# ANNA UNIVERSITY TIRUCHIRAPPALLI
## Tiruchirappalli – 620 024
### Regulations 2008
### Curriculum

**B.E. COMPUTER SCIENCE AND ENGINEERING**

## SEMESTER III

| S.No. | Subject Code | Subject | L | T | P | C |
|-------|--------------|---------|---|---|---|---|
| | | **Theory** | | | | |
| 1 | **MA1201** | Transforms and Partial Differential Equations | 3 | 1 | 0 | 4 |
| 2 | **CS1201** | Data Structures | 3 | 0 | 0 | 3 |
| 3 | **EC1206** | Digital Principles and Systems Design | 3 | 1 | 0 | 4 |
| 4 | **CS1202** | Object Oriented Programming | 3 | 0 | 0 | 3 |
| 5 | **EC1207** | Analog and Digital Communication | 3 | 1 | 0 | 4 |
| 6 | **HS1201** | Environmental Science and Engineering | 3 | 0 | 0 | 3 |
| | | **Practical** | | | | |
| 7 | **EC1208** | Digital Laboratory | 0 | 0 | 3 | 2 |
| 8 | **CS1203** | Data Structures Laboratory | 0 | 0 | 3 | 2 |
| 9 | **CS1204** | Object Oriented Programming Laboratory | 0 | 0 | 3 | 2 |
| | | | | | **Total** | 27 |

## SEMESTER IV

| S.No. | Subject Code | Subject | L | T | P | C |
|-------|--------------|---------|---|---|---|---|
| | | **Theory** | | | | |
| 1 | **MA1252** | Probability and Queueing Theory | 3 | 1 | 0 | 4 |
| 2 | **CS1251** | Design and Analysis of Algorithms | 3 | 1 | 0 | 4 |
| 3 | **EC1257** | Microprocessors and Microcontrollers | 3 | 0 | 0 | 3 |
| 4 | **CS1252** | Computer Organization and Architecture | 3 | 1 | 0 | 4 |
| 5 | **CS1253** | Operating Systems | 3 | 0 | 0 | 3 |
| 6 | **CS1254** | Database Management Systems | 3 | 0 | 0 | 3 |
| | | **Practical** | | | | |
| 7 | **CS1255** | Operating Systems Laboratory | 0 | 0 | 3 | 2 |
| 8 | **CS1256** | Database Management Systems Laboratory | 0 | 0 | 3 | 2 |
| 9 | **EC1258** | Microprocessors Laboratory | 0 | 0 | 3 | 2 |
| | | | | | **Total** | 27 |

## SEMESTER V

| S.No. | Subject Code | Subject | L | T | P | C |
|---|---|---|---|---|---|---|
| | | **Theory** | | | | |
| 1 | **MA1301** | Discrete Mathematics | 3 | 1 | 0 | 4 |
| 2 | **CS1301** | Software Engineering | 3 | 0 | 0 | 3 |
| 3 | **CS1302** | Computer Networks | 3 | 0 | 0 | 3 |
| 4 | **CS1303** | Theory of Computation | 3 | 0 | 0 | 3 |
| 5 | **CS1304** | System Software | 3 | 1 | 0 | 4 |
| 6 | **CS1305** | Visual Programming | 3 | 1 | 0 | 4 |
| | | **Practical** | | | | |
| 7 | **CS1306** | Networks Laboratory | 0 | 0 | 3 | 2 |
| 8 | **CS1307** | System Software Laboratory | 0 | 0 | 3 | 2 |
| 9 | **CS1308** | Visual Programming Laboratory | 0 | 0 | 3 | 2 |
| | | | | | **Total** | 27 |

## SEMESTER VI

| S.No. | Subject Code | Subject | L | T | P | C |
|---|---|---|---|---|---|---|
| | | **Theory** | | | | |
| 1 | **MA1251** | Numerical Methods | 3 | 1 | 0 | 4 |
| 2 | **CS1351** | Artificial Intelligence | 3 | 1 | 0 | 4 |
| 3 | **CS1352** | Principles of Compiler Design | 3 | 0 | 0 | 3 |
| 4 | **CS1353** | Distributed Systems | 3 | 0 | 0 | 3 |
| 5 | **CS1354** | Graphics and Multimedia | 3 | 1 | 0 | 4 |
| 6 | **CS1355** | Cryptography and Network Security | 3 | 0 | 0 | 3 |
| | | **Practical** | | | | |
| 7 | **CS1356** | Compiler Design Laboratory | 0 | 0 | 3 | 2 |
| 8 | **CS1360** | Graphics and Multimedia Laboratory | 0 | 0 | 3 | 2 |
| 9 | **HS1301** | Communication and Soft Skills Laboratory | 0 | 0 | 3 | 2 |
| | | | | | **Total** | 27 |

# SEMESTER VII

| S.No. | Subject Code | Subject | L | T | P | C |
|-------|--------------|---------|---|---|---|---|
| | | **Theory** | | | | |
| 1 | **CS1401** | Internet Computing | 3 | 1 | 0 | 4 |
| 2 | **CS1310** | Object Oriented Analysis and Design | 3 | 0 | 0 | 3 |
| 3 | **IT1402** | Middleware Technologies | 3 | 0 | 0 | 3 |
| 4 | **MG1301** | Total Quality Management | 3 | 0 | 0 | 3 |
| 5 | **E1****** | Elective I | 3 | 0 | 0 | 3 |
| 6 | **E2****** | Elective II | 3 | 0 | 0 | 3 |
| | | **Practical** | | | | |
| 7 | **CS1311** | CASE Tools Laboratory | 0 | 0 | 3 | 2 |
| 8 | **IT1404** | Middleware Technologies Laboratory | 0 | 0 | 3 | 2 |
| 9 | **CS1402** | Software Development  Laboratory | 0 | 0 | 3 | 2 |
| | | | | | **Total** | **25** |

# SEMESTER VIII

| S.No. | Subject Code | Subject | L | T | P | C |
|-------|--------------|---------|---|---|---|---|
| | | **Theory** | | | | |
| 1 | **IT1403** | Mobile Computing | 3 | 0 | 0 | 3 |
| 2 | **CS1451** | Network Protocols | 3 | 0 | 0 | 3 |
| 3 | **E3****** | Elective III | 3 | 0 | 0 | 3 |
| 4 | **E4****** | Elective IV | 3 | 0 | 0 | 3 |
| | | **Practical** | | | | |
| **5** | **CS1455** | **Project Work** | **0** | **0** | **12** | **6** |
| | | | | | **Total** | **18** |

# LIST OF ELECTIVES

| S.No. | Subject Code | Subject | L | T | P | C |
|---|---|---|---|---|---|---|
| | | **Elective I** | | | | |
| 1 | **CS1001** | Parallel Computing | 3 | 0 | 0 | 3 |
| 2 | **CS1002** | Digital Image Processing | 3 | 0 | 0 | 3 |
| 3 | **CS1003** | Component Based Technology | 3 | 0 | 0 | 3 |
| 4 | **CS1004** | Natural Language Processing | 3 | 0 | 0 | 3 |
| 5 | **CS1005** | UNIX Internals | 3 | 0 | 0 | 3 |
| 6 | **CS1006** | Open Source Software | 3 | 0 | 0 | 3 |
| 7 | **CS1007** | Wireless Network Systems | 3 | 0 | 0 | 3 |
| | | **Elective II** | | | | |
| 1 | **EC1018** | High Performance Microprocessors | 3 | 0 | 0 | 3 |
| 2 | **CS1008** | Advanced Java Programming | 3 | 0 | 0 | 3 |
| 3 | **CS1009** | Advanced Databases | 3 | 0 | 0 | 3 |
| 4 | **CS1010** | Advanced Operating Systems | 3 | 0 | 0 | 3 |
| **5** | **EC1316** | **Embedded Systems** | **3** | **0** | **0** | **3** |
| 6 | **CS1011** | Data Warehousing and Mining | 3 | 0 | 0 | 3 |
| 7 | **CS1012** | Knowledge based Decision Support Systems | 3 | 0 | 0 | 3 |
| | | **Elective III** | | | | |
| 1 | **CS1013** | C # and .NET | 3 | 0 | 0 | 3 |
| 2 | **IT1451** | XML and Webservices | 3 | 0 | 0 | 3 |
| 3 | **CS1014** | User Interface Design | 3 | 0 | 0 | 3 |
| 4 | **CS1015** | Information Security | 3 | 0 | 0 | 3 |
| 5 | **CS1016** | Software Testing | 3 | 0 | 0 | 3 |
| 6 | **GE1301** | Professional Ethics and Human Values | 3 | 0 | 0 | 3 |
| 7 | **CS1017** | TCP / IP Design and Implementation | 3 | 0 | 0 | 3 |
| | | **Elective IV** | | | | |
| 1 | **CS1018** | Grid Computing | 3 | 0 | 0 | 3 |
| 2 | **IT1452** | Fundamentals of Pervasive Computing | 3 | 0 | 0 | 3 |
| 3 | **CS1019** | Real Time Systems | 3 | 0 | 0 | 3 |
| 4 | **CS1020** | Soft Computing | 3 | 0 | 0 | 3 |
| 5 | **CS1021** | Software Project Management | 3 | 0 | 0 | 3 |
| 6 | **CS1022** | Resource Management Techniques | 3 | 0 | 0 | 3 |
| 7 | **CS1023** | Software Quality Management | 3 | 0 | 0 | 3 |

# ANNA UNIVERSITY TIRUCHIRAPPALLI
## Tiruchirappalli – 620 024
### Regulations 2008
### Syllabus

## B.E. COMPUTER SCIENCE AND ENGINEERING

## SEMESTER III

### MA1201 – TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

|  | L | T | P | C |
|---|---|---|---|---|
|  | 3 | 1 | 0 | 4 |

**UNIT I        FOURIER SERIES                                                                9**
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.

**UNIT II        FOURIER TRANSFORM                                                    9**
Fourier integral theorem (without proof) – Fourier transform pair – Sine and Cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity.

**UNIT III        PARTIAL DIFFERENTIAL EQUATIONS                            9**
Formation of partial differential equations – Lagrange's linear equation – Solution of standard types of first order partial differential equations –  Linear partial differential equations of second and higher order with constant coefficients

**UNIT IV APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS       9**
Solutions of one dimensional wave equation – One dimensional equation of heat conduction – Steady state solution of two-dimensional equation of  heat equation (Insulated edges excluded)  – Fourier series solutions in cartesian coordinates.

**UNIT V Z-TRANSFORM AND DIFFERENCE EQUATIONS                     9**
Z-transform – Elementary properties – Inverse Z-transform – Convolution theorem – Formation of difference equations – Solution of difference equations using Z-transform

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

**TEXT BOOK**
1.       Grewal B.S, "Higher Engineering Mathematics", 39th Edition, Khanna Publishers, Delhi, 2007.

**REFERENCES**
1.       Bali.N.P., Manish Goyal, "A Textbook of Engineering Mathematics", 7th Edition, Laxmi Publications (P) Ltd.
2.       Ramana.B.V. "Higher Engineering Mathematics" Tata McGraw Hill, New Delhi
3.       Glyn James, "Advanced Modern Engineering Mathematics", 3rd Edition, Pearson Education, 2007.
4.       Erwin Kreyszig, "Advanced Engineering Mathematics" 8th Edition, Wiley India, 2007.

# CS1201 – DATA STRUCTURES

|   | L | T | P | C |
|---|---|---|---|---|
|   | 3 | 0 | 0 | 3 |

**UNIT I          FUNDAMENTALS OF ALGORITHMS                    8**
Algorithm – Analysis of Algorithm – Best Case and Worst Case Complexities – Analysis of Algorithm using Data Structures – Performance Analysis – Time Complexity – Space Complexity – Amortized Time Complexity – Asymptotic Notation

**UNIT II         FUNDAMENTALS OF DATA STRUCTURES              9**
Arrays – Structures – Stacks – Definition and examples – Representing Stacks – Queues and Lists – Queue and its Representation – Applications of Stack – Queue and Linked Lists.

