

# ANNA UNIVERSITY TIRUCHIRAPPALLI

Tiruchirappalli – 620 024

Regulations 2008

Syllabus

## B. TECH INFORMATION TECHNOLOGY

### SEMESTER III

#### MA1201 – TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>UNIT I      FOURIER SERIES</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
Dirichlet's conditions – General fourier series – Odd and even functions – Half range sine series – Half range cosine series – Complex form of fourier series – Parseval's identity – Harmonic analysis.				
<b>UNIT II      FOURIER TRANSFORMS</b>				<b>9</b>
Fourier integral theorem (Without Proof) – Fourier transform pair – Sine and cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity.				
<b>UNIT III      PARTIAL DIFFERENTIAL EQUATIONS</b>				<b>9</b>
Formation of partial differential equations – Lagrange's linear equation – Solutions of standard types of first order partial differential equations – Linear partial differential equations of second and higher order with constant coefficients.				
<b>UNIT IV      APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATION</b>				<b>9</b>
Solutions of one dimensional wave equation – One dimensional equation of heat conduction – Steady state solution of two-dimensional equation of heat conduction (Insulated Edges Excluded) – Fourier series solutions in cartesian coordinates.				
<b>UNIT V      Z –TRANSFORMS AND DIFFERENCE EQUATIONS</b>				<b>9</b>
Z-Transforms – Elementary properties – Inverse Z-transform – Convolution theorem – Formation of difference equations – Solution of difference equations using Z-transform.				

**L: 45 T: 15 Total: 60**

### **TEXT BOOK**

1. Grewal, B.S., “Higher Engineering Mathematics”, 40th Edition, Khanna Publishers, 2007.

### **REFERENCES**

1. Bali.N.P and Manish Goyal, “A Textbook of Engineering Mathematics”, 7th Edition, Laxmi Publications (P) Ltd, 2007.
2. Ramana.B.V, “Higher Engineering Mathematics”, Tata Mc-GrawHill Publishing Company limited, 2007.
3. Glyn James, “Advanced Modern Engineering Mathematics”, 3rd Edition, Pearson Education, 2007.
4. Erwin Kreyszig, “Advanced Engineering Mathematics”, 8th Edition,Wiley , 2007.



## EC1206 – DIGITAL PRINCIPLES AND SYSTEM DESIGN

L	T	P	C
3	1	0	4

### UNIT I      **BOOLEAN ALGEBRA AND LOGIC GATES**      **9**

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

### UNIT II      **COMBINATIONAL LOGIC**      **9**

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

### UNIT III      **DESIGN WITH MSI DEVICES**      **9**

Decoders and encoders – Multiplexers and demultiplexers – Memory and programmable Logic – HDL for combinational circuits.

### UNIT IV      **SYNCHRONOUS SEQUENTIAL LOGIC**      **9**

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

### UNIT V      **ASYNCHRONOUS SEQUENTIAL LOGIC**      **9**

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

**L: 45 T: 15 Total: 60**

#### **TEXT BOOK**

1. Morris Mano, M., “Digital Design”, 3rd Edition, Pearson Education, 2007.

#### **REFERENCES**

1. Roth, C.H. Jr., “Fundamentals of Logic Design”, 4th Edition, Jaico Publishing House, 2000.
2. Givone, D. D., “Digital Principles and Design”, Tata McGraw–Hill, 2007.

## CS1201 – DATA STRUCTURES

L	T	P	C
3	0	0	3

### UNIT I      FUNDAMENTALS OF ALGORITHMS      8

Algorithm – Analysis of algorithm – Best case and worst case complexities – Analysis of algorithm using data structures – Performance analysis – Time complexity – Space complexity – Amortized time complexity – Asymptotic notation.

### UNIT II      FUNDAMENTALS OF DATA STRUCTURES      9

Arrays – Structures – Stacks – Definition and examples – Representing stacks – Queues and lists – Queue and its representation – Applications of stack – Queue and linked lists.

### UNIT III      TREES      10

Binary trees – Operations on binary tree representations – Node representation – Internal and external nodes – Implicit array representation – Binary tree traversal – Huffman algorithm – Representing lists as binary trees – Sorting and searching techniques – Tree searching – Hashing.

### UNIT IV      GRAPHS AND THEIR APPLICATIONS      9

Graphs – An application of graphs – Representation – Transitive closure – Warshall's algorithm – Shortest path algorithm – A flow problem – Dijkstra's algorithm – Minimum spanning trees – Kruskal and Prim's algorithm – An application of scheduling – Linked representation of graphs – Graph traversals.

### UNIT V      STORAGE MANAGEMENT      9

General lists – Operations – Linked list representation – Using lists – Freeing list Nodes – Automatic list Management : Reference count method – Garbage collection – Collection and compaction.

**Total: 45**

### TEXT BOOKS

1. Cormen T. H., Leiserson C. E, and Rivest R.L., "Introduction to Algorithms", Prentice Hall of India, 2007.
2. Weiss, M.A., "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education, 2005.

### REFERENCES

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, "Computer Algorithms/C++", Universities Press (India) Private Limited, 2nd Edition, 2007.
2. Aho, A. V., Hopcroft, J.E., and Ullman, J.D., "Data Structures and Algorithms", 1st Edition, Pearson Education, 2003.
3. Gilberg, R. F., and Forouzan, B.A., "Data Structures", 2nd Edition, Thomson India Edition, 2005.
4. Kruse, R.L., Leung, B.P., and Tondo, C.L., "Data Structures and Program Design in C", Pearson Education, 2004.
5. Tanaenbaum A. S., Langram, Y. and Augestein M.J, "Data Structures using C", Pearson Education, 2004.

## EC1211 – PRINCIPLES OF COMMUNICATION

L	T	P	C
3	1	0	4

### UNIT I SWITCHED COMMUNICATION SYSTEMS 8

Communication systems – Basic block representation – Communication channel types – Classification – Switched communication system – Telegraphy – Telephony – Transmitter – Receiver – DTMF – Telephone exchanges (qualitative treatment only) .

### UNIT II ANALOG COMMUNICATION 12

Amplitude modulation – Modulation index – Power calculation – Non-linear modulation – Linear modulation – AM types – DSB-SC – Modulation and coherent detection – Costas receiver – SSB – Modulation – Phase discrimination method – coherent SSB demodulation – VSB – Modulation and Envelope detection of VSB – Frequency modulation – Narrow band FM – Wide band FM – Transmission bandwidth of FM – Generation of FM – Indirect FM – Direct FM – Demodulation of FM signals – Non-linear effects in FM – Phase modulation – Modulation and demodulation – Comparison – AM – FM – PM.

### UNIT III TRANSMITTERS AND RECEIVERS 9

AM transmitter – Broadcast transmitters – SSB transmitter – Radio telegraphy transmitter – FM transmitter – Tuned radio frequency and super heterodyne receivers – AM broadcast receiver – SSB receivers – Diversity reception – FM receivers.

### UNIT IV DIGITAL COMMUNICATION 8

Sampling – Pulse amplitude modulation – Pulse duration modulation – Pulse position modulation – Pulse code modulation – DPCM – Delta modulation – Adaptive delta modulation – Generation and detection – Amplitude shift keying – Frequency shift keying – Phase shift keying.

### UNIT V BROAD BAND COMMUNICATION 8

Multiplexing – Time division multiplexing – Frequency division multiplexing – Multiple access techniques – CDMA – Optical communication – ISDN - Satellite communication system.

**L: 45 T: 15 Total : 60**

### TEXT BOOKS

1. Simon Haykin, “Communication Systems”, 4th Edition, John Wiley and Sons, 2007.
2. Anokh Singh, “Principles of communication”, S.Chand and company Ltd., 2000.

### REFERENCES

1. Proakis, J.G., Masoud Salehi, “Communication Systems”, 1st Edition Pearson Education, 2006.
2. H.Taub, D.L.Schilling and G.Saha, “Principles of communication”, 3rd Edition, Tata McGraw Hill Publishers, 2007.
3. B.Sklar, “Digital Communication Fundamentals and Applications”, 2nd Edition, Pearson Education, 2007.

## HS1201 – ENVIRONMENTAL SCIENCE AND ENGINEERING

**L T P C**  
**3 0 0 3**

### **UNIT I INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES 9**

Definition – Scope and importance – Need for public awareness – Forest resources:- Use and over – Exploitation – Deforestation – Case studies – Timber extraction – Mining – Dams and their ground water – Floods – Drought – Conflicts over water – Dams – Benefits and Problems – Mineral Resources:- Use Effects on Forests and Tribal People – Water Resources:- Use and Over-Utilization of Surface and Exploitation, Environmental Effects of Extracting and Using Mineral Resources, Case Studies – Food Resources: World Food Problems, Changes caused by Agriculture and Overgrazing, Effects of Modern Agriculture, Fertilizer- Pesticide Problems, Water Logging, salinity, Case Studies – Energy Resources:- Growing Energy Needs, Renewable and Non Renewable Energy Sources, Use of Alternate Energy Sources, Case Studies – Land Resources:- Land as a Resource, Land Degradation, Man Induced Landslides, Soil Erosion and Desertification – Role of an Individual in Conservation of Natural Resources – Equitable use of Resources for Sustainable Lifestyles..

### **UNIT II ECOSYSTEMS AND BIODIVERSITY 9**

Concepts of an Ecosystem – Structure and Function of an Ecosystem – Producers, Consumers and Decomposers – Energy Flow in the Ecosystem – Ecological Succession – Food Chains, Food Webs and Ecological Pyramids – Introduction, Types, Characteristic Features, Structure and Function of the (A) Forest Ecosystem (B) Grassland Ecosystem (C) Desert Ecosystem (D) Aquatic Ecosystems (Ponds, Streams, Lakes, Rivers, Oceans, Estuaries) – Introduction to Biodiversity – Definition: Genetic, Species and Ecosystem Diversity – Biogeographical Classification of India – Value of Biodiversity: Consumptive Use, Productive Use, Social, Ethical, Aesthetic and Option Values – Biodiversity at Global, National and Local Levels – India as a Mega-Diversity Nation – Hot-Spots of Biodiversity – Threats to Biodiversity: Habitat Loss, Poaching of Wildlife, Man-Wildlife Conflicts – endangered and Endemic Species of India – Conservation of Biodiversity: In-Situ and Ex-Situ conservation of Biodiversity. Field Study of Common Plants, Insects and Birds.

### **UNIT III ENVIRONMENTAL POLLUTION 9**

Definition – Causes, Effects and Control Measures of:- (A) Air Pollution (B) Water Pollution (C) Soil Pollution (D) Marine Pollution (E) Noise Pollution (F) Thermal Pollution (G) Nuclear Hazards – Solid Waste Management:- Causes, Effects and Control Measures of Urban and Industrial Wastes – Role of an Individual in Prevention of Pollution – Pollution Case Studies – disaster Management:- Floods, Earthquake, Cyclone and Landslides.

### **UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT 9**

From Unsustainable To Sustainable Development – Urban Problems Related To energy – Water conservation, Rain Water Harvesting, Watershed Management – Resettlement and Rehabilitation of People, Its Problems and Concerns, Case Studies – Environmental Ethics:- Issues and Possible Solutions – Climate Change, Global Warming, Acid Rain, Ozone Layer Depletion, Nuclear Accidents and Holocaust, Case Studies – Wasteland Reclamation – Consumerism and Waste Products – Environment Production Act – Air (Prevention and Control of Pollution) Act – Water (Prevention and Control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues Involved in enforcement of Environmental Legislation – Public Awareness.

**UNIT V HUMAN POPULATION AND THE ENVIRONMENT 9**

Population Growth, Variation Among Nations – Population Explosion – Family Welfare Programme – environment and Human Health – Human Rights – Value Education – HIV /AIDS – Women and Child Welfare – Role of Information Technology in Environment and Human Health – Case Studies.

Field Study of Local Area to Document Environmental assets – River/Forest/Grassland/Hill/ Mountain.

Field Study of Simple Ecosystems – Pond, River, Hill Slopes, etc

Field Study of Local Polluted Site – Urban/Rural/Industrial/Agricultural

**Total: 45**

**TEXT BOOKS**

1. Masters, G.M., “Introduction to Environmental Engineering and Science”, Pearson Education Pvt., Ltd., 2<sup>nd</sup> Edition, 2004.
2. Miller, T.G. Jr., “Environmental Science”, Wadsworth Pub. Co.
3. Townsend C., Harper, J. and Begon, M., “Essentials of Ecology”, Blackwell Science, 2003.
4. Trivedi, R.K., and Goel, P.K., “Introduction to Air Pollution”, Techno-Science Publications.

**REFERENCES**

1. Erach, B., “The Biodiversity of India”, Mapin Publishing Pvt. Ltd., Ahmedabad, India
2. Trivedi, R.K., “Handbook of Environmental Law’s, Rules, Guidelines, Compliances and Standards”, Vol-I and II, Envio Media.
3. Cunningham., Cooper, W.P. and Gorhani, T.H., “Environmental Encyclopedia”, Jaico Publishing House, Mumbai, 2001.
4. Wages, K.D., “Environmental Management”, W.B. Saunders Co., Philadelphia, USA, 1998.

