

**ANNA UNIVERSITY COIMBATORE
REGULATIONS 2007-08**

B.E. (Computer Science and Engineering)

SEMESTER V

Code No.	Course Title	L	T	P	M	C
THEORY						
	Probability and Queuing Theory	3	1	0	100	4
	Theory of Computation	3	1	0	100	4
	Database Management Systems	3	0	0	100	3
	Open Source Systems	3	1	0	100	4
	Microprocessors & Micro controllers	3	1	0	100	4
	Artificial Intelligence	3	0	0	100	3
PRACTICAL						
	Microprocessors & Micro controllers Lab	0	0	3	100	1.5
	DBMS Lab	0	0	3	100	1.5
	Communication Skill & Seminar	0	0	3	100	1.5

SEMESTER VI

Code No.	Course Title	L	T	P	M	C
THEORY						
	Digital Signal Processing	3	1	0	100	4
	Principles of Compiler Design	3	1	0	100	4
	Graphics and Multimedia Systems	3	0	0	100	3
	Numerical Methods	3	1	0	100	4
	Computer Networks	3	0	0	100	3
	Elective – I	3	0	0	100	3
PRACTICAL						
	Graphics and Multimedia Lab	0	0	3	100	1.5
	Compiler Design Lab	0	0	3	100	1.5
	Computer Networks Lab	0	0	3	100	1.5

PROBABILITY AND QUEUEING THEORY	L	T	P	M	C
	3	1	0	100	4

UNIT I PROBABILITY AND RANDOM VARIABLE 9 + 3

Axioms of probability - Conditional probability - Total probability – Baye’s theorem-
Random variable - Probability mass function - Probability density function - Properties -
Moments

UNIT II STANDARD DISTRIBUTIONS 9 + 3

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

UNIT III TWO DIMENSIONAL RANDOM VARIABLES 9 + 3

Joint distributions - Marginal and conditional distributions – Covariance - Correlation and
regression - Transformation of random variables

UNIT IV RANDOM PROCESSES AND MARKOV CHAINS 9 + 3

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

UNIT V QUEUEING THEORY 9 + 3

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

TUTORIAL 15
TOTAL : 60

REFERENCE BOOKS

Veerarajan., T., “Probability, Statistics and Random Processes”, Tata McGraw-Hill,
Second Edition, New Delhi, 2003.
Ross, S., “A first course in probability”, Sixth Edition, Pearson Education, Delhi, 2002.
Medhi J., “Stochastic Processes”, New Age Publishers, New Delhi, 1994. (Chapters 2,
3, & 4)
Taha, H. A., “Operations Research-An Introduction”, Seventh Edition, Pearson
Education Edition Asia, Delhi, 2002.

THEORY OF COMPUTATION

L	T	P	M	C
3	1	0	100	4

UNIT I AUTOMATA

9

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

UNIT II REGULAR EXPRESSIONS AND LANGUAGES

9

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

UNIT III CONTEXT-FREE GRAMMAR AND LANGUAGES

9

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

UNIT IV PROPERTIES OF CONTEXT-FREE LANGUAGES

9

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

UNIT V UNDECIDABILITY

9

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

TUTORIAL 15

TOTAL : 60

REFERENCE BOOKS

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

DATABASE MANAGEMENT SYSTEMS	L	T	P	M	C
	3	0	0	100	3

UNIT I INTRODUCTION AND CONCEPTUAL MODELING 9

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

UNIT II RELATIONAL MODEL 9

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

UNIT III DATA STORAGE AND QUERY PROCESSING 9

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

UNIT IV TRANSACTION MANAGEMENT 9

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

UNIT V CURRENT TRENDS 9

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

TOTAL : 45

REFERENCE BOOKS

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan- “Database System Concepts”, Fourth Edition, McGraw-Hill, 2002.
2. Ramez Elmasri and Shamkant B. Navathe, “Fundamental Database Systems”, Third Edition, Pearson Education, 2003.
3. Raghu Ramakrishnan, “Database Management System”, Tata McGraw-Hill Publishing Company, 2003.