**UNIT III        TREES                                        10**
Binary Trees – Operations on Binary Tree Representations – Node Representation – Internal and External Nodes – Implicit Array Representation – Binary Tree Traversal – Huffman Algorithm – Representing Lists as Binary Trees – Sorting and Searching Techniques – Tree Searching – Hashing

**UNIT IV         GRAPHS AND THEIR APPLICATIONS                9**
Graphs – An Application of Graphs – Representation – Transitive Closure – Warshall's Algorithm –  Shortest path Algorithm – A Flow Problem – Dijikstra's Algorithm – Minimum Spanning Trees – Kruskal and Prim's Algorithm – An Application of Scheduling – Linked Representation of Graphs – Graph Traversals

**UNIT V          STORAGE MANAGEMENT                           9**
General Lists – Operations – Linked List Representation – Using Lists – Freeing List Nodes – Automatic List Management : Reference Count Method – Garbage Collection – Collection and Compaction

**Total: 45**

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

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

## EC1206 – DIGITAL PRINCIPLES AND SYSTEMS DESIGN

|  | L | T | P | C |
|---|---|---|---|---|
|  | 3 | 1 | 0 | 4 |

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

Review of Binary Number Systems – Binary Arithmetic – Binary Codes – Boolean Algebra and Theorems – Boolean Functions – Simplifications of Boolean Functions Using Karnaugh Map and Tabulation Methods – Implementation of Boolean Functions using Logic Gates.

**UNIT II      COMBINATIONAL LOGIC      9**

Combinational Circuits – Analysis and Design Procedures - Circuits for Arithmetic Operations – Code Conversion – Hardware Description Language (HDL).

**UNIT III      DESIGN WITH MSI DEVICES      9**

Decoders and Encoders – Multiplexers and Demultiplexers – Memory and Programmable Logic – HDL for Combinational Circuits

**UNIT IV      SYNCHRONOUS SEQUENTIAL LOGIC      9**

Sequential Circuits – Flip flops – Analysis and Design Procedures - State Reduction and State Assignment – Shift Registers – Counters – HDL for Sequential Circuits.

**UNIT V      ASYNCHRONOUS SEQUENTIAL LOGIC      9**

Analysis and Design of Asynchronous Sequential Circuits - Reduction of State and Flow Tables – Race-Free State Assignment – Hazards – ASM Chart.

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

### TEXT BOOK

1.    M. Morris Mano, "Digital Design", 3$^{rd}$ Edition, Pearson Education, 2007.

### REFERENCES

1.    Charles H. Roth, "Fundamentals of Logic Design", 5$^{th}$ Edition, Thomson Learning, 2003.
2.    Donald D. Givone, "Digital Principles and Design", Tata McGraw-Hill, 2007.

# CS1202 – OBJECT ORIENTED PROGRAMMING

|   | L | T | P | C |
|---|---|---|---|---|
|   | 3 | 0 | 0 | 3 |

## UNIT I OBJECTS AND CLASSES 9
Object Oriented Programming Concepts – Objects – Classes – Methods and Messages – Abstraction and Encapsulation – Inheritance – Abstract Classes – Polymorphism – Basics of C++ – Classes – Access Specifiers – Function and Data Members – Default Arguments – Function Overloading – Friend Functions – Const and Volatile Functions – Static Members – Objects – Pointers and Objects – Constant Objects – Nested Classes – Local Classes.

## UNIT II CONSTRUCTORS AND DESTRUCTORS 9
Constructors – Default Constructor – Parameterized Constructors – Constructor with Dynamic Allocation – Copy Constructor – Destructors – Operator Overloading – Overloading through Friend Functions – Overloading the Assignment Operator – Type Conversion – Explicit Constructor.

## UNIT III INHERITANCE AND POLYMORPHISM 9
Inheritance – Public – Private and Protected Derivations – Multiple Inheritance – Virtual Base Class – Abstract Class – Composite Objects Runtime Polymorphism – Virtual Functions – Pure Virtual Functions – RTTI – Typeid – Dynamic Casting – RTTI and Templates – Cross Casting – Down Casting .

## UNIT IV FILE HANDLING 9
Streams and Formatted I/O – I/O Manipulators – File Handling – Random Access – Object Serialization – Namespaces – STD Namespace – ANSI String Objects – Standard Template Library.

## UNIT V TEMPLATES AND EXCEPTION HANDLING 9
Function and Class Templates – Exception Handling – Try-Catch-Throw Paradigm – Exception Specification – Terminate and Unexpected Functions – Uncaught Exception.

**Total: 45**

## TEXT BOOKS
1. B. Trivedi, "Programming with ANSI C++", Oxford University Press, 2007.
2. Ira Pohl, "Object Oriented Programming using C++", 2nd Edition, Pearson Education, Reprint 2004.

## REFERENCES
1. S. B. Lippman, Josee Lajoie, Barbara E. Moo, "C++ Primer", 4th Edition, Pearson Education, 2005.
2. B. Stroustrup, "The C++ Programming Language", 3rd Edition, Pearson Education, 2004.
3. Herbert Schildt, "C++: The Complete Reference", TMH, 2006.

**EC1207  –  ANALOG AND DIGITAL COMMUNICATION**

                                              **L    T    P    C**
                                              **3    1    0    4**

**UNIT I          FUNDAMENTALS OF ANALOG COMMUNICATION          9**
Principles of Amplitude Modulation – AM Envelope – Frequency Spectrum and Bandwidth – Modulation Index and Percent Modulation – AM Voltage Distribution – AM Power Distribution – Angle Modulation – FM and PM Waveforms – Phase Deviation and Modulation Index – Frequency Deviation and Percent Modulation – Frequency Analysis of Angle Modulated Waves – Bandwidth Requirements for Angle Modulated Waves.

**UNIT II          DIGITAL COMMUNICATION          9**
Basics  – Shannon Limit for Information Capacity – Digital Amplitude Modulation – Frequency Shift Keying – FSK Bit Rate and Baud – FSK Transmitter – BW Consideration of FSK – FSK Receiver – Phase Shift Keying – Binary Phase Shift Keying – QPSK – Quadrature Amplitude Modulation – Bandwidth Efficiency – Carrier Recovery – Squaring Loop – Costas Loop – DPSK.

**UNIT III        DIGITAL TRANSMISSION          9**
Basics – Pulse Modulation – PCM – PCM Sampling – Sampling Rate – Signal to Quantization Noise Rate – Companding – Analog and Digital – Percentage Error – Delta Modulation – Adaptive Delta Modulation – Differential Pulse Code Modulation – Pulse Transmission – Intersymbol Interference – Eye Patterns.

**UNIT IV        DATA COMMUNICATIONS          9**
Basics – History of Data Communications – Standards Organizations for Data Communication – Data Communication Circuits – Data Communication Codes – Error Control – Error Detection – Error Correction – Data Communication Hardware – Serial and Parallel Interfaces – Data Modems – Asynchronous Modem – Synchronous Modem – Low-Speed Modem – Medium and High Speed Modem – Modem Control.

**UNIT V    SPREAD SPECTRUM AND MULTIPLE ACCESS  TECHNIQUES**
                                                              **9**
Basics  –  Pseudo-Noise Sequence – DS Spread Spectrum with Coherent Binary PSK – Processing Gain – FH Spread Spectrum – Multiple Access Techniques – Wireless Communication – TDMA and CDMA in Wireless Communication Systems – Source Coding of Speech for Wireless Communications.


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

**TEXT BOOKS**

1. Wayne Tomasi, "Advanced Electronic Communication Systems", $6^{th}$ Edition, Pearson Education, 2007.
2. Simon Haykin, "Communication Systems", $4^{th}$ Edition, John Wiley and Sons, 2001.

**REFERENCES**

1. H. Taub, D L Schilling, G Saha , "Principles of Communication", $3^{rd}$ Edition, 2007.
2. B. P. Lathi, "Modern Analog and Digital Communication Systems", $3^{rd}$ Edition, Oxford University Press, 2007.
3. Blake, "Electronic Communication Systems", Thomson Delmar Publications, 2002.
4. Martin S. Roden, "Analog and Digital Communication System", $3^{rd}$ Edition, PHI, 2002.
5. B. Sklar,"Digital Communication Fundamentals and Applications", $2^{nd}$ Edition, Pearson Education, 2007.

# HS1201 – ENVIRONMENTAL SCIENCE AND ENGINEERING

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

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

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

## UNIT II  ECOSYSTEMS AND BIODIVERSITY  9

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

## UNIT III  ENVIRONMENTAL POLLUTION  9

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

## UNIT IV      SOCIAL ISSUES AND THE ENVIRONMENT      9

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

## UNIT V      HUMAN POPULATION AND THE ENVIRONMENT      9

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

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

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

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

**Total: 45**

## TEXT BOOKS

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

## REFERENCES

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

## EC1208 – DIGITAL LABORATORY

**L T P C**

**0 0 3 2**

### LIST OF EXPERIMENTS

1. Verification of Boolean Theorems using Digital Logic Gates.
2. Design and Implementation of Combinational Circuits using Basic Gates for Arbitrary Functions, Code Converters, Etc.
3. Design and Implementation of 4-Bit Binary Adder / Subtractor using Basic Gates and MSI Devices
4. Design and Implementation of Parity Generator / Checker using Basic Gates and MSI Devices.
5. Design and Implementation of Magnitude Comparator
6. Design and Implementation of Application using Multiplexers/ Demultiplexers.
7. Design and Implementation of Shift Registers.
8. Design and Implementation of Synchronous and Asynchronous Counters.
9. Simulation of Combinational Circuits using Hardware Description Language (VHDL / Verilog HDL Software Required).
10. Simulation of Sequential Circuits using HDL (VHDL / Verilog HDL Software Required).

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

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

## CS1203 – DATA STRUCTURES LABORATORY

|  | L | T | P | C |
|---|---|---|---|---|
|  | 0 | 0 | 3 | 2 |

## LIST OF EXPERIMENTS

1. Implement Singly and Doubly Linked Lists.
2. Represent a Polynomial as a Linked List and Write Functions for Polynomial Addition.
1. Implement Stack and use it to Convert Infix to Postfix Expression.
2. Implement a Double-Ended Queue (Dequeue) where Insertion and Deletion operations are possible at both the ends.
3. Implement an Expression Tree. Produce its Pre-Order, In-Order, and Post-order Traversals.
4. Implement Binary Search Tree.
5. Implement Insertion in AVL Trees.
6. Implement Priority Queue using Binary Heaps.
7. Implement Hashing with Open Addressing.
8. Implement Prim's Algorithm using Priority Queues to find MST of an Undirected Graph.

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

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

# CS1204 – OBJECT ORIENTED PROGRAMMING LABORATORY

$$\begin{array}{cccc} L & T & P & C \\ 0 & 0 & 3 & 2 \end{array}$$

## LIST OF EXPERIMENTS

1. Design C++ Classes with Static Members, Methods with Default Arguments, Friend Functions. (For example, Design Matrix and Vector Classes with Static Allocation, and a Friend Function to do Matrix-Vector Multiplication)
2. Implement Complex Number Class with necessary Operator Overloadings and type conversions such as integer to complex, double to complex, complex to double etc.
3. Implement Matrix class with Dynamic Memory Allocation and necessary methods. Give proper Constructor, Destructor, Copy Constructor, and Overloading of Assignment Operator.
4. Overload the new and delete operators to provide Custom Dynamic Allocation of Memory.
5. Develop a Template of Linked-List Class and its Methods.
6. Develop templates of standard Sorting Algorithms such as Bubble Sort, Insertion Sort, Merge Sort, and Quick Sort.
7. Design Stack and Queue Classes with necessary Exception Handling.
8. Define Point class and an Arc Class. Define a Graph class which represents Graph as a collection of Point objects and Arc objects. Write a method to find a Minimum Cost Spanning Tree in a Graph.
9. Develop with suitable Hierarchy, Classes for Point, Shape, Rectangle, Square, Circle, Ellipse, Triangle, Polygon, etc. Design a simple test Application to demonstrate Dynamic Polymorphism and RTTI.
10. Write a C++ Program that randomly generates complex numbers (use previously designed Complex class) and writes them two per line in a file along with an operator (+, -, *, or /). The numbers are written to file in the format (a + ib). Write another program to read one line at a time from this file, perform the corresponding operation on the two complex numbers read, and write the result to another file (one per line).

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

1. PC   - 30 Nos.

- Processors           - 2.0 GHz or Higher

- RAM                   - 256 MB or Higher

- Hard Disk            - 20 GB or Higher

- Operating System     - Windows 2000/XP/NT

2. Software     - TURBO C (Freeware) - to be installed in all PC's

# SEMESTER IV

## MA1252 – PROBABILITY AND QUEUEING THEORY
(Common to CSE and IT)

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**UNIT I     RANDOM VARIABLES                                        9**
Discrete and continuous random variables – Moments – Moment generating functions and their properties – Binomial – Poisson – Geometric – Negative binomial – Uniform – Exponential – Gamma and Weibull distribution .

**UNIT II     TWO DIMENSIONAL RANDOM VARIABLES                9**
Joint distributions – Marginal and conditional distributions – Covariance – Correlation and regression – Transformation of random variables – Central limit theorem.