## EC1208 – DIGITAL LABORATORY

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

### LIST OF EXPERIMENTS

1. Verification of Boolean theorems using digital logic gates
2. Design and implementation of combinational circuits using basic gates for arbitrary functions, code converters, etc.
3. Design and implementation of 4-bit binary adder / subtractor using basic gates and MSI devices
4. Design and implementation of parity generator / checker using basic gates and MSI devices
5. Design and implementation of magnitude comparator
6. Design and implementation of application using multiplexers/Demultiplexers
7. Design and implementation of Shift registers
8. Design and implementation of Synchronous and Asynchronous counters
9. Simulation of combinational circuits using Hardware Description Language (VHDL/ Verilog HDL software required)
10. Simulation of sequential circuits using HDL (VHDL/ Verilog HDL software required)

**Total: 45**

**List of Equipments and Components for a batch of 30 Students (2 per batch)**

S.NO	Name of equipment/Component	Quantity Required	Remarks
1	Dual power supply/ single mode power supply	15/30	+12/-12V
2	IC Trainer	15	10 Bit
3	Bread Boards	15	
4	Multimeter	5	
5	IC7400	60	
6	IC 7402	60	
7	IC 7404	60	
8	IC 7486	60	
9	IC 7408	60	
10	IC 7432	60	
11	IC 7483	60	
12	IC 74150	60	
13	IC 74151	40	
14	IC 74147	40	
15	IC 7445	40	
16	IC 7476	40	
17	IC 7491	40	
18	IC 555	40	
19	IC 7494	40	
20	IC 7447	40	
21	IC 74180	40	
22	IC 7485	40	
23	IC 7473	40	
24	IC 74138	40	
25	IC 7411	40	
26	IC 7474	40	
27	Computer with HDL Software	30	
28	Seven Segment Display	40	
29	Assembled LED Board/LEDs	40/200	
30	Wires		Single Strand

## CS1203 – DATA STRUCTURES LABORATORY

L	T	P	C
0	0	3	2

### LIST OF EXPERIMENTS

1. Implement singly and doubly linked lists.
2. Represent a polynomial as a linked list and write functions for polynomial addition.
1. Implement stack and use it to convert infix to postfix expression
2. Implement a double-ended queue (deque) where insertion and deletion operations are possible at both the ends.
3. Implement an expression tree. Produce its pre-order, in-order, and post-order traversals.
4. Implement binary search tree.
5. Implement insertion in AVL trees.
6. Implement priority queue using binary heaps
7. Implement hashing with open addressing.
8. Implement Prim's algorithm using priority queues to find MST of an undirected graph.

**Total: 45**

### List of Equipments and Components for a batch of 30 Students (1 per batch)

1. SOFTWARE REQUIRED - TURBO C VERSION 3 or GCC VERSION 3.3.4
2. OPERATING SYSTEM - WINDOWS 2000/XP/NT or LINUX
3. COMPUTERS REQUIRED- 30 Nos. (Minimum Requirement: Pentium III or Pentium IV with 256 RAM and 40GB Hard disk)

**LIST OF EXPERIMENTS**

1. Design C++ classes with static members, methods with default arguments, friend functions. (For example, design matrix and vector classes with static allocation, and a friend function to do matrix–vector multiplication)
2. Implement complex number class with necessary operator overloadings and type conversions such as integer to complex, double to complex, complex to double etc.
3. Implement Matrix class with dynamic memory allocation and necessary methods. Give proper constructor, destructor, copy constructor, and overloading of assignment operator.
4. Overload the new and delete operators to provide custom dynamic allocation of memory.
5. Develop a template of linked–list class and its methods.
6. Develop templates of standard sorting algorithms such as bubble sort, insertion sort; merge sort, and quick sort.
7. Design stack and queue classes with necessary exception handling.
8. Define Point class and an Arc class. Define a Graph class which represents graph as a collection of Point objects and Arc objects. Write a method to find a minimum cost spanning tree in a graph.
9. Develop with suitable hierarchy, classes for Point, Shape, Rectangle, Square, Circle, Ellipse, Triangle, Polygon, etc. Design a simple test application to demonstrate dynamic polymorphism and RTTI.
10. Write a C++ program that randomly generates complex numbers (use previously designed Complex class) and writes them two per line in a file along with an operator (+, –, \*, or /). The numbers are written to file in the format (a + ib). Write another program to read one line at a time from this file, perform the corresponding operation on the two complex numbers read, and write the result to another file (one per line).

**Total: 45**

**List of Equipments and Components for a batch of 30 Students (1 per batch)**

1. PC - 30 Nos.
  - Processors - 2.0 GHz or Higher
  - RAM - 256 MB or Higher
  - Hard Disk - 20 GB or Higher
  - Operating System - Windows 2000/XP/NT
2. Software - TURBO C (Freeware) - to be installed in all PC's

## SEMESTER IV

### MA1252 – PROBABILITY AND QUEUEING THEORY

(Common to CSE and IT)

**L T P C**

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**UNIT I RANDOM VARIABLES 9**

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

**UNIT II TWO DIMENSIONAL RANDOM VARIABLES 9**

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

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

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

**UNIT IV QUEUEING THEORY 9**

Markovian models – Birth and death queuing models – Steady state results – Single and Multiple server Queuing models – Queues with finite waiting rooms – Finite source models – Little's formula.

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

M/G/1 queue – Pollaczek – Khintchine formula – Series queues – Open and closed Networks.

**L: 45 T: 15 Total: 60**

#### TEXT BOOKS

1. Ibe, O.C., "Fundamentals of Applied Probability and Random Processes", Elsevier, 1st Indian Reprint, 2007.
2. Gross, D. and Harris, C.M., "Fundamentals of Queuing Theory", Wiley Student Edition, 2004.

#### REFERENCES

1. Allen, A.O., "Probability, Statistics and Queueing Theory with Computer Applications", 2nd Edition, Elsevier, 2005.
2. Taha, H.A., "Operations Research", 8th Edition, Pearson Education Asia, 2007.
3. Trivedi, K.S., "Probability and Statistics with Reliability, Queueing and Computer Science Applications", 2nd Edition, John Wiley and Sons, 2002.

# CS1254 – DATABASE MANAGEMENT SYSTEMS

(Common to CSE and IT)

L	T	P	C
3	0	0	3

## UNIT I INTRODUCTION 9

Purpose of database system – Views of data – Data models – Database languages– Database system architecture – Database users and administrator – Entity-Relationship Model (E-R Model ) – E-R diagrams – Introduction to relational databases.

## UNIT II RELATIONAL MODEL 9

The relational model – The catalog – Types – Keys – Relational algebra – Domain relational calculus – Tuple relational calculus – Fundamental operations – Additional operations – SQL fundamentals – Integrity – Triggers – Security – Advanced SQL features – Embedded SQL – Dynamic SQL – Missing information – Views – Introduction to distributed databases and client/server databases.

## UNIT III DATABASE DESIGN 9

Functional dependencies – Non-loss decomposition – Functional dependencies – First – Second – Third Normal Forms – Dependency Preservation – Boyce/Codd Normal Form – Multi-Valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form.

## UNIT IV TRANSACTIONS 9

Transaction Concepts – Transaction Recovery – ACID Properties – System Recovery – Media recovery – Two phase commit – Save points – SQL facilities for recovery – Concurrency – Need for concurrency – Locking protocols – Two phase locking – Intent locking – Deadlock – Serializability – Recovery isolation levels – SQL facilities for concurrency.

## UNIT V IMPLEMENTATION TECHNIQUES 9

Overview of physical storage media – Magnetic disks – RAID – Tertiary storage – File organization – Organization of records in files – Indexing and hashing – Ordered indices – B+ tree index files – B tree index files – Static hashing – Dynamic hashing – Query processing overview – Catalog information for cost estimation – Selection operation – Sorting – Join operation – Database tuning.

**Total: 45**

### TEXT BOOKS

1. Silberschatz, A., Korth, H.F. and Sudharshan, S., “Database System Concepts”, 5th Edition, Tata Mc-Graw Hill, 2006.
2. Date, C.J., Kannan, A. and Swamynathan, S., “An Introduction to Database Systems”, 8th Edition, Pearson Education, 2006.

### REFERENCES

1. Elmasri, R. and Navathe, S.B., “Fundamentals of Database Systems”, 4th Edition, Pearson / Addison Wesley, 2007.
2. Ramakrishnan, R., “Database Management Systems”, 3rd Edition, Mc-Graw Hill, 2003.
3. Singh, S. K., “Database Systems Concepts, Design and Applications”, 1st Edition, Pearson Education, 2006.

## EC1257 – MICROPROCESSORS AND MICROCONTROLLERS

(Common to CSE and IT)

L	T	P	C
3	0	0	3

### UNIT I THE 8085 AND 8086 MICROPROCESSORS 9

8085 Microprocessor architecture – Addressing modes – Instruction set – Programming the 8085.

### UNIT II 8086 SOFTWARE ASPECTS 9

Intel 8086 Microprocessor – Architecture – Signals – Instruction Set – Addressing modes – Assembler directives – Assembly language programming – Procedures – Macros – Interrupts and interrupt service routines – BIOS function calls.

### UNIT III MULTIPROCESSOR CONFIGURATIONS 9

Coprocessor configuration – Closely coupled configuration – Loosely coupled configuration – 8087 Numeric data processor – Data types – Architecture – 8089 I/O Processor – Architecture – Communication between CPU and IOP.

### UNIT IV I/O INTERFACING 9

Memory interfacing and I/O interfacing with 8085 – Parallel communication interface – Serial communication interface – Timer – Keyboard / Display controller – Interrupt controller – DMA controller (8237) – Applications – Stepper motor – Temperature Control.

### UNIT V MICROCONTROLLERS 9

Architecture of 8051 Microcontroller – Signals – I/O Ports – Memory – Counters and timers – Serial data I/O – Interrupts – Interfacing – Keyboard – LCD – ADC and DAC.

**Total: 45**

### TEXT BOOKS

1. Gaonkar, R.S., “Microprocessor-Architecture, Programming and Applications with the 8085”, 5th Edition, Penram International Publisher, 2006.
2. Yn - cheng Liu and Gibson, G.A., “Microcomputer Systems: The 8086 / 8088 Family Architecture, Programming and Design”, 2nd Edition, Prentice Hall of India, 2006.

### REFERENCES

1. Hall, D.V., “Microprocessors and Interfacing: Programming and Hardware”, 2nd Edition, Tata Mc-Graw Hill, 2006.
2. Ray, A.K. and Bhurchandi, K.M., “Advanced Microprocessor and Peripherals – Architecture, Programming and Interfacing”, Tata Mc-Graw Hill, 2006.
3. Mazidi, M.A. and Mazidi, J.G., “The 8051 Microcontroller and Embedded Systems using Assembly and C”, 2nd Edition, Pearson Education / Prentice Hall of India, 2007.

# CS1252 – COMPUTER ORGANIZATION AND ARCHITECTURE

(Common to CSE and IT)

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

## **UNIT I BASIC STRUCTURE OF COMPUTERS 9**

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

## **UNIT II BASIC PROCESSING UNIT 9**

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

## **UNIT III PIPELINING 9**

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

## **UNIT IV MEMORY SYSTEM 9**

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

## **UNIT V I/O ORGANIZATION 9**

Accessing I/O Devices – Programmed I/O– Interrupts – Direct memory access – Buses – Interface circuits – Standard I/O interfaces (PCI, SCSI, USB) – I/O devices and processors.

**L: 45 T: 15 Total: 60**

### **TEXT BOOKS**

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, “Computer Organization”, 5th Edition, Tata Mc-Graw Hill, 2002.
2. Heuring, V.P. and Jordan, H.F., “Computer Systems Design and Architecture”, 2nd Edition, Pearson Education, 2004.

### **REFERENCES**

1. Patterson, D. A., and Hennessy, J.L., “Computer Organization and Design: The Hardware/Software Interface”, 3rd Edition, Elsevier, 2005.
2. William Stallings, “Computer Organization and Architecture – Designing for Performance”, 6th Edition, Pearson Education, 2003.
3. Hayes, J.P., “Computer Architecture and Organization”, 3rd Edition, Tata Mc-Graw Hill, 1998.

# CS1253 – OPERATING SYSTEMS

(Common to CSE and IT)

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

## **UNIT I PROCESSES AND THREADS 9**

Introduction to operating systems – Review of computer organization – Operating system structures – System calls – System programs – System structure – Virtual machines – Processes – Process concept – Process scheduling – Operations on processes – Cooperating processes – Interprocess communication – Communication in client – Server systems – Case study – IPC in linux – Threads – Multi-threading models – Threading issues – Case study – Pthreads library.

## **UNIT II PROCESS SCHEDULING AND SYNCHRONIZATION 10**

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

## **UNIT III STORAGE MANAGEMENT 9**

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

## **UNIT IV FILE SYSTEMS 9**

File system interface – File concept – Access methods – Directory structure – File-system mounting – Protection – File system implementation – Directory implementation – Allocation methods – Free space management – Efficiency and performance – Recovery – Log-structured file systems – Case studies – File system in linux – File system in Windows XP.

## **UNIT V I/O SYSTEMS 8**

I/O systems – I/O hardware – Application I/O interface – Kernel I/O subsystem – Streams – Performance – Mass-storage structure – Disk scheduling – Disk management – Swap-space management – RAID – Disk attachment – Stable storage – Tertiary storage – Case study – I/O in linux.

**Total: 45**

### **TEXT BOOKS**

1. Silberschatz, Galvin and Gagne, “Operating System Concepts”, 6th Edition, Wiley India Pvt, Ltd, 2003.
2. Tanenbaum, S., “Modern Operating Systems”, 2nd Edition, Pearson Education, 2004.

### **REFERENCES**

1. Gary Nutt, “Operating Systems”, 3rd Edition, Pearson Education, 2004.
2. William Stallings, “Operating Systems”, 4th Edition, Prentice Hall of India, 2003.

## IT1251 – SOFTWARE ENGINEERING AND QUALITY ASSURANCE

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### **UNIT I SOFTWARE PRODUCT AND PROCESS 9**

Introduction – S/W Engineering paradigm – Verification – Validation – Life cycle models – System engineering – Computer based system – Business process engineering overview – Product engineering overview.

### **UNIT II SOFTWARE REQUIREMENTS 9**

Functional and non-functional – Software document – Requirement engineering process – Feasibility studies – Software prototyping – Prototyping in the software process – Data – Functional and behavioral models – Structured analysis and data dictionary.

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

Systems engineering – Analysis concepts – Design process and concepts – Modular design – Design heuristic – Architectural design – Data design – User interface design – Real time software design – System design – Real time executives – Data acquisition system – Monitoring and control system.