OPEN SOURCE SYSTEMS

L	T	P	M	C
3	1	0	100	4

Unit –I

9

Overview of Free/Open Source Software-- Definition of FOSS & GNU, History of GNU/Linux and the Free Software Movement , Advantages of Free Software and GNU/Linux, FOSS usage , trends and potential—global and Indian.GNU/Linux OS installation-- detect hardware, configure disk partitions & file systems and install a GNU/Linux distribution ; Basic shell commands - logging in, listing files, editing files, copying/moving files, viewing file contents, changing file modes and permissions, process management ; User and group management, file ownerships and permissions, PAM authentication ; Introduction to common system configuration files & log files ; Configuring networking, basics of TCP/IP networking and routing, connecting to the Internet (through dialup, DSL, Ethernet, leased line).

Unit – II

9

Configuring additional hardware - sound cards, displays & display cards, network cards, modems, USB drives, CD writers ; Understanding the OS boot up process; Performing every day tasks using gnu/Linux -- accessing the Internet, playing music, editing documents and spreadsheets, sending and receiving email, copy files from disks and over the network, playing games, writing CDs ; X Window system configuration and utilities -- configure X windows, detect display devices ; Installing software -- from source code as well as using binary packages. Setting up email servers-- using postfix (SMTP services), courier (IMAP & POP3 services), squirrel mail (web mail services) ; Setting up web servers -- using apache (HTTP services), php (server-side scripting), perl (CGI support) ; Setting up file services -- using samba (file and authentication services for windows networks), using NFS (file services for gnu/Linux / Unix networks) ; Setting up proxy services -- using squid (http / ftp / https proxy services) ; Setting up printer services - using CUPS (print spooler), foomatic (printer database)

Unit III

9

Setting up a firewall - Using netfilter and ip tables; Using the GNU Compiler Collection – GNU compiler tools ; the C preprocessor (cpp), the C compiler (gcc) and the C++ compiler (g++), assembler (gas) ; Understanding build systems -- constructing make files and using make, using autoconf and autogen to automatically generate make files tailored for different development environments ; Using source code versioning and management tools -- using CVS to manage source code revisions, patch & diff.

Unit IV

9

Understanding the GNU Libc libraries and linker -- linking against object archives (.a libraries) and dynamic shared object libraries (.so libraries), generating statically linked binaries and libraries, generating dynamically linked libraries ; Using the GNU debugging tools -- gdb to debug programs, graphical debuggers like ddd, memory debugging / profiling libraries mpatrol and valgrind ; Review of common programming practices and guidelines for GNU/Linux and FOSS ; Introduction to Bash, sed & awk scripting. Basics of the X Windows server architecture.

Unit V

9

Basics of the X Windows server architecture ; Qt Programming ; Gtk+ Programming ; Python Programming ; Programming GUI applications with localization support.

TUTORIAL : 15

Total: 60

REFERENCES:

Books

- 1 N. B. Venkateshwarlu (Ed); Introduction to Linux: Installation and Programming, B S Publishers; 2005.
- 2 Matt Welsh, Matthias Kalle Dalheimer, Terry Dawson, and Lar Kaufman, Running Linux, Fourth Edition, O'Reilly Publishers, 2002.
- 3 Carla Schroder, Linux Cookbook, First Edition, O'Reilly Cookbooks Series, 2004

On-line material

1. Open Sources: Voices from the Open Source Revolution, First Edition, January 1999, ISBN: 1-56592-582-3. URL: <http://www.oreilly.com/catalog/opensources/book/toc.html>
2. The Linux Cookbook: Tips and Techniques for Everyday Use, First Edition, Michael Stutz, 2001. URL: http://dsl.org/cookbook/cookbook_toc.html
3. The Linux System Administrators' Guide, Lars Wirzenius, Joanna Oja, Stephen Stafford, and Alex Weeks, December 2003. URL: <http://www.tldp.org/guides.html>
4. Using GCC, Richard Stallman et al. URL: <http://www.gnu.org/doc/using.html>
5. An Introduction to GCC, Brian Gough. URL: <http://www.network-theory.co.uk/docs/gccintro/>
6. GNU Autoconf, Automake and Libtool, Gary V. Vaughan, Ben Elliston, Tom Tromey and Ian Lance Taylor. URL: <http://sources.redhat.com/autobook/>
7. Open Source Development with CVS, Third Edition, Karl Fogel and Moshe Bar. URL: <http://cvsbook.red-bean.com/>
8. Advanced Bash Scripting Guide, Mendel Cooper, June 2005. URL: <http://www.tldp.org/guides.html>
9. GTK+/GNOME Application Development, Havoc Pennington. URL: <http://developer.gnome.org/doc/GGAD>
10. Python Tutorial, Guido van Rossum, Fred L. Drake, Jr., Editor. URL: <http://www.python.org/doc/current/tut/tut.html>

