## B. TECH. INFORMATION TECHNOLOGY

(Minimum Credits to be earned: 232)

| First Semester | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Code No.** | **Course** | **PEOs** | **POs** | **L** | **T** | **P** | **C** |
| 07O101 | Engineering Mathematics – I* | II | 1,2,3,4,12 | 3 | 2 | 0 | 4 |
| 07O102 | Engineering Physics | II | 1,2,4 | 3 | 0 | 0 | 3 |
| 07O103 | Engineering Chemistry | II | 2,7 | 3 | 0 | 0 | 3 |
| 07O104 | 'C' Programming | II,III | 1,3,12 | 3 | 0 | 0 | 3 |
| 07I105 | Basics of Civil & Mechanical Engineering | II | 1,2,3,8,9 | 4 | 0 | 0 | 4 |
| 07I106 | Basics of Electrical Engineering | II | 2,3 | 3 | 0 | 0 | 3 |
| 07G001 | Communication Skills – *I* | II,III | 9.10 | 3 | 0 | 0 | 3 |
| 07O108 | C Programming Laboratory | II,III | 2,3,5,12 | 0 | 0 | 3 | 2 |
| 07I109 | Engineering Graphics# | II | 1,2,4 | 2 | 0 | 3 | 4 |
| 07I110 | Workshop Practice# | II | 1,2,3 | 0 | 0 | 2 | 2 |
| | **Total** | | | **24** | **2** | **8** | **31** |
| **Second Semester** | | | | | | | |
| **Code No.** | **Course** | **PEOs** | **POs** | **L** | **T** | **P** | **C** |
| 07O201 | Engineering Mathematics – II | II | 1,2,3 | 3 | 2 | 0 | 4 |
| 07O202 | Environmental Science & Engineering | II | 6,7 | 3 | 0 | 0 | 3 |
| 07O203 | Object Oriented Programming | I,II,III | 1,3,5,12 | 3 | 0 | 0 | 3 |
| 07I204 | Semiconductor Physics & Optoelectronics | II | 1,2,4 | 3 | 0 | 0 | 3 |
| 07I205 | Data Structures and Algorithms I | II,III | 1,2,4,12 | 3 | 1 | 0 | 4 |
| 07I206 | Electron Devices and Circuits | II | 1,2 | 3 | 1 | 0 | 4 |
| 07G002 | Communication Skills – II | II,III | 9.10 | 3 | 0 | 0 | 3 |
| 07O208 | Object Oriented Programming Laboratory | I,II | 3,5 | 0 | 0 | 3 | 2 |
| 07I209 | Engineering Physics laboratory $ | II | 1,4,5 | 0 | 0 | 2 | 1 |
| 07I210 | Engineering Chemistry Laboratory$ | II | 1,4 | 0 | 0 | 2 | 1 |
| | Total | | | **21** | **4** | **7** | **28** |

# common to ECE,EEE,EIE,IT

| Third Semester | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Code No.** | **Course** | **PEOs** | **POs** | **L** | **T** | **P** | **C** |
| 07O301 | Engineering Mathematics– III* | II | 1,2 | 3 | 2 | 0 | 4 |
| 07I302 | Data Structures and algorithms II | I,II,III | 1,2,3, 12 | 3 | 0 | 0 | 3 |
| 07I303 | Computer Architecture | II | 3,4 | 3 | 1 | 0 | 4 |
| 07I304 | System Software | II | 1,2,4 | 3 | 0 | 0 | 3 |
| 07I305 | Digital System Design | I,II | 2,3 | 3 | 1 | 0 | 4 |
| 07I306 | Principles of Communication | II | 1,2,4 | 3 | 1 | 0 | 4 |
| 07G004 | Professional Ethics | II,III | 8,10 | 3 | 0 | 0 | 3 |
| 07I308 | Data Structures and Algorithms Laboratory | I,II | 3,4 | 0 | 0 | 3 | 2 |
| 07I309 | System Software Laboratory | II | 2,3 | 0 | 0 | 3 | 2 |
| 07I310 | Digital System Design La*b*oratory | II | 1,2,3 | 0 | 0 | 3 | 2 |
| | **Total** | | | **21** | **5** | **9** | **31** |
| **Fourth Semester** | | | | | | | |
| **Code No.** | **Course** | **PEOs** | **POs** | **L** | **T** | **P** | **C** |
| 07I401 | Probability & Statistics | II | 1,2,4,5 | 3 | 2 | 0 | 4 |
| 07I402 | Software Engineering | I,II,III | 2,3,4,5 ,11,12 | 3 | 0 | 0 | 3 |
| 07I403 | Operating Systems | II | 1,2,4, 12 | 3 | 1 | 0 | 4 |
| 07I404 | Database Management Systems | I,II,III | 1,3,5, 12 | 3 | 0 | 0 | 3 |
| 07I405 | Microprocessor and Microcontrollers | II | 1,2,4,5 | 3 | 0 | 0 | 3 |
| 07I406 | Signals and Systems | II | 1,2,3,4 | 3 | 1 | 0 | 4 |
| 07G003 | Professional Communication | II,III | 9,10, 12 | 2 | 0 | 2 | 3 |
| 07I408 | Operating Systems Laboratory | II | 1,3,4,5 | 0 | 0 | 3 | 2 |
| 07I409 | Database Management Systems Laboratory | I,II | 3,4,5 | 0 | 0 | 3 | 2 |
| 07I410 | Microprocessor and Microcontrollers Laboratory | II | 1,2,3,4 ,5 | 0 | 0 | 3 | 2 |
| | **Total** | | | **20** | **4** | **11** | **30** |

