

**ANNA UNIVERSITY TIRUCHIRAPPALLI**  
**Tiruchirappalli - 620 024**  
**Regulations 2007**  
**Curriculum**  
**B.TECH. INFORMATION TECHNOLOGY**

**SEMESTER III**

S.No.	Subject Code	Subject	L	T	P	Max. Marks
<b>Theory</b>						
1	<b>MA1201</b>	Mathematics III	3	1	0	100
2	<b>EC1205</b>	Signals and Systems	3	1	0	100
3	<b>EC1206</b>	Electronic Devices and Circuits	3	1	0	100
4	<b>CS1201</b>	Data Structures	3	0	0	100
5	<b>CS1203</b>	Object Oriented Programming	3	0	0	100
6	<b>EC1207</b>	Principles of Communication Engineering	3	1	0	100
<b>Practical</b>						
7	<b>EC1208</b>	Electronic Devices and Circuits Laboratory	0	0	3	100
8	<b>CS1204</b>	Data Structures Laboratory	0	0	3	100
9	<b>CS1205</b>	Object Oriented Programming Laboratory	0	0	3	100

**SEMESTER IV**

S.No.	Subject Code	Subject	L	T	P	Max. Marks
<b>Theory</b>						
1	<b>MA1252</b>	Probability and Queuing Theory	3	1	0	100
2	<b>CS1258</b>	Microprocessors and Microcontrollers	3	0	0	100
3	<b>IT1251</b>	Information Coding Techniques	3	0	0	100
4	<b>CS1202</b>	Computer Architecture	3	1	0	100
5	<b>EC1256</b>	Digital Signal Processing	3	1	0	100
6	<b>CS1254</b>	Database Management Systems	3	1	0	100
<b>Practical</b>						
7	<b>CS1259</b>	Microprocessors and Microcontrollers Laboratory	0	0	3	100
8	<b>EC1257</b>	Digital Signal Processing Laboratory	0	0	3	100
9	<b>CS1257</b>	Database Management Systems Laboratory	0	0	3	100

## SEMESTER V

S.No.	Subject Code	Subject	L	T	P	Max. Marks
<b>Theory</b>						
1	<b>MA1251</b>	Numerical Methods	3	1	0	100
2	<b>CS1301</b>	Software Engineering	3	0	0	100
3	<b>EE1305</b>	Embedded Systems	3	0	0	100
4	<b>CS1307</b>	Operating Systems	3	0	0	100
5	<b>CS1302</b>	Computer Networks	3	0	0	100
6	<b>HS1201</b>	Environmental Science and Engineering	3	0	0	100
<b>Practical</b>						
7	<b>CS1256</b>	Operating Systems Laboratory	0	0	3	100
8	<b>CS1305</b>	Networks Laboratory	0	0	3	100
9	<b>HS1301</b>	Communication and Soft Skills Laboratory	0	0	3	100

## SEMESTER VI

S.No.	Subject Code	Subject	L	T	P	Max. Marks
<b>Theory</b>						
1	<b>IT1351</b>	Telecommunication Systems	3	0	0	100
2	<b>IT1352</b>	Network Programming and Management	3	0	0	100
3	<b>IT1353</b>	Cryptography and Network Security	3	1	0	100
4	<b>CS1304</b>	Visual Programming	3	1	0	100
5	<b>CS1361</b>	Object Oriented Analysis and Design	3	0	0	100
6	<b>MG1352</b>	Total Quality Management	3	0	0	100
<b>Practical</b>						
7	<b>IT1354</b>	Network Programming Laboratory	0	0	3	100
8	<b>CS1362</b>	Visual Programming Laboratory	0	0	3	100
9	<b>CS1363</b>	CASE Tools Laboratory	0	0	3	100

## SEMESTER VII

S.No.	Subject Code	Subject	L	T	P	Max. Marks
<b>Theory</b>						
1	<b>IT1401</b>	Web Technology	3	0	0	100
2	<b>CS1402</b>	Middleware Technologies	3	0	0	100
3	<b>EC1411</b>	Mobile Computing	3	0	0	100
4	<b>CS1354</b>	Graphics and Multimedia	3	0	0	100
5	<b>E1****</b>	Elective I	3	0	0	100
6	<b>E2****</b>	Elective II	3	0	0	100
<b>Practical</b>						
7	<b>CS1405</b>	Middleware Technologies Laboratory	0	0	3	100
8	<b>CS1356</b>	Graphics and Multimedia Laboratory	0	0	3	100
9	<b>CS1407</b>	Software Development Laboratory	0	0	3	100

## SEMESTER VIII

S.No.	Subject Code	Subject	L	T	P	Max. Marks
<b>Theory</b>						
1	<b>IT1451</b>	XML and Web Services	3	1	0	100
2	<b>IT1452</b>	Fundamentals of Pervasive Computing	3	0	0	100
3	<b>E3****</b>	Elective III	3	0	0	100
4	<b>E5****</b>	Elective IV	3	0	0	100
<b>Practical</b>						
5	<b>IT1455</b>	Project Work	0	0	12	100

## SEMESTER VI

S.No.	Subject Code	Subject	L	T	P	Max. Marks
<b>ELECTIVE I</b>						
1	<b>CS1007</b>	Wireless Network Systems	3	0	0	100
2	<b>BM1354</b>	Medical Informatics	3	0	0	100
3	<b>BM1002</b>	Bioinformatics	3	0	0	100
4	<b>EC1022</b>	Optical Communication	3	0	0	100
5	<b>CS1013</b>	C# and .NET	3	0	0	100
6	<b>CS1008</b>	Advanced Java Programming	3	0	0	100
7	<b>CS1017</b>	TCP/IP Design and Implementation	3	0	0	100
<b>ELECTIVE II</b>						
8	<b>CS1005</b>	UNIX Internals	3	0	0	100
9	<b>CS1006</b>	Open Source Software	3	0	0	100
10	<b>CS1003</b>	Component Based Technology	3	0	0	100
11	<b>CS1022</b>	Software Project Management	3	0	0	100
12	<b>CS1002</b>	Digital Image Processing	3	0	0	100
13	<b>CS1021</b>	Soft Computing	3	0	0	100
14	<b>CS1010</b>	Advanced Operating Systems	3	0	0	100
<b>ELECTIVE III</b>						
15	<b>EC1021</b>	High Performance Microprocessors	3	0	0	100
16	<b>CS1001</b>	Parallel Computing	3	0	0	100
17	<b>CS1009</b>	Advanced Databases	3	0	0	100
18	<b>IT1002</b>	Nano Computing	3	0	0	100
19	<b>CS1016</b>	Software Testing	3	0	0	100
20	<b>IT1003</b>	Software Metrics	3	0	0	100
21	<b>CS1012</b>	Knowledge Based Decision Support Systems	3	0	0	100
<b>ELECTIVE IV</b>						
22	<b>IT1004</b>	Enterprise Resource Planning	3	0	0	100
23	<b>CS1023</b>	Resource Management Techniques	3	0	0	100
24	<b>CS1014</b>	User Interface Design	3	0	0	100
25	<b>CS1015</b>	Information Security	3	0	0	100
26	<b>IT1005</b>	Business Process Model	3	0	0	100
27	<b>IT1006</b>	Requirements Engineering	3	0	0	100
28	<b>CS1024</b>	Software Quality Management	3	0	0	100

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**Regulations 2007**

**Syllabus**

**B.TECH. INFORMATION TECHNOLOGY**

**SEMSETER III**

**MA1201 – MATHEMATICS III**  
(Common to all branches)

	<b>L</b>	<b>T</b>	<b>P</b>
<b>UNIT I      PARTIAL DIFFERENTIAL EQUATIONS</b>	<b>3</b>	<b>1</b>	<b>0</b>
<p>Formation of Partial Differential Equations by Elimination of Arbitrary Constants and Arbitrary Functions – Solution of Standard Types of First Order Partial Differential Equations – Lagrange’s Linear Equation – Linear Partial Differential Equations of Second and Higher Order with Constant Coefficients.</p>			
<b>UNIT II      FOURIER SERIES</b>			<b>9</b>
<p>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.</p>			
<b>UNIT III     BOUNDARY VALUE PROBLEMS</b>			<b>9</b>
<p>Classification of Second Order Quasi Linear Partial Differential Equations – Solutions of One Dimensional Wave Equation – One Dimensional Heat Equation – Steady State Solution of Two-Dimensional Heat Equation (Insulated edges excluded) – Fourier Series Solutions in Cartesian Coordinates.</p>			
<b>UNIT IV      FOURIER TRANSFORM</b>			<b>9</b>
<p>Fourier Integral Theorem (without proof) – Fourier Transform Pair – Sine and Cosine Transforms – Properties – Transforms of Simple Functions – Convolution Theorem – Parseval’s Identity.</p>			
<b>UNIT V      Z - TRANSFORM AND DIFFERENCE EQUATIONS</b>			<b>9</b>
<p>Z-Transform – Elementary Properties – Inverse Z-Transform – Convolution Theorem – Formation of Difference Equations – Solution of Difference Equations using Z-Transform.</p>			

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

### **TEXT BOOK**

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

### **REFERENCES**

1. Churchill R.V. and Brown J.W., “Fourier Series and Boundary Value Problems”, 4th Edition, McGraw-Hill Book Co., 1987.
2. Veerarajan .T, “Engineering Mathematics III”, 3rd Edition, Tata McGraw-Hill Education, 2007.
3. Kandasamy P., Thilagavathy K. and Gunavathy K., “Engineering Mathematics Volume III”, S. Chand and Company ltd., 1996.

