia

COMPUTER ORGANIZATION

R 402

2+1+0

Module 1

Introduction: Organization and Architecture – Review of basic operational concepts – CPU- single bus and two bus organization, Execution of a complete instruction – interconnection structures – layered view of a computer system.

Module 2

CPU - Arithmetic: Signed addition and subtraction – serial and parallel adder – BCD adder – Carry look ahead adder, Multiplication – Array multiplier – Booth's Algorithm, Division – Restoring and non-restoring division, floating point arithmetic - ALU Design.

Module 3

Control Unit Organization: Processor Logic Design – Processor Organization – Control Logic Design – Control Organization – Hardwired control – Microprogram control – PLA control – Microprogram sequencer, Horizontal and vertical micro instructions – Nano instructions.

Module 4

Memory: Memory hierarchy – RAM and ROM – Memory system considerations – Associative memory, Virtual memory – Cache memory – Memory interleaving.

Module 5

Input – Output: Printers, Plotters, Displays, Keyboard, Mouse, OMR and OCR, Device interface – I/O processor – Standard I/O interfaces – RS 232 C, IEEE 488.2 (GPIB).

References

1. Computer Organization - Hamacher, Vranesic and Zaky, Mc Graw Hill
2. Digital Logic and Computer Design - Morris Mano, PHI
3. Computer Organization and Architecture -William Stallings, Pearson Education Asia.
4. Computer Organization and Design - Pal Chaudhuri, PHI
5. Computer Organization and Architecture -M Morris Mano, PHI
6. Computer Architecture and Organization - John P Hayes, Mc Graw Hill

OBJECT ORIENTED PROGRAMMING

R403

2+1+0

Module 1

Introduction to OOP - Evolution of object oriented languages - Need of Objects - Definition of Object-Oriented Language – Classes and Objects – Creating and Using Classes and objects – Member functions and variables – Constructors and Destructors.

Module 2

Inheritance and Access Control - Member access control in classes – Friend functions and classes – Extending classes - Public Private and Protected Inheritance – Classification of Inheritance – Single – Multiple – Multilevel – Hierarchical – Hybrid.

Module 3

Polymorphism – Runtime and compile time polymorphism – overloading functions and operators – selecting friend member function for operator overloading - Virtual methods – pure virtual methods – Abstract classes - Defining and using of virtual methods, pure virtual methods and abstract classes – applications of abstract classes.

Module 4

Advanced Concepts- Virtual Destructors – Virtual Base Classes - Template classes – Creating and using templates – Namespaces

Module 5

Dynamic Objects - Dynamic object allocation - Inline functions.
Other Object oriented languages – Java – Object oriented features in Java – Comparison with C++

References

1. Object Oriented Programming in C ++ - Robert Lafore, Galgotia Pub.
2. Object Oriented Programming in C++ - Nabajyoti Barkakati, PHI
3. Structured and Object Oriented Problem Solving using C++ - Andrew C Staugaard Jr., PHI
4. Object oriented Programming with C++ - E. Balaguruswamy, TMH
5. Java 2 Complete Reference - Herbert, Schildt, TMH
6. The Java Programming Language 3rd Edition - Arnold, Gosling, Holmes, Pearson Education Asia
7. Object-oriented programming using C++ - Ira Pohl, Pearson Education Asia
8. C++ How to program - Dietel & Dietel, Pearson Education Asia
9. An Introduction to Object-oriented programming – Timothy Budd
10. Problem Solving with C++ - Walter Savitch, Pearson Education Asia
11. C++ Primer - Stanley B Lippman, Josee Zajoie, Pearson Education Asia

INTEGRATED CIRCUITS

R404

3+1+0

Module 1

Logic Families - DTL - TTL - ECL - I²L & CMOS. Comparison of circuits. Tristate logic - Propagation delay - power dissipation - Noise margin window profile - comparison - Fan in - Fan out.

Module 2

Storage elements - Flip flops - Latches - Registers, Decoders, Multiplexers- Buffers - Memory systems - ROM types - RAM - BJT RAM cells - MOS RAMs, RAM organization - flash memories - PLA - PAL - PGA - FPGA - PLD - CPLD - CDROM - Magneto optic storage.

Module 3

D/A Converters - Binary weighted resistor type - Ladder type A/D converters – counting type - Successive approximation type - Parallel comparator type dual slope type.

Module 4

Opamps: Characteristics - Basic principles - definitions - parameters - Input, Offset, Voltage, Input bias current, CMRR, slew rate - Ideal Opamp - inverting and non inverting opamps.

Module 5

Opamp Applications: Summing, Comparator, Differentiator - Integrator - Square wave generator - Triangular wave generator using opamps.

References

1. Digital Integrated Electronics - Taub & Shilling, McGraw Hill
2. Pulse Digital & Switching Wave forms - Millman & Taub. , McGraw Hill
3. Digital design with standard MSI & LSI by T.R. Blakesley & John Willey.
4. Integrated Circuits - Botkar, Khanna Publishers

DATA STRUCTURES & PROGRAMMING METHODOLOGIES

R 405

3+1+0

Module 1

Principles of programming – System Life Cycle - Algorithm Specification- Recursive Algorithms- Documentation- Performance Analysis and Measurements- Time and Space complexity-Complexity calculation of simple algorithms.

Module 2

Study of basic data structures – Arrays- Structures-Sparse matrix – Stacks – Queues- Circular queues- Priority queues - Dqueues. Evaluation of expressions – Polynomial representation using arrays.

Module 3

Linked Lists - Linked stacks and queues - Doubly linked lists - Polynomial representation using linked lists, Strings – Data representation – Pattern matching.

Module 4

Trees - Binary Trees – Tree Traversal – Inorder - Preorder and Postorder, Graphs – Depth first and breadth first search.

Module 5

Sorting methods: Selection sort, Bubble sort, Insertion sort, Merge sort, Quick sort, Heap sort, Radix sort, External sorting methods (basic idea only).

References

1. Fundamentals of Data Structures in C++: Horowitz, Sahni & Mehta, Galgottia Pub.
2. Classic Data Structures: Samanta, PHI
3. Data Structures and program design in C: Robert Kruse, Pearson Education Asia
4. Data Structures using C & C++: Langsam, Augenstein & Tanenbaum
5. Fundamental Algorithms: Knuth.
6. Algorithms + Data Structures = Programs: N.Wirth, PHI
7. An introduction to Data Structures with applications: Trembley & Sorenson, McGraw Hill
8. Data structures in Java: Thomas Standish, Pearson Education Asia

ADVANCED MICROPROCESSORS & PERIPHERALS**R 406****3+1+0****Module1**

Study of Interfacing ICs - 8255, 8252, 8251, 8279 (functions and internal block diagram only)

Module 2

Interfacing with 8085 - Interfacing keyboard – Hardware and Software approach – Interfacing seven segment displays - Interfacing D/A and A/D converters - Micro controllers (brief idea only)

Module 3

8086/88 Architecture, Block diagram – Addressing modes – memory addressing modes – Program memory addressing modes – stack memory addressing modes.

Module 4

Instructions format of 8086 – data transfer- arithmetic –branch – loop- flag manipulation- shift & rotate – string- REP instruction – writing simple program in 8086 – Additional features of 80286 – protected mode memory addressing.

Module 5

Additional features of 80386 – Paging mechanism – Interfacing coprocessors in 80386 – Additional features of Pentium Processors. Brief study of latest processors of Intel & AMD (Architecture not required) – Introduction to RISC processors

References

1. Microprocessor Architecture, Programming and Applications with the 8085 - Gaonkar, New Age International
2. The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium and Pentium Pro processors. Architecture, Programming and Interfacing – Barry B Bray, Pearson Education Asia
3. The 80X86 family - John Uffenbeck, PHI
4. Introduction to the Intel Family of Microprocessors - James L.Antonakos, Pearson Education Asia
5. Intel Microprocessors - A.K.Ray
6. Microprocessors and Interfacing - Douglas V. Hall, TMH
7. Advanced Microprocessors and Peripherals - A. K. Ray and K. M.Bhurchandi, TMH
8. The Intel 8086/88 Microprocessor Architecture, Programming Design and Interfacing – Bhupendra Singh Chhabra, Dhanpat Rai Publishing Company (P) Ltd
9. IBM PC and Clones - Govindarajalu, TMH

INTEGRATED CIRCUITS LAB

R407

0+0+4

1. OP-amp Characteristics
2. Inverting and Non-inverting amplifier using Op-amp - frequency response.
3. Differentiating and Integrating Circuits - frequency response.
4. Astable multivibrator using Op-amp.
5. A/D Converter.
6. D/A Converter.
7. Transfer Characteristics and specifications of TTL and MOS gates.
8. Study of flip flops
9. Synchronous and Asynchronous Counters
10. Astable and Monostable multivibrators using gates.

11. Study of shift registers and their applications.
12. Study of decoders and Multiplexers.

DATA STRUCTURES LAB

R408

0+0+4

Experiments based on the following:

1. Array and Linked list implementation of Stacks, Queues, Dqueues, Graphs, Binary Trees, Polynomials, Sparse matrix.
2. Infix, Postfix and Prefix conversions.
3. Sorting and Searching methods.
4. String representation and pattern matching

Any experiment according to the syllabus of R405 can be substituted.

**FIFTH
SEMESTER**

ENGINEERING MATHEMATICS - IV

RT 501

3+1+0

Module 1

QUEUEING THEORY: General Concepts - Arrival pattern - service pattern - Queue disciplines - The Markovian model M/M/1/\$, M/M/1/N - steady state solutions – Little's formula.

Module 2

NUMERICAL METHODS: Introduction - solution of algebraic and transcendental equations - Bisection method - Method of false position - Newton's method - Approximate solution of equations – Horner's method solutions of linear simultaneous equations - Iterative methods of solution-Jacobi's method - Gauss Seidal method.

Module 3

FINITE DIFFERENCES: Meaning of operators – Δ , ∇ , μ , δ , E - interpolation using Newton's forward and backward formula - Langrange's and Newton's divided difference interpolation formula - numerical differentiation - first and second order derivatives using forward and backward formula - numerical integration - trapizoidal rule - Simpson's 1/3 and 3/8 rules.

Module 4

LINEAR PROGRAMMING PROBLEM : graphical solution of LPP- general problem - solution of LPP using simplex method - Big M method – duality in LPP.

Module 5

TRANSPORTATION AND ASSIGNMENT PROBLEM: Balanced transportation problem - initial basic feasible solution -Vogel's approximation method - optimum solution by Modi method - Assignment problem - Hungarian techniques

References

1. Operations Research - P.K. Gupta & D.S. Hira, S.Chand & Co. Ltd
2. Advanced Engg Mathematics - Ervin Kreyszig, Wiley Eastern Ltd.
3. Higher Engg. Mathematics - Dr. B.S. Grewal, Khanna Publishers.
4. Operations research - Richard Bronson, Schaum's Outline Series
5. Operations research - Panneer Selvam, PHI
6. Numerical Methods in Science & Engg - M.K. Venkataraman, National Publishing Co.