| Fifth Semester | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Code No.** | **Course** | **PEOs** | **POs** | **L** | **T** | **P** | **C** |
| 07I501 | Numerical Methods | II | 1,2,3,4 | 3 | 2 | 0 | 4 |
| 07I502 | Digital Signal Processing | II | 1,2,3,4 | 3 | 1 | 0 | 4 |
| 07I503 | Object Oriented Analysis and Design | I,II | 2,3,4,5, 11 | 3 | 0 | 0 | 3 |
| 07I504 | Internet and Java Programming | II,III | 2,3 | 3 | 1 | 0 | 4 |
| 07I505 | Information Coding Techniques | II | 1,2,3,7 | 3 | 1 | 0 | 4 |
| 07I506 | Computer Networks | II | 1,2,3,6, 12 | 3 | 0 | 0 | 3 |
| 07G005 | Engineering Economics | II,III | 1,2,5,8 | 3 | 0 | 0 | 3 |
| 07I508 | Digital Signal Processing Laboratory | II | 2,3,4,5 | 0 | 0 | 3 | 2 |
| 07I509 | Case Tools Laboratory | I,II | 2,3,9,10 | 0 | 0 | 3 | 2 |
| 07I510 | Internet and Java Programming Laboratory | II | 1,2,3,4,6 | 0 | 0 | 3 | 2 |
| | **Total** | | | **21** | **5** | **9** | **31** |
| **Sixth Semester** | | | | | | | |
| **Code No.** | **Course** | **PEOs** | **POs** | **L** | **T** | **P** | **C** |
| 07I601 | E-Commerce | II,III | 2,7,8,9 | 3 | 0 | 0 | 3 |
| 07I602 | Management Information Systems | II,III | 1,3,4,6 | 3 | 0 | 0 | 3 |
| 07I603 | Information Security | II | 1,2,4,7 | 3 | 1 | 0 | 4 |
| 07I604 | Visual Programming | II | 1,3,6 | 3 | 0 | 0 | 3 |
| 07I605 | TCP/IP | II | 1,2,4,6 | 3 | 1 | 0 | 4 |
| | Elective | - | - | 3 | 0 | 0 | 3 |
| 07G006 | Total Quality Management | II,III | 1,8,9,12 | 3 | 0 | 0 | 3 |
| 07I608 | Networks Laboratory | II | 3,4,5,7 | 0 | 0 | 3 | 2 |
| 07I609 | Visual Programming Laboratory | II | 2,3,4,5 | 0 | 0 | 3 | 2 |
| 07I610 | Technical Seminar | I,III | 2,4,9,10, 12 | 0 | 0 | 3 | 2 |
| | **Total** | | | **21** | **2** | **9** | **29** |