**UNIT III     MARKOV PROCESSES AND MARKOV CHAINS            9**
Classification – Stationary process – Markov process – Markov chains – Transition probabilities – Limiting distributions – Poisson process.

**UNIT IV     QUEUEING THEORY                                    9**
Markovian models – Birth and death queuing models – Steady state results – Single and multiple server queuing models – Queues with finite waiting rooms – Finite source models – Little's formula.

**UNIT V     NON-MARKOVIAN QUEUES AND QUEUE NETWORKS     9**
M/G/1 queue – Pollaczek – Khintchine formula – Series queues – Open and closed networks.

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

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

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

# CS1251 – DESIGN AND ANALYSIS OF ALGORITHMS

|   | L | T | P | C |
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## UNIT I ALGORITHM ANALYSIS 9

Algorithm analysis – Time space tradeoff – Asymptotic notations – Conditional asymptotic notation – Removing condition from the conditional asymptotic notation – Properties of Big-oh notation – Recurrence equations – Solving recurrence equations – Analysis of linear search.

## UNIT II DIVIDE AND CONQUER, GREEDY METHOD 9

Divide and conquer – General method – Binary search – Finding maximum and minimum – Merge sort – Greedy algorithms – General method – Container loading – Knapsack problem.

## UNIT III DYNAMIC PROGRAMMING 9

Dynamic programming – General method – Multistage graphs – All-pair shortest paths – Optimal binary search trees – 0/1 Knapsack – Traveling salesperson problem.

## UNIT IV BACKTRACKING 9

Backtracking – General method – 8 Queens problem – Sum of subsets – Graph coloring – Hamiltonian problem – Knapsack problem.

## UNIT V TRAVERSALS, BRANCH AND BOUND 9

Graph traversals – Connected components – Spanning trees – Biconnected components – Branch and Bound – General methods (FIFO and LC) – 0/1 Knapsack problem – Introduction to NP-hard and NP-completeness.

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

## TEXT BOOKS

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, "Computer Algorithms / C++", 2nd Edition, Universities Press, 2007.
2. Easwarakumar, K.S., "Object Oriented Data Structures Using C++", Vikas Publishing House, 2000.

## REFERENCES

1. Cormen, T.H., Leiserson, C.E., Rivest, R.L. and Stein, C., "Introduction to Algorithms", 2nd Edition, Prentice Hall of India Pvt. Ltd, 2003.
2. Aho, A.V., Hopcroft J.E. and Ullman, J.D., "The Design and Analysis of Computer Algorithms", Pearson Education, 1999.
3. Sara Baase and Allen Van Gelder, "Computer Algorithms, Introduction to Design and Analysis", 3rd Edition, Pearson Education, 2009.

# EC1257 – MICROPROCESSORS AND MICROCONTROLLERS

## (Common to CSE and IT)

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### UNIT I THE 8085 AND 8086 MICROPROCESSORS 9

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

### UNIT II 8086 SOFTWARE ASPECTS 9

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

### UNIT III MULTIPROCESSOR CONFIGURATIONS 9

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

### UNIT IV I/O INTERFACING 9

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

### UNIT V MICROCONTROLLERS 9

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

**Total: 45**

## TEXT BOOKS

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

## REFERENCES

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

## CS1252 – COMPUTER ORGANIZATION AND ARCHITECTURE
### (Common to CSE and IT)

| L | T | P | C |
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**UNIT I          BASIC STRUCTURE OF COMPUTERS                    9**

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

**UNIT II          BASIC PROCESSING UNIT                    9**

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

**UNIT III          PIPELINING                    9**

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

**UNIT IV          MEMORY SYSTEM                    9**

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

**UNIT V          I/O ORGANIZATION                    9**

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

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

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

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

# CS1253 – OPERATING SYSTEMS
## (Common to CSE and IT)

|     | L | T | P | C |
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### UNIT I      PROCESSES AND THREADS      9

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

### UNIT II      PROCESS SCHEDULING AND SYNCHRONIZATION      10

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

### UNIT III      STORAGE MANAGEMENT      9

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

### UNIT IV      FILE SYSTEMS      9

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

### UNIT V      I/O SYSTEMS      8

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

**Total: 45**

### TEXT BOOK
1.     Silberschatz, Galvin and Gagne, "Operating System Concepts", 6th Edition, Wiley India Pvt. Ltd., 2003.

### REFERENCES
1.     Tanenbaum, A.S., "Modern Operating Systems", 2nd Edition, Pearson Education, 2004.
2.     Gary Nutt, "Operating Systems", 3rd Edition, Pearson Education, 2004.
3.     William Stallings, "Operating Systems", 4th Edition, Prentice Hall of India, 2003.

## CS1254 – DATABASE MANAGEMENT SYSTEMS
### (Common to CSE and IT)

|   | L | T | P | C |
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**UNIT I          FUNDAMENTALS                                                         9**

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

**UNIT II         RELATIONAL MODEL                                              9**

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

**UNIT III        DATABASE DESIGN                                               9**

Functional dependencies – Non-loss decomposition – Functional dependencies – First – Second – Third normal forms – Dependency preservation – Boyce/codd normal form – Multi-valued dependencies and fourth normal form – Join dependencies and fifth normal form.

**UNIT IV        TRANSACTIONS                                                     9**

Transaction concepts – Transaction recovery – ACID properties – System recovery – Media recovery – Two phase commit – Save points – SQL facilities for recovery – Concurrency – Need for concurrency – Locking protocols –  Two phase locking – Intent locking – Deadlock – Serializability – Recovery Isolation Levels – SQL Facilities  for Concurrency**.**

**UNIT V          IMPLEMENTATION TECHNIQUES                          9**

Overview of Physical Storage Media – Magnetic Disks – RAID – Tertiary Storage – File Organization – Organization of Records in Files – Indexing and Hashing – Ordered Indices – B+ Tree Index Files – B Tree index files – Static hashing – Dynamic hashing – Query processing overview – Catalog information for cost estimation – Selection operation – Sorting – Join operation – Database Tuning.

**Total: 45**

### TEXT BOOKS

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

### REFERENCES

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

## CS1255 – OPERATING SYSTEMS LABORATORY
### (Common to CSE and IT)

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

**LIST OF EXPERIMENTS**

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

**Total:  45**

**Example for exercises 8 and 9:**

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

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

**HARDWARE:**     30 Personal Computers

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

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

Linux  could be loaded in individual PCs.

### (OR)

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

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

| L | T | P | C |
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**LIST OF EXPERIMENTS**

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

**LAB EQUIPMENTS**

Hardware and Software required for a batch of  30 students:

**Hardware:**

30 Personal Computers

**Software:**

Front end:  VB/VC ++/JAVA

Back end:   Oracle 11g, my SQL, DB2

Platform: Windows 2000 Professional/Windows XP

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

**Total: 45**

**EC1258 – MICROPROCESSORS LABORATORY**

(Common to CSE and IT)

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**LIST OF EXPERIMENTS**

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

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

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

**Total: 45**

# SEMESTER V

## MA1301 – DISCRETE MATHEMATICS

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**UNIT I    PROPOSITIONAL CALCULUS                                9**

Propositions − Logical connectives − Compound propositions − Conditional and biconditional propositions − Truth tables − Tautologies and contradictions − Contrapositive − Logical equivalences and implications − Demorgan's Laws − Normal forms − Principal conjunctive and disjunctive normal forms − Rules of Inference − Arguments − Validity of Arguments.

**UNIT II    PREDICATE CALCULUS                                9**

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

**UNIT III    SET THEORY                                9**

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

**UNIT IV    FUNCTIONS                                9**

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

**UNIT V    GROUPS                                9**

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

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

**TEXT BOOKS**

1.    Trembly J .P and Manohar R, "Discrete Mathematical Structures with Applications to Computer Science", TMH Pub. Co. Ltd, 2003.
2.    Ralph P. Grimaldi, "Discrete and Combinatorial Mathematics: An Applied Introduction", 4th Edition, Pearson Education Asia, 2002.

**REFERENCES**

1.    Bernard Kolman, Busby, R.C. and Sharan Cutler Ross, "Discrete Mathematical Structures", 4th Indian reprint, Pearson Education Pvt Ltd., 2003.
2.    Kenneth H. Rosen, "Discrete Mathematics and its Applications", 5th Edition, TMH Pub. Co. Ltd., 2003.
3.    Richard Johnsonbaugh, "Discrete Mathematics", 5th Edition, Pearson Education Asia, 2002.

## CS1301 – SOFTWARE ENGINEERING

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### UNIT I        SOFTWARE PROCESS                                        9

Basics − S/W engineering paradigm − Life cycle models (Water fall, Incremental, Spiral, WINWIN Spiral, Evolutionary, Prototyping, Object Oriented) − System engineering − Computer based system − Verification − Validation − Life cycle process − Development process − System engineering hierarchy.

### UNIT II       SOFTWARE REQUIREMENTS                                   9

Functional and Non-Functional requirements − 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 BOOKS**

1. Roger S. Pressman, "Software Engineering A Practitioner's Approach", 5th Edition, McGraw-Hill International Edition, 2001.
2. Ian Sommerville, "Software Engineering", 6th Edition, Pearson Education Asia, 2000.

**REFERENCES**

1. Pankaj Jalote, "An Integrated Approach to Software Engineering", Springer Verlag, 1997.
2. Peters, J.F. and Witold Pedryez, "Software Engineering −An Engineering Approach", John Wiley and Sons, 2000.
3. Ali Behforooz and Frederick J Hudson, "Software Engineering Fundamentals", Oxford University Press, 1996.

# CS1302 – COMPUTER NETWORKS

|  | L | T | P | C |
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|  | 3 | 0 | 0 | 3 |

## UNIT I  DATA COMMUNICATIONS  8

Components − Direction of data flow − Networks − Components and categories − Types of connections − Topologies − Protocols and standards − ISO/OSI model − Transmission media − Coaxial cable − Fiber optics − Line coding − Modems − RS232 Interfacing sequences.

## UNIT II  DATA LINK LAYER  10

Error detection and correction − Parity − LRC − CRC − Hamming code − Flow control and error control − Stop and wait − Go back − N ARQ − Selective repeat ARQ - Sliding window − HDLC − LAN − Ethernet IEEE 802.3 − IEEE 802.4 − IEEE 802.5 − IEEE 802.11 − FDDI − SONET − Bridges.

## UNIT III  NETWORK LAYER  10

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

## UNIT IV  TRANSPORT LAYER  9

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

## UNIT V  APPLICATION LAYER  8

Domain Name Space (DNS) − SMTP − FTP − HTTP − WWW − Security − cryptography.

**Total: 45**

## TEXT BOOKS

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

## REFERENCES

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

## CS1303 – THEORY OF COMPUTATION

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3   0   0   3

**UNIT I        AUTOMATA                                                          9**

Introduction to formal proof − Additional forms of proof − Inductive proofs − Finite Automata (FA) − Deterministic Finite Automata (DFA) − Non-Deterministic Finite Automata (NFA) − Finite automata with epsilon transitions.

**UNIT II       REGULAR EXPRESSIONS AND LANGUAGES                9**

Regular expression − FA and Regular expressions − Proving languages not to be regular − Closure properties of regular languages − Equivalence and minimization of automata.

**UNIT III      CONTEXT-FREE GRAMMAR AND LANGUAGES              9**

Context Free Grammar (CFG) − Parse trees − Ambiguity in grammars and languages − Definition of the pushdown automata − Languages of a pushdown automata − Equivalence of pushdown automata and CFG − Deterministic pushdown automata.

**UNIT IV       PROPERTIES OF CONTEXT-FREE LANGUAGES             9**

Normal forms for CFG − Pumping lemma for CFL − Closure properties of CFL − Turing machines − Programming Techniques for TM.

**UNIT V        UNDECIDABILITY                                           9**

A language that is not Recursively Enumerable (RE) − problems about turing machine An Undecidable problem that is RE − Undecidable − Post's correspondence problem − The classes P and NP.

**Total: 45**

**TEXT BOOKS**

1.    Hopcroft, J.E.  Motwani, R. and Ullman, J.D "Introduction to Automata Theory, Languages and Computations", 2nd Edition, Pearson Education, 2003.

2.    Lewis, H.  and Papadimitriou, C.H "Elements of the Theory of Computation", 2nd Edition, Pearson Education/PHI, 2003.