### **UNIT IV TESTING 9**

Taxonomy of software testing – Types of S/W test – Black box testing – Testing boundary conditions – Structural testing – Test coverage criteria based on data flow mechanisms – Regression testing – Unit testing – Integration testing – Validation testing – System testing and debugging – Software implementation techniques.

### **UNIT V SOFTWARE QUALITY ASSURANCE 9**

Process and product quality – Quality assurance and standards – Quality planning and control – Software metrics – Process improvement – Software configuration management.

**Total: 45**

### **TEXT BOOKS**

1. Ian Sommerville, “Software Engineering”, 7th Edition, Pearson Education, 2007.
2. Pressman, R.S., “Software Engineering - A Practitioner’s Approach”, 6th Edition, McGraw-Hill International Edition, 2005.

### **REFERENCES**

1. Humphrey, W.S., “A Discipline for Software Engineering”, Pearson Education, 2007.
2. Peters, J.F. and Witold Pedrycz, “Software Engineering - An Engineering Approach”, Wiley-India Pvt. Ltd., 2007.
3. Schach, S.R., “Software Engineering”, Tata McGraw-Hill Publishing Company Limited, 2007.

**CS1256 – DATABASE MANAGEMENT SYSTEMS LABORATORY**  
(Common to CSE and IT)

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

**LIST OF EXPERIMENTS**

1. Data Definition, Table Creation, Constraints,
2. Insert, Select Commands, Update and Delete Commands.
3. Nested Queries and Join Queries
4. Views
5. High level programming language extensions (Control structures, Procedures and Functions).
6. Front end tools
7. Forms
8. Triggers
9. Menu Design
10. Reports.
- 11.. Database Design and implementation (Mini Project).

**LAB EQUIPMENTS**

Hardware and Software required for a batch of 30 students:

**Hardware:**

30 Personal Computers

**Software:**

Front end : VB/VC ++/JAVA

Back end : Oracle 11g, my SQL, DB2

Platform : Windows 2000 Professional/Windows XP

Oracle server could be loaded and can be connected from individual PCs.

**Total: 45**

# CS1255 – OPERATING SYSTEMS LABORATORY

(Common to CSE and IT)

L T P C

0 0 3 2

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

## LIST OF EXPERIMENTS

1. Write programs using the following system calls of UNIX operating system:  
fork, exec, getpid, exit, wait, close, stat, opendir, readdir  
Write programs using the I/O system calls of UNIX operating system (open, read, write, etc)
2. Write C programs to simulate UNIX commands like ls, grep, etc.
3. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2 sessions)
4. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2 sessions)
5. Developing Application using Inter Process Communication (using shared memory, pipes or message queues)
6. Implement the Producer – Consumer problem using semaphores (using UNIX system calls).
7. Implement some memory management schemes – I
8. Implement some memory management schemes – II
9. Implement any file allocation technique (Linked, Indexed or Contiguous)

**Total: 45**

### Example for exercises 8 and 9:

Free space is maintained as a linked list of nodes with each node having the starting byte address and the ending byte address of a free block. Each memory request consists of the process-id and the amount of storage space required in bytes. Allocated memory space is again maintained as a linked list of nodes with each node having the process-id, starting byte address and the ending byte address of the allocated space. When a process finishes (taken as input) the appropriate node from the allocated list should be deleted and this free disk space should be added to the free space list. [Care should be taken to merge contiguous free blocks into one single block. This results in deleting more than one node from the free space list and changing the start and end address in the appropriate node]. For allocation use first fit, worst fit and best fit.

### Hardware and Software required for a batch of 30 students.

**HARDWARE:** 30 Personal Computers

**SOFTWARE:** **Linux:**

Ubuntu / OpenSUSE / Fedora / Red Hat / Debian / Mint

OS

Linux could be loaded in individual PCs.

**(OR)**

A single server could be loaded with Linux and connected from the individual PCs.

## EC1258 – MICROPROCESSORS LABORATORY

(Common to CSE and IT)

L	T	P	C
0	0	3	2

### LIST OF EXPERIMENTS

1. Programming with 8085
2. Programming with 8086-experiments including BIOS/DOS calls:  
Keyboard control, Display, File Manipulation.
3. Interfacing 8085/8086 with 8255,8253
4. Interfacing 8085/8086 with 8279,8251
5. 8051 Microcontroller based experiments for Control Applications
6. Mini- Project

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

1. 8085 Trainer Kit with onboard 8255, 8253, 8279 and 8251 – 15 nos.
2. TASM/MASM simulator in PC (8086 programs) – 30 nos.
3. 8051 trainer kit – 15 nos.
4. Interfacing with 8086 – PC add-on cards with 8255, 8253, 8279 and 8251 – 15 nos.
5. Stepper motor interfacing module – 5 nos.
6. Traffic light controller interfacing module – 5 nos.
7. ADC, DAC interfacing module – 5 nos.
8. CRO's – 5 nos.

**Total: 45**

# SEMESTER V

## NUMERICAL METHODS

L	T	P	C
3	1	0	4

### UNIT I SOLUTION OF EQUATIONS AND EIGEN VALUE PROBLEMS 9

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 – Eigen value of a Matrix by Power Method.

### UNIT II INTERPOLATION AND APPROXIMATION 9

Lagrangian Polynomials – Divided Differences – Interpolating with a Cubic Spline – Newton’s Forward and Backward Difference Formulas.

### UNIT III NUMERICAL DIFFERENTIATION AND INTEGRATION 9

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

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

Finite Difference Solution of Second Order Ordinary Differential Equation – Finite Difference Solution of One Dimensional Heat Equation by Explicit and Implicit Methods – One Dimensional Wave Equation and Two Dimensional Laplace and Poisson Equations.

**L: 45 T: 15 Total: 60**

### TEXT BOOKS

1. C. F. Gerald and P. O. Wheatley, “Applied Numerical Analysis”, 6th Edition, Pearson Education, 2002.
2. E. Balagurusamy, “Numerical Methods”, Tata McGraw - Hill Pub. Co. Ltd., 1999.

### REFERENCES

1. P. Kandasamy, K. Thilagavathy and K. Gunavathy, “Numerical Methods”, S. Chand Co. Ltd., 2003.
2. R. L. Burden and T. D. Faires, “Numerical Analysis”, 7th Edition, Thomson Asia Pvt. Ltd., 2002.

## SIGNALS AND SYSTEMS

L	T	P	C
3	0	0	3

### UNIT I CLASSIFICATION OF SIGNALS AND SYSTEMS 9

Continuous Time Signals (CT Signals) – Discrete Time Signals (DT Signals) – Step – Ramp – Pulse – Impulse – Exponential – Classification of CT and DT Signals – Periodic and aperiodic – Random Signals – CT systems and DT systems – Classification of systems – Linear time invariant systems.

### UNIT II ANALYSIS OF CT SIGNALS 9

Fourier series analysis – Spectrum of CT signals – Fourier transform and laplace transform in signal analysis.

### UNIT III LTI – CT SYSTEMS 9

Differential equation – Block diagram representation – Impulse response – Convolution integral – Frequency response – Fourier methods and laplace transforms in analysis – State equations and matrix.

### UNIT IV ANALYSIS OF DT SIGNALS 9

Spectrum of DT signals – Discrete Time Fourier Transform (DTFT) – Discrete Fourier Transform (DFT) – Properties of z transform in signal analysis.

### UNIT V LTI – DT SYSTEMS 9

Difference equations – Block diagram representation – Impulse response – convolution SUM – Frequency response – FFT and z - Transform analysis – State variable equation and matrix.

**Total: 45**

### TEXT BOOK

1. Alan V. Oppenheim, Alan S. Willsky and S.Hamid Nawab, “Signals & Systems”, Pearson / Prentice Hall of India, 2003.

### REFERENCES

1. K.Lindner, “Signals and Systems”, Tata McGraw-Hill, 1999.
2. Simon Haykin and Barry Van Veen, “Signals and Systems”, John Wiley & Sons, 1999.

# EMBEDDED SYSTEMS

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

## **UNIT I FUNDAMENTALS OF 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 – Queue 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 organization 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 monotonic 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.

**L: 45 T: 15 Total: 60**

**TEXT BOOKS**

1. Wayne Wolf, “Computer as Components – Principles of Embedded Computing System Design”, Morgan Kaufmann Publishers, Harcourt India Private Limited, First Indian Reprint, 2001.
2. Rajkamal, “Embedded Systems Architecture - Programming and Design”, Tata McGraw - Hill, First reprint, 2003.

**REFERENCES**

1. Steve Heath, “Embedded Systems Design”, Newnes, 2nd Edition, 2003.
2. David E. Simon, “An Embedded Software Primer”, Pearson Education, First Indian Reprint, 2000.
3. Frank Vahid and Tony Givargis, “Embedded Systems Design - A Unified Hardware / Software Introduction”, John Wiley, 2002.
4. Heath, “Embedded System Design”, 2nd Edition, Elsevier India Private Limited, 2005.

## OBJECT ORIENTED ANALYSIS AND DESIGN

L	T	P	C
3	0	0	3

### UNIT I FUNDAMENTALS 8

An overview of object oriented systems development – Object basics – Object oriented systems development life cycle.

### UNIT II OBJECT ORIENTED METHODOLOGIES 12

Rumbaugh methodology – Booch methodology – Jacobson methodology – Patterns – Frameworks – Unified approach – Unified modeling language – Use case diagram – Class diagram – Interaction diagram – Package diagram – State diagram – Activity diagram – Implementation diagram.

### UNIT III OBJECT ORIENTED ANALYSIS 9

Identifying use cases – Object analysis – Classification – Identifying object relationships – Attributes and methods.

### UNIT IV OBJECT ORIENTED DESIGN 8

Design axioms – Designing classes – Access layer – Object storage – Object interoperability.

### UNIT V SOFTWARE QUALITY AND USABILITY 8

Designing interface objects – Software quality assurance – System usability – Measuring user satisfaction .

**Total: 45**

### TEXT BOOKS

1. Ali Bahrami, “Object Oriented Systems Development”, Tata McGraw - Hill, 1999.
2. Martin Fowler, “UML Distilled”, 2nd Edition, Prentice Hall of India / Pearson Education, 2002.

### REFERENCES

1. Stephen R. Schach, “Introduction to Object Oriented Analysis and Design”, Tata McGraw - Hill, 2003.
2. James Rumbaugh, Ivar Jacobson and Grady Booch “The Unified Modeling Language Reference Manual”, Addison Wesley, 1999.
3. Hans - Erik Eriksson, Magnus Penker, Brian Lyons and David Fado, “UML Toolkit”, OMG Press Wiley Publishing Inc., 2004.
4. Barclay, “ Object-Oriented Design with UML and Java”, Elsevier,2008

# COMPUTER NETWORKS

**L T P C**  
**3 0 0 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 – Flow control and error control – Stop and wait – Go back-N ARQ – Selective repeat ARQ – Sliding window – HDLC – LAN – Ethernet IEEE 802.3 – IEEE 802.4 – IEEE 802.5 – IEEE 802.11 – FDDI – SONET – Bridges.

## **UNIT III NETWORK LAYER 10**

Internetworks – Packet switching and datagram approach – IP addressing methods – Subnetting – Routing – Distance vector routing – Link state routing – Routers.

## **UNIT IV TRANSPORT LAYER 9**

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

## **UNIT V APPLICATION LAYER 8**

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

**Total: 45**

## **TEXT BOOKS**

1. Behrouz A. Forouzan, “Data communication and Networking”, Tata McGraw Hill, 2004.
2. James F. Kurose and Keith W. Ross, “Computer Networking: A Top - Down Approach Featuring the Internet”, Pearson Education, 2003.

## **REFERENCES**

1. Larry L. Peterson and Peter S. Davie, “Computer Networks”, 2nd Edition, Harcourt Asia Pvt. Ltd.,1996.
2. Andrew S. Tanenbaum, “Computer Networks”, 4th Edition, Prentice Hall of India, 2003.
3. William Stallings, “Data and Computer Communication”, 6th Edition, Pearson Education, 2000.
4. Peterson, “Computer Networks: A System Approach”,4th Edition, Elsevier India Private Limited, 2007.

## INFORMATION CODING TECHNIQUES

L	T	P	C
3	0	0	3

### UNIT I INFORMATION ENTROPY FUNDAMENTALS 9

Uncertainty - Information and entropy – Source coding theorem – Huffman coding – Shannon Fano coding – Discrete memory less channels – Channel capacity – Channel coding theorem – Channel capacity theorem.

### UNIT II DATA AND VOICE CODING 9

Differential pulse code modulation – Adaptive differential pulse code modulation – Adaptive sub-band coding – Delta modulation – Adaptive delta modulation – Coding of speech signal at low bit rates (Vocoders – LPC).

### UNIT III ERROR CONTROL CODING 9

Linear block codes – Syndrome decoding – Minimum distance consideration – Cyclic codes – Generator polynomial – Parity check polynomial – Encoder for cyclic codes – Calculation of syndrome – Convolutional codes.

### UNIT IV COMPRESSION TECHNIQUES 9

Principles – Text compression – Static Huffman coding – Dynamic Huffman coding – Arithmetic coding – Image compression – Graphics interchange format – Tagged image file format – Digitized documents – Introduction to JPEG standards.

### UNIT V AUDIO AND VIDEO CODING 9

Linear predictive coding – Code excited LPC – Perceptual coding – MPEG audio coders – Dolby audio coders – Video compression – Principles – Introduction to H.261 & MPEG video standards.

**Total: 45**

### TEXT BOOKS

1. Simon Haykin, “Communication Systems”, 4th Edition, John Wiley and Sons, 2001.
2. Fred Halsall, “Multimedia Communications - Applications Networks Protocols and Standards”, Pearson Education, 2002.

### REFERENCES

1. Mark Nelson, “Data Compression Book”, BPB, 1992.
2. Watkinson J, “Compression in Video and Audio”, Focal Press, London, 1995.