MICROPROCESSORS AND MICROCONTROLLERS	L	T	P	M	C
	3	1	0	100	4

UNIT I THE 8085 MICROPROCESSOR 9

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

UNIT II 8086 SOFTWARE ASPECTS 9

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

UNIT III 8086 SYSTEM DESIGN 9

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

UNIT IV I/O INTERFACING 8085 9

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

UNIT V MICROCONTROLLERS 9

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

TUTORIAL 15
TOTAL : 60

REFERENCE BOOKS

- Ramesh S.Gaonkar, “Microprocessor - Architecture, Programming and Applications with the 8085”, Penram International publishing private limited, fifth edition.
 - (UNIT-1: – Chapters 3,5,6 and programming examples from chapters 7-10)
- A.K. Ray & K.M.Bhurchandi, “Advanced Microprocessors and peripherals-Architectures, Programming and Interfacing”, TMH, 2002 reprint.
 - (UNITS 2 to 5: – Chapters 1-6, 7.1-7.3, 8, 16)
- Douglas V.Hall, “Microprocessors and Interfacing: Programming and Hardware”, TMH, Third edition
- Yu-cheng Liu, Glenn A.Gibson, “Microcomputer systems: The 8086 / 8088 Family architecture, Programming and Design”, PHI 2003
- Mohamed Ali Mazidi, Janice Gillispie Mazidi, “The 8051 microcontroller and embedded systems”, Pearson education, 2004.

ARTIFICIAL INTELLIGENCE

L	T	P	M	C
3	0	0	100	4

UNIT I INTRODUCTION 8

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

UNIT II SEARCHING TECHNIQUES 10

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

UNIT III KNOWLEDGE REPRESENTATION 10

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

UNIT IV LEARNING 9

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

UNIT V APPLICATIONS 8

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

TOTAL : 45

REFERENCE BOOKS

1. Stuart Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach", 2nd Edition, Pearson Education / Prentice Hall of India, 2004.
2. Nils J. Nilsson, "Artificial Intelligence: A new Synthesis", Harcourt Asia Pvt. Ltd., 2000.
3. Elaine Rich and Kevin Knight, "Artificial Intelligence", 2nd Edition, Tata McGraw-Hill, 2003.

**MICROPROCESSORS AND
MICROCONTROLLERS LAB**

**L T P M C
3 0 0 100 4**

LIST OF EXPERIMENTS

1. Programming with 8085 – 8-bit / 16-bit multiplication/division using repeated addition/subtraction
2. Programming with 8085-code conversion, decimal arithmetic, bit manipulations.
3. Programming with 8085-matrix multiplication, floating point operations
4. Programming with 8086 – String manipulation, search, find and replace, copy operations, sorting. (PC Required)
5. Using BIOS/DOS calls: Keyboard control, display, file manipulation. (PC Required)
6. Using BIOS/DOS calls: Disk operations. (PC Required)
7. Interfacing with 8085/8086 – 8255, 8253
8. Interfacing with 8085/8086 – 8279,8251
9. 8051 Microcontroller based experiments – Simple assembly language programs (cross assembler required).
10. 8051 Microcontroller based experiments – Simple control applications (cross assembler required).

DATABASE MANAGEMENT SYSTEMS LAB

L T P M C
3 0 0 100 4

LIST OF EXPERIMENTS

Data Definition Language (DDL) commands in RDBMS.

Data Manipulation Language (DML) and Data Control Language (DCL) commands in RDBMS.

High-level language extension with Cursors.

High level language extension with Triggers

Procedures and Functions.

Embedded SQL.

Database design using E-R model and Normalization.

Design and implementation of Payroll Processing System.

Design and implementation of Banking System.

Design and implementation of Library Information System.