**REFERENCES**

1.    Martin, J., "Introduction to Languages and the Theory of Computation", 3rd Edition, TMH, 2003.

2.    Micheal Sipser, "Introduction of the Theory and Computation", Thomson Brokecole, 1997.

3.    Greenlaw, "Fundamentals of Theory of Computation, Principles and Practice", Elsevier, 2008.

## CS1304 – SYSTEM SOFTWARE

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|     | 3 | 1 | 0 | 4 |

### UNIT I    FUNDAMENTALS    8

System software and machine architecture – The Simplified Instructional Computer (SIC) – Machine architecture – Data and instruction formats – Addressing modes – Instruction sets – I/O and programming.

### UNIT II    ASSEMBLERS    10

Basic assembler functions – A Simple SIC assembler – Assembler algorithm and data structures –Machine Dependent assembler features – Instruction formats and addressing modes – Program relocation – Machine independent assembler features – Literals – Symbol – Defining statements – Expressions – One pass assemblers and multi pass assemblers – Implementation example – MASM assembler.

### UNIT III    LOADERS AND LINKERS    9

Basic loader functions – Design of absolute loader – Simple bootstrap loader – Machine dependent loader features – Relocation – Program linking – Algorithm and data structures for linking loader – Machine independent loader features – Automatic library search – Loader options – Loader design options – Linkage editors – Dynamic linking – Bootstrap loaders – Implementation example– MSDOS linker.

### UNIT IV    MACRO PROCESSORS    9

Basic macro processor functions – Macro definition and expansion – Macro processor algorithm and data structures – Machine independent macro processor features – Concatenation of macro parameters – Generation of unique labels – Conditional macro expansion – Keyword macro parameters – Macro within macro – Implementation example – MASM Macro Processor – ANSI C Macro Language.

### UNIT V    SYSTEM SOFTWARE TOOLS    9

Text editors – Overview of the editing process – User interface – Editor Structure – Interactive debugging systems – Debugging functions and capabilities – Relationship with other parts of the system – User interface criteria.

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

### TEXT BOOK

1.    Beck, L.L. "System Software - An Introduction to Systems Programming", 3rd Edition, Pearson Education, 2000.

### REFERENCES

1.    Dhamdhere, D. M., "Systems Programming and Operating Systems", 2nd Revised Edition, Tata McGraw-Hill, 1999.
2.    Donovan, J.J., "Systems Programming", Tata McGraw-Hill, 1972.

## CS1308 – VISUAL PROGRAMMING

| | L | T | P | C |
|---|---|---|---|---|
| | 3 | 1 | 0 | 4 |

**UNIT I          WINDOWS PROGRAMMING                                      9**

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

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

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

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

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

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

ActiveX Controls Vs Ordinary windows controls − Installing ActiveX Controls − Calendar Control − ActiveX control container programming − Create ActiveX control at runtime − Component Object Model (COM) − Containment and Aggregation Vs Inheritance − OLE Drag and Drop − OLE embedded component and containers − Sample applications.

**UNIT V          ADVANCED CONCEPTS                                      9**

Database management with microsoft ODBC − Structured query language − MFC ODBC Classes − Sample database applications − Filter and Sort Strings − DAO Concepts − Displaying database records in scrolling view − Threading − VC++ Networking issues − WinSock − WinInet − Building a web client − Internet Information server − ISAPI server extension − Chat application − Playing and multimedia (sound and video) files.

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

**TEXT BOOKS**
1.      Charles Petzold,  "Windows Programming", Microsoft Press, 1996.
2.      David J. Kruglinski, George Shepherd and Scot Wingo, "Programming Visual C++", Microsoft press, 1999.

**REFERENCES**
1.      Steve  Holtzner,  "Visual C++ 6 Programming",  Wiley Dreamtech India Pvt. Ltd., 2003.
2.      Mueller and John, "Visual C++ from the Ground up", 2nd Edition, Tata McGraw Hill, 1999.
3.      Bates and Tompkins, "Practical Visual C++", Prentice Hall of India, 2002.

## CS1306 – NETWORKS LABORATORY

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 2 |

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

1. Write a socket Program for Echo / Ping / Talk commands.

2. Create a socket (TCP) between two computers and enable file transfer between them.

3. Write a program to implement Remote Command Execution (Two M/Cs must be used)

4. Write a program to implement CRC and Hamming code for error handling.

5. Write a code simulating Sliding Window Protocols.

6. A Client − Server application for chat.

7. Write a program for File Transfer in client–server architecture using following methods.

   a. USING RS232C

   b. TCP/IP

8. Perform a case study about the different routing algorithms to select the network path with its optimum and economical during data transfer.

   a. Shortest path routing

   b. Flooding

   c. Link State

   d. Hierarchical

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

**Total: 45**

## CS1307 – SYSTEM SOFTWARE LABORATORY

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 2 |

**LIST OF EXPERIMENTS**

1. Design of an Editor: Design of a Line or Screen Editor using C Language.
2. Design of an Assembler.
3. Simulation of Loaders.
4. Interprocess Communication.
5. Token Separation and Symbol Table Manipulation.
6. Construction of Parsing Table.

## CS1305 – VISUAL PROGRAMMING LABORATORY

**L   T   P   C**
**0   0   3   2**

**LIST OF EXPERIMENTS**

### WINDOWS SDK / VISUAL C++

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

### VISUAL C++

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

# SEMESTER VI

## MA1351 – NUMERICAL METHODS

|     | L | T | P | C |
|-----|---|---|---|---|
|     | 3 | 1 | 0 | 4 |

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

Linear interpolation methods (Method of False Position) − Newton's method − Statement of fixed point theorem − Fixed point iteration: x=G(x) method − Solution of linear system by Gaussian elimination and Gauss-Jordon methods − Iterative Methods: Gauss Jacobi and Gauss-Seidel Methods − Inverse of a matrix by Gauss Jordon Method – Eigen value of a matrix by power method.

**UNIT II       INTERPOLATION AND APPROXIMATION       9**

Lagrangian polynomials − Divided differences − Interpolating with a Cubic Spline − Newton's Forward and backward difference formulas.

**UNIT III       NUMERICAL DIFFERENTIATION AND INTEGRATION       9**

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

**UNIT IV       INITIAL       VALUE       PROBLEMS       FOR       ORDINARY DIFFERENTIAL EQUATIONS       9**

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

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

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

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

**TEXT BOOKS**

1.    Gerald C.F, and Wheatley, P.O, "Applied Numerical Analysis", 6th Edition, Pearson Education Asia, 2002.

2.    Balagurusamy E., "Numerical Methods", Tata McGraw-Hill Pub.Co.Ltd, 1999.

**REFERENCES**

1.    Kandasamy P., Thilagavathy K. and Gunavathy K., "Numerical Methods", S.Chand Co. Ltd., 2003.

2.    Burden R.L and Faires T.D., "Numerical Analysis", 7th Edition, Thomson Asia Pvt. Ltd., 2002.

# CS1351 – ARTIFICIAL INTELLIGENCE

**L  T  P  C**
**3  1  0  4**

## UNIT I        FUNDAMENTALS                                      8

Intelligent agents − Agents and environments − Good behavior − The nature of environments − Structure of agents − Problem solving − Problem solving agents − Example problems − Searching for solutions − Uniformed search strategies − Avoiding repeated states − Searching with partial information.

## UNIT II        SEARCHING TECHNIQUES                            10

Informed search and exploration − Informed search strategies − Heuristic function − Local search algorithms and optimistic problems − Local search in continuous spaces − Online search agents and unknown environments − Constraint Satisfaction Problems(CSP) − Backtracking Search and Local Search for CSP − Structure of problems − Adversarial search − Games − Optimal decisions in games − Alpha-Beta pruning − Imperfect real-time decision − Games that include an element of chance.

## UNIT III        KNOWLEDGE REPRESENTATION                      10

First order logic − Representation revisited − Syntax and semantics for first order logic − Using first order logic − Knowledge engineering in first order logic − Inference in first order logic − Propositional versus first order logic − Unification and lifting − Forward chaining − Backward chaining − Resolution − Knowledge representation − Ontological engineering − Categories and objects − Actions − Simulation and events − Mental events and mental objects.

## UNIT IV        LEARNING                                        9

Learning from observations − Forms of learning − Inductive learning − Learning decision trees − Ensemble learning − Knowledge in learning − Logical formulation of learning − Explanation based learning − Learning using relevant information − Inductive logic programming − Statistical Learning Methods − Learning with Complete Data − Learning with Hidden Variable − EM Algorithm − Instance Based Learning − Neural Networks − Reinforcement Learning − Passive Reinforcement Learning − Active reinforcement learning − Generalization in reinforcement learning.

## UNIT V        APPLICATIONS                                     8

Communication − Communication as action − Formal grammar for a fragment of english − Syntactic analysis − Augmented grammars − Semantic interpretation − Ambiguity and disambiguation − Discourse understanding − Grammar Induction − Probabilistic language processing − Probabilistic language models − Information Retrieval − Information extraction − Machine translation.

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

**TEXT BOOKS**

1.    Stuart Russell and Peter Norvig, "Artificial Intelligence−A Modern Approach", 2nd Edition, Pearson Education / Prentice Hall of India, 2004.

2.    Nilsson, N.J., "Artificial Intelligence: A new Synthesis", Elsevier, 2003.

**REFERENCES**

1.    Elaine Rich and Kevin Knight, "Artificial Intelligence", 2$^{nd}$ Edition, Tata McGraw-Hill, 2003.

2.    Luger, G.F., "Artificial Intelligence-Structures and Strategies for Complex Problem Solving", Pearson Education / PHI, 2002.

## CS1352 – PRINCIPLES OF COMPILER DESIGN

|   | L | T | P | C |
|---|---|---|---|---|
|   | 3 | 0 | 0 | 3 |

**UNIT I      INTRODUCTION TO COMPILING                    9**

Compilers − Analysis of the source program − Phases of a compiler − Cousins of the compiler − Grouping of phases − Compiler construction tools − Lexical analysis − Role of lexical analyzer − Input buffering − Specification of tokens.

**UNIT II      SYNTAX ANALYSIS                              9**

Role of the parser − Writing grammars − Context-Free Grammars − Top down parsing − Recursive descent parsing − Predictive parsing − Bottom-Up Parsing − Shift Reduce Parsing − Operator Precedence Parsing − LR Parsers − SLR Parser − Canonical LR Parser − LALR Parser.

**UNIT III      INTERMEDIATE CODE GENERATION                  9**

Intermediate languages − Declarations − Assignment statements − Boolean expressions − Case statements − Back patching − Procedure calls.

**UNIT IV      CODE GENERATION                              9**

Issues in the design of code generation − The target machine − Runtime storage management − Basic blocks and flow graphs − Next-Use Information − A Simple code generator − DAG representation of basic blocks − Peephole optimization.

**UNIT V      CODE OPTIMIZATION AND RUN TIME ENVIRONMENTS  9**

Basics − Principal sources of optimization − Optimization of basic blocks − Introduction to global data flow analysis − Runtime environments − Source language issues − Storage organization − Storage allocation strategies − Access to Non-Local Names − Parameter passing.

**Total: 45**

**TEXT BOOKS**
1.      Alfred Aho, Ravi Sethi and Jeffrey D Ullman, "Compilers Principles, Techniques and Tools", Pearson Education Asia, 2003.
2.      Holub, Allen I., "Compiler Design in C", PHI, 2003.

**REFERENCES**
1.      Fischer, C. N.  and LeBlanc, R. J., "Crafting a compiler with C", Benjamin Cummings, 2003.
2.      Bennet, J.P., "Introduction to Compiler Techniques", 2nd Edition, TMH, 2003.
3.      Henk Alblas and Albert Nymeyer, "Practice and Principles of Compiler Building with C", PHI, 2001.
4.      Louden, K.C., "Compiler Construction: Principles and Practice", Thompson Learning, 2003.

## CS1353 – DISTRIBUTED SYSTEMS

|  | L | T | P | C |
|---|---|---|---|---|
|  | 3 | 0 | 0 | 3 |

**UNIT I          BASIC CONCEPTS                                        9**

Characterization of distributed systems − Examples − Resource sharing and the Web − Challenges − System models − Architectural and fundamental models − Networking and internetworking − Types of networks − Network principles − Internet protocols − Case studies.

**UNIT II          PROCESSES AND DISTRIBUTED OBJECTS          9**

Interprocess communication − The API for the internet protocols − External data representation and marshalling − Client-server communication − Group communication − Case study − Distributed objects and remote invocation − Communication between distributed objects − Remote procedure call − Events and notifications − Java RMI − Case Study.

**UNIT III          OPERATING SYSTEM ISSUES I                    9**

The os layer − Protection − Processes and threads − Communication and invocation − OS Architecture − Security − Overview −Cryptographic algorithms − Digital signatures − Cryptography pragmatics − Case studies − Distributed file systems − File service architecture − Sun Network File System − The Andrew File System.