OPERATING SYSTEMS

R502

3+1+0

Module 1 Introduction

OS Concepts – Evolution of OS, OS Structures- Kernel, Shell, General Structure of MSDOS, Windows 2000, Linux.

Module 2 Process Management

Process & Threads – Process States - Process Control Block – Process Scheduling – Operations on Processes, Threads, CPU Scheduler – Preemptive and Non-Preemptive; Dispatcher, Scheduling Criteria, Scheduling Algorithms – Process Management in UNIX.

Module 3 Process Synchronization & Interprocess Communication

Concurrent Processes, Co-operating Processes, Precedence Graph, Hierarchy of Processes, Critical Section Problem – Two process solution, Synchronization Hardware, Semaphores – Deadlock- detection, handling, prevention, avoidance, recovery, Starvation, Critical Regions, Monitors, Interprocess communication.

Module 4 Memory Management

Objectives and functions, Simple Resident Monitor Program (No design), Overlays – Swapping; Schemes – Paging – Simple, Multi-level Paging; Internal and External Fragmentation; Virtual Memory Concept, Demand Paging - Page Interrupt Fault, Page Replacement Algorithms; Segmentation – Simple, Multi-level, Segmentation with Paging, Memory Management in UNIX.

Module 5 Information Management

Files and Directories – Directory Structure –Directory Implementation – Linear List - Hash Table.

Device Management: Dedicated, Shared and Virtual Devices - Serial Access Devices, Direct Access Devices, Direct Access Storage Devices - Channels and Control Units – Disk Scheduling methods.

Text Book

1. Operating Systems Concepts – Silberschatz, Galvin, Wiley Publications

References

1. Operating Systems – William Stallings, Pearson Education Asia
2. Operating Systems: Design & implementation - Andrew S. Tenenbaum, PHI

3. Modern Operating Systems - Andrew S. Tenenbaum, Pearson Education Asia / PHI
4. Operating Systems - Nutt, Pearson Education Asia
5. Operating Systems - Deitel & Deitel, Pearson Education Asia

DATA BASE MANAGEMENT SYSTEMS

RT503

3+1+0

Module 1

Basic Concepts - Purpose of database systems-Components of DBMS – DBMS Architecture and Data Independence- Data modeling - Entity Relationship Model, Relational – Network- Hierarchical and object oriented models-Data Modeling using the Entity Relationship Model.

Module 2

Structure of relational databases – relational databases – relational algebra- tuple relational calculus. Data definition with SQL, insert, delete and update statements in SQL – views – data manipulation with SQL

Module 3

Introduction to Transaction Processing- Transaction and System Concepts- Desirable properties of Transactions- Schedules and Recoverability- Serializability of Schedules-Query processing and Optimization- Concurrency Control- -assertions – triggers.

Oracle case study: The basic structure of the oracle system – database structure and its manipulation in oracle- storage organization in oracle - Programming in PL/SQL- Cursor in PL/SQL

Module 4

Database Design– Design guidelines– Relational database design – Integrity Constraints – Domain Constraints- Referential integrity – Functional Dependency- Normalization using Functional Dependencies, Normal forms based on primary keys- general definitions of Second and Third Normal Forms. Boyce Codd Normal Form– Multivalued Dependencies and Forth Normal Form – Join Dependencies and Fifth Normal Form – Pitfalls in Relational Database Design.

Module 5

Distributed databases: Distributed Database Concepts- Data Fragmentation, Replication and Allocation Techniques- Different Types- Query Processing – semijoin -Concurrency Control and Recovery.

Text Book

1. Fundamentals of Database System Elmasri and Navathe (3rd Edition), Pearson Education Asia

References

1. Database System Concepts - Henry F Korth, Abraham Silbershatz, Mc Graw Hill 2nd edition.
2. An Introduction to Database Systems- C.J.Date (7th Edition) Pearson Education Asia
3. Database Principles, Programming and Performance – Patrick O’Neil, Elizabeth O’Neil
4. An Introduction to Database Systems - Bibin C. Desai

FILE STRUCTURES AND ALGORITHMS

R504

2+1+0

Module1

File Organization: - Operations on Files – Heap Files - Sequential Files – Indexed sequential files – Direct files – Secondary key retrieval.

Module 2

Index Structures for Files: - Single level Ordered Index-Multilevel Indexes- Indexes on multiple Keys. Searching - Sequential search, Binary search, Interpolation search.

Module 3

Hashing: - Static Hashing-Hash Tables-Different Hash Functions-Mid Square-Division-Folding-Digit Analysis, Dynamic Hashing. Collision-Collision Resolution Techniques-Extendible Hashing.

Module 4

Search trees: -AVL Trees, height balanced trees, weight balanced trees, Threaded Binary Trees, Multiway search Trees- B Trees-B+ Trees.

Module 5

Storage management: - Dynamic storage management- storage allocation & liberation – First fit, best fit – Buddy system- Garbage Collection & Compaction.

References

1. Fundamentals of Data Structures in C++: Horowitz, Sahni & Mehta, Galgotia publications
2. Fundamentals of Database Systems: Elmasri & Navathe, Pearson Education Asia
3. File Structures an Object-Oriented Approach with C++: Folk, Zoellick, Riccardi, Pearson Education Asia.
4. Data Structures using C & C++: Langsam,Augenstein & Tanenbaum, Pearson Education Asia

5. Data Structures, Algorithms and Applications in C++: Sahni Galgotia publications
6. Data structures & Program design in C: Robert Kruse Pearson Education Asia

LANGUAGE PROCESSORS

RT 505

3+1+0

Module 1 Assembler

Overview of the assembly process - Design of two pass assembler- Single pass assembler- Macros – Macro definition and usage- schematics for Macro expansion – Design of a Macro pre-processor - Macro Assembler.

Module 2 Introduction to Compilers

Compilers and Translators – Structure of a compiler – lexical analysis – syntax analysis – context free grammars – basic parsing techniques- top down and bottom up parsing (brief idea only)- Recursive Decent parser – Shift reduce parser.

Module 3 Storage allocation

Data descriptors- Static and Dynamic storage allocation – Storage allocation and access in block structured programming languages – Array allocation and access- Compilation of expressions – Handling operator priorities – Intermediate code forms for expressions –code generator.

Module 4 Compilation of Control Structures

Control transfer- Conditional and Iterative constructs- Procedure calls – Code optimization – Optimization transformations – Local optimization and global optimization – Compiler writing tools – Incremental Compilers

Module 5 Loaders and Linkers

Loading – Program relocatability – linking – various loading schemes – linkage editing – Design of linkage editor – dynamic loading – overlays – dynamic linking.

Text Book

1. System Programming and Operating Systems - Dhamdhare Mc Graw Hill
2. Principles of Compiler Design - Aho A.V., Ullman Narosa Publications.

References

1. Systems programming - Donovan, Mc. Graw Hill.
2. System Software - An Introduction to Systems Programming- Leland L. Beck, Addison Wesley.
3. Compilers Principles Techniques And Tools Aho, Sethi, Ullman, Pearson Education Asia

DATA COMMUNICATION

RT 506

2+1+0

Module 1

Communication concepts – Analog modulation – Various schemes – AM, PM, FM – Sampling theorem - Analog pulse modulation – PAM, PWM, PPM – Generation of various modulated waves (Block diagram only) – Digital Pulse modulation (PCM).

Module 2

Multiplexing - Frequency Division Multiplexing (FDM) – Time Division Multiplexing (TDM), Synchronous Time Division Multiplexing – Statistical time Division multiplexing – Key Techniques - ASK, FSK, PSK, DPSK - Channel capacity - Shannon's Theorem.

Module 3

Digital data transmission – Serial, Parallel, Synchronous, Asynchronous and Isochronous transmission. Transmission mode- Simplex - Half duplex – Full duplex, Noise- different types of noise – Basic Principles of Switching (circuit, packet, message switching)

Module 4

Error detection and Correcting codes: Hamming code – Block codes and convolution codes – ARQ techniques – Transmission codes – Baudot – EBCDIC and ASCII codes – Barcodes.

Module 5

Terminal handling – Point to point, Multidrop lines. Components of computer communication – Concentrators - Front end Processor – Transmission media – Guided media – Twisted pair cable, coaxial cable, fibre optic cable. GSM service and GSM system architecture.

References

1. Electronic communication system - Kennedy, Mc Graw Hill.
2. Principles of Communication System- Taub & Schilling Mc Graw Hill.
3. Introduction to Data Communications & Networking - Behrouz & Forozan Mc Graw Hill.
4. Data Communication, Computer Networks & Open Systems - Fred Halsall Pearson Education Asia
5. Principles & Application of GSM. - Vijay K. Garg Pearson Education Asia

6. Modern Digital & Analog Communication Systems – B.P Lathi Prism Books Pvt. Ltd.
7. Computer Networks - A.S. Tanenbaum, PHI
8. Data and Computer Communication - William Stallings, Pearson Education Asia
9. Communication Engineering - A. Kumar, Umesh Publications

MICROPROCESSOR LAB

R507

0+0+4

1. Familiarization of training kits.
2. Simple programs for Arithmetic and Data Transfer.
3. Study of MASM Programming.
4. Programming Peripheral Controllers.
5. Interfacing the Trainer Kit.
6. Any experiment according to the syllabus R302 can be substituted

DATABASE LAB

R508

0+0+4

Experiments for performing the following:

1. Creation, insertion, updation, deletion of tables, indexes, views
2. Simple queries, nested queries, use of arithmetic and string functions.
3. Simple PL/SQL programs, use of exceptions, savepoints, cursor, procedure, function, trigger, sequence generator.
4. Importing and Exporting data.
5. Database Administration
6. ODBC/JDBC Interface.
7. Implementation of File Structures

Any experiment according to the syllabus of RT503 can be substituted.

**SIXTH
SEMESTER**

PC & PC BASED SYSTEMS

R601

3+1+0

Module 1 Introduction to PC

Hardware components – study of motherboards —Different types of ports, slots and connectors-Add-on cards-Power supply– SMPS- function & operations.

Module 2 Storage Devices

Floppy – Floppy Disk Controller - Disk Physical specification & operations – Disk magnetic properties – Cylinders – Clusters – Hard disks – Hard disk drive operation – Magnetic data storage - Sectors – Disk formatting – partitioning - Hard disk features – Hard disk data transfer modes –Programmed I/O – Direct memory access – Ultra DMA – Data addressing – Standard CHS addressing – Extended CHS addressing – Logical Block Addressing.

Module 3 Optical Storage

CD ROM, CD Technology, Sector layout, CD-R, CD-RW, CDROM, drive specifications- data transfer rate – Access time – Constant linear velocity – constant angular velocity - Buffers – Interface – Magneto optical drives – WORM devices –DVD- RAID – Holographic storage.