## CASE TOOLS LABORATORY

L	T	P	C
0	0	3	2

Prepare the following documents for two or three of the experiments listed below and develop the software engineering methodology.

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

### SUGGESTED LIST OF APPLICATIONS

Student Marks Analyzing System  
Quiz System  
Online Ticket Reservation System  
Payroll System  
Course Registration System  
Expert Systems  
ATM Systems  
Stock Maintenance  
Real - Time Scheduler  
Remote Procedure Call Implementation

**Total: 45**

## NETWORKS LABORATORY

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

### LIST OF EXPERIMENTS (All the Programs to be written using C )

1. Write a socket Program for Echo / Ping / Talk commands.
2. Create a socket (TCP) between two computers and enable file transfer between them.
3. Write a program to implement Remote Command Execution (Two M/Cs must be used)
4. Write a program to implement CRC and Hamming code for error handling.
5. Write a code simulating Sliding Window Protocols.
6. A Client – Server application for chat.
7. Write a program for File Transfer in client–server architecture using following methods.
  - a. USING RS232C
  - b. TCP/IP
8. Perform a case study about the different routing algorithms to select the network path with its optimum and economical during data transfer.
  - a. Shortest path routing
  - b. Flooding
  - c. Link State
  - d. Hierarchical
- 9 and 10 Study of Network Simulators like NS2 / Glomosim / OPNET.

**Total: 45**

## COMMUNICATION AND SOFT SKILLS LABORATORY

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>1</b>	<b>0</b>	<b>3</b>	<b>2</b>

(Common to All Branches of III Year B.E./ B.Tech students of Anna University Tiruchirappalli and affiliated colleges)

The aim of the course is two-fold: to enable the students to develop communication skills in the language laboratory and to arrange discussions for developing soft skills in the lab and/or the classroom. Each lab session shall last for three periods.

**List of activities that are to be carried out: (15 sessions x 3 periods = 45)**

Lab session # 1: Listening and speaking practice exercises with communicative functions. Learning material: the ACD of Spoken English: A Foundation Course for Speakers of Indian Languages (Orient Longman, 2008)

Lab session # 2: Practice with more advanced communicative functions. Learning material: the ACD of Spoken English: A Foundation Course for Speakers of Indian Languages (Orient Longman, 2008)

Lab session # 3: Pronunciation exercises with Oxford Advanced Learners' Dictionary of Current English or any other standard Dictionary

Lab session # 4: Making an oral presentation in English. Learning Material: Professional Presentations VCD (Cambridge University Press)

Lab session # 5: Listening to telephone conversations in English and completing the tasks. Learning material: Essential Telephoning in English ACD (Cambridge University Press)

Lab session # 6: Giving an exposure to and practice with model group discussion and interviews. Learning material: How to Prepare for Group Discussion and Interview Audio Cassette (McGraw-Hill)

Lab session # 7: Giving insights into the format and the task types in the IELTS (International English Language Testing System). Learning Material: Objective IELTS, Intermediate Level (CUP)

Lab session # 8: Understanding the format and the task types in the TOEFL (Test of English as a Foreign Language). Learning Material: Understanding the TOEFL (Educational Testing Services, Princeton)

Lab session # 9: Administering the BEC (Business English Certificate) Diagnostic Test. Learning Material: BEC Practice Materials (British Council, Chennai)

Lab session # 10: Completing the steps involved in Career, Life Planning and Change Management. Learning Material: Developing Soft Skills (Pearson Education)

Lab session # 11: Setting goals and objectives exercises. Learning Material: Developing Soft Skills (Pearson Education)

Lab session # 12: Prioritizing and time planning exercises. Learning Material: Managing Time Multimedia Program CD

Lab session # 13: Taking a Personality Typing/ Psychometric Test Learning Material: 200 Psychometric Test prepared by the CUIC, Anna University Chennai

Lab session # 14: Critical and creative thinking exercises.

Lab session # 15: Improving body language and cross-cultural communication with pictures. Learning material: Body Language (S. Chand and Co.)

For a detailed plan, refer to the topics given below;

## **UNIT I LISTENING AND SPEAKING PRACTICE IN COMMUNICATIVE FUNCTIONS**

Introductions and meetings – Talking about studies and/or job – Expressing likes and dislikes – Describing daily routines and current activities – Talking about past states and events – Talking about future plans and intentions – Expressing preferences – Giving reasons – Expressing opinions, agreement and disagreement – Seeking and giving advice – Making suggestions.

## **UNIT II SPEAKING APPLICATIONS**

Making an oral presentation – Preparing the presentation – Performing the presentation – Beginning – Language – Visual aids and body language – Voice – Ending – Questions – Telephone conversations – Group discussion and interview.

## **UNIT III UNDERSTANDING AND PREPARING FOR INTERNATIONAL ENGLISH LANGUAGE EXAMINATIONS**

International English Language Testing System (IELTS) – Test of English as a Foreign Language (TOEFL) – Business English Certificate (BEC)

## **UNIT IV SOFT SKILLS (1)**

Preparing for and dealing with change – Motivation, goal-setting and self-esteem – Managing time and stress – Career and life planning – Team work – Leadership traits.

## **UNIT V SOFT SKILLS (2)**

Multiple intelligences – Learning styles and personality typing – Critical and creative Thinking – People, cultures and self – intercultural communication.

## RESOURCES

1. Kamalesh Sadanand and Susheela Punitha, “Spoken English: A Foundation Course” for Speakers of Indian Languages, Part 2 Audio CD, Hyderabad: Orient Longman, 2008
2. Malcome Goodale, “Professional Presentations”, (VCD) New Delhi: Cambridge University Press, 2005
3. Barbara Garside and Tony Garside, Essential Telephoning in English (Audio CD), Cambridge: Cambridge University Press, 2002
4. Hari Mohan Prasad and Rajnish Mohan, “How to Prepare for Group Discussion and Interview (Audio Cassette)”, Tata McGraw-Hill Publishing
5. International English Language Testing System Practice Tests, CUP
6. Business English Certificate Materials, Cambridge University Press
7. Understanding the TOEFL. Educational Testing Services, Princeton, US
8. Interactive Multimedia Programs on Managing Time and Stress
9. Robert M. Sherfield and et al “Developing Soft Skills”,4th Edition, New Delhi, Pearson Education, 2009.

**L: 15 Total: 60**

# SEMESTER VI

## TELECOMMUNICATION SYSTEMS

L	T	P	C
3	0	0	3

### UNIT I METHODS OF COMMUNICATION 9

Transmission lines – Types and characteristics – Antenna fundamentals – Different types of antennas & their characteristics – Radio frequency wave propagation – Microwave – Principles – Devices (Reflex Klystron – Magnetron – TWT) – (Principles only) Radar – Pulsed radar – CW radar (Principles and block diagram only).

### UNIT II FUNDAMENTALS OF SATELLITE COMMUNICATIONS 9

Satellite orbits – Satellite communication systems – Earth stations – Applications – Surveillance – Navigation – Mobile communication – TV broadcast – Satellite radio – Satellite telephone – The internet.

### UNIT III FUNDAMENTALS OF FIBER OPTIC COMMUNICATION 9

Light wave communication systems – Fiber structure and function types of fiber – Optical transmitter and receiver – Fiber optic data communication systems.

### UNIT IV TELEPHONE SYSTEM AND ITS APPLICATION 9

Telephones – Telephone system – Facsimile – Cellular telephone system – Paging system – Integrated Services Digital Networks (ISDN)

### UNIT V CELLULAR RADIO 9

Citizen's band radio – Cordless telephone – Improved Mobile Telephone Service (IMTS) – Introduction to Advanced Mobile Phone Service (AMPS) – GSM – RF channels and time slots – Voice transmission – Frequency hopping – Subscriber ID module – GSM privacy and security – IS95 CDMA PCS – Channels – Forward channel – Reverse channel – Voice coding – Power control – Hand off and CDMA security.

**Total: 45**

### TEXT BOOKS

1. Louis. E. Frenzel, "Communication Electronics - Principles and Application", 3rd Editions, Tata McGraw - Hill, 2002
2. Roy Blake, "Wireless Communication Technology", Thomson Delmar Learning, 2nd Reprint 2002.

### REFERENCES

1. Wayne Tomasi, "Electronic Communication Systems", 4th Edition, Pearson Education, 2001.
2. Marin Cole, "Introduction to Telecommunications - Voice, Data and Internet", Pearson Education, 2001.

## NETWORK PROGRAMMING AND MANAGEMENT

L	T	P	C
3	0	0	3

### UNIT I ELEMENTARY TCP SOCKETS 9

Introduction to socket programming – Overview of TCP / IP protocols – Introduction to sockets – Socket address structures – Byte ordering functions – Address conversion functions – Elementary TCP sockets – Socket – Connect – Bind – Listen – Accept – Read – Write – Close functions – Iterative server – Concurrent server.

### UNIT II APPLICATION DEVELOPMENT 9

TCP echo server – TCP echo client – POSIX signal handling – Server with multiple clients – Boundary conditions– Server process crashes– Server host crashes – Server crashes and reboots – Server shutdown – I/O multiplexing – I/O models – Select function – Shutdown function – TCP echo server (with multiplexing) – Poll function – TCP echo client (with multiplexing)

### UNIT III SOCKET OPTIONS, ELEMENTARY UDP SOC SOCKETS 9

Socket options – Getsocket and setsocket functions – Generic socket options – IP socket options – ICMP socket options – TCP socket options – Elementary UDP sockets – UDP echo server – UDP echo client – Multiplexing TCP and UDP sockets – Domain Name System – Gethostbyname function – IPV6 support in DNS – Gethostbyadr function – Getservbyname and getservbyport functions.

### UNIT IV ADVANCED SOCKETS 9

IPV4 and IPV6 interoperability – Threaded servers – Thread creation and termination – TCP echo server using threads – Mutexes – Condition variables – Raw sockets – Raw socket creation – Raw socket output – Raw socket input – Ping program – Trace route program.

### UNIT V SIMPLE NETWORK MANAGEMENT 9

SNMP network management concepts – SNMP management information – Standard MIB's – SNMP V1 protocol and practical issues – Introduction to RMON, SNMP V2 and SNMP V3.

**Total: 45**

### TEXT BOOKS

1. W. Richard Stevens, “Unix Network Programming Vol - I”, 2nd Edition, Prentice Hall of India / Pearson Education, 1998.
2. William Stallings, “SNMP, SNMPV2, SNMPV3 and RMON 1 and 2”, 3rd Edition, Addison Wesley, 1999.

### REFERENCE

1. D. E. Comer, “Internetworking with TCP/IP Vol - III”, (BSD Sockets Version), 2nd Edition, Prentice Hall of India, 2003.



# VISUAL PROGRAMMING

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

## **UNIT I WINDOWS PROGRAMMING 9**

Windows environment – A simple windows program – Windows and messages – Creating the window – Displaying the window – Message loop – The window procedure – Message processing – Text output – Painting and repainting – Introduction to GDI – Device context – Basic drawing – Child window controls.

## **UNIT II VISUAL C++ PROGRAMMING - FUNDAMENTALS 9**

Application framework – MFC library – Visual C++ components – Event handling – Mapping modes – Colors – Fonts – Modal and modeless dialog – Windows common controls – Bitmaps

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

Menus – Keyboard accelerators – Rich edit control – Toolbars – Status bars – Reusable frame window base class – Separating document from its view – Reading and writing SDI and MDI documents – Splitter window and multiple views – Creating DLLS – Dialog based applications

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

ActiveX controls vs. ordinary windows controls – Installing activeX controls – Calendar control – ActiveX control container programming – Create activeX control at runtime – Component Object Model (COM) – Containment and aggregation vs. inheritance – OLE drag and drop – OLE embedded component and containers – Sample applications.

## **UNIT V ADVANCED CONCEPTS 9**

Database management with microsoft ODBC – Structured query language – MFC ODBC classes – Sample database applications – Filter and sort strings – DAO concepts – Displaying database records in scrolling view – Threading – VC++ Networking issues – WinSock – WinINet – Building a web client – Internet information server – ISAPI server extension – Chat application – Playing and multimedia (sound and video) files.

**L: 45 T: 15 Total: 60**

### **TEXT BOOKS**

1. Charles Petzold, “Windows Programming”, Microsoft Press, 1996.
2. David J. Kruglinski, George Shepherd and Scot Wingo, “Programming Visual C++”, Microsoft Press, 1999.

### **REFERENCES**

1. Steve Holtzner, “Visual C++ 6 Programming”, Wiley DreamTech India Pvt. Ltd., 2003.
2. Muller and John, “Visual C++ from the Ground up”, 2nd Edition, TMH, 1999.
3. Bates and Tompkins, “Practical Visual C++”, Prentice Hall of India, 2002.

# DIGITAL SIGNAL PROCESSING

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

## **UNIT I SIGNALS AND SYSTEMS 9**

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

## **UNIT II FAST FOURIER TRANSFORMS 9**

DFT – efficient computation of DFT – Properties of DFT – FFT algorithms – Radix-2 and radix-4 FFT algorithms – Decimation in time – Decimation in frequency algorithms – Use of FFT algorithms in linear filtering and correlation.

## **UNIT III IIR FILTER DESIGN 9**

Structure of IIR – System design of discrete time IIR filter from continuous time filter – IIR filter design by impulse invariance – Bilinear transformation – Approximation derivatives – Design of IIR filter in the frequency domain.

## **UNIT IV FIR FILTER DESIGN 9**

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

## **UNIT V FINITE WORD LENGTH EFFECTS 9**

Quantization noise – Derivation for quantization noise power – Fixed point and binary floating point number representation – Comparison – Over flow error – Truncation error – Co-efficient quantization error – Limit cycle oscillation – Signal scaling – Analytical model of sample and hold operations – Application of DSP – Model of speech wave form – Vocoder.