**UNIT IV          OPERATING SYSTEM ISSUES II                  9**

Name services − Domain name system − Directory and discovery services − Global name service − X.500 directory service − Clocks − Events and process states − Synchronizing physical clocks − Logical time and logical clocks − Global states − Distributed debugging − Distributed mutual exclusion − Elections − Multicast communication related problems.

**UNIT V          DISTRIBUTED TRANSACTION PROCESSING          9**

Transactions − Nested transactions − Locks − Optimistic concurrency control − Timestamp ordering − Comparison − Flat and nested distributed transactions − Atomic commit protocols − Concurrency control in distributed transactions − Distributed deadlocks − Transaction recovery − Overview of replication and distributed multimedia systems.

                                                            **Total: 45**

**TEXT BOOKS**

1.      George Coulouris, Jean Dollimore and Tim Kindberg, "Distributed Systems Concepts and Design", 3rd Edition, Pearson Education, 2002.

2.      Andrew S. Tanenbaum, Maartenvan Steen, Distibuted Systems, "Principles and      Pardigms", Pearson Education, 2002.

**REFERENCES**

1.      Tanenbaum and Steen, "Distributed Systems", PHI, 2002.
2.      Sape Mullender, "Distributed Systems", 2nd Edition, Addison Wesley, 1993.
3.      Albert Fleishman, "Distributed Systems: Software Design and Implementation", Springer Verlag, 1994.
4.      M. L. Liu, "Distributed Computing Principles and Applications", Pearson Education, 2004.

## CS1354 – GRAPHICS AND MULTIMEDIA

|     |     |     |     |
| --- | --- | --- | --- |
| L   | T   | P   | C   |
| 3   | 1   | 0   | 4   |

### UNIT I        OUTPUT PRIMITIVES                                        9

Basic − 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

Multimedia basics − Multimedia applications − Multimedia system architecture − Evolving technologies for multimedia − Defining objects for multimedia systems − Multimedia data interface standards − Multimedia databases.

### UNIT IV        MULTIMEDIA FILE HANDLING                        9

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

### UNIT V        HYPERMEDIA                                        9

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

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

### TEXT BOOKS

1. Donald Hearn and M. Pauline Baker, "Computer Graphics C Version", Pearson Education, 2003.
2. Andleigh, P. K and  Kiran Thakrar, "Multimedia Systems and Design", PHI, 2003.

### REFERENCES

1. Judith Jeffcoate, "Multimedia in practice: Technology and Applications", PHI, 1998.
2. Foley, Vandam, Feiner and Huges, "Computer Graphics: Principles and Practice", 2nd Edition, Pearson Education, 2003.

# CS1355 – CRYPTOGRAPHY AND NETWORK SECURITY

|   | L | T | P | C |
|---|---|---|---|---|
|   | 3 | 0 | 0 | 3 |

## 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 − RIPEMD − HMAC Digital Signatures − authentication protocols − Digital signature standard.

## UNIT IV        NETWORK SECURITY                                     8

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

## UNIT V        SYSTEM LEVEL SECURITY                                 8

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

**Total: 45**

## TEXT BOOKS
1.      William Stallings, "Cryptography and Network Security −Principles and Practices", 3rd Edition, Prentice Hall of India, 2003.
2.      Atul Kahate, "Cryptography and Network Security", Tata McGraw-Hill, 2003.

## REFERENCES
1.      Forozan, B.A., "Network Security", PHI, 2002.
2.      Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc, 2001.
3.      Charles B. Pfleeger and Shari Lawrence Pfleeger, "Security in Computing", 3rd Edition, Pearson Education, 2003.
4.      Maiwald, "Fundamentals of Network Security", Wiley Student Edition, 2006.

# CS1356 – COMPILER DESIGN LABORATORY

|  | L | T | P | C |
|---|---|---|---|---|
|  | 0 | 0 | 3 | 2 |

## LIST OF EXPERIMENTS

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

**CS1360 – GRAPHICS AND MULTIMEDIA LABORATORY**

|   | **L** | **T** | **P** | **C** |
|---|---|---|---|---|
|   | **0** | **0** | **3** | **2** |

**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 sharing.
3. To implement Cohen-Sutherland 2D clipping and window-viewport mapping.
4. To perform 3D Transformations such as translation, rotation and scaling.
5. To visualize projections of 3D images 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.

**HS1301 – COMMUNICATION AND SOFT SKILLS LABORATORY**

```
                                                    L   T   P   C
                                                    0   0   3   2
```

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Lab session # 14: Critical and creative thinking exercises.

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

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

## UNIT I        LISTENING AND  SPEAKING  PRACTICE  IN COMMUNICATIVE   FUNCTIONS

Introductions and Meetings – Talking about Studies and/or Job – Expressing Likes and Dislikes – Describing Daily Routines and Current Activities – Talking about Past States and Events – Talking about Future Plans and Intentions – Expressing Preferences – Giving Reasons – Expressing Opinions, agreement and Disagreement – Seeking and Giving Advice – Making Suggestions.

## UNIT II       SPEAKING APPLICATIONS

Making an Oral Presentation – Preparing the Presentation – Performing the Presentation – Beginning – Language – Visual Aids and Body Language – Voice – Ending – Questions – Telephone Conversations – Group Discussion and Interview.

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

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

## UNIT IV      SOFT SKILLS (1)

Preparing for and Dealing With Change – Motivation, Goal-Setting and Self-Esteem – Managing Time and Stress – Career and Life Planning – Team Work – Leadership Traits.

## UNIT V       SOFT SKILLS (2)

Multiple Intelligences – Learning Styles and Personality Typing – Critical and Creative Thinking – People, Cultures and Self – Intercultural Communication.

**RESOURCES**

1.  Kamalesh Sadanand and Susheela Punitha, "Spoken English**:** A Foundation Course" for Speakers of Indian Languages, Part 2 Audio CD, Hyderabad: Orient Longman, 2008

2.  Malcome Goodale, "Professional Presentations", (VCD) New Delhi: Cambridge University Press, 2005

3.  Barbara Garside and Tony Garside, Essential Telephoning in English (Audio CD**),** Cambridge: Cambridge University Press, 2002

4.  Hari Mohan Prasad and Rajnish Mohan, "How to Prepare for Group Discussion and Interview **(**Audio Cassette)", Tata McGraw-Hill Publishing

5.  International English Language Testing System Practice Tests, CUP

6.  Business English Certificate Materials, Cambridge University Press

7.  Understanding the TOEFL**.** Educational Testing Services, Princeton, US

8.  Interactive Multimedia Programs on Managing Time and Stress

9.  Robert M. Sherfield and et al "Developing Soft Skills", 4th Edition, New Delhi, Pearson Education, 2009.

**Total: 45**

# SEMESTER VII

## CS1401 – INTERNET COMPUTING

|   | L | T | P | C |
|---|---|---|---|---|
|   | 3 | 1 | 0 | 4 |

**UNIT I      FUNDAMENTALS                                              9**

Introduction – Network concepts – Web concepts – Internet addresses – Retrieving data with URL – HTML – DHTML cascading style sheets – Scripting languages javascript – VBscript.

**UNIT II      SERVER SIDE PROGRAMMING                              9**

Server side programming – Active server pages – Java server pages – Java servlets. Servlet container – Exceptions – Sessions and session tracking – Using servlet context – Dynamic content generation – Servlet chaining and communications.

**UNIT III      XML TECHNOLOGY FAMILY                              9**

XML – benefits – Advantages of XML over HTML – EDI – Databases – XML based standards – DTD – XML schemas – X – Files – XML processing – DOM – SAX – presentation technologies – XSL – XFORMS – XHTML – voice XML – Transformation – XSLT – XLINK – XPATH – XQ

**UNIT IV      SOAP                                                    9**

Overview of SOAP – HTTP – XML – RPC – SOAP – Protocol – Message Structure – intermediaries – Actors – Design patterns and faults – SOAP with attachments.

**UNIT V      WEBSERVICES                                            9**

Overview – Architecture – Key technologies – UDDI – WSDL – ebXML – SOAP and web services in E–Com – Overview of .NET And J2EE

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

## TEXT BOOKS

1.      Marty Hall, "Core  Web Programming", 2nd Edition, Sun Microsystems Press
2.      Coyle, F.P., "XML Web Services and the Data Revolution", Pearson Education, 2002.

## REFERENCES

1.      Eric Ladd and Jim O'Donnell, et al, "Using HTML 4, XML, and JAVA1.2", PHI publications, 2003.
2.      Sandeep Chatterjee and James Webber, "Developing Enterprise Web Services", Pearson Education, 2004.
3.      McGovern et al., "Java Web Services Architecture", Elsevier, 2008.

# CS1310 – OBJECT ORIENTED ANALYSIS AND DESIGN

|   | L | T | P | C |
|---|---|---|---|---|
|   | 3 | 0 | 0 | 3 |

## UNIT I         FUNDAMENTALS                                    8
An overview of object oriented systems development − Object basics − Object oriented systems development life cycle.

## UNIT II        OBJECT ORIENTED METHODOLOGIES          12
Rumbaugh methodology − Booch methodology − Jacobson methodology − Patterns − Frameworks − Unified approach − Unified modeling language − Use case diagram − Class diagram − Interaction diagram − Package diagram − State diagram − Activity diagram – Implementation diagram.

## UNIT III       OBJECT ORIENTED ANALYSIS                  9
Identifying use cases − Object analysis − Classification − Identifying object relationships − Attributes and methods.

## UNIT IV       OBJECT ORIENTED DESIGN                     8
Design axioms − Designing classes − Access layer − Object storage − Object interoperability.

## UNIT V        SOFTWARE QUALITY AND USABILITY         8
Designing interface objects − Software quality assurance − System usability − Measuring user satisfaction.

**Total: 45**

**TEXT BOOKS**
1.     Ali Bahrami, "Object Oriented Systems Development", Tata McGraw-Hill, 1999.
2.     Martin Fowler, "UML Distilled", 2nd Edition, PHI/Pearson Education, 2002.

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

## OT1402 – MIDDLEWARE TECHNOLOGIES

|   |   |   |   |
|---|---|---|---|
| **L** | **T** | **P** | **C** |
| **3** | **0** | **0** | **3** |

**UNIT I          CLIENT / SERVER CONCEPTS                                    9**
Client-Server − File server − Database server − Group server − Object server − Web server − Middleware − General middleware − Service specific middleware − Client / server building blocks − RPC − Messaging − Peer-to-Peer.

**UNIT II         EJB ARCHITECTURE                                            9**
EJB − EJB architecture − Overview of EJB software architecture − View of EJB − Conversation − Building and Ddeploying EJBs − Roles in EJB.

**UNIT III        EJB APPLICATIONS                                            9**
EJB session beans − EJB entity beans − EJB clients − EJB deployment − Building an application with EJB.

**UNIT IV        CORBA                                                        9**
CORBA − Distributed systems − Purpose − Exploring CORBA alternatives − Architecture overview − CORBA and networking Model − CORBA object model − IDL − ORB − Building an application with CORBA.

**UNIT V         COM                                                          9**
COM − Data types − Interfaces − Proxy and stub − Marshalling − Implementing Server/Client − Interface pointers − Object creation − Invocation − Destruction − Comparison COM and CORBA − Introduction to .NET − Overview of .NET architecture − Marshalling − Remoting.

**Total: 45**

**TEXT BOOKS**
1.      Robert Orfali, Dan Harkey and Jeri Edwards, "The Essential Client/Server Survival Guide", Galgotia Publications Pvt. Ltd., 2002.
2.      Tom Valesky, "Enterprise Java Beans", Pearson Education, 2002
3.      Jason Pritchard, "COM and CORBA side by side", Addison Wesley, 2000
4.      Jesse Liberty, "Programming C#", 2<sup>nd</sup> Edition, O'Reilly Press, 2002.

**REFERENCES**
1.      Mowbray, "Inside CORBA", Pearson Education, 2002.
2.      Puder, "Distributed System Architecture – A Middleware Approach", Elsevier, 2008.

# MG1301 – TOTAL QUALITY MANAGEMENT

|   | L | T | P | C |
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**UNIT I       FUNDAMENTALS                                                    9**

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

**UNIT II       TQM PRINCIPLES                                                 9**

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

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

The Seven Tools of Quality − Statistical Fundamentals − Measures of Central Tendency and Dispersion − Population and Sample − Normal Curve − Control Charts for Variables and Attributes − Process Capability − Concept of Six Sigma − New Seven Management Tools.