COMMUNICATION SKILL & SEMINAR 0 0 3 100 1.5

UNIT I

Strategies to Develop Communication Skills

Listening Skill

Importance of Listening - Hearing Versus Listening - Listening Process - Types of Listening - Benefits of Good Listening - Effective Listening Strategies - Preparing to Overcome Barriers to Listening - Evaluating your Listening Skill

UNIT II

Speaking Skill

Speech Style - Content - Audience - Formal and Informal - Improving Fluency - Voice Modulation- Good Pronunciation - Accent and Intonation - Word Stress - Body Language

UNIT III

Reading Skill

Reading with a Purpose - Active and Passive Reading - Speed - Skimming and Scanning - Techniques to Improve Reading Skills - SQ3R -

UNIT IV

Writing Skill

Effective Writing Strategies - Formal and Informal - Technical Writing - Structure - Coherence - Grammatical Accuracy - Letter Writing - Official / Personal / Business - Job Application - Writing Resume - E-mails - Report Writing - Journal Articles – Conference Papers

UNIT V

Seminar Presentation

Significance of Presentation Skills - Purpose - Gathering Resources - Topic - Content - Audience Analysis - Planning - Preparing - Organising - Delivery - Use of Audio - Visual aids - Rehearsal - Developing Confidence.

SEMESTER VI

DIGITAL SIGNAL PROCESSING

L	T	P	M	C
3	1	0	100	4

UNIT I OVERVIEW OF SIGNALS AND SYSTEMS 9

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

UNIT II FAST FOURIER TRANSFORMS 9

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

UNIT III OVERVIEW OF DIGITAL FILTERS 9

Introduction to digital filters-Types of digital filters-FIR and IIR filters – choosing between FIR and IIR filters-specification of the filter requirements – coefficient calculation-Realization structures of FIR and IIR filters – Digital Matched Filtering.

UNIT IV DIGITAL SIGNAL PROCESSORS 9

Introduction – computer Architecture for signal processing – Harvard architecture – Pipelining – Hardware Multiplier –Accumulator –Special Instructions – Replication – On chip memory cache – Extended parallelism – SIMD, VLIW and static superscalar processing – General purpose Digital Signal processors – Fixed point Digital Signal Processors – floating point Digital Signal Processors – Selecting Digital Signal Processors.

UNIT V REAL WORLD APPLICATIONS OF DSP 9

AUDIO APPLICATIONS OF DSP: Digital Audio Mixing – Speech Synthesis and Recognition – CD Digital audio Systems.

TELECOMMUNICATION APPLICATIONS OF DSP: Architecture – Digital cellular Mobile Telephony – set Top Box for Digital TV reception – Adaptive Telephone echo cancellation

BIOMEDICAL APPLICATIONS OF DSP: Fetal ECG Monitoring – DSP based closed loop controlled Anaesthesia - Detection of fetal heart beats during Labour.

TUTORIAL : 15

TOTAL : 60

REFERENCE BOOK

1. Emmanuel C.Ifearchor, Barrie.W.Jervis “Digital Signal Processing – A Practical Approach” second Edition, Pearson Education, 2003.
2. John G Proakis and Dimtris G Manolakis, “Digital Signal Processing Principles, Algorithms and Application”, PHI/Pearson Education, 2000, 3rd Edition.
3. Alan V Oppenheim, Ronald W Schafer and John R Buck, “Discrete Time Signal Processing”, PHI/Pearson Education, 2000, 2nd Edition.

PRINCIPLES OF COMPILER DESIGN

L	T	P	M	C
3	1	0	100	4

UNIT I INTRODUCTION TO COMPILING

9

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

UNIT II SYNTAX ANALYSIS

9

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

UNIT III INTERMEDIATE CODE GENERATION

9

Intermediate languages – Declarations – Assignment Statements – Boolean Expressions – Case Statements – Back patching – Procedure calls.

UNIT IV CODE GENERATION

9

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

UNIT V CODE OPTIMIZATION AND RUN TIME ENVIRONMENTS

9

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

TUTORIAL 15
TOTAL : 60

REFERENCE BOOKS

- Alfred Aho, Ravi Sethi, Jeffrey D Ullman, "Compilers Principles, Techniques and Tools", Pearson Education Asia, 2003.
- Allen I. Holub "Compiler Design in C", Prentice Hall of India, 2003.
- C. N. Fischer and R. J. LeBlanc, "Crafting a compiler with C", Benjamin Cummings, 2003.
- J.P. Bennet, "Introduction to Compiler Techniques", Second Edition, Tata McGraw-Hill, 2003.