| Seventh Semester | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Code No.** | **Course** | **PEOs** | **POs** | **L** | **T** | **P** | **C** |
| 07I701 | Web Technology | II | 2,3,5, 6,7,11 | 3 | 0 | 0 | 3 |
| 07I702 | Data Mining and Data Warehousing | I,II,III | 2,3,4, 5,7,11 ,12 | 3 | 0 | 0 | 3 |
| 07I703 | Multimedia and Graphics | I,II | 1,3,4, 5,7 | 3 | 0 | 0 | 3 |
| 07I704 | Distributed Component Architecture | II | 1,2,3, 5 | 3 | 0 | 0 | 3 |
| | Elective | - | - | 3 | 0 | 0 | 3 |
| | Elective | - | - | 3 | 0 | 0 | 3 |
| 07G007 | Creativity and Innovation | III | 2,6,7, 8 | 3 | 0 | 0 | 3 |
| 07I708 | Web Technology Laboratory | II | 2,3,4, 5,11, 12 | 0 | 0 | 3 | 2 |
| 07I709 | Multimedia and Graphics Laboratory | II | 2,3,4, 5,7 | 0 | 0 | 3 | 2 |
| 07I710 | Mini Project | I,II,III | 1-12 | 0 | 0 | 6 | 3 |
| | **Total** | | | **21** | **0** | **12** | **28** |
| **Eighth Semester** | | | | | | | |
| **Code No.** | **Course** | **PEOs** | **POs** | **L** | **T** | **P** | **C** |
| 07I801 | Enterprise Resource Planning | II,III | 2,5,6, 7 | 3 | 0 | 0 | 3 |
| | Elective | - | - | 3 | 0 | 0 | 3 |
| | Elective | - | - | 3 | 0 | 0 | 3 |
| 07G008 | Organizational Behavior and Management | III | 2,3,4, 9 | 3 | 0 | 0 | 3 |
| 07I805 | Project Work | I,II,III | 1-12 | 0 | 0 | 24 | 12 |
| | **Total** | | | **12** | **0** | **24** | **24** |

**ELECTIVES**

**Electives for Sixth Semester**

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| | | L | T | P | C |
|---|---|---|---|---|---|
| 07I001 | Indian Constitution and Society | 3 | 0 | 0 | 3.0 |
| 07I002 | Resource Management Techniques | 3 | 0 | 0 | 3.0 |
| 07I003 | Intellectual Property Rights | 3 | 0 | 0 | 3.0 |
| 07I004 | Health care Information Systems | 3 | 0 | 0 | 3.0 |
| 07I005 | Embedded Systems | 3 | 0 | 0 | 3.0 |
| 07I006 | Digital Image Processing | 3 | 0 | 0 | 3.0 |
| 07I007 | Principles of Compiler Design | 3 | 0 | 0 | 3.0 |

**Electives for Seventh Semester**

| | | L | T | P | C |
|---|---|---|---|---|---|
| 07I008 | Geographical Information Systems | - | - | - | 3.0 |
| 07I009 | Natural Language Processing | - | - | - | 3.0 |
| 07I010 | Mobile Communication | - | - | - | 3.0 |
| 07I011 | Satellite and Optical Communications | - | - | - | 3.0 |
| 07I012 | Neural and Fuzzy Logic Control | - | - | - | 3.0 |
| 07I013 | Grid Computing | - | - | - | 3.0 |
| 07I014 | C# and .NET | - | - | - | 3.0 |

**Electives for Seventh Semester**

| | | L | T | P | C |
|---|---|---|---|---|---|
| 07I015 | Bioinformatics | - | - | - | 3.0 |
| 07I016 | Software Testing Methods and Tools | - | - | - | 3.0 |
| 07I017 | Soft Computing | - | - | - | 3.0 |
| 07I018 | Artificial Intelligence and expert Systems | - | - | - | 3.0 |
| 07I019 | Fault Tolerant Computing Systems | - | - | - | 3.0 |
| 07I020 | XML and Web Services | - | - | - | 3.0 |
| 07I021 | Software Agents | - | - | - | 3.0 |

## 07G101 Engineering Mathematics - I

**3 2 0 4**

**Course Outcomes (COs)**

1. Apply mathematical concepts essential for engineers.
2. Solve applications modeled by separable, homogeneous, exact, linear first-order, differential equations, and equations reducible to first order differential equations.
3. Use the method of Laplace transforms to solve systems of linear first-order differential equations.