**UNIT IV       TQM TOOLS                                                      9**

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

**UNIT V       QUALITY SYSTEMS                                               9**

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

**Total: 45**

**TEXT BOOK**

1.      Besterfiled et al D.H., "Total Quality Management", Pearson Education, Inc. 2003.

**REFERENCES**

1.      Evans, J. R. and Lidsay, W. M., "The Management and Control of Quality", 5th Edition, South-Western (Thomson Learning), 2002

2.      Feigenbaum, A.V., "Total Quality Management", McGraw-Hill, 1991.

3.      Oakland, J.S., "Total Quality Management", 3rd Edition, Elsevier, 2005.

4.      Narayana, V.  and Sreenivasan, N. S., "Quality Management - Concepts and Tasks", New Age International, 1996.

5.      Zeiri, "Total Quality Management for Engineers", Wood Head Publishers, 1991.

# CS1311 – CASE TOOLS LABORATORY

**L   T   P   C**
**0   0   3   2**

**Objective :**

    **To learn and practice the various functionalities of appropriate Case Tools for the following Software Engineering concepts**

1.     **Problem Statement** Thorough study of the problem-Identify project scope, Objectives and infrastructure.

2.     **Business modeling and requirements specification** The specification language Unified Modeling Language (UML) will be used.

3.     **UML** Use work products-data dictionary, use case diagrams and activity diagrams, build and test, class diagrams, sequence diagrams, collaboration diagrams and add interface to class diagrams.

4.     **Software Implementation** Coding-Use tools for automatic code generation from system specifications.

5.     **Software Testing** Prepare test plan, perform validation testing, coverage analysis, memory leaks, develop test case hierarchy, Site check and site monitor.

6.     **Change Management** Program, Data and Documentation management

7.     **Reverse Engineering** Apply Reverse Engineering approach and compare with the forward engineering approach. Prepare documents and reports.

**Note :**

    Here the emphasis is based on equipping / training the student in applying Object Oriented Analysis and Design ( OOAD ) techniques using UML in a CASE tools environment such as StarUML, Rational Rose etc.,

**Total : 45**

## IT1404 – MIDDLEWARE TECHNOLOGIES LABORATORY

|     | L | T | P | C |
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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**

# CS1402 – SOFTWARE DEVELOPMENT LABORATORY

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**Objective :**

**To emphasize on software industry practices to acquire the knowledge about software development. Take up a software development project of your choice and systematically carry-out all the phases of Software Development Life Cycle (SDLC). Do the necessary documentation at each stage. Use your own choice of case tools.**

In order to carry out the below mentioned project use appropriate Front end and Back end tools:

1.      Student Marks Analyzing System.
2.      Online stock trading.
3.      Airport management.
4.      Bio-informatics.
5.      Hospital management.
6.      Internet-based multi-user online games.
7.      Programmer's editor with syntax-based coloring.
8.      Quiz System
9.      ATM System
10.     Library of computer security related algorithms.

**Total :  45**

# SEMESTER VIII

## IT1403 − MOBILE COMPUTING

|  | L | T | P | C |
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**UNIT I        WIRELESS COMMUNICATION FUNDAMENTALS        9**

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

**UNIT II        TELECOMMUNICATION NETWORKS        11**

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

**UNIT III        WIRLESS LAN        9**

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

**UNIT IV        MOBILE NETWORK LAYER        9**

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

**UNIT V        TRANSPORT AND APPLICATION LAYERS        7**

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

**Total : 45**

**TEXT BOOKS**
1. Jochen Schiller, "Mobile Communications", 2nd Edition, PHI/Pearson Education, 2003.
2. William Stallings, "Wireless Communications and Networks", PHI/Pearson Education, 2002.

**REFERENCES**
1. Kaveh Pahlavan and Prasanth Krishnamoorthy, "Principles of Wireless Networks", PHI/Pearson Education, 2003.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, 2003.
3. Hazysztof Wesolowshi, "Mobile Communication Systems", John Wiley and Sons Ltd, 2002.
4. Hansmann, "Principles of Mobile Computing", Wiley India Limited, 2004.

## CS1451 – NETWORK PROTOCOLS

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**UNIT I       FRAME RELAY AND ISDN                                     9**

Frame relay protocol architecture − Call control − Data transfer − Overview of ISDN − Channels − User access − Protocols.

**UNIT II       ATM AND BISDN                                          9**

ATM Protocol architecture − Transmission of ATM cells − ATM adaptation layer − Congestion control − Broadband ISDN.

**UNIT III       INTERNETWORK  PROTOCOLS                               9**

Basic Protocol function − Internet Protocol Operation – Internet Protocol- IP v4 - IPV6 − Routing Protocols − Internet Application Protocols – voice over IP and Multimedia support – SIP – RTP.

**UNIT IV       NETWORK MANAGEMENT FUNDAMENTALS                         9**

Network management requirements − Network monitoring − Network control − SNMP − Concepts, MIBs − Implementation issues.

**UNIT V       NETWORK MANAGEMENT PROTOCOLS                            9**

SNMP V2 system architecture − Protocols − SNMP V3 − RMON − CMIP.

**Total: 45**

### REFERENCES

1.   William Stallings, "Data and Computer Communications" 5th Edition, PHI, 1997.
2.   William Stallings, "SNMP, SNMPV2, SNMPV3 and RMON1 and 2", 3rd Edition, Addison Wesley, 1999.
3.   Mani Subramanian, "Network Management−Principles and Practices", Addison Wesley, 2000.
4.   William Stallings, "Cryptography and Network Security", PHI, 2000.

# LIST OF ELECTIVES

## ELETIVE I

### CS1001 – PARALLEL COMPUTING

|  | L | T | P | C |
|---|---|---|---|---|
|  | 3 | 0 | 0 | 3 |

**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. David E. Culler and Jaswinder Pal Singh, "Parallel Computing  Architecture: A Hardware/Software Approach", Elsevier, 2004.

**REFERENCES**
1. Michael J. Quinn, "Parallel Programming in C with MPI and OpenMP", Tata McGraw-Hill, 2003.
2. Kai Hwang, "Advanced Computer Architecture", Tata McGraw-Hill,  2003.

# CS1002 – DIGITAL IMAGE PROCESSING

**L T P C**

**3 0 0 3**

## 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 − Chair codes − Polygonal approximation − Boundary segments − Boundary descriptors − Simple descriptors − Fourier descriptors − Regional descriptors − Simple descriptors − Texture.

**Total: 45**

**TEXT BOOKS**
1. Rafael C Gonzalez and Richard E Woods, "Digital Image Processing", Second Edition, Pearson Education, 2003.
2. Willliam K Pratt, "Digital Image Processing", John Willey .

**REFERENCES**
1. A. K. Jain, "Fundamentals of Digital Image Processing", PHI, New Delhi (1995)
2. Chanda Dutta Magundar, "Digital Image Processing and Applications", PHI, 2000.

## CS1003 – COMPONENT BASED TECHNOLOGY

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**UNIT I        SOFTWARE COMPONENTS                              9**

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

**UNIT II       JAVA BASED COMPONENT TECHNOLOGIES               9**

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

**UNIT III      CORBA COMPONENT TECHNOLOGIES                    9**

Java and CORBA − Interface definition language − Object request broker − System object model − Portable object adapter − CORBA Services − CORBA Component model − Containers − Application server − Model driven architecture.

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

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

**UNIT V        COMPONENT FRAMEWORKS AND DEVELOPMENT           9**

Connectors − Contexts − EJB Containers − CLR contexts and channels − Black box Component framework − Directory objects − Cross-Development environment − Component-oriented programming − Component design and implementation tools − Testing tools − Assembly tools.

                                                              **Total: 45**

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

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

# CS1004 − NATURAL LANGUAGE PROCESSING

**L  T  P  C**

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## UNIT I  FUNDAMENTALS  6

Knowledge in speech and language processing − Ambiguity − Models and algorithms − Language − Thought and understanding − Regular expressions and automata − Regular expressions − Finite state automata. morphology and finite − State Transducers − Survey of english morphology − Finite state morphological parsing − Combining FST lexicon and rules − Lexicon free fsts: The Porter Stammer − Human morphological processing.

## UNIT II  SYNTAX  10

Word classes and part of speech tagging − English word classes − Tagsets for english − Part of speech tagging − Rule-based part of speech tagging  − Stochastic part of speech tagging − Transformation-based tagging − Other issues − Context-free grammars for english: constituency − Context-free rules and trees − Sentence-level constructions − Noun phrase − Coordination − Agreement − Verb phase and sub categorization − Auxiliaries − Spoken language syntax − Grammars equivalence and normal form − Finite state and context-free grammars − Grammars and human processing − Parsing with context-free grammars − Parsing as search − Basic top-Down parser − Problems with the basic Top-Down parser − Early algorithm − Finite-State parsing methods.

## UNIT III  ADVANCED FEATURES AND SYNTAX  11

Features and unification − Feature structures − Unification of feature structures − Features structures in the grammar − Implementing unification − Parsing with unification constraints − Types and inheritance − Lexicalized and probabilistic parsing − Probabilistic context-free grammar − Problems with PCFGS − Probabilistic lexicalized CFGS − Dependency grammars − Human parsing.

## UNIT IV  SEMANTIC  10

Representing meaning − Computational desiderata for representations − Meaning structure of language − First order predicate calculus − Some linguistically relevant concepts − Related representational approaches − Alternative approaches to meaning − Semantic analysis − Syntax driven semantic analysis − Attachments for a fragment of English − Integrating semantic analysis into the early parser − Idioms and compositionality − Robust semantic analysis − Lexical semantics − Relational among lexemes and their senses − Word net − Database of lexical relations − Internal structure of words − Creativity and the lexicon.

## UNIT V  APPLICATIONS  8

Word sense disambiguation and information retrieval − Selectional restriction − Based disambiguation − Robust word sense disambiguation − Information retrieval − Other information retrieval tasks − Natural language generation − Introduction to language generation − Architecture for generation − Surface realization − Discourse planning − Other issues − Machine translation − Language similarities and differences − Transfer metaphor − Interlingua idea: using meaning − Direct translation − Using statistical techniques − Usability and system development.

**Total: 45**

**TEXT BOOK**

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

**REFERENCES**

1. James Allen, "Natural Language Understanding", Pearson Education, 2003.
2. Akshar Bharathi, Chaitanya and Sangal, "Natural Language Processing : A Paninian approach", PHI, 2004.

## CS1005  –  UNIX INTERNALS

**L  T  P  C**

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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 − The context of a process − Saving the context of a process − Process control − Process creation − Signals − Process termination − Awaiting process termination − Invoking other programs − The shell − System boot and the INIT process.

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

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

**Total: 45**

**TEXT BOOK**
1.      Maurice J. Bach, "The Design of the Unix Operating System",  PHI, 2004.

**REFERENCE**
1.      Vahalia, "Unix Internals: The New Frontiers",  Pearson Education Inc, 2003.

# CS1006 – OPEN SOURCE SOFTWARE

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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 & POP3 Services) − Squirrel mail ( Web Mail Services) − Setting up web servers − Using apache ( HTTP Services) − PHP (Server-Side Scripting) − Perl ( CGI Support) − Setting up file services − Using samba ( File and Authentication Services for Windows Networks) − Using NFS ( File Services for Gnu/Linux / Unix Networks) − Setting up proxy services − Using squid ( Http / Ftp / Https Proxy Services) − Setting up printer services − Using CUPS (Print Spooler) − Foomatic.(Printer Database)

**UNIT III        DEVELOPMENT ENVIRONMENT        9**

Setting up a firewall − Using netfilter and IP tables − Using the GNU compiler collection − GNU compiler tools − C preprocessor (CPP) − C compiler (GCC) and the C++ compiler (G++) − Assembler (GAS) − Understanding build systems − Constructing make files and using make − Using autoconf and autogen to automatically generate make files tailored for different development  environments − Using source code versioning and management tools − Using CVS to manage source code revisions − Patch and  diff.

**UNIT IV        LINUX INTERNALS        9**

Understanding the GNU LIBC libraries and linker − Linking against object archives (.A Libraries) and dynamic shared object libraries (.So Libraries) − Generating statically linked binaries and libraries − Generating dynamically linked libraries − Using the GNU debugging tools − GDB to debug programs − Graphical debuggers like DDD − Memory debugging / profiling libraries MPATROL and VALGRIND − review of common programming practices and guidelines for GNU/Linux and FOSS − Basics of bash − SED and AWK scripting- Basics of the X windows server architecture.

QT Programming − GTK+ Programming − Python Programming − Programming GUI applications with localization support.