Module 4 Memory Management in PC

Parity – ECC – Static & Dynamic RAM – Memory Addressing – Segmented addressing - 64 KB Limits – 640 KB barrier – Logical, segmented, virtual, linear and physical memory addresses – Extended and Expanded memory – Cache memory – Video memory – HMA - Flat memory model – Advanced memory technologies.

Module 5 Bus Structures

ISA, PCI, PCMCIA, AGP, USB, Hard Disk Interfaces – IDE, EIDE, ATA – Communication ports – Serial – Parallel port – Keyboard / Mouse Interface connectors.

References

1. PC Hardware Complete Reference - Craig Zacker & John Rourke, Tata McGraw Hill
2. Inside the PC (8th Edition) - Peter Norton,BPB
3. The Indispensable PC Hardware Book - Messmer, Pearson Education
4. Troubleshooting and Repairing Your PC - Corey Candler, Wiley
5. Upgrading and repairing PC's (4th edition) - Scott Mueller, Pearson Education
6. IBM PC Assembly Language Programming - Abel, PHI
7. PC Upgrading Maintenance & Trouble shooting guide - Dr. S. K. Chauhan, Kataria

SOFTWARE ENGINEERING

RT 602

2+1+0

Module 1 Introduction to Software engineering

Introduction – Software and software Engg.- Phases in software development- Software development process models-Role of Management in software development –Role of Metrics and measurement –Software requirement specification(SRS) - Problem Analysis - validation .

Module 2 Project Planning

Cost Estimation – Uncertainties – models – COCOMO model – Project scheduling – average duration estimation – Project scheduling and milestones – staffing and personal plan – Rayleigh curve – personnel plan – team structure – software configuration – management plans – quality assurance plans – verification and validation – inspections and reviews - project monitoring plans - time sheets – reviews – cost schedule – milestone graph – risk management.

Module 3 System Design

Design Principles – Problem partitioning and hierarchy – abstraction – modularity – top down and bottom_up – strategies – module level concepts - coupling - cohesion – structured design methodology - verification - metrics.

Module 4 Coding

Top-down and Bottom-up - Structured Programming - Information Hiding - Programming style - Internal Documentation – Verification - Code Reading - Static Analysis - Symbolic execution - Proving Correctness - Code inspections – Unit testing.

Module 5 Testing

Testing fundamentals - Functional and Structured Testing - Testing Process - Comparison of Verification and Validation Techniques - Reliability assessment - Programmer Productivity - Error removal efficiency.

Text Book

1. An integrated approach to Software Engineering - Pankaj Jalote, Narosa Publication

References

1. Software Engineering - Roger S. Pressman, Tata McGraw Hill

2. Software Engineering - Ian Sommerville, Pearson Education
3. Software Engineering Theory and Practice - Shari Lawrence, Pearson Education Asia
4. Fundamentals of Software Engineering –Rajib Mall, PHI
5. Fundamentals of Software Engineering – Carlo Ghezzi, Mehdi Jazayeri, PHI

PROJECT MANAGEMENT AND QUALITY ASSURANCE

R603

2+1+0

Module 1 PROJECT PLANNING

Overview – Capital expenditure - Phases of capital budgeting – Project development cycle – 7-s of project management – Requirements of a project manager – Forms of project organization.

Module 2 PROJECT ANALYSIS

Market Analysis – Technical Analysis - Financial Analysis – Risk Analysis – Social cost Benefit Analysis.

Module 3 CONTROL OF PROJECT

Control Systems – Control of major constraints – Project management software & information systems.

REVIEW: Performance of Evaluation – Abandonment Analysis – Behavioral issues in Project Management

Module 4 TOTAL QUALITY MANAGEMENT

Quality systems – ISO 9000 series – ISI – Benchmarking – Quality Function development (QFD) – Total Productive Maintenance (TPM) – ISO 14000.

Module 5 CONCEPTS IN SAMPLING

Sampling designs and schemes – Errors in sampling – Simple random sample – stratified random sample – Cluster sample.

Sample size destination – Estimating population mean – Estimating population proportion.

References

1. Projects preparation, Appraisal, Budgeting & Implementation – Prasanna Chandra – Tata McGraw Hill
2. Projects – Planning, Analysis, Selection, Implementation & Review - Prasanna Chandra – Tata McGraw Hill
3. Project Management - Harvey Maylor - Pearson Education
4. Total Quality Management – Dale H. Besterfield – Pearson Education

5. Quality control and Improvement – Amitava Mitra – Pearson Education
6. Quality assurance and TQM – Jain & Chitale – Khanna Publishers

COMPUTER NETWORKS

RT 604

3+1+0

Module 1

Introduction: ISO-OSI Reference Model – TCP/IP Reference Model – Comparison Network hardware-Repeaters, Routers, Bridges, Gateways, Hub, Cable Modem.

Physical Layer: Transmission Media– ISDN system Architecture – Communication Satellites – geostationary satellites - Medium Earth Orbit Satellites- Low earth orbit satellites– Satellite v/s Fiber

Module 2

Data Link Layer: Design issues-Error Detection and correction – Elementary Data link protocols- Sliding window protocols. .

LAN Protocols: Static & Dynamic channel allocation in LAN's and WAN's, Multiple access protocols – ALOHA – Pure ALOHA – Slotted ALOHA – Carrier Sense Multiple Access protocols – persistent and non-persistent CSMA – CSMA with collision detection – IEEE 802.3 standards for LAN

Module 3

Network layer: Virtual Circuits, Datagrams, Routing Algorithm – Optimality principle - Flooding - Flow Based Routing - Link state routing – Distance vector routing – Multicasting – Link state multicasting – Distance vector multicasting - Congestion Control Algorithms – General principles – Packet discarding – Choke packets - Congestion prevention policies – Traffic shaping – Leaky bucket algorithm – Flow specifications – jitter control

Module 4

Transport Layer: - Transport Service - Elements of transport protocols – Internet Transfer Protocols UDP and TCP – ATM – Principle characteristics.

Module 5

Application Layer: Domain name system – DNS name space – Resource records – Name servers – operation of DNS - Electronic Mail – MIME

Mobile networks: Mobile telephone systems, Bluetooth - Components – Error correction – Network topology – Piconet and scatternet – L2CAP layers – Communication in Bluetooth networks

References

1. Computer Networks (Fourth Edition): Andrew S.Tanenbaum, Pearson Education Asia/ PHI

2. An Introduction to computer networking: Kenneth C. Mansfield Jr., James L. Antonakos, Prentice-Hall India
3. Communication Network: Leon, Garcia, Widjaja Tata McGraw Hill.
4. Computer Networks (Second Edition): Larry L Peterson & Bruce S Davie, (Harcourt India)
5. Computer Networking: James F Kurose & Keith W Ross, Pearson Education
6. Introduction to Data Communications and Networking: Behrouz, Forouzan, McGraw Hill

NETWORK COMPUTING

RT 605

3+1+0

Module 1

HTML Documents Basic Tags for Font & Paragraph Formatting Lists, Tables, Frames, image Maps

Cascading Style Sheets Style Element, Inline style sheets, Embedded style sheets, External Style sheets, CLASS Attribute, Absolute and relative positioning of elements, DIV & SPAN Tags.

Module 2

Dynamic HTML Pages Client side scripting - Java Script – variables, Arithmetic operations – message boxes, Arrays, control statements, functions, event handling, document object model.

Dynamic updating of pages with JAVA Script.

Embedding ActiveX controls - using the structured graphics – ActiveX Control.

Module 3

Java programming – Features of Java, Creating & using classes in Java – Static classes – Inheritance – Final methods, variables and classes – Interfaces - Nested classes – Inner classes – Anonymous Inner classes – Exception handling – Creating & using exceptions, Multithreaded programs and thread synchronization, creating and using packages. Creating GUI with AWT and Swing – -JDK1.1 event model

Module 4

Network Programming with Java - Features of Java – Applets & Application – Life cycle of applets - Security features for applets - Inter applet communication – Threads & Thread synchronization – TCP/IP Programming with Java – Iterative & Concurrent servers. Datagrams, IP multicasting, RMI (Structure and Working of a simple RMI Program only)

Module 5

HTTP Protocol working – HTTP methods, GET, PUT, DELETE, POST, HEAD
Server side scripting – HTML Forms & CGI – GET & POST, Basic working of a
CGI supported web server – Simple CGI program in C to validate user name &
Password. Email: Working of SMTP and POP protocols (Overview only).

References

Module 1,2,5

1. Internet and World Wide Web How to program - Deitel,Deitel & Nieto, Pearson Education Asia
2. HTML, DHTML, Java Script, Perl, CGI - Evan Bayross, BPB

Module 3,4,5

3. Java 2 Complete reference - Herbert, Schildt, Tata McGraw Hill
4. Java 2, AWT, Swing, XML and JavaBeans Programming Black Book – Steven Holzner, Wiley Dreamtech
5. The Java Programming Language 3rd Edition - Arnold, Gosling, Holmes, Pearson Education Asia
6. Using Java 2 Platform - Joseph Weber, PHI
7. Computer Networks - Tenanbaum, PHI/ Pearson Education Asia

Additional References

8. Unix Network Programming - Stevens W Richard, PHI
9. TCP/IP Protocol suite, 2/e -Behrouz A. Forouzan, TMH

ALGORITHM ANALYSIS AND DESIGN

R606

3+1+0

Module 1 Introduction and Complexity

What is an algorithm – Properties of an Algorithm, Difference between Algorithm, Computational Procedure and Program, Study of Algorithms; Pseudo-code Conventions; Recursive Algorithms –Space and Time Complexity – Asymptotic Notations – ‘Oh’, ‘Omega’, ‘Theta’, Common Complexity Functions; Recurrence Relations and Recurrence Trees for Complexity Calculations; Profiling. –Deterministic and non - deterministic algorithms.

Module 2 Divide and Conquer

Control Abstraction, Finding Maximum and Minimum, Binary Search, Divide and Conquer Matrix Multiplication, Strassen’s Matrix Multiplication, Merge Sort, Quick Sort.

Module 3 Greedy Strategy

Control Abstraction, General Knapsack Problem, Optimal Storage on Tapes, Minimum Cost Spanning Trees – Prim’s Algorithm, Kruskal’s Algorithm – Job sequencing with deadlines.

Module 4 Dynamic Programming

Principle of Optimality, Multi-stage Graph, All-Pairs Shortest Paths, Travelling Salesman Problem.

Lower Bound Theory - Comparison Trees for Searching and Sorting, Oracles and Adversary Arguments – Merging, Insertion & Selection Sort; Selection of ‘k’th Smallest Element.

Module 5 Backtracking

Control Abstraction - Bounding Functions, Control Abstraction, N-Queens Problem, Sum of Subsets, Knapsack problem.

Branch and Bound Techniques – FIFO, LIFO, and LC Control Abstractions, 15-puzzle, Travelling Salesman Problem.