**UNIT I REPRESENTATION OF SIGNALS 9**

Continuous and Discrete Time Signals: Classification of Signals – Periodic – Aperiodic Even – Odd – Energy and Power Signals – Deterministic and Random Signals – Complex Exponential and Sinusoidal Signals – Periodicity – Properties of Discrete Time – Complex Exponential Unit Impulse – Unit Step Impulse Functions – Transformation in Independent Variable of Signals: Time Scaling – Time Shifting. Determination of Fourier Series Representation of Continuous Time and Discrete Time Periodic Signals – Properties of Continuous Time and Discrete Time Fourier Series.

**UNIT II ANALYSIS OF CONTINUOUS TIME SIGNALS AND SYSTEMS 9**

Continuous Time Fourier Transform and Laplace Transform Analysis with Examples – Properties, Parseval's Relation – and Convolution in Time and Frequency Domains – Basic Properties of Continuous Time Systems: Linearity – Causality – Time Invariance – Stability – Magnitude and Phase Representations of Frequency Response of LTI Systems – Analysis and Characterization of LTI Systems using Laplace Transform: Computation of Impulse Response and Transfer Function using Laplace Transform

**UNIT III SAMPLING THEOREM AND Z - TRANSFORMS 9**

Representation of Continuous Time Signals by its Sample – Sampling Theorem – Reconstruction of a Signal from its Samples – Aliasing – Discrete Time Processing of Continuous Time Signals – Sampling of Band Pass Signals. Basic Principles of Z-Transform – Definition – Region of Convergence – Properties of ROC – Properties of Z-Transform – Poles and Zeros – Inverse Z-Transform using Contour Integration – Residue Theorem – Power Series Expansion and Partial Fraction Expansion – Relationship between Z-Transform and Fourier Transform.

**UNIT IV DISCRETE TIME SYSTEMS 9**

Computation of Impulse Response and Transfer Function using Z-Transform. DTFT Properties and Examples – LTI – DT Systems – Characterization using Difference Equation – Block Diagram Representation – Properties of Convolution and the Interconnection of LTI Systems – Causality and Stability of LTI Systems.

**UNIT V SYSTEMS WITH FINITE AND INFINITE DURATION IMPULSE RESPONSE 9**

Systems with Finite Duration and Infinite Duration Impulse Response – Recursive and Non-Recursive Discrete Time System – Realization Structures – Direct Form – I-direct Form – II-Transpose – Cascade and Parallel Forms.

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

## **TEXT BOOK**

1. Alan V. Oppenheim, Alan S. Willsky with S. Hamid Nawab, "Signals and Systems", 2nd Edition, Pearson Education, 1997.

## **REFERENCES**

1. John G. Proakis and Dimitris G. Manolakis, "Digital Signal Processing-Principles, Algorithms and Applications", 3rd Edition, PHI, 2000.
2. M. J. Roberts, "Signals and Systems Analysis using Transform method and MATLAB", TMH, 2003.
3. Simon Haykin and Barry Van Veen, "Signals and Systems", John Wiley, 1999.
4. Moman H. Hays, "Digital Signal Processing", Schaum's outlines, Tata McGraw-Hill, 2004.
5. Ashok Amhardar, "Analog and Digital Signal Processing", 2nd Edition, Thomson, 2002.

## EC1206 – ELECTRONIC DEVICES AND CIRCUITS

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**3 1 0**

### **UNIT I ELECTRON BALLISTICS AND APPLICATIONS 9**

Force on charged particles in an electric field – magnetic field – calculation of electrostatic and magnetic deflection sensitivity in cathode ray tube – analysis of parallel and perpendicular electric and magnetic fields – cyclotron – energy band structure of conductors – intrinsic and extrinsic semiconductor – N and P type – insulators – Hall effect.

### **UNIT II SEMICONDUCTOR DIODES 9**

PN junction – derivation of diode equation – current components – switching characteristics of diode – common diode applications – characteristics and applications of Varactor diode and Zener diode – Mechanism of Avalanche and Zener breakdown – backward diode – tunnel diode – PIN diode – point contact diode – Schottky barrier diode – photo diode – APD – light emitting diodes.

### **UNIT III BIPOLAR JUNCTION TRANSISTORS AND FIELD EFFECT TRANSISTORS 9**

Bipolar junction transistor – PNP and NPN action – current components – Eber-Moll model – transistor switching times – comparison of CE, CB and CC configuration – BJT applications – construction and characteristics of JFET – Relation between Pinch-off voltage and Drain current – MOSFET – enhancement and depletion types – MESFET – introduction to VMOS and CMOS devices.

### **UNIT IV TRANSISTOR BIASING 9**

BJT – operating point – need for biasing – various biasing methods of BJT – bias stability – stability parameters – biasing methods of FET – use of JFET as a voltage variable resistor (VVR).

### **UNIT V POWER SUPPLY AND POWER AMPLIFIERS 9**

Basic Elements of Regulated Power Supply System – Stabilization – Series and Shunt Voltage Regulators – General purpose and Monolithic Linear Regulators – Switching Regulators. Classification of Power Amplifiers (Class A, B, AB, C and D) – Efficiency of Class A – RC Coupled and Transformer – Coupled Power Amplifiers – Class B Complementary-Symmetry – Push-Pull Power Amplifiers.

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

### **TEXT BOOKS**

1. Jacob Millman and Christos C.Halkias, “Electronic Devices and Circuits” Tata McGraw–Hill, 1991.
2. Robert T.Paynter, Introductory Electronic Devices and Circuits, Pearson Education, 7th Edition, 2006.

### **REFERENCES**

1. Boylestad ,R.L and Nashelsky,L, ”Electronic Devices and Circuit Theory”, Pearson Education,1997
2. Donald A.Neaman, ” Semiconductor Physics and Devices” 3rd Edition, Tata McGraw-Hill, 2002.
3. S.Salivahanan, N.Sureshkumar and A.Vallavaraj, “Electronic Devices and Circuits”, TMH, 1998.

## CS1201 – DATA STRUCTURES

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

<b>UNIT I</b>	<b>PROBLEM SOLVING</b>	<b>9</b>
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Problem Solving – Top-down Design – Implementation – Verification – Efficiency – Analysis – Sample algorithms.

<b>UNIT II</b>	<b>LISTS - STACKS AND QUEUES</b>	<b>8</b>
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Abstract Data Type (ADT) – The List ADT – The Stack ADT – The Queue ADT.

<b>UNIT III</b>	<b>TREES</b>	<b>10</b>
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Binary Trees – The Search Tree ADT – Binary Search Trees – AVL Trees – Tree Traversals – Hashing – General Idea – Hash Function – Separate Chaining – Open Addressing – Linear Probing – Priority Queues (Heaps) – Model – Simple Implementations – Binary Heap

<b>UNIT IV</b>	<b>SORTING</b>	<b>9</b>
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Insertion Sort – Shell Sort – Heap Sort – Merge Sort – Quick Sort – External Sorting.

<b>UNIT V</b>	<b>GRAPHS</b>	<b>9</b>
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Topological Sort – Shortest Path Algorithms – Unweighted Shortest Paths – Dijkstra’s Algorithm – Minimum Spanning Tree – Prim’s Algorithm – Applications of Depth-First Search – Undirected Graphs – Biconnectivity – Introduction to NP Completeness.

**Total: 45**

### TEXT BOOKS

1. R. G. Dromey, “How to Solve it by Computer”, Prentice-Hall of India, 2002.
2. M. A. Weiss, “Data Structures and Algorithm Analysis in C”, Pearson Education, 2nd Edition, 2002.

### REFERENCES

1. Y. Langsam, M. J. Augenstein and A. M. Tenenbaum, “Data Structures using C”, Pearson Education, 2004.
2. Richard F. Gilberg, Behrouz A. Forouzan, “Data Structures, A Pseudocode Approach with C”, Thomson Brooks / COLE, 1998.
3. Aho J. E. Hopcroft and J. D. Ullman, “Data Structures and Algorithms”, Pearson Education, 1983.
4. Harowitz, Sahani, Anderson-Freed, “Fundamentals of DataStructures in C”, 2nd Edition, Universities Press, 2007.

## CS1203 – OBJECT ORIENTED PROGRAMMING

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**3 0 0**

### **UNIT I FUNDAMENTALS 9**

Object Oriented Programming Concepts – Encapsulation – Programming Elements – Program Structure – Enumeration Types — Functions and Pointers – Function Invocation – Overloading Functions – Scope and Storage Class – Pointer Types – Arrays and Pointers – Call-by-Reference – Assertions – Standard Template Library.

### **UNIT II IMPLEMENTING ADTS AND ENCAPSULATION 9**

Aggregate Type struct – Structure Pointer Operators – Unions – Bit Fields – Data Handling and Member Functions – Classes – Constructors and Destructors – Static Member – this Pointer – Reference Semantics – Implementation of Simple ADTs.

### **UNIT III POLYMORPHISM 9**

ADT Conversions – Overloading – Overloading Operators – Unary Operator Overloading – Binary Operator Overloading – Function Selection – Pointer Operators

### **UNIT IV INHERITANCE 9**

Derived Class – Typing Conversions and Visibility – Code Reuse – Virtual Functions – Run-Time Type Identifications – Exceptions – Handlers – Standard Exceptions.