**L: 45 T: 15 Total: 60**

### **TEXT BOOK**

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

### **REFERENCES**

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

# TOTAL QUALITY MANAGEMENT

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

## **UNIT I FUNDAMENTALS 9**

Definition of quality – Dimensions of quality – Quality planning – Quality costs – Analysis techniques for quality costs – Basic concepts of total quality management – Historical review – Principles of TQM – Leadership – Concepts – Role of senior management – Quality council – Quality statements – Strategic planning – Deming philosophy – Barriers to TQM implementation.

## **UNIT II TQM PRINCIPLES 9**

Customer satisfaction – Customer perception of quality – Customer complaints – Service quality – Customer retention – Employee involvement – Motivation – Empowerment – Teams – Recognition and reward – Performance appraisal – Benefits – Continuous process improvement – Juran trilogy – PDSA cycle – 5S – Kaizen – supplier partnership – Partnering – Sourcing – Supplier selection – Supplier rating – Relationship development – Performance measures – Basic concepts – Strategy – Performance measure.

## **UNIT III STATISTICAL PROCESS CONTROL (SPC) 9**

The seven tools of quality – Statistical fundamentals – Measures of central tendency and dispersion – Population and sample – Normal curve – Control charts for variables and attributes – Process capability – Concept of six sigma – New seven management tools.

## **UNIT IV TQM TOOLS 9**

Benchmarking – Reasons to benchmark – Benchmarking process – Quality Function Deployment (QFD) – House of quality – QFD process – Benefits – Taguchi quality loss function – Total Productive Maintenance (TPM) – Concept – Improvement needs – FMEA – Stages of FMEA.

## **UNIT V QUALITY SYSTEMS 9**

Need for ISO 9000 and other quality systems – ISO 9000:2000 quality system – Elements – Implementation of quality system – Documentation – Quality auditing – TS 16949 – ISO 14000 – Concept – Requirements and benefits.

**Total: 45**

### **TEXT BOOK**

1. Dale H. Besterfield et al., “Total Quality Management”, Pearson Education, Inc. 2003. (Indian reprint 2004).

### **REFERENCES**

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

## DIGITAL SIGNAL PROCESSING LABORATORY

L	T	P	C
0	0	3	2

### LIST OF EXPERIMENTS

#### USING TMS320C5X

Study of various addressing modes of DSP using simple programming examples

Sampling of input signal and display

Implementation of FIR filter

Calculation of FFT

#### USING MATLAB

Generation of Signals

Linear and circular convolution of two sequences

Sampling and effect of aliasing

Design of FIR filters

Design of IIR filters

Calculation of FFT of a signal

**Total: 45**

## NETWORK PROGRAMMING LABORATORY

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

### LIST OF EXPERIMENTS

All the Programs to be written using C in UNIX Environment

1. Simulation of ARP / RARP.
2. Develop a client that contacts a given DNS server to resolve a given host name.
3. Simulation of OSPF routing protocol.
4. Develop a client server application for chat.
5. Develop a trace route program.
6. Signal handling and handling zombie.
7. Implementation of RPC.
8. Write a client to download a file from HTTP server.
9. Implementation of FTP.
10. Multiplexed TCP server and client.
11. Study of NS2/Glomosim.

**Total: 45**

## VISUAL PROGRAMMING LABORATORY

L	T	P	C
0	0	3	2

### LIST OF EXPERIMENTS

#### WINDOWS SDK / VISUAL C++

Writing code for keyboard and mouse events.

Dialog Based applications

Creating MDI applications

#### VISUAL C++

Threads

Document view Architecture, Serialization

Dynamic controls

Menu, Accelerator, Tool tip, Tool bar

Creating DLLs and using them

Data access through ODBC

Creating ActiveX control and using it

**Total: 45**



## MIDDLEWARE TECHNOLOGIES

L	T	P	C
3	0	0	3

### UNIT I CLIENT / SERVER CONCEPTS 9

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

### UNIT II EJB ARCHITECTURE 9

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

### UNIT III EJB APPLICATIONS 9

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

### UNIT IV CORBA 9

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

### UNIT V COM 9

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

**Total: 45**

### TEXT BOOKS

1. Robert Orfali, Dan Harkey and Jeri Edwards, “The Essential Client / Server Survival Guide”, Galgotia Publications Pvt. Ltd., 2002.
2. Tom Valesky, ”Enterprise Java Beans”, Pearson Education, 2002.
3. Jason Pritchard, “COM and CORBA Side by Side”, Addison Wesley, 2000
4. Jesse Liberty, “Programming C#”, 2nd Edition, O’Reilly Press, 2002.

### REFERENCES

1. Mowbray, “Inside CORBA”, Pearson Education, 2002.
2. Jeremy Rosenberger, “Teach Yourself CORBA in 14 days”, TEC Media, 2000.

## MOBILE COMPUTING

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### **UNIT I WIRELESS COMMUNICATION FUNDAMENTALS 9**

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

### **UNIT II TELECOMMUNICATION NETWORKS 11**

Telecommunication systems – GSM – GPRS – DECT – UMTS – IMT-2000 – Satellite networks – Basics – Parameters and configurations – Capacity allocation – FAMA and DAMA – Broadcast systems – DAB – DVB.

### **UNIT III WIRELESS LAN 9**

Wireless LAN – IEEE 802.11 – Architecture – Services – MAC – Physical layer – IEEE 802.11a – 802.11b standards – HIPERLAN – Blue tooth.

### **UNIT IV MOBILE NETWORK LAYER 9**

Mobile IP – Dynamic host configuration protocol – Routing – DSDV – DSR– Alternative metrics.

### **UNIT V TRANSPORT AND APPLICATION LAYERS 7**

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

**Total: 45**

### **TEXT BOOKS**

1. Jochen Schiller, “Mobile Communications”, 2nd Edition, Prentice Hall of India / Pearson Education, 2003.
2. William Stallings, “Wireless Communications and Networks”, Prentice Hall of India / Pearson Education, 2002.

### **REFERENCES**

1. Kaveh Pahlavan and Prasanth Krishnamoorthy, “Principles of Wireless Networks”, Prentice Hall of India / Pearson Education, 2003.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, “Principles of Mobile Computing”, Springer, New York, 2003.
3. Hazysztof Wesolowshi, “Mobile Communication Systems”, John Wiley and Sons Ltd, 2002.
4. Hansmann, ”Principles of Mobile Computing”, Wilesey India Limited, 2004.

## GRAPHICS AND MULTIMEDIA

L	T	P	C
3	1	0	4

### UNIT I      OUTPUT PRIMITIVES      9

Introduction – Line – Curve and ellipse drawing algorithms – Attributes – Two dimensional geometric transformations – Two dimensional clipping and viewing – Input techniques.

### UNIT II      THREE–DIMENSIONAL CONCEPTS      9

Three dimensional object representations – Three dimensional geometric and modeling transformations – Three dimensional viewing – Hidden surface elimination – Color models – Animation.

### UNIT III      MULTIMEDIA SYSTEMS DESIGN      9

An introduction – Multimedia applications – Multimedia system architecture – Evolving technologies for multimedia – Defining objects for multimedia systems – Multimedia data interface standards – Multimedia databases.

### UNIT IV      MULTIMEDIA FILE HANDLING      9

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

### UNIT V      HYPERMEDIA      9

Multimedia authoring and user interface – Hypermedia messaging – Mobile messaging – Hypermedia message component – Creating hypermedia message – Integrated multimedia message standards – Integrated document management – Distributed multimedia systems.

**L: 45 T: 15 Total: 60**

### TEXT BOOKS

1. Donald Hearn and M. Pauline Baker, “Computer Graphics C Version”, Pearson Education, 2003.
2. Prabat K Andleigh and Kiran Thakrar, “Multimedia Systems and Design”, Prentice Hall of India, 2003.

### REFERENCES

1. Judith Jeffcoate, “Multimedia in Practice Technology and Applications”, Prentice Hall of India, 1998.
2. Foley, Vandam, Feiner and Huges, “Computer Graphics: Principles and Practice”, 2nd Edition, Pearson Education, 2003.

## MIDDLEWARE TECHNOLOGIES LABORATORY

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

### LIST OF EXPERIMENTS

1. Create a distributed application to download various files from various servers using RMI
2. Create a Java Bean to draw various graphical shapes and display it using or without using BDk
3. Develop an Enterprise Java Bean for Banking operations
4. Develop an Enterprise Java Bean for Library operations
5. Create an Active-X control for File operations
6. Develop a component for converting the currency values using COM / .NET
7. Develop a component for encryption and decryption using COM / .NET
8. Develop a component for retrieving information from message box using DCOM / .NET
9. Develop a middleware component for retrieving Stock Market Exchange information using CORBA
10. Develop a middleware component for retrieving Weather Forecast information using CORBA

**Total: 45**

## GRAPHICS AND MULTIMEDIA LABORATORY

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### LIST OF EXPERIMENTS

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 and Hidden Surface Elimination.
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

**Total: 45**

## SOFTWARE DEVELOPMENT LABORATORY

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

Take up a software development project of your choice and systematically carry-out all the phases of SDLC. Do the necessary documentation at each stage. Use appropriate case tools.

The project to be carried out may be in domains such as

1. Online stock trading
2. Airport management
3. Bio - Informatics
4. Hospital management
5. Internet based multi user online games
6. Programmer's editor with syntax based coloring
7. Library of computer security related algorithms

**Total: 45**

## SEMESTER VIII

### XML AND WEB SERVICES

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#### UNIT I XML TECHNOLOGY FAMILY 9

XML – Benefits – Advantages of XML over HTML – EDI – Databases – XML based standards – Structuring with schemas – DTD – XML schemas – XML processing – DOM – SAX – Presentation technologies – XSL – XFORMS – XHTML – Transformation – XSLT – XLINK – XPATH – Xquery

#### UNIT II ARCHITECTING WEB SERVICES 9

Business motivations for web services – B2B – B2C – Technical motivations – Limitations of CORBA and DCOM – Service Oriented Architecture (SOA) – Architecting web services – Implementation view – Web services technology stack – Logical view – Composition of web services – Deployment view – From application server to peer to peer – Process view – Life in the runtime.

#### UNIT III WEB SERVICES BUILDING BLOCKS 9

Transport protocols for web services – Messaging with web services – Protocols – SOAP – Describing web services – WSDL – Anatomy of WSDL – Manipulating WSDL – Web service policy – Discovering web services – UDDI – Anatomy of UDDI – Web service inspection – Ad hoc discovery – Securing web services.

#### UNIT IV IMPLEMENTING XML IN E-BUSINESS 9

B2B – B2C applications – Different types of B2B interaction – Components of E - Business XML systems – EBXML – RosettaNet – Applied XML in vertical industry – Web services for mobile devices.

#### UNIT V XML CONTENT MANAGEMENT AND SECURITY 9

Semantic web – Role of meta data in web content – Resource description framework – RDF schema – Architecture of semantic web – Content management workflow – XLANG – WSFL – Securing web services

**L: 45 T: 15 Total: 60**

#### TEXT BOOKS

1. Ron Schmelzer and Travis Vandersypen, “XML and Web Services unleashed”, Pearson Education, 2002.
2. Keith Ballinger, “. NET Web Services Architecture and Implementation”, Pearson Education, 2003.

#### REFERENCES

1. David Chappell, “Understanding .NET A Tutorial and Analysis”, Addison Wesley, 2002.
2. Kennard Scibner and Mark C. Stiver, “Understanding SOAP”, SAMS publishing, 2000.
3. Alexander Nakhimovsky and Tom Myers, “XML Programming: Web Applications and Web Services with JSP and ASP”, Apress, 2002.

## FUNDAMENTALS OF PERVASIVE COMPUTING

L	T	P	C
3	0	0	3

### UNIT I PERVASIVE ARCHITECTURE 9

Local area networks – Wireless LANS – Relationship of wireless, internet and ubiquitous computing – Pervasive computing and ubiquitous computing – Ambient computing – Pervasive web application architecture – Requirements of computational infrastructure – Failure management – Security – Performance – Dependability.

### UNIT II MOBILE DEVICE TECHNOLOGIES 9

Mobile computing devices characteristics – Adaptation – Data dissemination and management – Heterogeneity – Interoperability – Context awareness – Language localization issues – User interface design issues – Difference between UI design for mobile devices and conventional systems – Mobile agents – Mobile device technology overview – Windows CE – Symbian – J2ME – Pocket PC – BREW.

### UNIT III SENSOR NETWORKS AND RFID'S 9

Introduction to sensor networks – Sensor node architecture – Sensor network architecture – Types of sensor networks – Platforms for wireless sensor networks – Applications of wireless sensor networks – Introduction to RFID – Transponder and reader architecture – Types of tags and readers – Frequencies of operation – Application of RFID technologies.

### UNIT IV LOCAL AREA AND WIDE AREA WIRELESS TECHNOLOGIES 9

IEEE 802.11 technologies – Infrared technologies – Bluetooth networks (OBEX protocol) – Personal area networks – Mobility management – Mobile IP – Establishing wide area wireless networks – Concept and structure of "Cell" – Call establishment and maintenance – Channel management – Frequency assignment techniques.

### UNIT V PROTOCOLS AND APPLICATIONS 9

Networking protocols – Packet switched protocols – Routing protocols for sensor networks – Data centric protocols – Hierarchical protocols – Location – Based protocols – Multimedia Messaging Service (MMS) protocols – Wireless Application Protocol (WAP) – Applications of pervasive computing – Retail – Healthcare – Sales force automation – Tracking applications.

**Total: 45**

### REFERENCES

1. Burkhardt, Henn, Hepper and Rintdorff, Schaeck, "Pervasive Computing", Addison Wesley, 2002.
2. F. Adelstein and S.K.S. Gupta, "Fundamentals of Mobile and Pervasive Computing", Tata McGraw Hill, 2005.
3. Ashoke Talukdar and Roopa Yavagal, "Mobile Computing", Tata McGraw Hill, 2005.