Text Book

1. Fundamentals of Computer Algorithms - Horowitz and Sahni, Galgotia

References

1. Computer Algorithms – Introduction to Design and Analysis - Sara Baase & Allen Van Gelder, Pearson Education
2. Data Structures algorithms and applications - Sahni, Tata McGrHill
3. Foundations of Algorithms - Richard Neapolitan, Kumarss N., DC Hearth & Company
4. Introduction to algorithm- Thomas Coremen, Charles, Ronald Rivest -PHI

SYSTEM SOFTWARE LAB

R607

0+0+4

1. Symbol table construction
2. Single pass and two pass assembler.
3. Macro processor module binder (with limited Instruction set)
4. Lexical analyzer.
5. Bottom Up and Top Down Parser.
6. Code generation.
7. Generation of code for linkers & loaders. Working of device drivers, process scheduling methods.

Any experiment according to the syllabus of RT505 can be substituted.

MINI PROJECT

R608

0+0+4

The aim of the mini project is to prepare the students for the final year project. The topic for the mini project should be simple as compared to the main project, but should cover all the aspects of a complete project.

**SEVENTH
SEMESTER**

OBJECT ORIENTED MODELING AND DESIGN

RT 701

2+1+0

Module 1

Introduction: object oriented development-modeling concepts – object oriented methodology – models – object oriented themes-Object Modeling– links and associations – advanced links and association concepts – generalization and inheritance - grouping constructs – a sample object model

Advanced Object Modeling: aggregation – abstract classes – generalization as extension and restriction – multiple inheritance – metadata – candidate keys – constraints.

Module 2

Dynamic modeling: Events and states – Operations – Nested state diagrams – Concurrency – Advanced dynamic modeling concepts – A sample dynamic model – Relationship of Object and Dynamic models.

Functional modeling: Functional models – Data Flow Diagrams - Specifying operations – Constraints – A sample functional model – Relation of functional to Object and Dynamic models.

Module 3

Analysis: Analysis in object modeling, dynamic modeling and functional modeling, Adding operations- Iterating the analysis

System Design: Breaking system into subsystems - Identifying concurrency-allocating subsystems to processors and tasks, managing of data stores. Handling of global resources- handling boundary conditions-Common Architectural Frameworks

Module 4

Object Design: Overview of Object design – Combining the three models – Designing algorithms – Design optimization – Implementation of control – Adjustment of inheritance - Design of association – Object representation – Physical packaging – Documenting design decisions-Comparison of methodologies

Module 5

Other Models: Booch's Methodology- Notations, models, concepts. Jacobson Methodology- architecture, actors and use-cases, requirement model, Analysis Model, Design model, Implementation model and Test Model-Unified Modeling Language (UML).

Text Book

1. Object Oriented Modeling and Design -JamesRumbaugh, Prentice Hall India
2. Object Oriented Analysis and Design with Applications - Grady Booch, Pearson Education Asia

References

1. Object Oriented Software Engineering - Ivan Jacobson, Pearson Education Asia
2. Object Oriented Software Engineering - Berno Bruegge, Allen H. Dutoit, Pearson Education Asia
3. Object Oriented Analysis and Design using UML - H. Srimathi, H. Sriram, A. Krishnamoorthy
4. Succeeding with the Booch OMT Methods -A practical approach - Lockheed Martin, Addison Wesley
5. UML and C++ practical guide to Object Oriented development - Richard C.Lee & William, Prentice Hall India

COMPUTER GRAPHICS

RT 702

3+1+0

Module 1

Introduction to Computer Graphics: Basic concepts in Computer Graphics – Applications of Computer Graphics, Interactive Graphics system – Raster scan and Random scan systems – Generating a raster image, Application of raster scan graphics. Video Display Devices, Display processors – Display files – graphical input & output devices.

Module 2

2D Graphics: Line drawing algorithms – DDA, Bresenham's – Bresenham's Circle drawing algorithm - 2D Transformations, Clipping – Line clipping – Polygon Clipping, Windowing.

Module 3

3D Graphics: 3D display methods, 3D Object Representation – Polygon Surfaces – Quadratic surfaces – Spline Representations – Bezier Curves and Surfaces – B-Spline Curves and Surfaces, 3D Transformations.

Module 4

3D Rendering: Three-Dimensional Viewing - Projections, Clipping, Visible Surface Detection – Classification of Visible surface detection algorithms – Back-face Detection, Depth- Buffer Method, Scan-line Method.
Surface Rendering Methods-Basic illumination Models – Polygon-rendering Methods, Gouraud Shading, Ray-Tracing Methods.

Module 5

Advanced Technologies: Fractals – Classification of Fractals – Self-Squaring Fractals, Animation- Raster Animation, Morphing.

Text Book

1. Computer Graphics (C version) - Donald Hearn & Pauline Baker (Pearson Education Asia)

References

1. Computer Graphics - Donald Hearn & Pauline Baker (Prentice Hall of India)
2. Principles of Interactive Computer Graphics – William .N. Newman, Robert .F. Sproull (second edition), McGraw Hill edition
3. Computer Graphics Principles & Practice -Foley, VanDam, Feiner, Hughes (second edition in C), Addison Wesley
4. Fundamentals of Computer graphics & multimedia- D. P. Mukherjee, Prentice Hall of India
5. Java 2 complete reference - Herbert, Schildt, Tata McGraw Hill
6. Computer Graphics - Roy A Plastack & Gordon Kally (Schanmi Series McGraw Hill edition)

THEORY OF COMPUTATION

R703

3+1+0

Module 1

Introduction to the theory of computation – Set theory – Definition of sets – Properties – Countability – Uncountability – Equinumerous sets – Functions – Primitive recursive and partial recursive functions – Computable and non computable functions – Diagonalization principle – Formal representation of languages – Chomsky Classification.

Module 2

Introduction to Automata theory – Definition of Automation – Finite Automata – Formal definition – Language acceptability by Finite Automata – Transition Diagrams and Transition systems - Deterministic and Nondeterministic finite automation – Finite Automation with λ -Transitions – Eliminating λ -Transitions - Conversion of NFA to DFA – Regular operations – Regular Expressions – Pumping lemma for regular languages – Applications of finite state automata – Lexical analysers – Text search.

Module 3

Pushdown Automata – Formal definition – Language acceptability by PDA – Deterministic and nondeterministic PDA – Context free grammar - Applications of PDA – Parsing.

Module 4

Turing Machines – Formal definition – Language acceptability – Universal Turing Machines – Halting Problem of Turing Machines – Church's Thesis - Godelization.

Module 5

Algorithmic complexity – Tractable and intractable problems – Complexity classes – Class P – Class NP – NP Complete and NP Hard problems.

References

1. Introduction to the Theory of Computation- Michael Sipser, Brooks/Cole (Thomson Learning)
2. Theory of Computer Science – K.L.P. Mishra, N. Chandrashekharan, Prentice Hall of India
3. Elements of the theory of computation -Harry R Lewis, Christos H Papadimitriou Prentice Hall of India / Pearson Education Asia
4. The Theory of Computation - Bernard M Morct (Pearson Edn)
5. Introduction to Automata Theory, Languages & Computation John Hopcroft, Rajeev Motwani & Jeffrey Ullman (Pearson Edn)

ADVANCED SOFTWARE ENVIORNMENTS

R704

2+1+0

Module 1

Windows Programming – Components of Windows API- Distinction with ordinary programs – Event Driven Programming – WinMain Function – Creating Windows – Message loop – Window procedures - Menus & Buttons – Drawing on Windows.

Module 2

MFC Features & Advantages – MFC Classes – Life cycle of an MFC application – The CWinApp Classes – Creating windows – Message maps and event handling – Menus & Buttons - Drawing on MFC windows – Handling mouse & Keyboard events.

Module 3

CORBA – Introduction – Features – Fundamental concepts in Distributed objects – CORBA IDL – stub & Skeleton - implementing a simple CORBA server and CORBA client with C++.

Module 4

CORBA object reference – Managing references at server – CORBA factories – CORBA object creation in C++ & JAVA – CORBA Exceptions – Destroying CORBA objects - comparison of CORBA & DCOM Architectures.

Module 5

X-Windows – Clients & Servers - Basic Architecture of X-Windows systems – Layers in XWindows Architecture – XWindows Programming – Simple Hello World Application in X. Command line options and resources – connecting to X-Display – creating windows and graphics context – Handling events – creating child windows.

References

Module1, 2

1. Visual C++ Programming - Yashwanth Kanetkar (BPB)
2. Programming Windows Fifth Edition – Charles Petzold Microsoft Press
3. Visual C++ Programming Bible – Leinecker & Archer IDG Books
4. Visual C++ Handbook - Osborne, TMH

Module 3, 4

5. COM & CORBA side by side – Janson Pritchard, Pearson Education Asia

Module 5

6. X-Windows system programming – Nabajyoti Barkakati (2nd Edition), Prentice Hall of India

WEB TECHNOLOGIES

RT 705

2+1+0

Module 1

Introduction to SGML – features - XML, XML as a subset of SGML – XML Vs HTML – Views of an XML document – simple XML documents – Starting & Ending of Tags – Attributes of Tags – Entity References – Comments - CDATA section

Module 2

Document Type declarations – Creating XML DTDs – Element type declaration – Attribute List Declaration – Attribute types – Attribute defaults – Displaying XML Data in HTML browser as HTML tables – Storing XML data in HTML document – Converting XML to HTML with XSL minimalist XSL style sheets – XML applications

Module 3

Java Beans: Features – Designing Java Beans – Creating and using properties – Induced - bound and constrained properties - using and creating events – Introspection – creating & using BeanInfo clauses – customization – providing custom property editors and GUI interfaces.

Module 4

JSPs - Creating simple JSP Pages – templating – Request time expression – Request & Response objects – Reading parameter values – Using Javabeans in JSPs - Reading & setting Properties of JavaBeans – Connecting forms & bean properties – Serialized beans – declaring variables & methods in pages – scriptlets – conditionals, loops & execution handling in JSPs with scriptlets – Accessing beans via scriptlets.

Module 5

EJB – Basics of EJB – Types of Beans – Development of Session Beans – Steps – Creating & Implementing Interfaces – Writing Deployment descriptors – Packaging and deploying bean - using the bean from a client – Development of stateful session bean. Entity beans – Features (Basics of developing and using entity beans)

References

Module1, 2

1. XML by Example: Building Ecommerce applications - Sean McGrath, Pearson Education Asia

Module3

2. Using JAVA 2 Platform Special Edition Java 2, AWT, Swing, XML and Java Beans - Joseph L. Weber, Prentice Hall of India
3. Programming Black Book - Steven Holzner, Wiley Dreamtech

Module4

4. Java Server pages - Larne Pekowsky – Pearson Education Asia
5. JSP: Java server pages - Barry Burd, IDG Books India

Module 5

6. Mastering Enterprise Java Beans and the Java 2 Platforms, Enterprise Edition – EdRoman (WILEY computer publishing)
7. EJB Design Patterns - Floyd Marinescu

Additional Reference

8. Internet & Web Technologies - Raj Kamal, TMH

ELECTIVE - I

R706

3+1+0

List of electives

1. Optimization Techniques
2. Operating System Kernal Design
3. Principles of Real Time Systems

4. Windows Programming
5. Mobile Computing
6. Software Architecture
7. Lan Technology

Note

New Electives may be added according to the needs of emerging fields in technology. The name of the elective and its syllabus should be submitted to the university before the course is offered.