### **UNIT V TEMPLATES AND FILE HANDLING 9**

Template Class – Function Templates – Class Templates – C++ Streams – Console Streams – Console Stream Classes – Formatted and Unformatted Console I/O Operations – Manipulators – File Streams – Classes File Modes – File Pointers and Manipulations – File I/O – Exception Handling

**Total: 45**

### **TEXT BOOKS**

1. Ira Pohl, “Object–Oriented Programming Using C++”, 2nd Edition, Pearson Education, 2003
2. K.R.Venugopal, Rajkumar Buyya and T.Ravishankar, “Mastering C++”, TMH, 2003.

### **REFERENCES**

1. Ashok N.Kamthane, “Object-Oriented Probramming with ANSI and Turbo C++”, Pearson Education, 2006.
2. Bjarne Stroustrup, “The C++ programming language”, Addison Wesley, 2000.
3. John R.Hubbard, “Progranning with C++”, Schaums outline series, TMH, 2003.

## EC1207 – PRINCIPLES OF COMMUNICATION ENGINEERING

**L T P**  
**3 1 0**

### **UNIT I AMPLITUDE MODULATION 9**

Principles of Amplitude Modulation – AM Envelope – Frequency Spectrum and Bandwidth – Modulation Index and Percent Modulation – AM Power Distribution – AM Modulator Circuits – Low Level AM Modulator – Medium Power AM Modulator – AM Transmitters – Low Level Transmitters – High Level Transmitters – Receiver Parameters – AM Reception AM Receivers – TRF – Super Heterodyne Receivers – Double Conversion AM Receivers.

### **UNIT II ANGLE MODULATION 9**

Angle Modulation – FM and PM Waveforms – Phase Deviation and Modulation Index – Frequency Deviation – Phase and Frequency Modulators and Demodulators – Frequency Spectrum of Angle Modulated Waves – Bandwidth Requirement – Broadcast Band FM – Average Power FM and PM Modulators – Direct FM and PM – Direct FM Transmitters – Indirect Transmitters – Angle Modulation Vs. Amplitude Modulation – FM Receivers FM Demodulators – PLL FM Demodulators – FM Noise Suppression – Frequency Vs. Phase Modulation.

### **UNIT III DIGITAL MODULATION 9**

Introduction – Binary PSK – DPSK – Differentially Encoded PSK – QPSK – M-ary PSK – QASK – Binary FSK – MSK – GMSK – Duobinary Encoding – Performance Comparison of Various Systems of Digital Modulation.

### **UNIT IV BASEBAND DATA TRANSMISSION 9**

Sampling Theorem – Quadrature Sampling of Bandpass Signals – Reconstruction of Message from its Samples – Signal Distortion in Sampling – Discrete PAM Signals – Power Spectra of Discrete PAM Signals – ISI Nyquist Criterion for Distortionless Baseband Binary Transmission – Eye Pattern – Baseband M-ary PAM Systems – Adaptive Equalization for Data Transmission.

### **UNIT V SPREAD SPECTRUM AND MULTIPLE ACCESS TECHNIQUES 9**

Introduction – Pseudo-Noise Sequence – DS Spread Spectrum with Coherent Binary PSK – Processing Gain – FH Spread Spectrum – Multiple Access Techniques – Wireless Communications – TDMA and CDMA – Wireless Communication Systems – Source Coding of Speech for Wireless Communications.

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

### **TEXT BOOKS**

1. Wayne Tomasi, “Electronic Communication Systems: Fundamentals Through Advanced”, Pearson Education, 2001.
2. Simon Haykin, “Digital Communications”, John Wiley and Sons, 2003.

### **REFERENCES**

1. Simon Haykin, “Communication Systems”, Fourth Edition, John Wiley and Sons, 2001.
2. Taub and Schilling, “Principles of Communication Systems”, Second Edition, TMH, 2003.
3. Martin S. Roden, “Analog and Digital Communication System”, Third Edition, PHI, 2002.
4. Blake, “Electronic Communication Systems”, Second Edition, Thomson Delman, 2002.

## EC1208 – ELECTRONIC DEVICES AND CIRCUITS LABORATORY

L	T	P
0	0	3

1. Measurement of characteristics of PN Junction Diode.
2. Measurement of characteristics of Zener Diode
3. Measurement of characteristics of Special Diodes such as
  - a. Varactor Diode
  - b. Tunnel Diode
  - c. Photo Diode
  - d. Schottky Diode
4. Clipper and Clamper Circuits using Diode.
5. Design and testing of Rectifiers with and without Filters.
6. Input and Output characteristics of BJT and determination of h- parameters from the graph.
7. Output characteristics of JFET.
  - a.. Plot of Transfer characteristics from the output characteristics.
  - b. Determination of pinch off voltage and  $I_{ds}$
8. Fixed Bias amplifier circuits using BJT.
9. BJT Amplifier using voltage divider bias (self bias) with unbypassed emitter resistor.
10. Source follower with Bootstrapped gate resistance.
11. Measurement of UJT and SCR Characteristics.
  - a. Firing Characteristics of SCR.
  - b. Measurement of Intrinsic stands off ratio of UJT.
  - c. Measurement of DIAC and TRIAC Characteristics.
12. Measurement of Characteristics of Power Amplifiers (Class A, B and C)

**Total: 45**

**Implement the following exercises using C**

1. Array Implementation of List ADT
2. Linked List Implementation of List ADT
3. Cursor Implementation of List ADT
4. Array Implementation of Stack ADT
5. Linked List Implementation of Stack ADT
6. The following three exercises are to be done by implementing the following source files
  - (a) Program for ‘Balanced Paranthesis’
  - (b) Array Implementation of Stack ADT
  - (c) Linked List Implementation of Stack ADT
  - (d) Program for ‘Evaluating Postfix Expressions’

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

- I. Implement the application for checking ‘Balanced Paranthesis’ using array implementation of Stack ADT (by implementing files (a) and (b) given above)
  - II. Implement the application for checking ‘Balanced Paranthesis’ using linked list implementation of Stack ADT (by using file (a) from experiment 1 and implementing file (c))
  - III. Implement the application for ‘Evaluating Postfix Expressions’ using array and linked list implementations of Stack ADT (by implementing file (d) and using file (b) - and then by using files (d) and (c))
7. Queue ADT
  8. Search Tree ADT – Binary Search Tree
  9. Heap Sort
  10. Quick Sort

**Total: 45**

## CS1205 – OBJECT ORIENTED PROGRAMMING LABORATORY

L	T	P
0	0	3

1. Programs Using Functions
  - Functions with Default Arguments
  - Implementation of Call by Value - Call by Address
  
2. Simple Classes for Understanding Objects - Member Functions and Constructors
  - Classes with Primitive Data Members
  - Classes with Arrays as Data Members
  - Classes with Pointers as Data Members - String Class
  - Classes with Constant Data Members
  - Classes with Static Member Functions
  
3. Compile Time Polymorphism
  - Operator Overloading including Unary and Binary Operators.
  - Function Overloading
  
4. Runtime Polymorphism
  - Inheritance
  - Virtual Functions
  - Virtual Base Classes
  - Templates
  
5. File Handling
  - Sequential Access
  - Random Access

**Total: 45**

## SEMESTER IV

### MA1252 – PROBABILITY AND QUEUEING THEORY

L	T	P
3	1	0

#### UNIT I      **PROBABILITY AND RANDOM VARIABLE**      **9**

Axioms of Probability – Conditional Probability – Total Probability – Baye’s Theorem – Random Variable – Probability Mass Function – Probability Density Function – Properties – Moments – Moment Generating Functions and their Properties.

#### UNIT II      **STANDARD DISTRIBUTIONS**      **9**

Binomial – Poisson – Uniform – Exponential – Gamma – Normal Distributions and their Properties – Functions of a Random variable – Chebyshev inequality

#### UNIT III      **TWO DIMENSIONAL RANDOM VARIABLES**      **9**

Joint Distributions – Marginal and Conditional Distributions – Covariance – Correlation and Regression – Transformation of Random Variables – Central Limit Theorem.

#### UNIT IV      **RANDOM PROCESSES AND MARKOV CHAINS**      **9**

Classification – Stationary Process – Markov Process – Poisson Process – Birth and Death Process – Markov Chains – Transition Probabilities – Limiting Distributions.

#### UNIT V      **QUEUEING THEORY**      **9**

Markovian Models – M/M/1 – M/M/C – Finite and Infinite Capacity – M/M/∞ Queues – Finite Source Model – M/G/1 Queue (Steady State Solutions Only) – Pollaczek – Khintchine Formula – Special Cases.

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

#### TEXT BOOKS

1. Ross S., “A first course in probability”, Seventh Edition, Pearson Education, 2006.
2. S.Karlin and H.M. Taylor, “An Introduction to Stochastic Modeling” Academic Press, 2007
3. Taha, H. A., “Operations Research - An Introduction”, Eighth Edition, Pearson Education, 2007.

#### REFERENCES

1. Veerarajan T., “Probability, Statistics and Random Processes”, Second Edition, Tata McGraw Hill, 2006.
2. Richard A Johnson, “Probability and Statistics for Engineers”, Seventh Edition, Pearson Education, 2005.
3. Gross D. and Harris, C.M., “Fundamentals of Queuing Theory”, Third Edition, John Wiley and Sons, 1998.

## CS1258 – MICROPROCESSORS AND MICROCONTROLLERS

L	T	P
3	0	0

### UNIT I      8085 MICROPROCESSOR      9

Introduction to 8085 – Microprocessor Architecture – Instruction Set – Programming the 8085 – Code Conversion.