NUMERICAL METHODS

L	T	P	M	C
3	1	0	100	4

UNIT I SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 9+3

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

UNIT II INTERPOLATION AND APPROXIMATION 9+ 3

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

UNIT III NUMERICAL DIFFERENTIATION AND INTEGRATION 9+ 3

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

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

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

UNIT V BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS 9+ 3

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

TUTORIAL 15
TOTAL : 60

REFERENCE BOOKS

1. Gerald, C.F, and Wheatley, P.O, "Applied Numerical Analysis", Sixth Edition, Pearson Education Asia, New Delhi, 2002.
2. Kandasamy, P., Thilagavathy, K. and Gunavathy, K., "Numerical Methods", S.Chand Co. Ltd., New Delhi, 2003
3. Balagurusamy, E., "Numerical Methods", Tata McGraw-Hill Pub.Co.Ltd, New Delhi, 1999.
4. Burden, R.L and Faires, T.D., "Numerical Analysis", Seventh Edition, Thomson Asia Pvt. Ltd., Singapore, 2002

COMPUTER NETWORKS

L	T	P	M	C
3	0	0	100	3

UNIT I DATA COMMUNICATIONS

8

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

UNIT II DATA LINK LAYER

10

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

UNIT III NETWORK LAYER

10

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

UNIT IV TRANSPORT LAYER

9

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

UNIT V APPLICATION LAYER

8

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

TOTAL : 45

REFERENCE BOOKS

1. Behrouz A. Forouzan, “Data communication and Networking”, Tata McGraw-Hill, 2004.
2. James F. Kurose and Keith W. Ross, “Computer Networking: A Top-Down Approach Featuring the Internet”, Pearson Education, 2003.
3. Andrew S. Tanenbaum, “Computer Networks”, PHI, Fourth Edition, 2003.
4. William Stallings, “Data and Computer Communication”, Sixth Edition, Pearson Education, 2000.

GRAPHICS AND MULTIMEDIA SYSTEMS LAB

L	T	P	M	C
0	0	3	100	3

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

COMPILER DESIGN LAB

L	T	P	M	C
0	0	3	100	3

- 1 & 2 Implement a lexical analyzer in "C".
3. Use LEX tool to implement a lexical analyzer.
4. Implement a recursive descent parser for an expression grammar that generates arithmetic expressions with digits, + and *.
5. Use YACC and LEX to implement a parser for the same grammar as given in problem
6. Write semantic rules to the YACC program in problem 5 and implement a calculator that takes an expression with digits, + and * and computes and prints its value.
- 7 & 8. Implement the front end of a compiler that generates the three address code for a simple language with: one data type integer, arithmetic operators, relational operators, variable declaration statement, one conditional construct, one iterative construct and assignment statement.
- 9 & 10. Implement the back end of the compiler which takes the three address code generated in problems 7 and 8, and produces the 8086 assembly language instructions that can be assembled and run using a 8086 assembler. The target assembly instructions can be simple move, add, sub, jump. Also simple addressing modes are used.

COMPUTER NETWORKS LAB

L	T	P	M	C
0	0	3	100	3

1. Applications using TCP Sockets like
 - a. Echo client and echo server
 - b. File transfer
 - c. Remote command execution
 - d. Chat
 - e. Concurrent server
2. Applications using UDP Sockets like
 - a. DNS
 - b. SNMP
3. Applications using Raw Sockets like
 - a. Ping
 - b. Trace route
4. RPC
5. Experiments using simulators like OPNET:
 - a. Performance comparison of MAC protocols
 - b. Performance comparison of Routing protocols
 - c. Study of TCP/UDP performance