OPTIMIZATION TECHNIQUES (ELECTIVE - I)

CMELRTA 706-1

3+1+0

Module1: Classical optimization techniques

Single variable optimization – Multivariable optimization with no constraints – Hessian matrix – Multivariable saddle point – Optimization with equality constraints – Lagrange multiplier method- Multivariable optimization with inequality constrains – Kuhn-Tucker conditions.

Module 2: One-dimensional unconstrained minimization

Elimination metods – unrestricted search method – Fibonacci method – Interpolation methods – Quadratic interpolation and cubic interpolation metods.

Module 3 Unsonstrained minimization

Gradient of function – Steepest descent method – Newton’s method – Powells method – Hooke and Jeeve’s method.

Module 4 Interger – Linear programming problem

Gomory’s cutting plane method – Gomery’s method for all integer programming problems, mixed integer programming problems

Module 5 Network Technique

Shortest path model - Dijkstra’s Algorithm Floyd’s Algorithm – minimum spanning tree problem – **PRIM** algorithm – Maximal Flow Problem algorithm

References

1. Optimization theory and application - S.S. Rao, New Age International P. Ltd.
2. Optimization Concepts and applications in Engineering - A. D. Belegundu, T.R. Chandrupatla, Pearson Education Asia.
3. Principles of Operations Research for Management - F. S. Budnick, D. McLeavey, R. Mojena, Richard D. Irwin, INC.
4. Operation Research an introduction - H. A. Taha, Eastern Economy Edition.
5. Operation Research – R. Pannerselvam, PHI

OPERATING SYSTEM KERNEL DESIGN (ELECTIVE - I)

Module 1

Operating system – Basic Structure - Kernel – monolithic and microkernel architectures – Overview of UNIX kernels – Process kernel Model - reentrant kernels -Signals –Interrupts – Timer interrupts - System calls – Implementation of simple system calls – Booting procedure.

Module 2

Processes and Tasks – Process relationship – process creation – Process Scheduling – Scheduling algorithm – SMP Scheduler
Synchronization in kernel – Synchronization techniques - Interprocess communication using semaphores, messages and shared memory

Module 3

Memory Management – The architecture independent memory model in Linux – memory pages – Virtual address space and linear address calculation – Virtual address space for a process – User segment – Virtual memory areas – Kernel Segment – Memory allocation in kernel segment – Block device caching mechanisms in Linux – paging – Page cache and management – handling page faults.

Module 4

Linux File systems: Basic principles – kernel representation of file systems – layered file system architecture – Virtual file system – filesystem registration – mounting.
The ext2 File system – Directories in ext2 – block allocation and addressing - extensions in ext2 file system

Module 5

Device drivers – Character and block devices – polling – interrupt sharing – implementing a device driver for PC speaker

References

1. Linux Kernel Internals 2nd edition – Beck (Pearson Education Asia)
2. Understanding the Linux Kernel - Daniel P Bovet and Marco Cesati (O'Reilly)
3. Linux Device Drivers – Rubini A. (O'Reilly)
4. Operating System Concepts - Silbershatz and Galvin (John Wiley)
5. Linux Kernel Online Book– David A Rusling
(<http://www.linuxdoc.org/LDP/tlk/tlk.html>)
6. Linux Kernel Book – Card R, E Dumas, F Mevel (John Wiley)
7. Unix Internals Then New Frontiers – Vahalia U (PHI)
8. Red Hat Linux 7.1 Bible – Christofer Negus (IDG Books)

PRINCIPLES OF REAL TIME SYSTEMS (ELECTIVE - I)

RT706-3

3+1+0

Module 1

Introduction to Real Time Systems – Structure of real time systems, real time computer, task classes – Periodic, Aperiodic, critical, Non-critical, definition of real time systems – real time systems, embedded systems - Hard real time systems, soft real time systems, real time design issues.

Module 2

Real time kernel – polled loop systems, co-routines, interrupt driven systems – sporadic, fixed rate systems, hybrid systems, task control block - task status, scheduling – uniprocessor scheduling – traditional rate monotonic, rate monotonic deferred server, EDF, IRIS tasks – multiprocessor scheduling – utilization balancing algorithm, next-fit, bin- packing algorithm, myopic offline, buddy strategy (no need of proofs) fault tolerant scheduling.

Module 3

Communication – Communication Media and message sending topologies, network architecture issues, protocols – contention – based, token - based, stop and go multiloop, polled bus, hierarchal, round robin, fault tolerant routing – clocks and synchronization – fault tolerant synchronization in hardware, synchronization in software.

Module 4

Fault tolerance – definition, cause of failure, fault types, fault detection and containment, redundancy – hardware, software, time, information, integrated failure handling – reliability – parameter values – series – parallel systems, NMR clusters, combinational model, master chain model, fault latency, transient faults, software error models.

Module 5

Programming Languages – Desired language characteristics, Real time databases, characteristics, main memory databases, Transaction, Disk schedule algorithms, Databases for hard real time systems, maintaining serialization constituency.

Text Book

1. Real Time Systems - C.M Krishna, Kang G. Shini (Tata McGraw Hill)

References

1. Real Time Systems, Design & Analysis - Philip Laplante (IEEE)
2. Real Time Systems- Krishna, Tata McGraw Hill

WINDOWS PROGRAMMING (ELECTIVE - I)

Module 1

Introduction - Concepts of Windows Programming - Event Driven Programming – Languages that support Windows Programming – Visual Basic – Java – Visual C++

Visual Basic Programming: Basic Language features – Variables, data types, constants, control statements – Forms – Creating and Using basic Controls – text boxes, labels, buttons - Event handling procedures – Properties Window – Common properties for Controls. Message boxes

Module 2

Visual Basic Programming (Contd) Standard Controls – List boxes, Comboboxes, Image box, picture box, Shape controls, Timer, Scrollbars, Frames, Checkboxes, Option Boxes – Frames - File, Drive and Directory List boxes.- MDI and SDI interfaces – Menus

Module 3

ActiveX controls - RichTextBox, Tree View Control, List view Control, Progressbar, Flexgrid Control, Common dialog Controls – Font, File, Print Dialogs – Creating Custom activex controls – Creating Events and properties for ActiveX controls.

Module 4

Graphics and Multimedia – Drawing Graphics in Windows - setting colors - Drawing text, lines, ellipses, arcs, circles – plotting points –Filling figures with colors and patterns – Using clipboards to transfer images between applications Printing graphics and text – Creating animations with Picture clip control - applying image effects – stretching, flipping, embossing, engraving, blurring, sweeping – Using the Multimedia Control – Handling multimedia Errors

Module 5

Database Access – Using DAO, RDO and ADO for accessing databases – Creating tables, inserting, deleting and updating records – Using the Data Control – Using the ADO Data Control

Using Windows API: Using DLL Procedures in Visual Basic – Declare statement – Handling C++ and Windows Data types – Playing sound with API funtions – Capturing Images from the screen – Handling mouse outside Applications window – Making an ‘always on top’ window.

References

1. Visual Basic 6 Programming Black Book – Steven Holzner (Dreamtech Press)

2. Programming Windows fifth Edition - Charles Petzold (Microsoft Press)
3. Visual Basic - Ivan Petrosaus (BPB)
4. Visual Basic - Garry Cornell (BPB)
5. Using Visual Basic - Resselman (PHI)

MOBILE COMPUTING (ELECTIVE - I)

RT706-5

3+1+0

Module 1

Introduction: - Short History, Mobile telephone systems
Simplified Reference model. Multi carrier modulation. Cellular systems.

Module 2

Wireless Communication Systems: -Telecommunication Systems-GSM & DECT-Architecture and Protocols.Satellite Systems-GEO, LEO, MEO.
Broadcast Systems-Broadcast transmission, Digital Audio Broadcasting-Multimedia Object Transfer Protocol. Digital Video Broadcasting.

Module 3

Wireless LAN and ATM: - Infra red and Radio Transmission, Infrastructure and ad hoc networks, 802.11- Bluetooth- Architecture, Applications and Protocol, Layers, Frame structure, comparison between 802.11 and 802.16.
Wireless ATM- Services, Reference Model, Functions, Radio Access Layer. Handover- Reference Model, Requirements, Types, handover scenarios.
Location Management, Addressing, Access Point Control Protocol (APCP).

Module 4

Mobile Network and Transport Layers:- Mobile IP- Goals, Requirements, IP packet delivery, Advertisement and discovery. Registration, Tunneling and Encapsulation, Optimization, Reverse Tunneling, IPv6, Dynamic Host configuring protocol, Ad hoc networks – Routing, DSDV, Dynamic source routing. Hierarchical Algorithms.
Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Transmission.

Module 5

Wireless Application Protocol & World Wide Web
WAP- Architecture, Protocols-Datagram, Transaction, Session -Wireless Application Environment-WML- Features, Script- Wireless Telephony Application.
WWW- HTTP, Usage of HTML, WWW system architecture.

Text Book

1. Mobile Communications – Jochen Schiller, Pearson Education Asia

References

1. Computer Networks – Andrew S. Tanenbaum, PHI
2. Communication Networks -Fundamental Concepts and Key Architectures Leon-Garcia & Indra Widjaja, Tata McGraw Hill

SOFTWARE ARCHITECTURE (ELECTIVE - I)

RT706-6

3+1+0

Module 1

Introduction to Software architecture – Architectural styles – pipes and filters – data abstraction and object oriented organization – Event based, Implicit invocation, Layered systems – Repositories – Interpreters – Process control – Heterogeneous Architectures.

Module 2

Shared Information Systems – Integration in software Development Environment – Integration in the design of Buildings – Architectural structures for shared information systems

Module 3

Guidance for user interface architecture Quantified design space – Formal models and specifications-The value of architectural formalism – Formalizing the architecture of a specific system – Formalizing the architectural style – Formalizing an architectural design space

Module 4

Linguistic issues - Requirements for architecture – Description languages – first class connectors – Adding implicit invocation to factorial processing languages.

Module 5

Tools for architectural design – Unicon – Exploiting style in architectural design environments – Architectural interconnection

Reference

1. Software Architecture – perspectives on an emerging discipline - Mary Shaw, David Garlan, PHI

LAN TECHNOLOGY (ELECTIVE - I)

R706-7

3+1+0

Module 1

Classification of LAN - Life cycle of LAN- Models for Communication - Topology - LAN standards - IEEE 802.2 LLC, IEEE 802.x MAC, FDDI.

Module 2

Protocols: LAN protocols, protocol evaluation factors – CSMA – CSMA/CD, CSMA/CA – polling – Token passing – Ethernet – ACRNETs – IBM/PC network – IBM token ring.