### UNIT II      8086 SOFTWARE ASPECTS      9

Intel 8086 Microprocessor – Architecture – Instruction Set and Assembler Directives – Addressing Modes – Assembly Language Programming – Procedures – Macros – Interrupts and Interrupt Service Routines.

### UNIT III      8086 SYSTEM DESIGN      9

8086 Signals and Timing – Min/Max Mode of Operation – Addressing Memory and I/O – Multiprocessor Configurations – System Design using 8086

### UNIT IV      I/O INTERFACING      9

Memory Interfacing and I/O Interfacing – Parallel Communication Interface – Serial Communication Interface – Timer – Keyboard /Display Controller – Interrupt Controller – DMA Controller – Programming and Applications.

### UNIT V      MICROCONTROLLERS      9

Architecture of 8051 – Signals – Operational Features – Memory and I/O Addressing – Interrupts – Instruction Set – Applications.

**Total: 45**

### TEXT BOOKS

1. Ramesh S.Gaonkar, “Microprocessor: Architecture, Programming and Applications with the 8085”, Fifth Edition, Penram International publishing private limited, 2002.
2. A.K. Ray and K.M.Bhurchandi, “Advanced Microprocessors and peripherals- Architectures, Programming and Interfacing”, TMH, 2002.

### REFERENCES

1. Douglas V. Hall, “Microprocessors and Interfacing Programming and Hardware”, Third Edition, TMH, 2002.
2. Yu -cheng Liu, Glenn A.Gibson, “Microcomputer systems The 8086 / 8088 Family architecture, Programming and Design”, PHI, 2003.
3. Mohamed Ali Mazidi, and Janice Gillispie Mazidi, “The 8051 microcontroller and embedded systems”, Pearson Education, 2004.

## IT1251 – INFORMATION CODING TECHNIQUES

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### 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 and MPEG Video Standards.

**Total: 45**

### TEXTBOOKS

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, 1995.

## CS1202 – COMPUTER ARCHITECTURE

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### UNIT I BASIC STRUCTURE OF COMPUTERS 9

Functional Units – Basic Operational Concepts – Bus Structures – Software Performance – Memory Locations and Addresses – Memory Operations – Instruction and Instruction Sequencing – Addressing Modes – Assembly Language – Basic I/O Operations – Stacks and Queues.

### UNIT II ARITHMETIC UNIT 9

Addition and Subtraction of Signed Numbers – Design of Fast Adders – Multiplication of Positive Numbers – Signed Operand Multiplication and Fast Multiplication – Integer Division – Floating Point Numbers and Operations.

### UNIT III BASIC PROCESSING UNIT 9

Fundamental Concepts – Execution of a Complete Instruction – Multiple Bus Organization – Hardwired Control – Microprogrammed Control – Pipelining – Basic Concepts – Data Hazards – Instruction Hazards – Influence on Instruction Sets – Data Path and Control Consideration – Superscalar Operation – Performance Considerations.

### UNIT IV I/O ORGANIZATION 9

Accessing I/O Devices – Interrupts – Direct Memory Access – Buses – Interface Circuits – Standard I/O Interfaces (PCI - SCSI - USB).

### UNIT V MEMORY SYSTEM 9

Memory Concepts – Semiconductor RAMs – ROMs – Speed – Size and Cost – Cache Memories – Performance Consideration – Virtual Memory – Memory Management Requirements – Secondary Storage.

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

### TEXT BOOK

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

### REFERENCES

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



## CS1254 – DATABASE MANAGEMENT SYSTEMS

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### **UNIT I FUNDAMENTALS AND CONCEPTUAL MODELING 9**

Introduction to File And Database Systems – Database System Structure – Data Models – Introduction to Network and Hierarchical Models – ER Model – Relational Model – Relational Algebra and Calculus.

### **UNIT II RELATIONAL MODEL 9**

SQL – Data Definition – Queries in SQL – Updates – Views – Integrity and Security – Relational Database Design – Functional Dependences and Normalization for Relational Databases (Up To BCNF).

### **UNIT III DATA STORAGE AND QUERY PROCESSING 9**

Record Storage and Primary File Organization – Secondary Storage Devices – Operations On Files – Heap File – Sorted Files – Hashing Techniques – Index Structure for Files – Different Types of Indexes – B-Tree – B+Tree – Query Processing.

### **UNIT IV TRANSACTION MANAGEMENT 9**

Transaction Processing – Introduction – Need for Concurrency Control – Desirable Properties of Transaction – Schedule and Recoverability – Serializability and Schedules – Concurrency Control – Types of Locks – Two Phases Locking – Deadlock – Time Stamp Based Concurrency Control – Recovery Techniques – Concepts – Immediate Update – Deferred Update – Shadow Paging.

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

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

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

### **TEXT BOOK**

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

### **REFERENCES**

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

**LIST OF EXPERIMENTS**

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

**Total: 45**

## EC1257 – DIGITAL SIGNAL PROCESSING LABORATORY

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### LIST OF EXPERIMENTS

#### USING TMS320C5X

1. Study of various addressing modes of DSP using simple programming examples
2. Sampling of input signal and display
3. Implementation of FIR filter
4. Calculation of FFT

#### USING MATLAB

1. Generation of Signals
2. Linear and circular convolution of two sequences
3. Sampling and effect of aliasing
4. Design of FIR filters
5. Design of IIR filters
6. Calculation of FFT of a signal

**Total: 45**

## CS1257 – DATABASE MANAGEMENT SYSTEMS LABORATORY

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### LIST OF EXPERIMENTS

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

**Total: 45**

## SEMESTER V

### MA1251 – NUMERICAL METHODS

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

Linear interpolation methods (method of false position) – Newton’s 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 formulae.

#### **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 – Double integrals using trapezoidal and Simpson's rules.

#### **UNITIV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS 9**

Single step Methods: Taylor Series method – Euler’s method – Modified and Improved Euler’s method – Fourth order Runge-Kutta method for solving first and second order equations – Multi-step 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 implicit and explicit methods – one dimensional wave equation and two dimensional Laplace and Poisson equations.

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

#### **TEXT BOOK**

1. C.F. Gerald and P.O. Wheatley “Applied Numerical Analysis”, Seventh Edition, Pearson Education, 2007.

#### **REFERENCES**

1. M.K. Jain, S.R.K. Iyengar and R.K. Jain, “Numerical Methods for Scientific and Engineering Computation” Fourth Edition, New Age International Publishers, 2003.
2. M.K. Venkatraman, ‘Numerical Methods’, National Publication Company, 1991.
3. P. Kandasamy, K. Thilakavthy and K. Gunavathy, “Numerical Methods”, Second Edition, S.Chand and Co., 2003.

# CS1301 – SOFTWARE ENGINEERING

**L T P**  
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## **UNIT I SOFTWARE PROCESS 9**

Introduction – S/W Engineering Paradigm – Life Cycle Models (Water Fall, Incremental, Spiral, Win Win Spiral, Evolutionary, Prototyping, Object Oriented) – System Engineering – Computer Based System – Verification – Validation – Life Cycle Process – Development Process – System Engineering Hierarchy.

## **UNIT II SOFTWARE REQUIREMENTS 9**

Functional and Non Functional – User System – Requirement Engineering Process – Feasibility Studies – Requirements – Elicitation – Validation and Management – Software Prototyping – Prototyping in the Software Process – Rapid Prototyping Techniques – User Interface Prototyping – S/W Document – Analysis and Modeling – Data, Functional and Behavioral Models – Structured Analysis and Data Dictionary.

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

Design Process and Concepts – Modular Design – Design Heuristic – Design Model and Document – Architectural Design – Software Architecture – Data Design – Architectural Design – Transform and Transaction Mapping – User Interface Design – User Interface Design Principles : Real Time Systems – Real Time Software Design – System Design – Real Time Executives – Data Acquisition System – Monitoring and Control System: SCM – Need for SCM – Version Control – Introduction to SCM Process – Software Configuration Items.

## **UNIT IV TESTING 9**

Taxonomy of Software Testing – Levels – Test Activities – Types of S/W Test – Black Box Testing – Testing Boundary Conditions – Structural Testing – Test Coverage Criteria Based on Data Flow Mechanisms – Regression Testing – Testing in the Large. S/W Testing Strategies – Strategic Approach and Issues – Unit Testing – Integration Testing – Validation Testing – System Testing and Debugging.

## **UNIT V SOFTWARE PROJECT MANAGEMENT 9**

Measures and Measurements – S/W Complexity and Science Measure – Size Measure – Data and Logic Structure Measure – Information Flow Measure – Software Cost Estimation – Function Point Models – COCOMO Model – Delphi Method – Defining a Task Network – Scheduling – Earned Value Analysis – Error Tracking – Software Changes – Program Evolution Dynamics – Software Maintenance – Architectural Evolution – Taxonomy of CASE Tools.

**Total: 45**

## **TEXT BOOK**

1. Roger S. Pressman, "Software Engineering – A Practitioner's Approach", Fifth Edition, McGraw Hill International Edition, 2001.

## **REFERENCES**

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

## EE1305 – EMBEDDED SYSTEMS

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### UNIT I PIC MICROCONTROLLER 16F87X 9

Architecture - Features – Resets –Memory Organisations : Program Memory, Data Memory – Instruction Set – simple programs. Interrupts –I/O Ports –Timers- CCP Modules- Master Synchronous serial Port(MSSP)- USART –ADC- I<sup>2</sup>C

### UNIT II EMBEDDED PROCESSORS 9

ARM processor- processor and memory organization, Data operations, Flow of Control, CPU Bus configuration, ARM Bus, Memory devices, Input/output devices, Component interfacing, designing with microprocessor development and debugging, Design Example : Alarm Clock.