## **ELECTIVE I**

### **WIRELESS NETWORK SYSTEMS**

	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>UNIT I      FUNDAMENTALS</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>
Overview of wireless systems – Teletraffic engineering – Radio propagation and propagation path-loss models – Overview of digital communication and transmission.				
<b>UNIT II      WIRELESS WIDE AREA NETWORK (WWAN)</b>				<b>9</b>
Multiple access techniques – Architecture of a wireless wide area network.				
<b>UNIT III      SPEECH AND MODULATION SCHEMES</b>				<b>9</b>
Speech coding and channel coding – Modulation schemes.				
<b>UNIT IV      MOBILITY AND SECURITY MANAGEMENT</b>				<b>9</b>
Mobility management in wireless networks – Security in wireless systems.				
<b>UNIT V      GSM AND CDMA 2000</b>				<b>9</b>
Wide Area Wireless Networks (WANs) – GSM evolution – Wide area wireless networks – CDMAone evolution.				
<b>Total: 45</b>				

#### **TEXT BOOKS**

1. Vijay K. Garg, “Wireless Communications and Networking”, Elsevier, 2008.
2. Theodore S. Rappaport, “Wireless Communications, Principles and Practice”, Prentice Hall, 1996.

#### **REFERENCES**

1. W. Stallings, “Wireless Communications & Networks”, Prentice Hall, 2001.
2. J. Schiller, “Mobile Communications”, Addison Wesley, 2000.
3. W. C. Y. Lee, “Mobile Communications Engineering: Theory and Applications”, 2nd Edition, McGraw Hill, 1997.
4. K. Pahlavan and P. Krishnamurthy, “Principles of Wireless Networks”, Prentice Hall, 2002.
5. U. D. Black, “Mobile and Wireless Networks”, Prentice Hall, 1996.



## BIO INFORMATICS

L	T	P	C
3	0	0	3

### UNIT I FUNDAMENTALS 9

Life in space and time – Dogmas – Data archives – WWW – Computers – Biological classification – Use of sequences – Protein structure – Clinical implications.

### UNIT II GENOME ORGANIZATION 9

Genomics and proteomics – Eavesdropping on transmission of genetic information – Genomes of prokaryotes – Genomes of eukaryotes – Human genome – SNPs – Genetic diversity – Evolution of genomes.

### UNIT III ARCHIVES AND INFORMATION RETRIEVAL 9

Introduction – The archives – Gateways to archives.

### UNIT IV ALIGNMENTS AND PHYLOGENETIC TREES 9

Introduction to sequence alignment – The Dotplot – Dotplots and sequence alignments – Measures of sequence similarity – Computing the alignment – The dynamic programming algorithm – Significance of alignments – Multiple sequence alignment – Applications – Phylogeny – Phylogenetic trees.

### UNIT V PROTEIN STRUCTURE AND DRUG DISCOVERY 9

Protein stability and folding – Applications of hydrophobicity – Superposition of structures – DALI – Evolution of protein structures – Classification of protein structures – Protein structure prediction and modeling – Assignment of protein structures to genomes – Prediction of protein function – Drug discovery and development

**Total: 45**

### TEXT BOOK

1. Arthur M Lesk, “Introduction to Bioinformatics”, Oxford University Press, India, 2004.

### REFERENCES

1. Attwood T K and Parry Smith D J, “Introduction to Bioinformatics”, Pearson Education, 2001.
2. Rastogi S.C, Mendiratta N and Rastogi. P, “Bioinformatics: Method and Applications”, 3rd Edition, Prentice Hall of India, 2008.

## OPTICAL COMMUNICATION

L	T	P	C
3	0	0	3

### UNIT I      FUNDAMENTALS OF OPTICAL FIBERS      9

Evolution of fiber optic system – Element of an optical fiber transmission link – Ray optics – Optical fiber modes and configurations – Mode theory of circular wave guides – Overview of modes – Key modal concepts – Linearly polarized modes – Single mode fibers – Graded index fiber structure.

### UNIT II      SIGNAL DEGRADATION OPTICAL FIBERS      9

Attenuation – Absorption losses – Scattering losses – Bending losses – Core and cladding losses – Signal distortion in optical wave guides – Information capacity determination – Group delay – Material dispersion – Wave guide dispersion – Signal distortion in SM fibers – Polarization mode dispersion – Intermodal dispersion – Pulse broadening in GI fibers – Mode coupling – Design optimization of SM fibers – RI profile and cut off wavelength.

### UNIT III      FIBER OPTICAL SOURCES AND COUPLING      9

Direct and indirect band gap materials – LED structures – Light source materials – Quantum efficiency and LED power – Modulation of a LED – Lasers diodes – Modes and threshold condition – Rate equations – External quantum efficiency – Resonant frequencies – Laser diodes – Temperature effects – Introduction to quantum laser – Fiber amplifiers – Power launching and coupling – Lencing schemes – Fibre to fibre joints – Fibre splicing.

### UNIT IV      FIBER OPTICAL RECEIVERS      9

PIN and APD diodes – Photo detector noise – SNR – Detector response time– Avalanche multiplication noise – Comparison of photo detectors – Fundamental receiver operation – Preamplifiers – Error sources – Receiver configuration – Probability of error – Quantum limit.

### UNIT V      DIGITAL TRANSMISSION SYSTEM      9

Point to point links system considerations – Link power budget – Rise time budget – Noise effects on system performance – Operational principles of WDM, Solitons – Erbium – Doped amplifiers – Basic concepts of SONET/SDH network. .

**Total: 45**

### TEXT BOOK

1. Gerd Keiser, “Optical Fiber Communication”, 3rd Edition, McGraw Hill International, 2000.

### REFERENCES

1. J. Senior, “Optical Communication, Principles and Practice”, Prentice Hall of India, 1994.
2. J. Gower, “Optical Communication System”, Prentice Hall of India, 2001.

## C # AND. NET

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### **UNIT I BASICS OF C# 8**

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

### **UNIT II OBJECT ORIENTED ASPECTS OF C# 9**

Classes – Objects – Inheritance – Polymorphism – Interfaces – Operator overloading – Delegates – Events – Errors and exceptions.

### **UNIT III APPLICATION DEVELOPMENT ON .NET 8**

Building windows applications – Accessing data with ADO.NET.

### **UNIT IV WEB BASED APPLICATION DEVELOPMENT ON .NET 8**

Programming web applications with web forms – Programming web services.

### **UNIT V THE CLR AND THE .NET FRAMEWORK 12**

Assemblies – Versioning – Attributes – Reflection – Viewing metadata – Type discovery – Reflecting on a type – Marshalling – Remoting – Understanding server object types – Specifying a server with an interface – Building a server – Building the client – Using single call – Threads.

**Total: 45**

### **TEXT BOOKS**

1. E. Balagurusamy, “Programming in C#”, TMH, 2004.
2. J. Liberty, “Programming C#”, 2nd Edition, O’Reilly, 2002.

### **REFERENCES**

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

## ADVANCED JAVA PROGRAMMING

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### UNIT I      JAVA FUNDAMENTALS      9

Java I/O streaming – Filter and pipe streams – Byte code interpretation – Reflection – Dynamic reflexive classes – Threading – Java native interfaces – Swing.

### UNIT II      NETWORK PROGRAMMING IN JAVA      9

Sockets – Secure sockets – Custom sockets – UDP datagram's – Multicast sockets – URL classes – Reading data from the server – Writing data – Configuring the connection – Reading the header – Telnet application – Java messaging services.

### UNIT III      APPLICATIONS IN DISTRIBUTED ENVIRONMENT      9

Remote method invocation – Activation models – RMI custom sockets – Object serialization – RMI – IIOP implementation – CORBA – IDL technology – Naming services – CORBA programming models – JAR file creation.

### UNIT IV      MULTI-TIER APPLICATION DEVELOPMENT      9

Server side programming – Servlets – Java server pages – Applet to applet communication – Applet to servlets communication – JDBC – Using BLOB and CLOB objects – Storing multimedia data into databases – Multimedia streaming applications – Java media framework.

### UNIT V      ENTERPRISE APPLICATIONS      9

Server side component architecture – Introduction to J2EE – Session beans – Entity beans – Persistent entity beans – Transactions.

**Total: 45**

### TEXT BOOKS

1.      Elliotte Rusty Harold , “ Java Network Programming” , O'Reilly Publishers, 2000 .
2.      Ed Roman, “Mastering Enterprise Java Beans”, John Wiley and Sons Inc., 1999.
3.      Hortsman and Cornell , “Core Java 2 Advanced Features, VOL II”, Pearson Education , 2002.

### REFERENCES

1.      Web Reference: <http://java.sun.com>.
2.      Patrick Naughton , “Complete Reference – Java2”, TMH 2003.

## TCP / IP DESIGN AND IMPLEMENTATION

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### UNIT I FUNDAMENTALS 9

Internetworking concepts and architectural model – Class full internet address – CIDR – Subnetting and super netting – ARP – RARP – IP –IP routing – ICMP – IPV6.

### UNIT II TCP 9

Services – Header – Connection establishment and termination – Interactive data flow – Bulk data flow – Timeout and retransmission – Persist timer – Keep alive timer – Futures and performance.

### UNIT III IP IMPLEMENTATION 9

IP global software organization – Routing table – Routing algorithms – Fragmentation and reassembly – Error processing (ICMP) – Multicast processing. (IGMP)

### UNIT IV TCP IMPLEMENTATION I 9

Data structure and input processing – Transmission control blocks – Segment format – Comparison – Finite state machine implementation – Output processing – Mutual exclusion – Computing the TCP data length.

### UNIT V TCP IMPLEMENTATION II 9

Timers – Events and messages – Timer process – Deleting and inserting timer event – Flow control and adaptive retransmission – Congestion avoidance and control – Urgent data processing and push function.

**Total: 45**

### TEXT BOOKS

1. Douglas E. Comer, “Internetworking with TCP/IP Principles- Protocols and Architecture –Vol. 1 & 2”, Fourth Edition, Pearson Education Asia, 2003.
2. W. Richard Stevens, “TCP/IP illustrated” Volume 1, Pearson Education, 2003.

### REFERENCES

1. Forouzan , “TCP/IP Protocol Suite” , 2nd Edition, TMH, 2003.
2. W. Richard Stevens, “TCP/IP Illustrated”, Volume 2, Pearson Education 2003.



**UNIT I LINUX FUNDAMENTALS I 9**

Overview of free/open source software – Definition of FOSS and 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 and file systems – 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 and log files – Configuring networking – Basics of TCP/IP networking and routing – Connecting to the internet. (through dialup –DSL- Ethernet –Leased line)

**UNIT II LINUX FUNDAMENTALS II 9**

Configuring additional hardware – Sound cards – Displays and 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 DEVELOPMENT ENVIRONMENT 9**

Setting up a firewall – Using netfilter and IP tables – Using the GNU compiler collection – GNU compiler tools – C preprocessor (CPP) – 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 and diff.

**UNIT IV LINUX INTERNALS 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 – Basics of bash – SED and Awk scripting- Basics of the X windows server architecture.

QT programming – GTK+ programming – Python programming – Programming GUI applications with localization support.

**Total: 45**

**TEXT BOOK**

1. N. B. Venkateshwarlu, “Introduction to Linux: Installation and Programming”, B S Publishers, 2005.

**REFERENCES**

1. Matt Welsh, Matthias Kalle Dalheimer, Terry Dawson and Lar Kaufman, “Running Linux”, 4th Edition, O'Reilly Publishers, 2002.
2. Carla Schroder, “Linux Cookbook”, 1st Edition, O'Reilly Cookbooks Series, November 2004.

**ON-LINE MATERIALS**

1. “Open Sources: Voices from the Open Source Revolution”, 1st Edition, January 1999.  
URL: <http://www.oreilly.com/catalog/opensources/book/toc.html>
2. “The Linux Cookbook: Tips and Techniques for Everyday Use”, 1st Edition, Michael Stutz, 2001. URL: [http://dsl.org/cookbook/cookbook\\_toc.html](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, 3rd 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>

## COMPONENT BASED TECHNOLOGY

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### **UNIT I SOFTWARE COMPONENTS 9**

Software components – Objects – Fundamental properties of component technology – Modules – Interfaces – Callbacks – Directory services – Component architecture – Components and middleware.

### **UNIT II JAVA BASED COMPONENT TECHNOLOGIES 9**

Threads – Java beans – Events and connections – Properties – Introspection – JAR Files – Reflection – Object serialization – Enterprise java beans – Distributed object models – RMI and RMI – IIOP.

### **UNIT III CORBA COMPONENT TECHNOLOGIES 9**

Java and CORBA – Interface definition language – Object request broker – System object model – Portable object adapter – CORBA services – CORBA component model – Containers – Application server – Model driven architecture.

### **UNIT IV .NET BASED COMPONENT TECHNOLOGIES 9**

COM – Distributed COM – Object reuse – Interfaces and versioning – Dispatch interfaces – Connectable objects – OLE containers and servers – Active X controls – .NET components – Assemblies – Appdomains – Contexts – Reflection – Remoting.

### **UNIT V COMPONENT FRAMEWORKS AND DEVELOPMENT 9**

Connectors – Contexts – EJB containers – CLR contexts and channels – Black box component framework – Directory objects – Cross-development environment – Component-oriented programming – Component design and implementation tools – Testing tools – Assembly tools.

**Total: 45**

### **TEXT BOOKS**

1. Clemens Szyperski, “Component Software: Beyond Object-Oriented Programming”, Pearson Education Publishers, 2003.
2. Ed Roman, “Mastering Enterprise Java Beans”, John Wiley and Sons Inc, 1999.

### **REFERENCES**

1. Mowbray, “Inside CORBA”, Pearson Education, 2003.
2. Freeze, “Visual Basic Development Guide for COM & COM+”, BPB Publication, 2001.
3. Hortsamann and Cornell, “Core Java Vol-II” Sun Press, 2002.
4. Sudha Sudasivam, “Component Based Technology”, John Wiley & Sons, 2008.