**Total: 45**

**TEXT BOOK**
1.      N. B. Venkateshwarlu, "Introduction to Linux: Installation and Programming", B S Publishers, 2005.

**REFRENCES**
1.      Matt Welsh, Matthias Kalle Dalheimer, Terry Dawson and Lar Kaufman, "Running Linux", Fourth Edition,  O'Reilly Publishers,  2002.
2.       Carla Schroder, "Linux Cookbook", First Edition, O'Reilly Cookbooks Series, November 2004.

**ON-LINE MATERIALS**
1.      "Open Sources: Voices from the Open Source Revolution", First Edition, January 1999.

        URL: http://www.oreilly.com/catalog/opensources/book/toc.html
2.      "The Linux Cookbook: Tips and Techniques for Everyday Use", First Edition, Michael Stutz, 2001. URL: http://dsl.org/cookbook/cookbook_toc.html
3.      "The Linux System Administrators' Guide", Lars Wirzenius, Joanna Oja, Stephen Stafford, and Alex Weeks, December 2003.

        URL: ttp://www.tldp.org/guides.html
4.      Using GCC, Richard Stallman et al. URL: http://www.gnu.org/doc/using.html
5.      An Introduction to GCC, Brian Gough. URL: http://www.network-theory.co.uk/docs/gccintro/
6.      GNU Autoconf, Automake and Libtool, Gary V. Vaughan, Ben Elliston, Tom Tromey and Ian Lance Taylor. URL: http://sources.redhat.com/autobook/
7.      Open Source Development with CVS, Third Edition, Karl Fogel and Moshe Bar. URL:http://cvsbook.red-bean.com/
8.      Advanced Bash Scripting Guide, Mendel Cooper, June 2005.

        URL: http://www.tldp.org/guides.html
9.      GTK+/GNOME Application Development, Havoc Pennington.

        URL: http://developer.gnome.org/doc/GGAD/
10.     Python Tutorial, Guido van Rossum, Fred L. Drake, Jr., Editor.

        URL: http://www.python.org/doc/current/tut/tut.html

## CS1007 – WIRELESS NETWORK SYSTEMS

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**UNIT I          FUNDAMENTALS                                          9**

Overview of wireless systems –  Teletraffic engineering – Radio propagation and propagation path-loss models – Overview of digital communication and transmission.

**UNIT II          WIRELESS WIDE AREA NETWORK (WWAN)          9**

Multiple access techniques – Architecture of a wireless wide area network.

**UNIT III          SPEECH AND MODULATION SCHEMES                  9**

Speech coding and channel coding – Modulation schemes.

**UNIT IV          MOBILITY AND SECURITY MANAGEMENT          9**

Mobility management in wireless networks – Security in wireless systems.

**UNIT V          GSM AND CDMA 2000                                  9**

Wide Area Wireless Networks (WANs) – GSM Evolution – Wide Area Wireless networks – cdmaOne evolution.

**Total: 45**

**TEXT BOOK**

1.      Vijay K. Garg, "Wireless Communications and Networking", Elsevier, 2008.

**REFERENCES**

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

# ELECTIVE II

## EC1018 − HIGH PERFORMANCE MICROPROCESSORS

|     | L | T | P | C |
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|     | 3 | 0 | 0 | 3 |

**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 Pentium4 microprocessors.

**UNIT III        RISC PRINCIPLES                                          10**

RISC Vs CISC − RISC properties and evaluation − On chip register file Vs cache evaluation − Study of a typical RISC processor − The powerPC − Architecture and special features − Power PC 601 − IBM RS/6000 − Sun SPARC family − Architecture − Super SPARC.

**UNIT IV        RISC PROCESSOR                                             8**

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

**UNIT V        SPECIAL PURPOSE PROCESSORS                         8**

EPIC Architecture − ASIPs − Network processors − DSPs − Graphics/Image processors.

**Total: 45**

**TEXT BOOK**
1.      Daniel Tabak, "Advanced Microprocessors", Second Edition, TMH, 1995.

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

## CS1008 – ADVANCED JAVA PROGRAMMING

**L   T   P   C**
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### UNIT I        JAVA FUNDAMENTALS                                              9

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

### UNIT II       NETWORK PROGRAMMING IN JAVA                         9

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

### UNIT III      APPLICATIONS IN DISTRIBUTED ENVIRONMENT        9

Remote method invocation − Activation models − RMI custom sockets − Object serialization − RMI − IIOP Implementation − CORBA − IDL Technology − Naming services − CORBA programming models − JAR file creation.

### UNIT IV       MULTI-TIER APPLICATION DEVELOPMENT              9

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

### UNIT V        ENTERPRISE APPLICATIONS                                    9

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

**Total: 45**

### TEXT BOOKS

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

### REFERENCES

1.   Web Reference: http://java.sun.com.
2.   Patrick Naughton , "Complete Reference − Java2", TMH  2003.

# CS1009 – ADVANCED DATABASES

L  T  P  C
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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 BOOK**

1. Thomas M. Connolly and Carolyn E. Begg , "Database Systems −A Practical Approach to Design , Implementation and Management", 3rd Edition, Pearson Education, 2003.

**REFERENCES**

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

# CS1010 − ADVANCED OPERATING SYSTEMS

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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 − Lamp ports logical clocks − Vector clocks − Casual 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 BOOK

1.    Mukesh Singhal and Niranjan G.Shivaratri,  "Advanced Concepts in Operating Systems: Distributed  Database  and  Multiprocessor  Operating  Systems" , TMH, 2001.

## REFERENCES

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

# EC1316 – EMBEDDED SYSTEMS

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## UNIT I        EMBEDDED SYSTEM BASICS                          9

Definition and classification − Overview of processors and hardware units in an embedded system − Software embedded into the system − Exemplary embedded systems − Embedded systems on a chip (Soc) − Use of VLSI designed circuits.

## UNIT II        DEVICES AND BUSES FOR DEVICES NETWORK          9

I/O Devices − Device I/O types and examples − Synchronous − Iso-Synchronous and asynchronous communications from serial devices − Examples of internal serial-Communication devices − UART and HDLC − Parallel port devices − Sophisticated interfacing features in devices/ports − Timer and counting devices − 12C- USB − CAN and advanced I/O serial high speed buses − ISA − PCI − PCIX − CPCI and advanced buses.

## UNIT III        PROGRAMMING CONCEPTS AND EMBEDDED
                   PROGRAMMING IN C and C++                      9

Programming in assembly language (ALP) Vs high level language − C program elements − Macros and functions − Use of pointers − NULL pointers − Use of function calls − Multiple function calls in a cyclic order in the main function pointers − Function queues and interrupt service routines − Queues − Pointers − Concepts of embedded programming in C++ − Objected Oriented Programming − Embedded programming in C++ − C program compilers − Cross compiler − Optimization of memory codes.

## UNIT IV        REAL TIME OPERATING SYSTEMS −PART I            9

Definitions of process − Tasks and threads − Clear cut distinction between functions − ISRS and tasks by their characteristics  operating system services − Goals – Structures − Kernel − Process management − Memory management − Device management − file system organization and implementation − I/O subsystems − Interrupt routines handling in RTOS − Real time operating systems − RTOS task scheduling models − handling of task scheduling and latency and deadlines as performance metrics − Co-operative round robin scheduling − Cyclic scheduling with time slicing (Rate Monotonic Co-Operative Scheduling) − Preemptive scheduling model strategy by a scheduler − critical section service by a preemptive scheduler − Fixed (static) real time scheduling of tasks − Inter process communication and synchronisation − Shared data problem − Use of semaphore(S) − Priority inversion problem and deadlock situations − Inter process communications using signals − Semaphore flag or mutex as resource key − Message queues − Mailboxes − Pipes − Virtual (Logical) sockets − Remote Procedure Calls (RPC).

**UNIT V       REAL TIME OPERATING SYSTEMS −PART II       9**

Study of micro C/OSII or Vx works or any other popular RTOS − RTOS system level functions − Task service functions − Time delay functions − Memory allocation related functions − Semaphore related functions − Mailbox related functions − Queue related functions − Case studies of programming with RTOS − Understanding case definition − Multiple tasks and their functions − Creating a list of tasks − Functions and IPCs − Exemplary coding steps.

**Total: 45**

**TEXT BOOKS**

1. Wayne Wolf, "Computers as Components − Principles of Embedded Computing System Design", 2nd Edition, Elsevier, 2008

2. Rajkamal, "Embedded Systems Architecture - Programming and Design", TMH First Reprint, Oct 2003.

**REFERENCES**

1. Steve Heath, "Embedded Systems Design", 2nd Edition, Elsevier, 2005.

2. David E. Simon, "An Embedded Software Primer", Pearson Education Asia, 2000.

3. Frank Vahid and Tony Givargis, "Embedded Systems Design − A Unified Hardware / Software Introduction", John Wiley, 2002.

4. Heath, "Embedded System Design", 2nd Edition, Elsevier India Private Limited, 2005.

## CS1011 – DATA WAREHOUSING AND MINING

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**UNIT I        BASICS OF DATA WAREHOUSING                            8**

Basics − Data warehouse − Multidimensional data model − Data warehouse architecture − Implementation − Further development − Data warehousing to data mining.

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

Why preprocessing − Cleaning − Integration − Transformation − Reduction − Discretization − Concept hierarchy generation − Data mining primitives − Query language − Graphical user interfaces − Architectures − Concept description − Data generalization − Characterizations − Class comparisons − Descriptive statistical measures.

**UNIT III        ASSOCIATION RULES                            9**

Association rule mining − Single-Dimensional boolean association rules from transactional databases − Multi level association rules from transaction databases

**UNIT IV        CLASSIFICATION AND CLUSTERING                            12**

Classification and prediction − Issues − Decision tree induction − Bayesian classification − Association rule based − Other classification methods − Prediction − Classifier accuracy − Cluster analysis − Types of data − Categorization of methods − Partitioning methods − Outlier analysis.

**UNIT V        RECENT TRENDS                            8**

Multidimensional analysis and descriptive mining of complex data objects − Spatial databases − Multimedia databases − Time series and sequence data − Text databases − World Wide Web − Applications and trends in data mining.

**Total: 45**

**TEXT BOOK**
1.    J. Han and M. Kamber, "Data Mining: Concepts and Techniques", Elsevier, 2008.

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

# CS1012 – KNOWLEDGE BASED DECISION SUPPORT SYSTEMS

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## UNIT I        BASIC CONCEPTS                                                9

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

## UNIT II       DECISION SUPPORT SYSTEM DEVELOPMENT            9

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

## UNIT III      KNOWLEDGE MANAGEMENT                              9

Organizational learning and memory − Knowledge management − Development − Methods − Technologies and tools − Success − Knowledge management and artificial intelligence − Electronic Document Management − Knowledge Acquisition and Validation − Knowledge Engineering − Scope − Acquisition Methods − Interviews − Tracking Methods − Observation and other Methods − Grid Analysis − Machine Learning − Rule Induction − Case-Based Reasoning − Neural Computing − Intelligent Agents − Selection of an appropriate Knowledge Acquisition Methods − Multiple Experts − Validation and Verification of the Knowledge Base − Analysis- Coding- Documenting- and Diagramming − Numeric and Documented Knowledge Acquisition − Knowledge Acquisition and the Internet/Intranets − Knowledge Representation Basics − Representation in Logic and other Schemas − Semantic Networks − Production Rules − Frames − Multiple Knowledge Representation − Experimental Knowledge Representations − Representing Uncertainty.

## UNIT IV       INTELLIGENT SYSTEM DEVELOPMENT                 9

Inference Techniques − Reasoning in Artificial Intelligence − Inference with Rules − Inference Tree − Inference with Frames − Model Based and Case Based Reasoning − Explanation and Meta Knowledge − Inference with Uncertainty − Representing Uncertainty − Probabilities and Related Approaches − Theory of Certainty − Approximate Reasoning using Fuzzy Logic − Intelligent Systems Development − Prototyping − Project Initialization − System Analysis and Design − Software Classification − Building Expert Systems with Tools − Shells and Environments − Software Selection − Hardware − Rapid Prototyping and a Demonstration Prototype − System Development − Implementation − Post Implementation.

Implementing and Integrating Management Support Systems − Implementation − Major Issues − Strategies − System Integration − Generic Models MSS − DSS − ES − Integrating EIS − DSS and ES − Global Integration − Intelligent DSS − Intelligent Modeling and Model Management − Examples of Integrated Systems − Problems and Issues in Integration − Impacts of Management Support Systems − Overview − Organizational Structure and Related Areas − MSS Support to Business Process Re-Engineering − Personnel Management Issues − Impact on Individuals − Productivity − Quality and Competitiveness − Decision Making and the Manager Manager's Job − Issues of Legality − Privacy and Ethics − Intelligent Systems and Employment Levels − Internet Communication − Other Societal Impacts − Managerial Implications and Social Responsibilities.