### UNIT III EMBEDDED PROGRAMMING 9

Programming in Assembly Language(ALP) Vs High level language – C program elements, Macros and Functions – Use of pointers – NULL pointers – use of function calls – multiple function calls in a cyclic order in the main function pointers – Function queues and interrupt service Routines queues pointers – Concepts of Embedded programming in C++ - Object oriented programming – Embedded programming in C++, C program compilers – Cross compiler – optimization of memory codes.

### UNIT IV EMBEDDED SYSTEM CO-DESIGN 9

Embedded System project management – Embedded system design and Co-Design Issues in System Development process – Design cycle in the development phase for an embedded system – Uses of Target system or its emulator and In-Circuit Emulator – Use of software Tools for Development of an embedded system – Use of scopes and logic analyzers for system hardware tests – Issues in Embedded System Design

### UNIT V REAL-TIME OPERATING SYSTEMS 9

Operating system services –I/O subsystems – Network operating systems –Interrupt Routines in RTOS Environment – RTOS Task scheduling models, Interrupt – Performance Metric in Scheduling Models – IEEE standard POSIX functions for standardization of RTOS and inter-task communication functions – List of Basic functions in a Preemptive scheduler – Fifteen point strategy for synchronization between processors, ISRs, OS Functions and Tasks – OS security issues- Mobile OS.

**Total: 45**

## **TEXT BOOKS**

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

## **REFERENCES**

1. Steve Heath, "Embedded Systems Design", Newnes, Second 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", Second Edition, Elsevier India Private Limited, 2005.



**TEXT BOOK**

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", Sixth Edition, John Wiley and Sons Pvt. Ltd, 2003.

**REFERENCES**

1. Harvey M. Deitel, "Operating Systems", Second Edition, Pearson Education, 2002.
2. Andrew S. Tanenbaum, "Modern Operating Systems", Prentice Hall of India, 2003.
3. William Stallings, "Operating System", Prentice Hall of India, Fourth Edition, 2003.
4. Crowley, "Operating Systems: A Design Oriented Approach", Tata Mcgraw Hill, 2002.

## CS1302 – COMPUTER NETWORKS

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### UNIT I DATA COMMUNICATIONS 8

Components – Direction of Data Flow – Networks – Components and Categories – Types of Connections – Topologies – Protocols and Standards – ISO / OSI Model – Transmission Media – Coaxial Cable – Fiber Optics – Line Coding – Modems – RS232 Interfacing Sequences.

### UNIT II DATA LINK LAYER 10

Error – Detection and Correction – Parity – LRC – CRC – Hamming Code – Low Control and Error Control – Stop and Wait – Go Back-N ARQ – Selective Repeat ARQ – Sliding Window – HDLC – LAN – Ethernet IEEE 802.3 – IEEE 802.4 – IEEE 802.5 – IEEE 802.11 – FDDI – SONET – Bridges.

### UNIT III NETWORK LAYER 10

Internetworks – Packet Switching and Datagram Approach – IP Addressing Methods – Subnetting – Routing – Distance Vector Routing – Link State Routing – Routers.

### UNIT IV TRANSPORT LAYER 9

Duties of Transport Layer – Multiplexing – Demultiplexing – Sockets – User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) – Congestion Control – Quality of Services (QoS) – Integrated Services.

### UNIT V APPLICATION LAYER 8

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

**Total: 45**

### TEXT BOOK

1. Behrouz A. Forouzan, “Data communication and Networking”, Tata McGraw Hill, 2004.

### REFERENCES

1. James F. Kurose and Keith W. Ross, “Computer Networking: A Top - Down Approach Featuring the Internet”, Pearson Education, 2003.
2. Larry L. Peterson and Peter S. Davie, “Computer Networks”, Second Edition, Harcourt Asia Pvt. Ltd., 1996.
3. Andrew S. Tanenbaum, “Computer Networks”, Fourth Edition, Prentice Hall of India, 2003.
4. William Stallings, “Data and Computer Communication”, Sixth Edition, Pearson Education, 2000.
5. Peterson, ”Computer Networks: A System Approach”, Fourth Edition, Elsevier India Private Limited, 2007.

## HS1201 – ENVIRONMENTAL SCIENCE AND ENGINEERING

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### UNIT I IMPORTANCE OF ENVIRONMENTAL STUDIES 9

Definition – Scope and Importance – Need for Public Awareness – Forest Resources – Water Resources – Mineral Resources – Land Resources – Energy Resources – Food Resources – Equitable use of Resources for Sustainable Lifestyles.

### UNIT II ECOSYSTEMS AND BIO DIVERSITY 9

Concept of Ecosystem – Structure and Function of an Ecosystem – Energy Flow in the Ecosystem – Food Chains – Food Webs – Ecological Pyramids – Definition of Bio-Diversity – Bio Geographical Classification in India – Value of Bio Diversity – Bio Diversity at Global – National and Local Levels – India as a Mega Diversity Nation – Hot Spots of Bio Diversity – Threats to Bio Diversity – Conservation of Bio Diversity.

### UNIT III ENVIRONMENTAL POLLUTION 9

Definition – Causes and Effects of Environmental Pollution – Air Pollution – Water Pollution – Soil Pollution – Marine Pollution – Noise Pollution – Thermal Pollution – Nuclear Hazards – Solid Waste Management – Societal Role in Pollution Prevention – Environmental Disasters and Management.

### UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT 9

Unsustainable to Sustainable Development – Concept of Conservation – Water and Energy Conservation – Rain Water Harvesting – Climate Change – Global Warming – Acid Rain – Ozone Layer Depletion – Nuclear Accidents and Holocaust – Environmental Protection Act – Issues Involved in Enforcement of Environmental Legislation – Public Awareness.

### UNIT V HUMAN POPULATION AND THE ENVIRONMENT 9

Population Growth – Population Explosion – Family Welfare Programme – Environment and Human Health – Human Rights – Value Education – HIV / AIDS – Women and Child Welfare – Role of IT in Environment and Human Health

**Total: 45**

### TEXT BOOKS

1. Gilbert M. Masters, “Introduction to Environmental Engineering and Science”, Second Edition, Pearson Education, 2004.
2. Miller T.G. Jr., “Environmental Science Working With the Earth”, Thomson Learning, 2001.
3. Trivedi R.K and P.K. Goel, “Introduction to Air Pollution”, Techno - Science Publications, 1998.

### REFERENCES

1. Bharucha Erach, “The Biodiversity of India”, Mapin Publishing, 2006.
2. Trivedi R.K., “Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards”, Vol. I and II, Environ Media, 1998.
3. Cunningham W.P. Copper and T.H. Gorhani, “Environmental Encyclopedia”, Jaico Publication, 2001.

## LIST OF EXPERIMENTS

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

1. Shell Programming: Command Syntax – Write Simple Functions – Basic Tests
2. Shell Programming: Loops – Patterns – Expansions – Substitutions
3. Write programs using the following system calls of UNIX operating system:  
fork, exec, getpid, exit, wait, close, stat, opendir, readdir
4. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc).
5. Write C programs to simulate UNIX commands like ls, grep, etc.
6. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time.
7. Given the list of processes, their CPU burst times and arrival times, Display / print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time.
8. Implement the Producer – Consumer problem using semaphores.
9. Implement some memory management schemes – I  
For eg 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.
10. Implement some memory management schemes – II.  
For eg. 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.

**Total: 45**

**LIST OF EXPERIMENTS**

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 may be used)
4. Write a program to implement CRC and Hamming code for error handling.
5. Write a code simulating Sliding Window Protocols.
6. Create a socket for HTTP for web page upload and Download.
7. Write a program for TCP module Implementation.(TCP services)
8. Write a program for File Transfer in client–server architecture using following methods.
  - a. USING RS232C
  - b. TCP/IP
9. Write a program to implement RMI (Remote Method Invocation)
10. 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
11. Broadcast /Multicast routing

**Total: 45**

## HS1301 – COMMUNICATION AND SOFT SKILLS LABORATORY

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(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:**

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”, 4<sup>th</sup> edition, New Delhi, Pearson Education, 2009.

**Total: 45**

## SEMESTER VI

### IT1351 – TELECOMMUNICATION SYSTEMS

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#### UNIT I      METHODS OF COMMUNICATION      9

Transmission lines – Types and characteristics – Antenna fundamentals – Different types of antennas and 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 COMMUNICATION      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. Frenzel, L.E., "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.



## IT1353 – CRYPTOGRAPHY AND NETWORK SECURITY

**L T P**  
**3 1 0**

### **UNIT I FUNDAMENTALS 10**

OSI security architecture – Classical encryption techniques – Cipher principles – Data encryption standard – Block cipher design principles and modes of operation – Evaluation criteria for AES – AES cipher – Triple DES – Placement of encryption function – Traffic confidentiality.

### **UNIT II PUBLIC KEY CRYPTOGRAPHY 10**

Key management – Diffie-Hellman key exchange – Elliptic curve architecture and cryptography – Introduction to number theory – Confidentiality using symmetric encryption – Public key cryptography and RSA.