Module 3

Traditional interconnection components – Repeater, Bridges, Routers, Network interface cards, Types of switch, port switching & segment switching – combined speed – Hubs.

Module 4

LAN Operating System – Peer – to –peer network – Function & responsibility – Print spooler – Current Network Operating Systems.

Module 5

Management & security – security levels – printing environment – opportunities, driver, printing queue – LAN security – physical security – logical security.

Text Book

1. Local area networks: Management, Design & security- Arne Mikalsen Per Borgesen – WILEY- dreamtech
2. Local Area Network - S. K. Basandra, S. Jaiswal

References

1. Local Area Networks - John E McNamara
2. Understanding Local Area Network- Stan Schutt – PHI
3. Handbook of LAN Technology - Paul J. Fortier – McGraw Hill
4. Networking Technologies - Jaisal – Galgotia Publications
5. Networking and Connectivity - Gary R. McClain – Academic Press
6. Wireless LANs - Raymond P. Wenig – Academic Press
7. TCP/IP Networking – A Guide to the IBM Environment - David M. Peterson – McGraw Hill
8. Introduction to Local Area Networks- Robert M. Thomas – BPB
9. LAN- Peter Hodson – BPB
10. LAN- Gerd E. Kerser – McGraw Hill
11. The Business Guide to Local Area Networks - William Stallings

COMPUTER HARDWARE AND NETWORKING LAB

R707

0+0+3

Familiarisation with PC Components

1. Diagnostic S/Ws, Cards, Design & Programming of add-on cards familiarisation with device drivers, Micro controllers etc.
2. Experiments for communication with peripheral devices using C and MASM.
3. Experiments for serial and parallel port communication using C and MASM.
4. Familiarisation with network configuration (routing, DNS, File Servers etc...)
5. Lan trouble shooting, Network problems and recovery, Network diagnostics softwares.

References

1. Upgrading & Repairing PC's - Scott Muller (PHI)
2. Red hat Linux Bible- Cristofer Negas (IDG Books)
3. TCP/IP Bible –Rob Scringer (IDG Books)

NETWORK PROGRAMMING LAB

R708

0+0+3

Experiments using interprocess communication and Network communication, synchronisation & IPC using semaphore, pipe & messages.

Programs for FTP and socket based chat.

Implementation of File Transfer - Communication through serial port - Communication through TCP/IP port

Efficient error checking algorithms (Eg: CRC)

Remote Procedure Call, Remote Method Invocation.

Programs with HTML, DHTML, Applets, Java Script, Java, XML, Java Beans, JSP and EJB.

Any experiments according to the syllabus of RT604 Computer Networks, RT605 Network Computing and RT705 Web Technologies may be substituted

References

1. UNIX Network programming - Stevens. (PHI)
2. Using Java2 Platform – Weber (AWL)

PROJECT & SEMINAR

R709/ R808

0+0+3

Each student is required to present a technical paper on subject approved by the department. The paper should in general reflect the state of the art. He/ She submits a report of the paper to the department.

In addition to the seminar He/She shall undertake a project work in the 7th semester itself in consultation with the guide(s). On completion of the project work, He/She shall present the work done before a panel of staff members, and submit a report of the project work done to the department.

EIGHTH SEMESTER

SECURITY IN COMPUTING

RT 801

2+1+0

Module1

Introduction: Security basics – Aspects of network security – Attacks – Different types – Hackers – Crackers – Common intrusion techniques –Trojan Horse, Virus, Worm – Security services and mechanisms.

Module 2

OS Security – Protection Mechanisms –Authentication & Access control – Discretionary and Mandatory access control – Authentication mechanisms – Official levels of computer security (DoD) - Security breaches – Concept of a hole - Types of a holes – Study of the security features for authentication, access control and remote execution in UNIX, WINDOWS 2000

Module 3

Cryptography: Basic Encryption & Decryption – Transposition & substitution ciphers – Caesar substitution – Polyalphabetic substitutions – Crypt analysis – Symmetric key algorithms – Fiestel Networks – Confusion – Diffusion – DES Algorithm – Strength of DES – Comparison & important features of modern symmetric key algorithms – Public key cryptosystems – The RSA Algorithm – Diffice Hellman key exchange – comparison of RSA & DES – Message Authentication & Hash functions – Digital signature

Module 4

Network & Application Security: Kerberos – X509 Authentication service – IP security Architecture – Secure socket layer – Electronic mail security – Pretty Good privacy – S/MIME – secure Electronic Transactions – Firewalls - Security mechanisms in JAVA platform – Applet security – Security policy and Security Manager.

Module 5

Database Security: - Security issues – SQL security DAC based on granting & revoking privileges – MAC for multilevel security – Statistical database security.

Text Books

1. Module1, 4 Network Security Essentials Applications & Standards, William S., Pearson Education Asia
2. Module2 Modern operating System, Andrew S. Tanenbaum, Pearson Education Asia
3. Using JAVA 2 platform, Joseph L. Weber, Prentice Hall of India
4. Module3 Cryptography and network security principles and practice, William Stallings, Pearson Education Asia
5. Information theory coding and cryptography, Ranjan Bose, TMH

6. Module 4,5 Designing security Architecture Solutions, Jay Ramachandran, Wiley Dreamtech
7. Module5 Database Security Mechanisms for Computer Network, Sead Muftic, John wiles

References

1. Security in Computing - Charles P. Pfleeger IEEE Computer Science Press
2. Database Security Mechanisms for Computer Network- Sead Muftic, John wiles
3. Designing Security Architecture Solutions – Jay Ramachandran, Wiley dreamtech
4. Firewalls Complete - Marcus Gonsalvus, TMH
5. Networking Technologies - Jaisal, Galgotia Publication
6. Security in Computer Operating System - G.O.Shea, NCC Blackwell Manchester Oxford
7. Mastering JAVA security: Cryptography, Algorithms and Architecture - Rich Helton, Wiley Dreamtech
8. Implementing IPv6- Mark A. Miller P.E, IDG Books

HIGH PERFORMANCE COMPUTING

R802

2+1+0

Module1

Introduction to parallel processing - Trends towards parallel processing - Parallelism in uniprocessor - Parallel computer structures-Architecture classification schemes - Indian contribution to parallel processing.

Module 2

Principles of pipelining and vector processing - Linear pipelining - Classification of pipeline processors - General pipelines - Instruction and Arithmetic pipelines – Design of Pipelined instruction unit-Prinnciples of Designing Pipeline Processors- Instruction prefetch and branch handling- Dynamic pipelines - Architecture of Cray-1.

Module 3

Array processors - SIMD array processors - Interconnection networks - Static vs dynamic networks - mesh connected networks - Cube interconnection networks - Parallel algorithms for array processors - SIMD matrix multiplication-Parallel sorting on array processors - Associative array processing - Memory organization.

Module 4

Multiprocessor architectures and Programming - Loosely coupled and Tightly coupled multiprocessors - Interconnection networks - Language features to exploit parallelism - Process synchronisation mechanisms.

Module5

Dataflow computers - Data driven computing and Languages - Data flow computers architectures - Static data flow computer -Dynamic data flow computer -Data flow design alternatives.

Text Book

1. Computer Architecture & Parallel Processing - Kai Hwang & Faye A. Briggs, McGraw Hill

References

1. Elements of Parallel computing - V. Rajaraman - PHI
2. Super Computers - V. Rajaraman - Wiley
3. Parallel Processing for Super Computers & AI - Kai Hwang & Douglas DeGneot
4. McGraw Hill
5. Highly parallel computing - George S. Almasi, Allan Gottlieb - Benjamin Cummings Publishers.
6. High Performance Computer Architecture - Harold S. Stone, Addison Wesley.
7. Advanced Computing - Vijay P. Bhatkar, Asok V. Joshi, Arirban Basu, Asok K. Sharma.

PRINCIPLES OF PROGRAMMING LANGUAGES

R803

3+1+0

Module 1

Introduction – Role of programming languages - Effects of Environments on languages - Language Design issues - Virtual computers and binding times, Language Paradigms.

Module 2

Data types - Specification of data types, implementation of elementary data types, Declarations, type checking and type conversion - Assignment and Initialisation - Structured data types - Specification of data structure types, Implementation of data structure type - Declarations and type checking for data structures.

Module 3

Abstract data types, Encapsulation by subprogram - Type definition, storage management - Sequence Control - Implicit and Explicit sequence control, sequencing with arithmetic expressions, sequence control between statements.

Module 4

Subprogram control - Subprogram sequence control, attributes of data control, Shared data in subprograms - Abstract data types revisited, Inheritance, Polymorphism.

Module 5

Advances in Language design - Variations of subprogram control, Parallel programming, Introduction to exception handling - Exception handling in JAVA, Hardware developments, software architecture.

Text Book

1. Programming Languages, Design & Implementation - Terrence W. Pratt, Marvin V. Zelkowitz., Pearson Education Asia / Prentice Hall of India

Reference

1. Programming Languages - Robert W Sebesta, Pearson EducationAsia

ARTIFICIAL INTELLIGENCE

RT 804

3+1+0

Module 1

Introduction – Definitions – AI application areas – Example problems- Problems and problem spaces - Problem characteristics – Problem solving by searching, Searching strategies – Breadth first search, Uniform cost search, DFS, Depth – Limited search, Bi-directional search – Constraint satisfaction search.

Module 2

Informed search, A* algorithm, Heuristic functions – Inventing Heuristic functions - Heuristic for constraint satisfaction problem – Iterative deepening – Hill climbing – Simulated Annealing.

Module3

Game playing and knowledge structures – Games as search problem – Imperfect decisions – Evaluation functions – Alpha – Beta pruning – state of art game programs, Introduction to frames and semantic nets.

Module 4

Knowledge and Reasoning – Review of representation and reasoning with Logic – Inference in first order logic, Inference rules involving quantifiers, modus ponens, Unification, forward and backward chaining – Resolution.

Module 5

Introduction to Prolog – Representing facts – Recursive search – Abstract data types – Alternative search strategies – Meta predicates, Matching and evaluation, meta interpreters – semantic nets & frames in prolog.

Text Books

Module 1,2,3,4

1. Artificial Intelligence – A modern approach, Stuart Russell – Peter Narang, Pearson Education Asia
2. Artificial Intelligence Rich E. - McGraw Hill Book Company

Module 5

3. Artificial Intelligence, George F Luger, Pearson Education Asia

References

1. An Introduction to Artificial Intelligence – Eugene Charniak & Drew McDermot, Pearson Education Asia

ELECTIVE - II

R805

3+1+0

List of electives

1. Advanced Mathematics
2. Client-Server Computing
3. E-Commerce
4. Analysis and Modeling of Digital Systems
5. Distributed Computing
6. User Interface Design

Note

New Electives may be added according to the needs of emerging fields in technology. The name of the elective and its syllabus should be submitted to the university before the course is offered.