Total : 45

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

SEMESTER VI

Code No.	Course Title	L	T	P	M	C
	Resource Management Techniques	3	0	0	100	3
	UNIX Internals	3	0	0	100	3
	High Performance Microprocessors	3	0	0	100	3
	Data Warehousing and Mining	3	0	0	100	3
	Visual Programming	3	0	0	100	3
	Embedded Systems	3	0	0	100	3
	Advanced Databases	3	0	0	100	3
	Intellectual Property Rights	3	0	0	100	3
	Indian Constitution and Society	3	0	0	100	3

RESOURCE MANAGEMENT TECHNIQUES 3 0 0 100 3

Unit I LINEAR PROGRAMMING:

9

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

Unit II. DUALITY AND NETWORKS:

9

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

Unit III INTEGER PROGRAMMING:

9

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

Unit IV CLASSICAL OPTIMISATION THEORY:

9

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

Unit V OBJECT SCHEDULING:

9

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

TOTAL = 45

REFERNECE BOOKS:

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

UNIX INTERNALS

3 0 0 100 3

UNIT I GENERAL OVERVIEW OF THE SYSTEM 9

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

UNIT II Buffer Cache 9

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

UNIT III SYSTEM CALLS FOR FILE SYSTEM 9

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

UNIT IV THE STRUCTURE OF PROCESSES 9

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

UNIT V PROCESS SCHEDULING AND MEMORY MANAGEMENT POLICIES 9

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

TOTAL : 45

REFERENCE BOOKS

1. Maurice J. Bach, “The Design of the Unix Operating System”, Prentice Hall of India, 2004.
2. Vahalia, “Unix Internals: The New Frontiers”, Pearson Education Inc, 2003.

**HIGH PERFORMANCE
MICROPROCESSORS**

3 0 0 100 3

UNIT I CISC PRINCIPLES 9

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

UNIT II PENTIUM PROCESSORS 10

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

UNIT III RISC PRINCIPLES 10

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

UNIT IV RISC PROCESSOR 8

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

UNIT V SPECIAL PURPOSE PROCESSORS 8

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

TOTAL : 45

REFERENCE BOOKS

1. Daniel Tabak, "Advanced Microprocessors", Tata McGraw-Hill, 1995, 2nd Edition.
2. www.intel.com/products/server/processors/server/itanium2 (Unit V:EPIC)
3. www.hpl.hp.com/techreports/1999/HPL-1999-111.html (Unit V: Network Processor)
4. www.intel.com/design/network/products/npfamily (Unit V: Network Processor)
5. www.national.com/appinfo/imaging/processors.html(Unit V: Image Processor)
6. Barry B.Brey, "The Intel Microprocessors, 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, PentiumPro Processor, PentiumII, PentiumIII, PentiumIV, Architecture, Programming & Interfacing", 6th Edition, Pearson Education/PHI, 2002.

DATA WAREHOUSING AND MINING 3 0 0 100 3

UNIT I INTRODUCTION AND DATA WAREHOUSING 8

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

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

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

UNIT III ASSOCIATION RULES 9

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

UNIT IV CLASSIFICATION AND CLUSTERING 12

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

UNIT V RECENT TRENDS 8

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

TOTAL : 45

REFERENCE BOOK

1. J. Han, M. Kamber, "Data Mining: Concepts and Techniques", Harcourt India / Morgan Kaufman, 2001.
2. Margaret H. Dunham, "Data Mining: Introductory and Advanced Topics", Pearson Education 2004.
3. Sam Anahory, Dennis Murry, "Data Warehousing in the real world", Pearson Education 2003.
4. David Hand, Heikki Manila, Padhraic Symth, "Principles of Data Mining", PHI 2004.
5. W.H. Inmon, "Building the Data Warehouse", 3rd Edition, Wiley, 2003.
6. Alex Besson, Stephen J. Smith, "Data Warehousing, Data Mining & OLAP", McGraw-Hill Edition, 2001.
7. Paulraj Ponniah, "Data Warehousing Fundamentals", Wiley-Interscience Publication, 2003.

VISUAL PROGRAMMING

3 0 0 100 3

UNIT I WINDOWS PROGRAMMING 10

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

UNIT II VISUAL C++ PROGRAMMING – INTRODUCTION 9

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

UNIT III THE DOCUMENT AND VIEW ARCHITECTURE 10

Menus – Keyboard accelerators – rich edit control – toolbars – status bars – reading and writing SDI and MDI documents – splitter window and multiple views – creating DLLs – dialog based applications.