### **UNIT III AUTHENTICATION AND HASH FUNCTION 9**

Authentication requirements – Authentication functions – Message authentication codes – Hash Functions – Security of hash functions and MACS – MD5 message digest Algorithm – Secure hash algorithm – Ripend – HMAC digital signatures – Authentication protocols – Digital signature standard.

### **UNIT IV NETWORK SECURITY 8**

Authentication applications – Kerberos – X.509 authentication service – Electronic mail security – PGP – S/MIME – IP security – Web security.

### **UNIT V SYSTEM LEVEL SECURITY 8**

Intrusion detection – Password management – Viruses and related threats – Virus counter measures – Firewall design principles – Trusted systems.

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

### **TEXT BOOKS**

1. William Stallings, “Cryptography and Network Security - Principles and Practices”, 3rd Edition, Prentice Hall of India, 2003.
2. Maiwald, “Fundamentals of Network Security”, Wiley Students Edition, 2006.

### **REFERENCES**

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

## CS1304 – VISUAL PROGRAMMING

L T P  
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### 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 GUI – 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 run time – 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. Kruglinski, D.J., 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, Tata Mc Graw Hill, 1999.
3. Bates and Tompkins, “Practical Visual C++”, Prentice Hall of India, 2002.

## CS1361 – OBJECT ORIENTED ANALYSIS AND DESIGN

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### UNIT I BASIC CONCEPTS 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 – Usecase – Class diagram – Interactive diagram – Package diagram – Collaboration diagram – State diagram – Activity diagram.

### UNIT III OBJECT ORIENTED ANALYSIS 9

Identifying usecases – 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. Schach, S.R., “Introduction to Object Oriented Analysis and Design”, Tata McGraw - Hill, 2003.
2. Rumbaugh, J., Jacobson, I. and Booch, G., “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.

## MG1352 – TOTAL QUALITY MANAGEMENT

(Common to Biomedical, CSE, ECE and IT)

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**3 0 0**

### **UNIT I QUALITY 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 – PDCA 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 systems – Elements, implementation of quality system – Documentation – Quality auditing – TS 16949 – ISO 14000 – Concept – Requirements and benefits.

**Total: 45**

### **TEXT BOOKS**

1. Besterfield, D.H., “Total Quality Management”, 3rd Edition, Pearson Education, 2004.
2. Narayana, V. and Sreenivasan N.S., “Quality Management-Concepts and Tasks”, New Age International, 1996.

### **REFERENCES**

1. Evans, J.R. and Lindsay, W.M., “The Management and Control of Quality”, South-Western (Thomson Learning), 5th Edition, 2002.
2. Feigenbaum, A.V., “Total Quality Management”, McGraw Hill, 1991.
3. Oakland, J.S., “Total Quality Management”, Butterworth-Heinemann Ltd., 1989.

## IT1354 – NETWORK PROGRAMMING LABORATORY

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### 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**

## CS1304 – VISUAL PROGRAMMING LABORATORY

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### 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**

## CS1363 – CASE TOOLS LABORATORY

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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**

# SEMESTER VII

## IT1401 – WEB TECHNOLOGY

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### **UNIT I FUNDAMENTALS 8**

History of the internet and world wide web – HTML 4 protocols – HTTP – SMTP – POP3 – MIME – IMAP – Introduction to JAVA scripts – Object based scripting for the web – Structures – Functions – Arrays – Objects.

### **UNIT II DYNAMIC HTML 9**

Introduction – Object refers– Collectors all and children – Dynamic style – Dynamic position – Frames – Navigator – Event model – On check – On load – Onenor – Mouse REL – Form process – Event bubblers – Filters – Transport with the filter – Creating images – Adding shadows – Creating gradients – Creating motion with blur – Data binding – Simple data binding – Moving with a record set – Sorting table data – Binding of an image and table.

### **UNIT III MULTIMEDIA 9**

Audio and video speech synthesis and recognition – Electronic commerce – E-Business model – E-Marketing – Online payments and security – Web servers – HTTP Request types – System architecture – Client side scripting and server side scripting – Accessing web servers – IIS – Apache web server.

### **UNIT IV DATABASE - ASP - XML 10**

Database – Relational database model – Overview – SQL – ASP – Working of ASP – Objects – File system objects – Session tracking and cookies – ADO – Access a database from ASP – Server side active - X components – Web resources – XML – Structure in data – Name spaces – DTD – Vocabularies – DOM Methods.

### **UNIT V SERVLETS AND JSP 9**

Introduction – Servlet overview architecture – Handling HTTP request – Get and post request – Redirecting request – Multi-Tier applications – JSP – Overview – Objects – Scripting – Standard actions – Directives.

**Total: 45**

### **TEXT BOOKS**

1. Deitel and Goldberg, “Internet and World Wide Web - How to Program”, Pearson Education Asia, 2001.
2. Eric Ladd and Jim O’ Donnel, “Using HTML 4, XML and JAVA”, Prentice Hall of India, 1999.

### **REFERENCES**

1. Aferganatel, “Web Programming: Desktop Management”, Prentice Hall of India, 2004.
2. Rajkamal, “Web Technology”, Tata McGraw - Hill, 2001.

## CS1402 – MIDDLEWARE TECHNOLOGIES

(Common to CSE and IT)

L	T	P
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### 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.

### REFERENCES

1. Mowbray, “Inside CORBA”, Pearson Education, 2002.
2. Jeremy Rosenberger, “Teach Yourself CORBA in 14 days”, TEC Media, 2000.
3. Jason Pritchard, “COM and CORBA Side by Side”, Addison Wesley, 2000.
4. Jesse Liberty, “Programming C#”, 2nd Edition, O’Reilly Press, 2002.



## CS1354 – GRAPHICS AND MULTIMEDIA

(Common to CSE and IT)

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### 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.

**Total: 45**

### TEXT BOOKS

1. Hearn, D. and Baker, M.P., “Computer Graphics C Version”, Pearson Education, 2003.
2. Andleigh, P.K. and Thakrar, K., “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.

## CS1405 – MIDDLEWARE TECHNOLOGIES LABORATORY

(Common to CSE and IT)

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### 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**

## CS1406 – GRAPHICS AND MULTIMEDIA LABORATORY

(Common to CSE and IT)

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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**

## CS1407 – SOFTWARE DEVELOPMENT LABORATORY

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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

### IT1451 – XML AND WEB SERVICES

(Common to CSE and IT)

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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 – X query.

#### 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 – Rosetta net – 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 Stiver, M.C., “Understanding SOAP”, SAMS publishing, 2000.
3. Alexander Nakhimovsky and Tom Myers, “XML Programming: Web Applications and Web Services with JSP and ASP”, Apress, 2002.

# IT1452 – FUNDAMENTALS OF PERVASIVE COMPUTING

(Common to CSE and IT)

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## 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**

### TEXT BOOK

1. Burkhardt, Henn, Hepper, Rintdorff and Schaeck, "Pervasive Computing", Addison Wesley, 2002.

### REFERENCES

1. Adelstein, F. and Gupta, S.K.S., "Fundamentals of Mobile and Pervasive Computing", Tata McGraw Hill, 2005.
2. Ashoke Talukdar and Roopa Yavagal, "Mobile Computing", Tata McGraw Hill, 2005.

## **ELECTIVE I**

### **CS1007 – WIRELESS NETWORK SYSTEMS**

(Common to CSE and IT)

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<b>UNIT I</b>	<b>FUNDAMENTALS</b>	<b>9</b>
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Overview of wireless systems – Teletraffic engineering – Radio propagation and propagation path-loss models – Overview of digital communication and transmission.

<b>UNIT II</b>	<b>WIRELESS WIDE AREA NETWORK (WWAN)</b>	<b>9</b>
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Multiple access techniques – Architecture of a wireless wide area network.

<b>UNIT III</b>	<b>SPEECH AND MODULATION SCHEMES</b>	<b>9</b>
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Speech coding and channel coding – Modulation schemes.

<b>UNIT IV</b>	<b>MOBILITY AND SECURITY MANAGEMENT</b>	<b>9</b>
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Mobility management in wireless networks – Security in wireless systems.

<b>UNIT V</b>	<b>GSM AND CDMA 2000</b>	<b>9</b>
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Wide area wireless networks (WANs) – GSM evolution – Wide area wireless networks – CDMAONE Evolution.

**Total: 45**

#### **TEXT BOOKS**

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

#### **REFERENCES**

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

## BM1354 – MEDICAL INFORMATICS

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### UNIT I      MEDICAL DATABASE IMPLEMENTATION      9

Medical data acquisition and database systems – PC based multi channel data acquisition system – storage – Analysis and retrieval techniques.

### UNIT II      VISUAL BASIC      9

Visual programming concepts – Visual basic environment – Tools and controls – Dynamic data exchange – VB based medical information system.

### UNIT III      COMPUTERS IN SYSTEM DESIGN      9

Hospital information system and its design and functional characteristics – Principles and application of artificial intelligence – Pattern recognition – Neural network and fuzzy logic in medicine.

### UNIT IV      MULTIMEDIA AND VIRTUAL REALITY APPLIED TO MEDICINE      9

Basic concepts of multimedia – Design of multimedia information systems – Components of virtual reality – Virtual reality applications in medicine.

### UNIT V      COMPUTERS IN MEDICAL RESEARCH      9

Medical informatics and its levels – Design and development of educational packages on medical sciences – Integrated design concepts – Interactive multimedia – Virtual and digital libraries – Internet and its applications.