                                                                    **Total: 45**

**TEXT BOOK**

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

**REFERENCES**

1.      Ganesh Natarajan and Sandhya Shekhar, "Knowledge Management Enabling Business Growth", Tata McGraw Hill, 2002.

2.      George M. Marakas, "Decision Support System", Prentice Hall India, 2003.

3.      Efrem A. Mallach, "Decision Support and Data Warehouse Systems", Tata McGraw-Hill, 2002.

4.      Dalkar, "Knowledge Management – Theory and Practice", Elsevier, 2007.

5.      Becerra Fernandez and Laidener, "Knowledge Management – An Evolutionary View", PHI, 2009.

# ELECTIVE III

## CS1013 − C # AND. NET

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**UNIT I        BASICS OF  C#                                                  8**

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

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

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

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

Building windows applications − Accessing Data with ADO.NET.

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

Programming web Applications with Web Forms − Programming Web Services.

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

Assemblies − Versioning − Attributes − Reflection − Viewing Metadata − Type Discovery − Reflecting on a type − Marshalling − Remoting − Understanding server object types − Specifying a server with an Interface − Building a server − Building the Client − Using single call − Threads.

**Total: 45**

**TEXT BOOKS**

1.      E. Balagurusamy,  "Programming in C#",  TMH,  2004.
2.      J. Liberty, "Programming C#", 2nd Edition,  O'Reilly, 2002.

**REFERENCES**

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

## CS1014 – XML AND WEB SERVICES

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**UNIT I        XML TECHNOLOGY FAMILY                    9**

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

**UNIT II        ARCHITECTING WEB SERVICES                    9**

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

**UNIT III        WEB SERVICES BUILDING BLOCKS                    9**

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

**UNIT IV        IMPLEMENTING XML IN E–BUSINESS                    9**

B2B – B2C applications – Different types Of B2b interaction – Components of E -Business XML systems – EBXML – RosettaNet  – Applied XML in vertical industry – Web services for mobile devices.

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

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

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

**TEXT BOOKS**

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

**REFERENCES**

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

# CS1015 – USER INTERFACE DESIGN

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## UNIT I         USER INTERFACE BASICS                                        8

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.

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**TEXT BOOK**
1.     Wilbent. O. Galitz, "The Essential Guide to User Interface Design", John Wiley  and Sons, 2001.

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

## CS1015 – INFORMATION SECURITY

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**UNIT 1        FUNDAMENTALS                              9**

History − What is Information Security? − Critical characteristics of information − NSTISSC security model − Components of an information system − Securing the components − Balancing security and access − SDLC − 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 Mode l − 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.      Micki Krause and Harold F. Tipton, "Handbook of Information Security Management",  Vol 1-3 CRC Press LLC,  2004.

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

# CS1016 – SOFTWARE TESTING

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## UNIT I       TESTING BASICS                                    8

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

## UNIT II      TEST CASE DESIGN                                  11

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

## UNIT III     LEVELS OF TESTING                                 9

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

## UNIT IV      TEST MANAGEMENT                                   9

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

## UNIT V       CONTROLLING AND MONITORING                        8

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

                                                    **Total: 45**

**TEXT BOOKS**

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


**REFERENCES**

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

# GE1301 – PROFESSIONAL ETHICS AND HUMAN VALUES

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## UNIT I        HUMAN VALUES                                    10

Morals- Values and ethics − Integrity − Work ethic − Service learning − Civic Virtue − Respect for Others − Living Peacefully − Caring − Sharing − Honesty − Courage − Valuing Time − Co-operation − Commitment − Empathy − Self-Confidence − Character − Spirituality.

## UNIT II        ENGINEERING ETHICS                             9

Senses of Engineering Ethics − Variety of moral issued − Types of inquiry − Moral dilemmas − Moral autonomy − Kohlberg's theory − Gilligan's theory − Consensus and controversy − Models of professional roles − Theories about Right Action − Self-Interest − Customs and religion − Uses of ethical theories.

## UNIT III        ENGINEERING AS SOCIAL EXPERIMENTATION         9

Engineering as experimentation − Engineers as Responsible Experimenters − Codes of Ethics − Balanced Outlook on Law − Challenger Case Study.

## UNIT IV        SAFETY- RESPONSIBILITIES AND RIGHTS            9

Safety and Risk − Assessment of Safety and Risk − Risk Benefit Analysis and Reducing Risk − Three Mile Island and Chernobyl Case Studies − Collegiality and Loyalty − Respect for Authority − Collective Bargaining − Confidentiality − Conflicts of Interest − Occupational Crime − Professional Rights − Employee Rights − Intellectual Property Rights (IPR) − Discrimination.

## UNIT V        GLOBAL  ISSUES                                  8

Multinational corporations − Environmental ethics − Computer Ethics  Weapons Development − Engineers as managers − Consulting Engineers − Engineers as Expert Witnesses and Advisors − Moral leadership − Sample Code of Ethics Like ASME-ASCE − IEEE- Institution of Engineers (India) − Indian Institute of Materials Management − Institution of Electronics and Telecommunication Engineers (IETE)-India- Etc.

                                                         **Total: 45**

## TEXT BOOKS

1.      Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw Hill, 1996.
2.      Govindarajan M., Natarajan S. and Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, 2004.

## REFERENCES

1.      Charles D. Fleddermann, "Engineering Ethics", Pearson Education/ Prentice Hall, 2004.
2.      Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics −Concepts and Cases", Wadsworth Thompson Learning,  2000.
3.      John R Boatright, "Ethics and the Conduct of Business", Pearson Education, 2003.
4.      Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, 2001.

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## UNIT I       FUNDAMENTALS      9

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

## UNIT II       TCP      9

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

## UNIT III       IP IMPLEMENTATION      9

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

## UNIT IV       TCP IMPLEMENTATION I      9

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

## UNIT V       TCP IMPLEMENTATION II      9

Timers − Events and messages − Timer process − Deleting and Inserting Timer Event − Flow control and adaptive retransmission − Congestion avoidance and control − Urgent data processing and push function.

**Total: 45**

**TEXT BOOKS**
1. Douglas E. Comer, "Internetworking with TCP/IP Principles- Protocols and Architecture −Vol. 1 & 2 ", 4th Edition, Pearson Education Asia, 2003.
2. W. Richard Stevens, "TCP/IP illustrated" Volume 1, Pearson Education, 2003.

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

# ELECTIVE IV

## CS1018 – GRID COMPUTING

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**UNIT I          GRID COMPUTING                                                        9**
Basics − Definition and scope of grid computing.

**UNIT II          GRID COMPUTING INITIALIVES                          9**
Grid computing organizations and their roles − Grid computing analog − Grid computing road map.

**UNIT III          GRID COMPUTING APPLICATIONS                     9**
Merging the grid sources − Architecture with the web devices architecture.

**UNIT IV          TECHNOLOGIES                                                      9**
OGSA − Sample use cases − OGSA platform components − OGSI − OGSA basic services.

**UNIT V          GRID COMPUTING TOOL KITS                            9**
Globus GT 3 Toolkit − Architecture − Programming model − High level services − OGSI .Net middleware solutions.

**Total: 45**

**TEXT BOOK**
1.      Joshy Joseph and Craig Fellenstein, "Grid Computing", Pearson Education, 2003.

**REFERENCES**
1.      Ahmar Abbas,  "Grid Computing − A Practical Guide to Technology and Applications",  Charles River Media, 2003.
2.      Plaszczak, "Grid Computing: The Savvy Managers Guide", Elsevier, 2006.

# IT1452 − FUNDAMENTALS OF PERVASIVE COMPUTING

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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**

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

# CS1019 − REAL TIME SYSTEMS

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## UNIT I          BASIC REAL TIME CONCEPTS                                   9
Basic computer architecture − Some terminology − Real time design issues − Example real time systems − Input and output − Other devices − Language features.

## UNIT II        REAL TIME SPECIFICATION AND DESIGN TECHNIQUES  9
Natural languages − Mathematical specification − Flow charts − Structured charts − Pseudo code and programming design languages − Finite state automata − Data Flow Diagrams − Petri Nets − Warnier or Notation − State Charts − Polled Loop Systems − Phase/State Driven Code − Co-routines − Interrupt driven systems − Foreground/background system − Full featured Real Time Operating Systems.

## UNIT III       INTERTASK COMMUNICATION AND SYNCHRONIZATION
9
Buffering Data − Mailboxes − Critical Regions − Semaphores − Deadlock − Process Stack Management − Dynamic Allocation − Static Schemes − Response Time Calculation − Interrupt Latency − Time Loading and its Measurement − Scheduling is NP Complete − Reducing response times and time loading − Analysis of Memory Requirements − Reducing memory loading − I/O Performance.

## UNIT IV        QUEUING MODELS                                              9
Probability Functions − Discrete − Basic buffering calculation − Classical Queuing Theory − Little's Law − Erlong's Formula − Faults − Failures − Bugs and Effects − Reliability − Testing − Fault Tolerance − Classification of architecture − Distributing Systems − Non von neuman architecture.

## UNIT V         HARDWARE/SOFTWARE INTEGRATION                               9
Goals of real time system integration − Tools − Methodology − Software Heinsberg Uncertainty principle − Real time applications.

**Total: 45**

**TEXT BOOK**
1. Philip A. Laplante, "Real Time System Design and Analysis − An Engineer's Handbook", 3$^{rd}$ Edition, Wiley-IEEE Press, 2006.

**REFERENCES**
1. C. M. Krishna and Kang G Shin, "Real Time Systems", TMH, 1997.
2. Stuart Bennelt, "Real Time Computer Control and Introduction", Pearson Education, 2003.
3. Allen Burns and Andy Wellings, "Real Time Systems and Programming Languages", Pearson Education, 2003.
4. Williams, "Real Time Systems Development", Elsevier, 2008.

# CS1020 − SOFT COMPUTING

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**UNIT I        FUZZY SET THEORY                                      10**

Neuro − Fuzzy and soft computing − Fuzzy Sets − Basic definition and terminology − Set-Theoretic operations − Member function formulation and parameterization − Fuzzy rules and Fuzzy reasoning − Extension principle and fuzzy relations − Fuzzy if-then Rules − Fuzzy reasoning − Fuzzy Inference Systems − Mamdani fuzzy models − Sugeno fuzzy models − Tsukamoto fuzzy models − Input space partitioning and fuzzy modeling.

**UNIT II        OPTIMIZATION                                          8**

Derivative − Based optimization − Descent methods −  Method of steepest descent − Classical Newton's Method − Step size determination − Derivative-Free optimization − Genetic algorithms − Simulated annealing − Random search − Downhill simplex search.

**UNIT III        NEURAL NETWORKS                                   10**

Supervised learning neural networks − Perceptrons − Adaline − Back propagation Multilayer perceptrons − Radial basis function networks − Unsupervised learning neural networks − Competitive learning networks − Kohonen Self-organizing networks − Learning vector quantization − Hebbian learning.

**UNIT IV        NEURO FUZZY MODELING                           9**

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

**UNIT V        APPLICATIONS OF COMPUTATIONAL INTELLIGENCE    8**

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

**Total: 45**

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

**REFERENCES**
1.    Davis E. Goldberg,  "Genetic Algorithms: Search- Optimization and Machine Learning",  Addison Wesley,  N.Y.,  1989.
2.    S. Rajasekaran and G. A. V. Pai,  "Neural Networks- Fuzzy Logic and Genetic Algorithms",  PHI,  2003.
3.    R. Eberhart,  P. Simpson and R. Dobbins, "Computational Intelligence − PC Tools",  Elsevier, 2008.
4.    Sivanandham amd Deepa, "Principles of Soft Computing", Wiley India, 2008.

## CS1021 – SOFTWARE PROJECT MANAGEMENT

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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 − Organisation 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 Mikecotterell, "Software Project Management", 3rd Edition, Tata McGraw Hill, 2004.

## CS1022 – RESOURCE MANAGEMENT TECHNIQUES

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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 BOOK**
1.      H. A. Taha,  "Operation Research", PHI, 2002.

**REFERENCES**
1.      Anderson, "Quantitative Methods for Business", 8th Edition, Thomson Learning, 2002.
2.      Winston, "Operation Research", Thomson Learning, 2003.
3.      Vohra,  "Quantitative Techniques in Management" , TMH, 2002.
4.      Anand Sarma, "Operation Research",  Himalaya Publishing House,  2003.

# CS1023 – SOFTWARE QUALITY MANAGEMENT

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**UNIT I      FUNDAMENTALS 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.