ADVANCED MATHEMATICS (ELECTIVE - I)

CMELR 805-1

3+1+0

Module 1 Green's Function

Heavisides, unit step function – Derivative of unit step function – Dirac delta function – properties of delta function – Derivatives of delta function – testing functions – symbolic function – symbolic derivatives – inverse of differential operator – Green's function – initial value problems – boundary value problems – simple cases only

Module 2 Integral Equations

Definition of Volterra and Fredholm Integral equations – conversion of a linear differential equation into an integral equation – conversion of boundary value problem into an integral equation using Green's function – integral equation with separable Kernels – Integral equations of convolution type – Neumann series solution.

Module 3 Gamma, Beta functions

Gamma function, Beta function – Relation between them – their transformations – use of them in the evaluation certain integrals – Dirichlet's integral – Liouville's extension of Dirichlet's theorem – Elliptic integral – Error function.

Module 4 Power Series solution of differential equation

The power series method – Legendre's Equation – Legendre's polynomial – Rodrigues formula – generating function – Bessel's equation – Bessel's function of the first kind – Orthogonality of Legendre's Polynomials and Bessel's functions.

Module 5 Numerical solution of partial differential equations.

Classification of second order equations- Finite difference approximations to partial derivatives – solution of Laplace and Poisson's equations by finite difference method – solution of one dimensional heat equation by Crank – Nicolson method – solution one dimensional wave equation.

References

1. Linear Integral Equation- Ram P.Kanwal, Academic Press, New York
2. A Course on Integral Equations - Allen C.Pipkin, Springer – Verlag
3. Advanced Engg. Mathematics - H.K.Dass, S.Chand
4. Advanced Engg. Mathematics- Michael D.Greenberge, Pearson Edn. Asia
5. Numrical methods in Engg. & Science - B.S.Grewal, Khanna Publishers
6. Generalized functions - R.F. Hoskins, John Wiley and Sons.
7. Principles and Techniques of Bernard Friedman - John Wiley and sons Applied Mathematics
8. Principles of Applied Mathematics- James P.Keener, Addison Wesley.
9. Numerical methods - P.Kandasamy, K.Thilagavathy, K.Gunavathy, S.Chand & co

CLIENT SERVER COMPUTING (ELECTIVE - II)

RT 805-2

3+1+0

Module 1 Introduction

History - uses - Client Server Computing & Hetrogenous Computing - Cross Platform Computing Distributed Computing - The costs of Client Server Computing - Advantages and Disadvantages - Client Server Databases.

Module 2 Design

Fundamentals of client server design - Managing the interaction of client and server - Communications Techniques protocols & Client server interaction protocols - Preparing applications for client server - Optimizing applications for client server - Example client server implementations - Request acceptance dispatching - Execution of requests - Client server interaction using message.

Module 3 Multitasking

Multi programming vs multitasking - Processor - Advantages and draw backs of multiple processor - Child and parent processor - Case study Novell Netware and Windows NT - Developing server applications - Threads - Server communication model.

Module 4 Synchronization

Scheduling implementations - processing queues - context switching pre emptive systems - critical sections - mutual exclusion - semaphores - semaphore implementations in NT & Netware.

Module 5 Communications

Network communication - Inter process communication - Building portable client server applications.

References

1. Novell's Guide to Client-Server Application & Architecture- Jeffrey D.Schqnk, Novell Press.
2. Client Server Computing - Dawna Travis Dewire, McGraw Hill.
3. Developing Client Server Applications - W.H.Inman, BPB.
4. Guide to Client Server Databases - Joe Salemi, BPB.
5. Client Server Strategies- David Vaskevitch, Galgotia.

E-COMMERCE (ELECTIVE - II)

R805-3

3+1+0

Module1 Introduction to Electronic Commerce

E-Commerce Framework, Anatomy of E-Commerce Applications, E-Commerce Consumer & Organization Applications. E- Commerce and World Wide Web – Internet Service Providers, Architectural Framework for Electronic Commerce, WWW as the Architecture, Hypertext publishing.

Module 2 Network Security

Client-Server Network Security, CS Security Threats, Firewalls, Data & Message Security, Encrypted Documents, Security on the Web.

Module 3 Electronic Payment Systems

Types of Electronic Payment Systems, Digital Token Based Electronic Payment System, Smart Cards, Credit Cards, Risk in Electronic Payment Systems, Designing Electronic Payment Systems.

Module 4 Electronic Data Interchange

EDI Application in Business, EDI-Legal, Security and Privacy Issues, EDI standardization, EDI Envelope for Message Transport, Internet based EDI, Internal Information System, Work-flow Automation and Coordination, Supply Chain Management, Document Library, Types of Digital Documents, Corporate Data Warehouses

Module 5 Recent Trends in E-Commerce

Multimedia in E-Commerce, Video Conferencing with Digital Videos, Broad Band Telecommunication, Frame & Cell Relays, Switched Multimegabit Data Service (SMDS), Asynchronous Transfer Mode, Mobile Computing and Wireless Computing.

Text Book

1. Frontiers of Electronic Commerce - Ravi Kalakota & Andrew B Whinston, Pearson Education Asia

References

1. Global Electronic Commerce – J Christopher Westland & Theodore H K Clark
2. E- Commerce The cutting edge of Business - Kamlesh K Bajaj & Debjani Nag
3. E-Commerce - Strategy, Technologies and Applications, TMH

ANALYSIS AND MODELING OF DIGITAL SYSTEMS (ELECTIVE - II)

RT805-4

3+1+0

Module1

Introduction to VHDL: Digital system design - Role of hardware description language- Modeling digital systems – events, propagation delays and concurrency – waveforms and timing – signal values – shared signals – simulation model – synthesis model – Field Programmable Gate Arrays.

Module 2

Basic language concepts simulation: signals – Entity architecture – concurrent statements – Constructing VHDL models using CSAs – delays.

Synthesis: Interface from declarations, simple CSA statements, conditional signal assignment statements, and selected signal assignment statements.

Module3

Modeling behavior Simulation: The process construct – programming constructs – the wait statement – attributes – generating clocks and periodic waveforms – using signals – modeling state machines – constructing VHDL models – programming errors.

Synthesis: language directed view – inference from within process – issues – signals vs. variables – latch vs. flip flop – the wait statement – state machine.

Module 4

Modeling structure: Describing structure – structural VHDL model – hierarchy, abstraction and accuracy – generics – component instantiation and synthesis – the generate statement subprograms: functions – procedures – sub program and operator overloading – packages and libraries.

Module 5

Basic I/O operations – the package TEXTIO – ASSERT statement – terminology and directory structure – simulation mechanics – synthesis mechanics – identifiers – data objects – data types – operators.

Text Book

1. Introductory VHDL - Sudhakar Yalamanchili, Pearson Education Asia.

References

1. VHDL primer - J Bhaskar, Pearson Education Asia
2. Analysis and modeling of digital systems - Zainalabedin Navabi, McGraw Hill.

DISTRIBUTED COMPUTING (ELECTIVE - II)

RT805-5

3+1+0

Module I Introduction

Introduction to Distributed Systems, evolution, characteristics, design issues, user requirements, Network technologies and protocols – overview, MACH, AMOBEA- overview.

Module 2 Distributed file system

File service components, design issues, interfaces, implementation techniques, Sun Network File System – architecture and implementation, other distributed file systems – AFS, CODA. Name services – SNS name service model.

Module 3 Communication in distributed systems

Client server communication, Group communication, Message passing – features, synchronizations, RPC – model, implementation, stub generation, messages, marshalling, Server management. Distributed shared memory – Architecture, design issues, structure of shared memory space, replacement strategy, thrashing. Synchronization – clock synchronization, event ordering, mutual exclusion

Module 4 Resource and Process management

Features of scheduling algorithms, Task assignment approach, load balancing, load sharing, Process migration mechanisms, Threads – scheduling.

Module 5 Consistency maintenance

Transaction recovery – methods- intention lists, Fault tolerance – failures, Byzantine failures.

Deadlocks in distributed systems – detection and prevention, centralized and distributed approaches.

References

1. Distributed Systems – Concepts and designing - George Coulouris, Jean Dellimore, Tim Kindberg - Pearson Education Asia
2. Distributed Operating Systems - Andrew S. Tenenbaum Pearson Education Asia
3. Distributed Operating Systems - Concepts and design - Pradeep. K, Sinha, PHI

USER INTERFACE DESIGN (ELECTIVE - II)

RT805-6

3+1+0

Module 1 Introduction

Importance of user interface – definition, importance of good design, brief history – Graphical User Interface – Web User Interface – Principles of User interface design.

Module 2 Design Process

Human Interaction with computers, Importance of Human Characteristics, Human consideration, Human Interaction speeds – Understanding Business function

Module 3 Screen Designing

Design goals - screen meaning and purpose, organizing screen elements- ordering of screen data and content – screen navigation and flow – visually pleasing composition – amount of information – focus and emphasis – presenting

information simply and meaningfully – information retrieval on web – Statistical graphics – Technological considerations in Interface Design.

Module 4 Windows and components

Menus and navigation schemes, selection of windows, Selection of device based and screen based controls - text and messages – icons and images – Multimedia – colours- uses, problems, choosing colours.

Module 5 Software tools

Specification methods, interface building tools
Interaction devices: keyboard and function keys - pointing devices- speech recognition, digitization and generation – image and video displays – printers.

Text Book

1. The Essential Guide to User Interface Design 2nd Edn. – Wilbert O. Galitz, Wiley Dreamtech
2. Designing the User Interface 3rd Edn. – Ben Shneiderman, Pearson Education Asia

References

1. Human Computer Interaction – John M. Carroll, Pearson Education Asia
2. The Essentials of User Interface Design - Alan Cooper, Wiley Dreamtech

ELECTIVE - III

R806

3+1+0

List of electives

1. Multimedia Systems
2. Embedded Systems
3. Neural Networks
4. Genetic Algorithms and Applications
5. Advanced Networking Trends
6. Data Processing and Analysis Techniques
7. Biometrics

Note

New Electives may be added according to the needs of emerging fields in technology. The name of the elective and its syllabus should be submitted to the university before the course is offered.

MULTIMEDIA SYSTEMS (ELECTIVE - III)

R806-1

3+1+0

Module 1 Introduction

Definition of multimedia, multimedia, hardware, software applications and software environments - Media Types - Analog and digital video, digital audio, music and animation - Analog & Digital video - Memory storage - Basic tools - Authoring tools.

Module 2 Building Blocks

Text - Hyper text - Sound - Sound cards - Standards - Image - Image types - Image compression, RLE, JPEG, MPEG - Fractal and Wavelet Compressions - Image file types - Animation - Capture and Playback techniques. (basic ideas only)

Module 3 Multimedia Environments

The Compact Disc family, CD-interactive, Digital Video Interactive, QuickTime, Multimedia PC and Microsoft Multimedia Extensions.

Module 4 Multimedia Programming

Framework: Overview, Media classes, Transform classes, Format classes and Component classes - Problems related to programming - Composition, Synchronisation, Interaction, Database integration.