**Total: 45**

### TEXT BOOKS

1. Lele, R.D., “Computer in Medicine”, Tata McGraw - Hill, 1997.
2. Tay Vaughan, “Multimedia Making It Work”, Tata McGraw - Hill, 1997.

### REFERENCES

1. Detal, “Visual Basis for Programmers”, 2nd Edition, Pearson, 2002.
2. Harold Sackman, “Biomedical Information Technology”, Academic Press, 1997.
3. Mary Brth Fecko, “Electronics Resources: Access and Issues”, Bowker and Saur, 1997.

## BM1002 – BIOINFORMATICS

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### **UNIT I BASICS 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 – Snips – Genetic diversity – Evolution of genomes.

### **UNIT III ARCHIVES AND INFORMATION RETRIEVAL 9**

Introduction – Data base indexing – analysis of retrieved data – The archives – Nucleic acid sequence – genome data bases – protein sequence data bases – Gateways to archives Sequence Retrieval system(SRS) – Protein Identification Resources (PIR) – Expert protein Analysis system(ExpASY) .

### **UNIT IV ALIGNMENTS AND PHYLOGENETIC TREES 9**

Introduction to sequence alignment – The Dot-plot – Dot-plots 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 BOOKS**

1. Arthur M. Lesk, “Introduction to Bioinformatics”, Oxford University Press, 2004.
2. N. Gautham , “Bioinformatics: Databases and Algorithms (Hardcover)”, Alpha Science International Ltd ,2005.

### **REFERENCE**

1. Attwood T.K and Parry-Smith D.J., “Introduction to Bioinformatics”, Pearson Education Asia, 2001.

## EC1022 – OPTICAL COMMUNICATION

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

## CS1013 – C# AND .NET

(Common to CSE and IT)

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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. Balagurusamy, E., “Programming in C#”, TMH, 2004.
2. Liberty, J., “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. Thamarai Selvi, S. and Murugesan, R., “A Textbook on C#”, Pearson Education, 2003.

# CS1008 – ADVANCED JAVA PROGRAMMING

(Common to CSE and IT)

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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.

### REFERENCES

1.     Hortsmann and Cornell , “Core Java 2 Advanced Features, VOL II”, Pearson Education , 2002.
2.     Web Reference: <http://java.sun.com>.
3.     Patrick Naughton, “Complete Reference – Java2”, TMH 2003.



# ELECTIVE II

## CS1005 – UNIX INTERNALS

(Common to CSE and IT)

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### UNIT I GENERAL OVERVIEW OF THE SYSTEM 9

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

### UNIT II BUFFER CACHE 9

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

### UNIT III SYSTEM CALLS FOR FILE SYSTEM 9

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

### UNIT IV THE STRUCTURE OF PROCESSES 9

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

### UNIT V PROCESS SCHEDULING AND MEMORY MANAGEMENT POLICIES 9

Process scheduling – Memory management policies – Swapping – A Hybrid system with swapping and demand paging – The I/O subsystem – Driver interfaces – Disk drivers – Terminal drivers.

**Total: 45**

#### TEXT BOOK

1. Bach, M.J., “The Design of the Unix Operating System”, PHI, 2004.

#### REFERENCE

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

# CS1006 – OPEN SOURCE SOFTWARE

(Common to CSE and IT)

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## **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 and 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. Venkateshwarlu, N.B., “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 Tromeu 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>

## CS1003 – COMPONENT BASED TECHNOLOGY

(Common to CSE and IT)

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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 and COM+”, BPB Publication, 2001.
3. Hortsamann and Cornell, “Core Java Vol - II”, Sun Press, 2002.
4. Sudha Sadasivam, “Component Based Technology”, John Wiley and Sons, 2008.

## CS1022 – SOFTWARE PROJECT MANAGEMENT

(Common to CSE and IT)

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### UNIT I FUNDAMENTALS 9

Conventional software management – Evolution of software economics – Improving software economics – Conventional versus modern software project management.

### UNIT II SOFTWARE MANAGEMENT PROCESS FRAMEWORK 9

Lifecycle phases – Artifacts of the process – Model based software architectures – Workflows of the process – Checkpoints of the process.

### UNIT III SOFTWARE MANAGEMENT DISCIPLINES 9

Iterative process planning – Organization and responsibilities – Process automation – Process control and process instrumentation – Tailoring the process.

### UNIT IV MANAGED AND OPTIMIZED PROCESS 9

Data gathering and analysis – Principles of data gathering – Data gathering process – Software measures – Data analysis – Managing software quality – Defect prevention.

### UNIT V CASE STUDIES 9

COCOMO Cost estimation model – Change metrics – CCPDS-R.

**Total: 45**

### TEXT BOOKS

1. Walker Royce, “Software Project Management - A Unified Framework”, Pearson Education, 2004.
2. Humphrey Watts, “Managing the software process”, Addison Wesley, 1989.

### REFERENCES

1. Humphrey Watts, “Managing the Software Process”, Addison Wesley, 1989.
2. Ramesh Gopalaswamy, “Managing Global Projects”, Tata McGraw Hill, 2001.
3. Bob Hughes and Mikecoterrell, “Software Project Management”, 3rd Edition, Tata McGraw Hill, 2004.

# CS1002 – DIGITAL IMAGE PROCESSING

(Common to CSE, ECE and IT)

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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 BOOKS

1. Gonzalez, R.C. and Richard Woods, E., “Digital Image Processing”, 2nd Edition, Pearson Education, 2003.
2. Jain, A. K., “Fundamentals of Digital Image Processing”, PHI, 1995.

### REFERENCES

1. Pratt, W. K., “Digital Image Processing”, John Willey.
2. Chanda Dutta Magundar, “Digital Image Processing and Applications”, PHI, 2000.

**CS1021 – SOFT COMPUTING**  
(Common to Biomedical, CSE, ECE and IT)

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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 BOOKS**

1. Jang, J.S.R., Sun, C.T. and Mizutani, E., “Neuro-Fuzzy and Soft Computing”, Pearson Education, 2004.
2. Ross, T.J., “Fuzzy Logic with Engineering Applications”, TMH, 1997.

**REFERENCES**

1. Goldberg, D.E., “Genetic Algorithms: Search- Optimization and Machine Learning”, Addison Wesley, 1989.
2. Rajasekaran, S. and Pai, G.A.V., “Neural Networks- Fuzzy Logic and Genetic Algorithms”, PHI, 2003.
3. Eberhart, R., Simpson, P. and Dobbins, R., “Computational Intelligence – PC Tools”, AP Professional, Boston, 1996.
4. Sivanandhan and Deepa, “Principles of Soft Computing”, Wiley India, 2008.

# CS1010 – ADVANCED OPERATING SYSTEMS

(Common to CSE and IT)

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## UNIT I      DISTRIBUTED SYSTEM STRUCTURES      9

Architectures of distributed systems – System architecture types – Issues in distributed operating systems – Communication networks – Communication primitives – Theoretical foundations – Inherent limitations of a distributed system – Lamport's logical clocks – Vector clocks – Causal ordering of messages – Global state – Cuts of a distributed computation – Termination detection – Distributed mutual exclusion – Basics – Classification of mutual exclusion and associated algorithms – Comparative performance analysis.

## UNIT II      DISTRIBUTED DEADLOCKS      9

Distributed deadlock detection – Basics – Deadlock handling strategies in distributed systems – Issues in deadlock detection and resolution – Control organizations for distributed deadlock detection – Centralized and distributed deadlock detection algorithms – Hierarchical deadlock detection algorithms – Agreement protocols – Introduction to the system model – A classification of agreement problems – Solutions to the byzantine agreement problem – Applications of agreement algorithms – Distributed resource management – Architecture – Mechanism for building distributed file systems – Design issues – Log structured file systems.

## UNIT III      DISTRIBUTED COORDINATION      9

Distributed shared memory – Architecture – Algorithms for implementing DSM – Memory coherence and protocols – Design issues – Distributed scheduling – Issues in load distributing – Components of a load distributing algorithm – Stability – Load distributing algorithm – Performance comparison – Selecting a suitable load sharing algorithm – Requirements for load distributing – Task migration and associated issues – Failure recovery and fault tolerance – Introduction – Basic concepts – Classification of failures – Backward and forward error recovery – Backward error recovery – Recovery in concurrent systems – Consistent set of check points – Synchronous and asynchronous check pointing and recovery – Check pointing for distributed database systems – Recovery in replicated distributed databases.

## UNIT IV      PROTECTION AND SECURITY      9

Protection and security – Preliminaries – The access matrix model and its implementations – Safety in matrix model – Advanced models of protection – Data security – Cryptography – Model of cryptography – Conventional cryptography – Modern cryptography – Private key cryptography – Data encryption standard – Public key cryptography – Multiple encryptions – Authentication in distributed systems.

## **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 Shivaratri, N.G., “Advanced Concepts in Operating Systems: Distributed Database and Multiprocessor Operating Systems”, TMH, 2001.
2. Tanenbaum, A.S., “Modern Operating System”, PHI, 2003.

### **REFERENCES**

1. Sinha, P.K., “Distributed Operating System-Concepts and Design”, PHI, 2003.
2. Tanenbaum, A.S., “Distributed Operating System”, Pearson Education, 2003.