# DIGITAL IMAGE PROCESSING

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## **UNIT I IMAGE FUNDAMENTALS AND TRANSFORMS 9**

Elements of visual perception – Image sampling and quantization basic relationship between pixels – Basic geometric transformations – Introduction to fourier transform and DFT – Properties of 2D fourier transform – FFT – Separable image transforms – Walsh-Hadamard – Discrete cosine transform – Haar-Slant – Karhunen-Loeve transforms.

## **UNIT II IMAGE ENHANCEMENT TECHNIQUES 9**

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

## **UNIT III IMAGE RESTORATION 9**

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

## **UNIT IV IMAGE COMPRESSION 9**

Lossless compression – Variable length coding – LZW coding – Bit plane coding – Predictive coding – PCM – Lossy compression – Transform coding – Wavelet coding – Basics of image compression standards – JPEG – MPEG – Basics of vector quantization.

## **UNIT V IMAGE SEGMENTATION AND REPRESENTATION 9**

Edge detection – Thresholding – Region based segmentation – Boundary representation – Chain codes – Polygonal approximation – Boundary segments – Boundary descriptors – Simple descriptors – Fourier descriptors – Regional descriptors – Simple descriptors – Texture.

**Total: 45**

### **TEXT BOOK**

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

### **REFERENCES**

1. William K Pratt, “Digital Image Processing”, John Willey.
2. A. K. Jain, “Fundamentals of Digital Image Processing”, PHI, New Delhi, 1995.
3. Chanda Dutta Magundar, “Digital Image Processing and Applications”, PHI, 2000.

## SOFT COMPUTING

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### UNIT I FUZZY SET THEORY

10

Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set-Theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy if-then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

### UNIT II OPTIMIZATION

8

Derivative – Based optimization – Descent methods – Method of steepest descent – Classical newton’s method – Step size determination – Derivative-free optimization – Genetic algorithms – Simulated annealing – Random search – Downhill simplex search.

### UNIT III NEURAL NETWORKS

10

Supervised learning neural networks – Perceptrons – Adaline – Back propagation multilayer perceptrons – Radial basis function networks – Unsupervised learning neural networks – Competitive learning networks – Kohonen self-organizing networks – Learning vector quantization – Hebbian learning.

### UNIT IV NEURO FUZZY MODELING

9

Adaptive neuro – Fuzzy inference systems – Architecture – Hybrid learning algorithm – Learning methods that cross-fertilize ANFIS and RBFN – Coactive neuro fuzzy modeling – Framework neuron functions for adaptive networks – Neuro fuzzy spectrum.

### UNIT V APPLICATIONS OF COMPUTATIONAL INTELLIGENCE

8

Printed character recognition – Inverse kinematics problems – Automobile fuel efficiency prediction – Soft computing for color recipe prediction.

**Total: 45**

### TEXT BOOK

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

### REFERENCES

1. Timothy J. Ross, “Fuzzy Logic with Engineering Applications”, TMH, 1997.
2. Davis E. Goldberg, “Genetic Algorithms: Search- Optimization and Machine Learning”, Addison Wesley, N.Y., 1989.
3. S. Rajasekaran and G. A. V. Pai, “Neural Networks- Fuzzy Logic and Genetic Algorithms”, PHI, 2003.
4. R. Eberhart, P. Simpson and R. Dobbins, “Computational Intelligence – PC Tools”, AP Professional, Boston, 1996.
5. Sivanadtham and Deepa, ”Principles of Soft Computing”, Wileys India, 2008.



**UNIT V THE NETWORK OF KNOWLEDGE AND TIME 9**

Magic paper made real – Linking our knowledge – Dangers of hypertext – From desktop to world library – Hypertext and printing press – Worlds enough and time – Nanotechnology and daily life – Other science fiction dreams – Advanced simplicity – Room enough for dreams – Preparations.

**Total: 45**

**TEXT BOOK**

1. Eric Drexler, “Engines of Creation: The Coming Era of Nanotechnology”, Reprint Edition, Anchor, 1987.

**REFERENCES**

1. Mark A Ratner, Daniel Ratner, Mark Ratner, ”Nanotechnology: A Gentle Introduction to the Next Big Idea”, 1st Edition, Prentice Hall of India, 2002.
2. Eric Drexler, “Nanosystems: Molecular Machinery, Manufacturing, and Computation”, 1st Edition, Wiley, 1992.
3. Jack Uldrich and Deb Newberry, “The Next Big Thing Is Really Small: How Nanotechnology Will Change the Future of Your Business”, 1st Edition, Crown Business, 2003.
4. Douglas Mulhall, “Our Molecular Future: How Nanotechnology, Robotics, Genetics and Artificial Intelligence Will Transform Our World”, Prometheus Books, 2002.

# ELECTIVE III

## HIGH PERFORMANCE MICROPROCESSORS

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### UNIT I CISC PRINCIPLES 9

Classic CISC microprocessors – Intel X86 families – Architecture – Register set – Data formats – Addressing modes – Instruction set – Assembler directives – Interrupts – Segmentation – Paging – Real and virtual mode execution – Protection Mechanism – Task management 8086- 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 – PentiumIII 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 and special features – Power PC 601 – IBM RS/6000 – Sun SPARC family – Architecture – Super SPARC.

### UNIT IV RISC PROCESSOR 8

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

### UNIT V SPECIAL PURPOSE PROCESSORS 8

EPIC architecture – ASIPs – Network processors – DSPs – Graphics/image processors.

**Total: 45**

### TEXT BOOK

1. Daniel Tabak, “Advanced Microprocessors”, 2nd Edition, TMH, 1995.

### REFERENCES

1. [www.intel.com/products/server/processors/server/itanium2](http://www.intel.com/products/server/processors/server/itanium2) (Unit V:EPIC)
2. [www.hpl.hp.com/techreports/1999/HPL-1999-111.html](http://www.hpl.hp.com/techreports/1999/HPL-1999-111.html)(UnitV:Network Processor)
3. [www.intel.com/design/network/products/npfamily](http://www.intel.com/design/network/products/npfamily) (UnitV:Network Processor)
4. [www.national.com/appinfo/imaging/processors.html](http://www.national.com/appinfo/imaging/processors.html)(UnitV: Image Processor)
5. Barry B.Brey, “The Intel Microprocessors –8086/8088- 80186/80188, 80286, 80386, 80486, Pentium –Pentium Pro Processor, Pentium II, Pentium III, Pentium IV, Architecture, Programming and Interfacing”, 6th Edition, Pearson Education/PHI, 2002.

## PARALLEL COMPUTING

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### UNIT I SCALABILITY AND CLUSTERING 9

Evolution of computer architecture – Dimensions of scalability – Parallel computer models – Basic concepts of clustering – Scalable design principles – Parallel programming overview – Processes – Tasks and threads – Parallelism issues – Interaction / communication issues – Semantic issues in parallel programs.

### UNIT II ENABLING TECHNOLOGIES 9

System development trends – Principles of processor design – Microprocessor architecture families – Hierarchical memory technology – Cache coherence protocols – Shared memory consistency – Distributed cache memory architecture – Latency tolerance techniques – Multithreaded latency hiding.

### UNIT III SYSTEM INTERCONNECTS 9

Basics of interconnection networks – Network topologies and properties – Buses – Crossbar and multistage switches – Software multithreading – Synchronization mechanisms.

### UNIT IV PARALLEL PROGRAMMING 9

Paradigms and programmability – Parallel programming models – Shared memory programming.

### UNIT V MESSAGE PASSING PROGRAMMING 9

Message passing paradigm – Message passing interface – Parallel virtual machine.

**Total: 45**

### TEXT BOOK

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

### REFERENCES

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

## ADVANCED DATABASES

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### **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 optimization – Distribution and replication in oracle.

### **UNIT II OBJECT ORIENTED DATABASES 9**

Object oriented databases – Introduction – Weakness of RDBMS – Object oriented concepts storing objects in relational databases – Next generation database systems – Object oriented data models – OODBMS perspectives – Persistence – Issues in OODBMS – Object oriented database management system manifesto – Advantages and disadvantages of OODBMS – Object oriented database design – OODBMS standards and systems – Object management group – Object database standard ODMG – Object relational DBMS – Postgres – Comparison of ORDBMS and OODBMS.

### **UNIT III WEB DATABASES 9**

Web technology and DBMS – Introduction – The web – The web as a database application platform – Scripting languages – Common gateway interface – HTTP cookies – Extending the web server – Java – Microsoft's web solution platform – Oracle internet platform – Semi structured data and XML – XML related technologies – XML query languages.

### **UNIT IV INTELLIGENT DATABASES 9**

Enhanced data models for advanced applications – Active database concepts and triggers – Temporal database concepts – Deductive databases – Knowledge databases.

### **UNIT V CURRENT TRENDS 9**

Mobile database – Geographic information systems – Genome data management – Multimedia database – Parallel database – Spatial databases – Database administration – Data warehousing and data mining.

**Total: 45**

### **TEXT BOOKS**

1. Thomas M. Connolly and Carolyn E. Begg , “Database Systems –A Practical Approach to Design , Implementation and Management”,3rd Edition, Pearson Education, 2003.
2. Ramez Elmasri and Shamkant B.Navathe, “Fundamentals of Database Systems”, 4th Edition, Pearson Education, 2004.

### **REFERENCES**

1. M. Tamer Ozsu and Patrick Ualduriel, “Principles of Distributed Database Systems”, 2nd Edition, Pearson Education, 2003.
2. C.S.R.Prabhu, “Object Oriented Database Systems”, PHI, 2003.
3. Peter Rob and Corlos Coronel, “Database Systems Design Implementation and Management”, 5th Edition, Thompson Learning Course Technology, 2003.



## **UNIT V          MULTIPROCESSOR AND DISTRIBUTED DATABASE          9**

Multiprocessor operating systems – Basic multiprocessor system architectures – Inter connection networks for multiprocessor systems – Caching – Hypercube architecture – Multiprocessor operating system – Structures of multiprocessor operating system – Operating system design issues – Threads – Process synchronization and scheduling.

Database operating systems – Introduction – Requirements of a database operating system concurrency control – Theoretical aspects – Introduction database systems – A concurrency control model of database systems – The problem of concurrency control – Serializability theory – Distributed database systems – Concurrency control algorithms – Introduction – Basic synchronization primitives – Lock based algorithms – Timestamp based algorithms – Optimistic algorithms – Concurrency control algorithms – Data replication.

**Total: 45**

### **TEXT BOOKS**

1. Mukesh Singhal and Niranjan G.Shivaratri, "Advanced concepts in operating systems: Distributed Database and multiprocessor operating systems" , TMH, 2001.
2. Andrew S. Tanenbaum , "Modern Operating System", PHI, 2003.

### **REFERENCES**

1. Pradeep K. Sinha, "Distributed Operating System-Concepts and Design", PHI, 2003.
2. Andrew S. Tanenbaum, "Distributed Operating System", Pearson Education, 2003.

# SOFTWARE TESTING

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## **UNIT I TESTING BASICS 8**

Testing as an engineering activity – Role of process in software quality – Testing as a process – Basic definitions – Software testing principles – The tester’s role in a software development organization – Origins of defects – Defect classes – The defect repository and test design – Defect examples – Developer / tester support for developing a defect repository.

## **UNIT II TEST CASE DESIGN 11**

Introduction to testing design strategies – The smarter tester – Test case design strategies – Using black box approach to test case design – Random testing – Equivalence class partitioning – Boundary value analysis – Other black box test design approaches – Black box testing and COTS – Using white box approach to test design – Test adequacy criteria – Coverage and control flow graphs – Covering code logic – Paths – Their role in white box based test design – Additional white box test design approaches – Evaluating test adequacy criteria.

## **UNIT III LEVELS OF TESTING 9**

The need for levels of testing – Unit test – Unit test planning – Designing the unit tests – The class as a testable unit – The test harness – Running the unit tests and recording results – Integration tests – Designing integration tests – Integration test planning – System test – The different types – Regression testing – Alpha, beta and acceptance tests.

## **UNIT IV TEST MANAGEMENT 9**

Basic concepts – Testing and debugging goals and policies – Test planning – Test plan components – Test plan attachments – Locating test items – Reporting test results – The role of three groups in test planning and policy development – Process and the engineering disciplines – Introducing the test specialist – Skills needed by a test specialist – Building a testing group.

## **UNIT V CONTROLLING AND MONITORING 8**

Defining terms – Measurements and milestones for controlling and monitoring – Status meetings – Reports and control issues – Criteria for test completion – SCM – Types of reviews – Developing a review program – Components of review plans – reporting review results.

**Total: 45**

### **TEXT BOOKS**

1. Ilene Burnstein, “Practical Software Testing”, Springer International Edition, 2003.
2. Edward Kit, “Software Testing in the Real World – Improving the Process”, Pearson Education, 1995.

### **REFERENCES**

1. Elfriede Dustin, “Effective Software Testing”, Pearson Education, 2003.
2. Renu Rajani and Pradeep Oak, “Software Testing – Effective Methods, Tools and Techniques”, Tata McGraw Hill, 2003.

# SOFTWARE METRICS

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## **UNIT I MEASUREMENT AND EXPERIMENTATION 9**

Measurement in software engineering – Scope of software metrics – The basics of measurement – The representational theory of measurement – Measurement and models – Measurement scales and scale types – Meaningfulness in measurement – Goal based framework for software measurement – Classifying software measures – Determining what to measure – Applying the framework – Software measurement validation – Software measurement validation in practice.

## **UNIT II EMPIRICAL INVESTIGATION AND SOFTWARE MEASUREMENT DATA 9**

Empirical investigation – Four principles of investigation – Planning formal experiments – Planning case studies – Software metrics data collection – What is good data – How to define the data – How to collect the data – When to collect the data – How to store and extract data – Analyzing software measurement data – Analyzing the result of measurements – Examples of simple analysis techniques – More advanced methods – Overview of statistical tests.