Module 5 Advanced Multimedia

Moving pictures - Techniques realistic image synthesis, Virtual Reality - Full motion digital video - Video capture techniques - multimedia networks - Desktop video conferencing - Future multimedia.

References

1. Multimedia Programming Objects, Environments & Framework - Simon J. Gibbs, Dionysios C. Tsischritziz (Addison-Wesley Publishing Co.)
2. Multimedia - Making it work - Tay Van Ghan – Osborne - Tata Mcgraw Hill
3. Authoring Interactive multimedia - Arch C Luther
4. Optimizing your Multimedia PC - L.J. Skibbe, Susan Lafe Meister - Comdex
5. Multimedia Bible - Winn L. Rosch, Sams
6. Multimedia Producers Bible - Ron Goldberg, Comdex
7. Multimedia Power Tools - Peter Jellam, Random house Electronic Pub.
8. Multimedia Computing - Mathew E. Hodger & Russel M. Sasnett, Addison wesley
9. Integrated Multimedia Systems Overview - Palikom, The communication Wall

EMBEDDED SYSTEMS (ELECTIVE - III)

RT806-2

3+1+0

Module1 Overview of Embedded System

Embedded System, Categories of Embedded System, Requirements of Embedded Systems, Challenges and Issues in Embedded Software Development, Applications of Embedded Systems in Consumer Electronics, Control System, Biomedical Systems, Handheld computers, Communication devices.

Module 2 Embedded Hardware & Software Development Environment

Hardware Architecture, Micro-Controller Architecture, Communication Interface Standards, Embedded System Development Process, Embedded Operating systems, Types of Embedded Operating systems.

Module 3 Embedded Communication System

Serial Communication, PC-to-PC Communication, Serial Communication with the 8051 Family of Micro-controllers, Protocol Converter, Voice-over-IP, Embedded Applications over Mobile Network example MP3 Sound Player.

Module 4 Real Time & Database Applications

Real-Time Embedded Software Development, Sending a Message over a Serial Link, Simulation of a Process Control System, Controlling an Appliance from the RTLinux System, Embedded Database Applications using examples like Salary Survey, Energy Meter Readings.

Module 5 Java Applications & Future Trends in Embedded Systems

Networked Java-Enabled Information Appliances, Embedded Process Control System, Mobile Java Applications, Appliance Control using Jini, System on a Chip (SOC), Smart Cards and the Cashless Society, Security in Embedded Systems.

Text Book

1. Programming for Embedded Systems- Dreamtech Software Team, Wiley
Dreamtech

Reference

1. Fundamentals of Embedded Software where C and Assembly Meet – Daniel W Lewis.

NEURAL NETWORKS (ELECTIVE - III)

RT806-3

3+1+0

Module 1

Introduction - Principles - artificial neuron - activation functions - Single layer & multilayer networks - Training artificial neural networks - Perception - Representation - Linear separability - Learning - Training algorithms.

Module 2

Back Propagation - Training algorithm - Applications - network configurations - Network paralysis - Local minima - temporal instability.

Module 3

Counter Propagation networks: Kohonen layer - Training the Kohonen layer - Pre initialising the weight vectors - statistical properties - Training the Grossberg layer - Full counter propagation network - Application.

Module 4

Statistical methods - Boltzmann's Training - Conjugate training - Artificial neural network methods - Applications to general non-linear optimization problems.

Module 5

Hopfield nets - Recurrent networks - stability - Associative memory - applications - Thermo dynamic systems - Statistical Hopfield networks - Bidirectional associative memories - Continuous BAM - Adaptive resonance theory - Architecture classification - Implementation.

Text Book

1. Neural Computing Theory & Practice - Philip D. Wasserman.

References

1. Neural Networks - Simon Haykins
2. Adaptive Pattern Recognition & Neural Networks - Pay Y.H.
3. An Introduction to neural computing - Chapman & Hall
4. Artificial Neural Networks - Robert J. Schalkoff, McGraw Hill
5. Artificial Neural Networks - B.Yegnanarayana, PHI

GENETIC ALGORITHMS AND APPLICATIONS (ELECTIVE - III)

RT806-4

3+1+0

Module 1 Architecture-Altering Operations

Introduction, Previous Methods of Determining the Architecture of a Multi-Part Program - On the origin of new function- Architecture-Altering operations for Subroutines -Automatically Defined Iterations, Loops, Recursion, Storage. Self-Organization of Hierarchies and Program Architecture - Rotating the Tires on an Automobile – Boolean Parity Problem- Time-Optimal Robot Control Problem - Multi-Agent Problem - Using Architecture Altering Operations for Subroutines. Transmembrane Segment Identification Problem using Architecture-Altering Operations for Iterations-Fibonacci Sequence- Cart Centering.

Module 2 Genetic Programming Problem Solver (GPPS)

Elements of GPPS 1.0-Problems Illustrating GPPS 1.0 - Elements of GPPS 2.0 - Problems Illustrating GPPS 2.0 - Previous Work on Automated Analog Circuit Synthesis.

Module 3 Automated synthesis of analog electrical circuits

Synthesis of a Low-pass Filter and High-pass Filter The Role of Crossover in Genetic Programming.

Module 4 Evolvable Hardware

Evolvable Hardware and Rapidly Re-configurable Field-Programmable Gate Arrays

Discovery of cellular Automata Rules: Discovery of a Cellular Automata Rule for the Majority Classification Problem.

Module 5 Programmatic Motifs for molecular Biology

Automatic Discovery of Protein Motifs –Programmatic Motifs and the Cellular Location Problem.

Parallelization and Implementation Issues: Computer Time- Parallelisation of Genetic Programming –Implementation Issues.

Text Book

1. John R. Koza, Forrest H Bennett III, David Andre, Martin A. Kean, “ Genetic Programming III: Darwinian Invention and Problem Solving”, Morgan Kaufmann, 1999

Reference

1. Genetic Algorithms for VLSI Design, Layout and test Automation - Pinaki Mazumder, Elizabeth M Rudnick (Pearson Education Asia)

ADVANCED NETWORKING TRENDS (ELECTIVE - III)

RT806-5

3+1+0

Module 1

Ethernet Technology – Frame format – Interface Gap – CSMA/CD – 10 mbps Ethernet, Fast Ethernet, Gigabit Ethernet, Wireless Ethernet – SONET – Sonet multiplexing, Sonet frame structure

Module 2

ISDN - Definition - Protocol architecture - System architecture - Transmission channels - ISDN interface, B-ISDN.

Module 3

ATM – ATM Principles – BISDN reference model – ATM layers – ATM adaption Layer – AAL1, AAL2, AAL3/4, AAL5 – ATM addressing – UNI Signaling – PNNI Signalling

Module 4

SATELLITE COMMUNICATION: Satellite communication principles - Geo stationary satellites - block schematic of satellite earth station - VSAT - VSAT networks - applications in personnel communication. (basic ideas only)

Module 5

Wireless Lan – Infrared Vs Radio transmission – Infrastructure & ad hoc n/w – IEEE 802.11 – Hiper Law – Bluetooth – Physical Layer – MAC layer – Networking – Security

References

Module 1

1. An introduction to Computer Networking - Kenneth C Mansfield, Jr., James L. Antonakos, PHI

Module 1,2,3

1. Communication Networks Fundamental Concepts & Key Architecture - Leon-Garcia – Widjaja, Tata McGraw Hill
2. Mobile Communication - Jochen Schiller, Pearson Education Asia

DATA PROCESSING AND ANALYSIS TECHNIQUES (ELECTIVE - III)

RT806-6

3+1+0

Module 1

Introduction to COBOL programming -elements of COBOL divisions, sections and paragraphs -Table writing - complete program in COBOL using various options verbs, statements- conditional statements.

Module 2

Table Handling – Occur clause – PERFORM verb – SET verb, SEARCH verb – Occurs depending clause – Sorting a Table.

Module 3

Processing of various file structures in COBOL Language – File description – Fixed Length Record – Statements – Sequential File with variable length record – Sorting and merging of files – Direct access files.

Module 4

Data warehousing – Definition – Multidimensional datamodel – OLAP operation – Data warehouse architecture – Warehouse Server – Metadata – OLAP Engine.

Module 5

Data mining – Definitions, KDD Vs Data mining, DBMS Vs DM – DM Techniques, Issues and Challenges in DM – DM application areas.

References

1. COBOL programming - M K Roy & D Ghosh Dastidar, Tata McGraw Hill
2. Data mining Techniques - Arun K Pujari (Universal Press)
3. Data mining Concepts and Techniques - Jawei Han & Micheline Kamber (Morgan Kunfmann Pub.)
4. Data Mining - Pieter Adriaans, Dolf Zantinge, Person Education Asia
5. Structured COBOL Programming - E. Rajasekar & S.Selvi (Anuradha Agencies)
6. Structured COBOL- A. S. Philippakis & Leonard, J. Kazmier (Tata McGraw Hill)

BIOMETRICS (ELECTIVE -III)

RT806-7

3+1+0

Module 1

Introduction – Benefits of biometric security – verification and identification – basic working of biometric matching – accuracy – false match rate – false nonmatch rate – failure to enroll rate – derived metrics – layered biometric solutions

Module 2

Finger scan – features – components – operation (steps) – competing finger scan technologies – strength and weakness
Facial scan - features – components – operation (steps) – competing facial scan technologies – strength and weakness

Module 3

Iris scan - features – components – operation (steps) – competing iris scan technologies – strength and weakness
Voice scan - features – components – operation (steps) – competing facial scan technologies – strength and weakness

Module 4

Other physiological biometrics-Handscan-retina scan- AFIS (automatic fingerprint Identification systems)-Behavioral Biometrics-Signature scan-Key stroke Scan.

Module 5

Biometrics Application – Biometric Solution Matrix-Bioprivacy-Comparison of privacy factor in different biometrics technologies-Designing privacy sympathetic biometric systems-Biometric standards- (BioAPI, BAPI)-Biometric middleware.

Reference

1. Biometrics -Identify Verification in a Networked World - Samir Nanavati, Michael Thieme, Raj Nanavati- WILEY-dreamtech

GRAPHICS AND MULTIMEDIA LAB

R807

0+0+4

Point plotting, line and circle drawing, Line and Polygon clipping, transformations, hidden line elimination, curves, polygon hatching, Multimedia programming, Visual programming, Animation

Any experiment according to the syllabus of R702 Computer Graphics may be substituted

PROJECT & SEMINAR

R709/ R808

0+0+4

Each student is required to present a technical paper on subject approved by the department. The paper should in general reflect the state of the art. He/ She submits a report of the paper to the department.

In addition to the seminar He/She shall undertake a project work in the 7th semester itself in consultation with the guide(s). On completion of the project work, He/She shall present the work done before a panel of staff members, and submit a report of the project work done to the department.

VIVA -VOCE

R809

A comprehensive Viva-voce examination will be conducted to assess the students overall knowledge in the specified field of engineering. At the time of Viva-voce, certified report of seminar, mini project and project work are to be presented for evaluation.