## **ELECTIVE III**

### **EC1021 – HIGH PERFORMANCE MICROPROCESSORS**

(Common to CSE and IT)

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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 – Pentium III and Pentium 4 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 BOOKS**

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

#### **REFERENCES**

1. [www.intel.com/products/server/processors/server/itanium2](http://www.intel.com/products/server/processors/server/itanium2) (Unit V:EPIC)
3. [www.hpl.hp.com/techreports/1999/HPL-1999-111.html](http://www.hpl.hp.com/techreports/1999/HPL-1999-111.html)(UnitV:Network Processor)
4. [www.intel.com/design/network/products/npfamily](http://www.intel.com/design/network/products/npfamily) (UnitV:Network Processor)
5. [www.national.com/appinfo/imaging/processors.html](http://www.national.com/appinfo/imaging/processors.html)(UnitV: Image Processor)

# CS1001 – PARALLEL COMPUTING

(Common to CSE and IT)

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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 BOOKS

1. Kai Hwang and Zhi.wei Xu, “Scalable Parallel Computing”, Tata McGraw-Hill, 2003.
2. Culler, D.E. and Jaswinder Pal Singh, “Parallel Computing Architecture: A Hardware/Software Approach”, Morgan Kaufman Publishers, 1999.

### REFERENCES

1. Quinn, M. J., “Parallel Programming in C with MPI and OpenMP”, Tata McGraw-Hill, 2003.
2. Kai Hwang, “Advanced Computer Architecture”, Tata McGraw-Hill, 2003.

# CS1009 – ADVANCED DATABASES

(Common to CSE and IT)

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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. Connolly, T.M., and Begg, C.E., "Database Systems –A Practical Approach to Design, Implementation and Management", 3rd Edition, Pearson Education, 2003.
2. Ramez Elmasri and Navathe, S.B., "Fundamentals of Database Systems", 4th Edition, Pearson Education, 2004.

## **REFERENCES**

1. Tamer Ozsu, M. and Patrick Ualduriel, "Principles of Distributed Database Systems", 2nd Edition, Pearson Education, 2003.
2. Prabhu, C.S.R., "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.



## **TEXT BOOKS**

1. Eric Drexler, "Engines of Creation: The Coming Era of Nanotechnology", Reprint Edition, Anchor, 1987.
2. Ratner, M.A., Daniel Ratner and Mark Ratner, "Nanotechnology: A Gentle Introduction to the Next Big Idea", 1st Edition, Prentice Hall of India, 2002.

## **REFERENCES**

1. Eric Drexler, "Nanosystems: Molecular Machinery, Manufacturing, and Computation", 1st Edition, Wiley, 1992.
2. 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.
3. Douglas Mulhall, "Our Molecular Future: How Nanotechnology, Robotics, Genetics and Artificial Intelligence Will Transform Our World", Prometheus Books, 2002.

# CS1016 – SOFTWARE TESTING

(Common to CSE and IT)

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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. Renu Rajani and Pradeep Oak, “Software Testing – Effective Methods, Tools and Techniques”, Tata McGraw Hill, 2003.

## REFERENCES

1. Edward Kit, “Software Testing in the Real World – Improving the Process”, Pearson Education, 1995.
2. Elfriede Dustin, “Effective Software Testing”, Pearson Education, 2003.

# IT1003 – 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**

## TEXTBOOK

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

## REFERENCE

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

# CS1012 – KNOWLEDGE BASED DECISION SUPPORT SYSTEMS

(Common to CSE and IT)

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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 – 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.

## **UNIT V      MANAGEMENT SUPPORT SYSTEMS**

**9**

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. Efram A. Mallach, “Decision Support and Data Warehouse Systems”, Tata McGraw-Hill, 2002.
3. Dalkar, “Knowledge Management – Theory and Praticce”, Elsevir, 2007.
4. Beccrra Fernandez and Laidener, “ Knowledge Management – An Evolutionary View”, PHI, 2009.

## **ELECTIVE IV**

### **IT1004 – ENTERPRISE RESOURCE PLANNING**

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**UNIT 1          FUNDAMENTALS** **9**

ERP – Enterprise – Benefits of ERP – ERP and related technologies – Business process reengineering (BPR) – Data warehousing and data mining – OLAP – SCM.

**UNIT II          ERP IMPLEMENTATION** **9**

ERP implementation lifecycle – Implementation methodology – Hidden costs – Organizing the implementation – Vendors– Consultants and users – Contracts with vendors – Consultants and employees – Project management and monitoring.

**UNIT III          BUSINESS MODULES** **9**

Business modules in an ERP package – Finance – Manufacturing – Human resources – Plant maintenance – Materials management – Quality management – Sales and distribution.

**UNIT IV          ERP MARKET** **9**

ERP Market place – SAP AG – Peoplesoft – Baan – JD Edwards – Oracle – QAD – SSA.

**UNIT V          ERP – PRESENT AND FUTURE** **9**

Turbo Charge the ERP System – EIA – ERP and e - Commerce – ERP and internet – Future directions.

**Total: 45**

#### **TEXT BOOK**

1. Alexis Leon, “ERP Demystified”, Tata McGraw Hill, 2000.

#### **REFERENCES**

1. Brady, J.A., Monk, E.F., and Bret Wagner, “Concepts in Enterprise Resource Planning”, Thompson Course Technology, 2001.
2. Vinod Kumar Garg and Venkitakrishnan N K., “Enterprise Resource Planning Concepts and Practice”, Prentice Hall of India, 2003.

## CS1023 – RESOURCE MANAGEMENT TECHNIQUES

(Common to CSE and IT)

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### UNIT I      **LINEAR PROGRAMMING**      **9**

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

### UNIT II      **DUALITY AND NETWORKS**      **9**

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

### UNIT III      **INTEGER PROGRAMMING**      **9**

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

### UNIT IV      **CLASSICAL OPTIMIZATION THEORY**      **9**

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

### UNIT V      **OBJECT SCHEDULING**      **9**

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

**Total: 45**

### TEXT BOOKS

1. Taha, H.A., “Operation Research”, PHI, 2002.
2. Anderson, “Quantitative Methods for Business”, 8th Edition, Thomson Learning, 2002.

### REFERENCES

1. Winston, “Operation Research”, Thomson Learning, 2003.
2. Vohra, “Quantitative Techniques in Management” , TMH, 2002.
3. Anand Sarma, “Operation Research”, Himalaya Publishing House, 2003.

# CS1014 – USER INTERFACE DESIGN

(Common to CSE and IT)

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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. Galitz, W.O., “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.

# CS1015 – INFORMATION SECURITY

(Common to CSE and IT)

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## **UNIT I FUNDAMENTALS 9**

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.

## **UNIT II SECURITY INVESTIGATION 9**

Need for security – Business needs – Threats – Attacks – Legal – Ethical and professional issues.

## **UNIT III SECURITY ANALYSIS 9**

Risk management – Identifying and assessing risk – Assessing and controlling risk.

## **UNIT IV LOGICAL DESIGN 9**

Blueprint for security – Information security policy – Standards and practices – ISO 17799/BS 7799 – NIST models – VISA International security model – Design of security architecture – Planning for continuity.

## **UNIT V PHYSICAL DESIGN 9**

Security technology – IDS – Scanning and analysis tools – Cryptography – Access control devices – Physical security – Security and personnel.

**Total: 45**

### **TEXT BOOKS**

1. Michael E. Whitman and Herbert J. Mattord, “Principles of Information Security”, Vikas Publishing House, 2003.
2. Straub, “Information Security : Policy, Processes and Practices”, PHI, 2009.

### **REFERENCES**

1. Micki Krause and Harold F. Tipton, “Handbook of Information Security Management”, Vol 1-3, CRC Press LLC, 2004.
2. Stuart Mc Clure, Joel Scrambray and George Kurtz, “Hacking Exposed”, Tata McGraw-Hill, 2003.
3. Matt Bishop, “Computer Security Art and Science”, Pearson/PHI, 2002.
4. Patel, “Information Security : Theory and Practice”, PHI, 2006.

## IT1005 – BUSINESS PROCESS MODEL

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### 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.
2. Ould, M.A., "Business Processes: Modelling and Analysis for Re Engineering and Improvement", John Wiley and Sons, 1995.

### REFERENCES

1. Howard Smith and Peter Fingar, "Business Process Management (BPM): The Third Wave", Meghan - Kiffer Press, 2003.
2. Roger Burlton, "Business Process Management: Profiting from Process", SAMS, 2001.
3. Mike Jacka, J. and Keller, P.J., "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, ., 2000.
5. Gelinas, U.J., Sutton, SG. and Jane Fedorowicz, "Business Processes and Information Technology", Thompson Learning, .2004.

## IT1006 – REQUIREMENTS ENGINEERING

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### 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 and 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 VandV 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. Pressman, R.S., “Software Engineering, A Practitioner’s Approach”, 6th Edition, McGraw - Hill International, 2005.

# CS1024 – SOFTWARE QUALITY MANAGEMENT

(Common to CSE and IT)

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## **UNIT I FUNDAMANTALS OF SOFTWARE QUALITY 9**

Software quality – Hierarchical models of Boehm and Mccall – Quality measurement – Metrics measurement and analysis – Gilb’s approach – GQM model.

## **UNIT II SOFTWARE QUALITY ASSURANCE 9**

Quality tasks – SQA plan – Teams – Characteristics – Implementation – Documentation – Reviews and audits.

## **UNIT III QUALITY CONTROL AND RELIABILITY 9**

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

## **UNIT IV QUALITY MANAGEMENT SYSTEM 9**

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

## **UNIT V QUALITY STANDARDS 9**

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

**Total: 45**

### **TEXT BOOKS**

1. Allan C. Gillies, “Software Quality: Theory and Management”, Thomson Learning, 2003.
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.