UNIT IV ACTIVEX CONTROLS ,COM AND OLE 9

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

UNIT V DATABASE MANAGEMENT CONCEPTS 7

Database Management with Microsoft ODBC – Structured Query Language – MFC ODBC classes – sample database applications – filter and sort strings – DAO concepts – displaying database records in scrolling view – Threading .

TOTAL : 45

REFERENCE BOOKS

1. Charles Petzold, "Windows Programming", Microsoft press, 1996 (Unit I – Chapter 1-9)
2. David J.Kruglinski, George Shepherd and Scot Wingo, "Programming Visual C++", Microsoft press, 1999 (Unit II – V)
3. Steve Holtzner, "Visual C++ 6 Programming", Wiley Dreamtech India Pvt. Ltd., 2003.

EMBEDDED SYSTEMS

3 0 0 100 3

UNIT I INTRODUCTION TO EMBEDDED SYSTEMS 9

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

UNIT II DEVICES AND BUSES FOR DEVICES NETWORK 9

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

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

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

UNIT IV REAL TIME OPERATING SYSTEMS – PART - 1 9

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

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

TOTAL: 45**REFERENCE BOOKS**

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

ADVANCED DATABASES

3 0 0 100 3

UNIT I DISTRIBUTED DATABASES 9

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

UNIT II OBJECT ORIENTED DATABASES 9

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

UNIT III WEB DATABASES 9

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

UNIT IV INTELLIGENT DATABASES 9

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

UNIT V CURRENT TRENDS 9

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

TOTAL : 45

REFERENCE BOOK

1. Thomas M. Connolly, Carolyn E. Begg, “Database Systems - A Practical Approach to Design , Implementation , and Management”, Third Edition , Pearson Education, 2003
2. Ramez Elmasri & Shamkant B.Navathe, “Fundamentals of Database Systems”, Fourth Edition , Pearson Education , 2004.
3. M.Tamer Ozsu , Patrick Ualduriel, “Principles of Distributed Database Systems”, Second Edition, Pearson Education, 2003.
4. C.S.R.Prabhu, “Object Oriented Database Systems”, PHI, 2003.
5. Peter Rob and Corlos Coronel, “Database Systems – Design, Implementation and Management”, Thompson Learning, Course Technology, 5th Edition, 2003.

INTELLECTUAL PROPERTY RIGHTS (IPR) 3 0 0 100 3

UNIT I

5

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

UNIT II

10

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

UNIT III

10

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

UNIT IV

10

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

UNIT V

10

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

Total 45

REFERENCE BOOKS

1. Subbaram N.R. “ Handbook of Indian Patent Law and Practice “, S. Viswanathan (Printers and Publishers) Pvt. Ltd., 1998.
2. Eli Whitney, United States Patent Number : 72X, Cotton Gin, March 14, 1794.
3. Intellectual Property Today : Volume 8, No. 5, May 2001, [www.iptoday.com].
4. Using the Internet for non-patent prior art searches, Derwent IP Matters, July 2000. [www.ipmatters.net/features/000707_gibbs.html].

INDIAN CONSTITUTION AND SOCIETY 3 0 0 100 3

UNIT I

9

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

UNIT II

9

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

UNIT III

9

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

UNIT IV

9

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

UNIT V

9

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

REFERENCE BOOKS

1. Durga Das Basu, “Introduction to the Constitution of India“, Prentice Hall of India, New Delhi.
2. R.C.Agarwal, “(1997) Indian Political System”, S.Chand and Company, New Delhi.
3. Maciver and Page, “Society: An Introduction Analysis”, Mac Milan India Ltd., New Delhi.
4. K.L.Sharma, “(1997) Social Stratification in India: Issues and Themes”, Jawaharlal Nehru University, New Delhi.
5. Sharma, Brij Kishore, “Introduction to the Constitution of India”, Prentice Hall of India, New Delhi.
6. U.R.Gahai, “(1998) Indian Political System”, New Academic Publishing House, Jalaendhar.
7. R.N. Sharma, “Indian Social Problems”, Media Promoters and Publishers Pvt. Ltd.
8. Yogendra Singh, “(1997) Social Stratification and Change in India”, Manohar, New Delhi.