## **UNIT III SOFTWARE ENGINEERING MEASUREMENTS 9**

Measuring internal product attribute: size – Aspects of software size – Length – Reuse – Functionality – Complexity – Measuring internal product attributes: structure – Types of structural measures – Control flow structure – Modularity and information flow attributes – Object oriented metrics – Data structure – Difficulties with general “Complexity” measures – Measuring external product attributes – Modeling software quality – Measuring aspects of quality.

## **UNIT IV SOFTWARE RELIABILITY AND RESOURCE MEASUREMENT 9**

Software reliability: measurement and prediction – Basics of reliability theory – Software reality problem – Parametric reliability growth models – Predictive accuracy – The recalibration of software reliability growth predictions – The importance of the operational reliability – Resource measurement: productivity – Teams and tools – The meaning of productivity – Productivity of what – Measuring productivity – Teams – Tools and methods – Making process predictions – Good estimates – Cost estimation: problems and approaches – Models of effort and cost – Problems with existing modeling methods – Dealing with problems of current estimation methods – Implication for process prediction.

## **UNIT V MEASUREMENT AND MANAGEMENT**

**9**

Planning a measurement program – What is a metrics plan – Why and What: developing goals, questions and metrics – Where and When: mapping measure to activities – How: measurement tools – Who: measures, analysts and audience – Revising the plan – Measurement in practice – Success criteria – Measurement in the small – Measurement in the large – Lessons learned – Empirical research in software engineering – Problems with empirical research – Investigating products – Investigating resources – Investigating processes – Measurement today and tomorrow.

**Total: 45**

### **TEXT BOOK**

1. Norman E. Fenton and Shari Lawrence Pfleeger, “Software Metrics – A Rigorous and Practical Approach”, 2nd Edition, Thomson International Student Edition, 2003.

### **REFERENCE**

1. Roger S. Pressman, “Software Engineering – A Practitioner’s Approach”, 5th Edition, McGraw Hill International Edition, 2001.

# KNOWLEDGE BASED DECISION SUPPORT SYSTEMS

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## **UNIT I BASIC CONCEPTS 9**

Decision making systems – Modeling and support – Basics and definition – Systems models – Modeling process – Decision making – Intelligence phase – Design phase – Choice phase – Evaluation – Implementation phase – Alternative decision making models – Decision support systems – Decision makers – Case applications.

## **UNIT II DECISION SUPPORT SYSTEM DEVELOPMENT 9**

Decision support system development – Basics – Life cycle – Methodologies – Prototype – Technology levels and tools – Development platforms – Tool selection – Developing DSS – Enterprise systems – Concepts and definition – Evolution of information systems – Information needs – Characteristics and capabilities – Comparing and integrating EIS and DSS – EIS data access – Data warehouse – OLAP – Multidimensional analysis – Presentation and the web – Including soft information enterprise on systems – Organizational DSS – Supply and value chains – Decision support – Supply chain problems and solutions – Computerized systems MRP – ERP – SCM – Frontline decision support systems.

## **UNIT III KNOWLEDGE MANAGEMENT 9**

Organizational learning and memory – Knowledge management – Development – Methods – Technologies and tools – Success – Knowledge management and artificial intelligence – Electronic document management – Knowledge acquisition and validation – Knowledge engineering – Scope – Acquisition methods – Interviews – Tracking methods – Observation and other methods – Grid analysis – Machine learning – Rule induction – Case-based reasoning – Neural computing – Intelligent agents – Selection of an appropriate knowledge acquisition methods – Multiple experts – Validation and verification of the knowledge base – Analysis- Coding- Documenting- and diagramming – Numeric and documented knowledge acquisition – Knowledge acquisition and the internet/intranets – Knowledge representation basics – Representation in logic and other schemas – Semantic networks – Production rules – Frames – Multiple knowledge representation – Experimental knowledge representations – Representing uncertainty.

## **UNIT IV INTELLIGENT SYSTEM DEVELOPMENT 9**

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

Implementing and integrating management support systems – Implementation – Major Issues – Strategies – System integration – Generic models MSS – DSS – ES – Integrating EIS – DSS and ES – Global integration – Intelligent DSS – Intelligent modeling and model management – Examples of integrated systems – Problems and issues in integration – Impacts of management support systems – Overview – Organizational structure and related areas – MSS support to business process re-engineering – Personnel management issues – Impact on individuals – Productivity – Quality and competitiveness – Decision making and the manager manager’s job – Issues of legality – Privacy and ethics – Intelligent systems and employment levels – Internet communication – Other societal impacts – Managerial implications and social responsibilities.

**Total: 45**

**TEXT BOOKS**

1. Efrain Turban and Jay E. Aronson, “Decision Support Systems and Intelligent Systems”, 6th Edition, Pearson Education, 2001.
2. Ganesh Natarajan and Sandhya Shekhar, “Knowledge Management Enabling Business Growth”, Tata McGraw Hill, 2002.

**REFERENCES**

1. George M. Marakas, “Decision Support System”, Prentice Hall India, 2003.
2. Efrem A. Mallach, “Decision Support and Data Warehouse Systems”, Tata McGraw-Hill, 2002.
3. Dalker, “Knowledge Management – Theory and Practice”, Elsevier, 2007.
4. Becerra Fernandez and Laidener, “Knowledge Management – An Evolutionary View”, PHI, 2009.





## USER INTERFACE DESIGN

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### UNIT I USER INTERFACE BASICS 8

Introduction – Importance – Human – Computer interface – Characteristics of graphics interface – Direct manipulation graphical system – Web user interface – Popularity – Characteristic and principles.

### UNIT II INTERFACE DESIGN 10

User interface design process – Obstacles – Usability – Human characteristics in design – Human interaction speed – Business functions – Requirement analysis – Direct – Indirect methods – Basic business functions – Design standards – System timings – Human consideration in screen design – Structures of menus – Functions of menus – Contents of menu – Formatting – Phrasing the menu – Selecting menu choice – Navigating menus – Graphical menus.

### UNIT III INTERFACE CHARACTERISTICS 9

Windows – Characteristics – Components – Presentation styles – Types – Managements – Organizations – Operations – Web systems – Device – Based controls – Characteristics – Screen – Based controls – Operate control – Text boxes, Selection control – Combination control – Custom control – Presentation control.

### UNIT IV WEB PRESENTATION 9

Text for web pages – Effective feedback – Guidance and assistance – Internationalization – Accessibility – Icons – Image – Multimedia – Coloring.

### UNIT V LAYOUT TESTING 9

Windows layout test – Prototypes – Kinds of tests – Retest – Information search – Visualization – Hypermedia – WWW – Software tools.

**Total: 45**

### TEXT BOOK

1. Wilbent. O. Galitz, “The Essential Guide to User Interface Design”, John Wiley and Sons, 2001.

### REFERENCES

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

## **INFORMATION SECURITY**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

<b>UNIT 1</b>	<b>FUNDAMENTALS</b>	<b>9</b>
<p>History – Introduction to information security – Critical characteristics of information – NSTISSC security model – Components of an information system – Securing the components – Balancing security and access – The SDLC – The security SDLC.</p>		
<b>UNIT II</b>	<b>SECURITY INVESTIGATION</b>	<b>9</b>
<p>Need for security – Business needs – Threats – Attacks – Legal – Ethical and professional issues.</p>		
<b>UNIT III</b>	<b>SECURITY ANALYSIS</b>	<b>9</b>
<p>Risk management – Identifying and assessing risk – Assessing and controlling risk</p>		
<b>UNIT IV</b>	<b>LOGICAL DESIGN</b>	<b>9</b>
<p>Blueprint for security – Information security policy – Standards and practices – ISO 17799/BS 7799 – NIST models – VISA international security mode 1 – Design of security architecture – Planning for continuity.</p>		
<b>UNIT V</b>	<b>PHYSICAL DESIGN</b>	<b>9</b>
<p>Security technology – IDS – Scanning and analysis tools – Cryptography – Access control devices – Physical security – Security and personnel</p>		

**Total: 45**

### **TEXT BOOKS**

1. Michael E Whitman and Herbert J Mattord, “Principles of Information Security”, Vikas Publishing House, 2003.
2. Micki Krause and Harold F. Tipton, “Handbook of Information Security Management”, Vol 1 - 3, CRC Press LLC, 2004.

### **REFERENCES**

1. Stuart Mc Clure, Joel Scrambray and George Kurtz, “Hacking Exposed”, Tata McGraw Hill, 2003
2. Matt Bishop, “Computer Security Art and Science”, Pearson / Prentice Hall of India, 2002.
3. Patel, “Information Security Theory and Practice”, Prentice Hall of India, 2006.
4. Straub, “Information Security: Policy, Processes and Practices”, PHI, 2009.

## BUSINESS PROCESS MODEL

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### **UNIT I UNDERSTANDING BUSINESS PROCESS 9**

Organizations as systems – Effective operations management – Adding value – Competing on capabilities – Value chain and competitive advantage.

### **UNIT II CUSTOMER AND MATERIALS PROCESSING 9**

Marketing in a changing world – Relationship marketing – Purchasing – Concept of a manufacturing system – Logistics and competitive strategy – Reverse logistics – The triumph of process.

### **UNIT III PROCESS MODELING 9**

Process modeller's needs – Basic concepts in process modeling – Modeling with RADS – Animating a process.

### **UNIT IV LARGE PROCESSES 9**

Micro-Modeling of processes – Modeling large processes – Process patterns.

### **UNIT V MANAGING THE MODELING 9**

Modeling the materials in the process – Analyzing a process model – Managing the modeling.

**Total: 45**

### **TEXT BOOKS**

1. Davis Barnes, "Understanding Business : Process", Routledge, 2000 [Units 1, 2].
2. Martyn A Ould, "Business Processes : Modelling and Analysis for Re Engineering and Improvement", John Wiley and Sons, 1995 [Units 3, 4, 5].

### **REFERENCES**

1. Howard Smith and Peter Fingar, "Business Process Management (BPM): The Third Wave", Meghan - Kiffer Press, USA, 2003.
2. Roger Burlton, "Business Process Management: Profiting from Process", SAMS, USA, 2001.
3. Mike Jacka J and Paulette J Keller, "Business Process Mapping: Improving Customer Satisfaction", John Wiley and Sons, USA, 2001.
4. Faisal Haque, "e - Enterprise: Business Models, Architecture and Components", Cambridge University Press, UK, 2000.
5. Ulric J Gelinas, Steve G Sutton and Jane Fedorowicz, "Business Processes and Information Technology", Thompson Learning, India, 2004.

# REQUIREMENTS ENGINEERING

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

## **UNIT I          PROBLEM ANALYSIS AND BUSINESS MODELING          9**

The Requirements problem – Requirements management – The Software team – Analyzing the problem – The five steps in problem analysis – Business modeling – Systems engineering of software intensive systems

## **UNIT II          UNDERSTANDING USER NEEDS & SYSTEM DEFINITION          9**

The Challenge of requirements elicitation – The features of a product or system – Interviewing – Brainstorming and idea reduction – Storyboarding – Applying use cases – Role playing – Prototyping – Defining the system – Organizing requirements Information – The vision document – The champion.

## **UNIT III          MANAGING SCOPE          9**

The problem of project scope – Establishing project scope – managing your customer – Scope management and software development process models – Refining the system definition – Software requirements.

## **UNIT IV          REFINING THE SYSTEM DEFINITION          9**

Refining the use cases – A modern software requirements specification – On ambiguity and specificity – Quality measures of software requirements – Technical methods for specifying requirements.

## **UNIT V          BUILDING THE RIGHT SYSTEM          9**

From requirements to implementation – Using traceability to support verification – Validating the system – Using ROI to determine the V&V effort – Managing change – Case studies

**Total: 45**

### **TEXT BOOKS**

1. Dean Leffingwell and Don Widrig, “Managing Software Requirements A Unified Approach”, 5th Printing, Addison - Wesley, 2000.
2. Roger S. Pressman, “Software Engineering, A Practitioner’s Approach”, 6th Edition, McGraw - Hill International, 2005.

## **SOFTWARE QUALITY MANAGEMENT**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

<b>UNIT I</b>	<b>FUNDAMENTALS OF SOFTWARE QUALITY</b>	<b>9</b>
<p>Software quality – Hierarchical models of Boehm and McCall – Quality measurement – Metrics measurement and analysis – Gilb’s approach – GQM model.</p>		
<b>UNIT II</b>	<b>SOFTWARE QUALITY ASSURANCE</b>	<b>9</b>
<p>Quality tasks – SQA plan – Teams – Characteristics – Implementation – Documentation – Reviews and audits.</p>		
<b>UNIT III</b>	<b>QUALITY CONTROL AND RELIABILITY</b>	<b>9</b>
<p>Tools for quality – Ishikawa’s basic tools – CASE tools – Defect prevention and removal – Reliability models – Rayleigh model – Reliability growth models for quality assessment.</p>		
<b>UNIT IV</b>	<b>QUALITY MANAGEMENT SYSTEM</b>	<b>9</b>
<p>Elements of QMS – Rayleigh model framework – Reliability growth models for QMS – Complexity metrics and models – Customer satisfaction analysis.</p>		
<b>UNIT V</b>	<b>QUALITY STANDARDS</b>	<b>9</b>
<p>Need for standards – ISO 9000 Series – ISO 9000-3 for software development – CMM and CMMI – Six sigma concepts.</p>		

**Total: 45**

### **TEXT BOOKS**

1. Allan C. Gillies, “Software Quality: Theory and Management”, Thomson Learning, 2003.
2. Stephen H. Kan, “Metrics and Models in Software Quality Engineering”, Pearson Education (Singapore) Pvt. Ltd., 2002.

### **REFERENCES**

1. Norman E. Fenton and Shari Lawrence Pfleeger, “Software Metrics”, Thomson, 2003.
2. Mordechai Ben, Menachem and Garry S.Marliss, “Software Quality” Thomson Asia Pvt. Ltd., 2003.
3. ISO 9000-3 “Notes for the application of the ISO 9001 Standard to software development”.
4. Kamna Malik and Praveen Choudry, “Software Quality: A Practitioner Approach”, PHI, 2000.