**Unit I - Matrices**

The characteristic equation - Eigen values and eigen vectors of a real matrix-Some properties of eigen values - Cayley – Hamilton theorem - Reduction of a real matrix to a diagonal form- Orthogonal matrices properties - Reduction of a quadratic form to a canonical form by orthogonal transformation.

**10 Hours**

**Unit II - Three Dimensional Analytical Geometry**

Direction cosines and ratios - Angle between two lines - Equation of a plane - Equation of a straight line - Coplanar lines - Shortest distance between skew lines – Sphere - Tangent plane - Plane section of a sphere - Orthogonal spheres.
**10 Hours**

**Unit III - Geometrical Applications of Differential Calculus**

Curvature - Cartesian and polar coordinates-Circle of curvature- Involutes and Evolutes – Envelopes - Properties of the envelopes- Evolutes as envelopes of normal. **10 Hours**

**Unit IV - Differential Equations**

Simultaneous first order linear equations with constant coefficients- Linear equations of second and higher order with constant and variable coefficients- Homogeneous linear equations of Euler type- Equations reducible to homogeneous form- Method of reduction of order- Method of variation of parameters. **10 Hours**

**Unit V - Laplace Transforms**

Transforms of simple functions- Basic operational properties- Transforms of derivatives and integrals-Initial and Final value theorems- Inverse transforms- Convolution theorems-Periodic functions- Applications of Laplace transforms for solving the ordinary differential equations up to second order with constant coefficients and simultaneous equations of first order with constant coefficients.

**10 Hours**

**Total: 50 Hours**

**Textbooks**


1. Lakshminarayanan K. A. et al., "**Engineering Mathematics – I",** 6th edition, Vikas Publishing House, New Delhi 2006.
2. Veerarajan T, "**Engineering Mathematics**", 5th Edition, Tata McGraw Hill Publications, New Delhi.


**References**


1. Kandasamy P et al., "**Engineering Mathematics**", **Volume I & II**, S. Chand & Co., New Delhi 2001.
2. Narayanan S, Manicavachagam Pillai, Ramaiah.T.K "**Advanced Mathematics for Engineering Students**" **Volume I,** Viswanathan. S (Printers & Publishers), 1993.

3. Grewal B.S., "**Higher Engineering Mathematics**", Khanna Publications, New Delhi 2000.
4. Kreyszig, E, "**Advanced Engineering Mathematics"**, 8th Edition, John Wiley & Sons, Inc, Singapore (2002).

## 07G102 Engineering Physics

**3 0 0 3**

**Course Outcomes (COs)**

1. Apply the concepts of acoustics and ultrasonics for real world problems.
2. Explore the construction, working and applications of laser.
3. Identify practical applications of fiber optics, metallic glasses, ceramics, shape, memory alloys and nano materials.

**Unit I - Properties of Matter and Acoustics**

Properties of Matter: Elasticity- Stress - Strain Diagram - Twisting couple on a wire – Shafts - Torsion pendulum - Depression of a cantilever - Young's Modulus by cantilever - Uniform and Nonuniform bending. Acoustics: Classification of sound - Characteristics of musical sound – Loudness - Weber-Fechner law - Decibel - Absorption coefficient – Reverberation - Reverberation time - Sabine's formula (growth & decay) - Factors affecting acoustics of buildings and their remedies. **10 Hours**

**Unit II - Crystallography and Ultrasonic**

Crystal Physics: Lattice - Unit cell - Bravais lattices - Lattice planes - Miller indices – 'd' spacing in cubic lattice - Calculation of number of atoms per unit cell - Atomic radius - Coordination number - Packing factor for SC, BCC , FCC and HCP structures. Ultrasonics: Ultrasonic production – Magnetostriction - Piezo electric methods – Applications - Determination of velocity of ultrasonic waves (acoustic grating) -SONAR.

**10 Hours**

**Unit III - Wave Optics**

Interference : Air wedge - Theory – Uses - Testing of flat surfaces - Thickness of a thin wire - Polarization: Expressions for plane, circularly and elliptically polarized light (derivation)-Quarter and Half wave plates- Uses - Production of plane, circularly and elliptically polarized light - Analysis of plane, circularly and elliptically polarized light. LASER: Types of lasers – Nd-YAG laser - $CO_2$ laser - semiconductor laser (homojunction) – Applications – Holography – Construction – Reconstruction -Uses. **10 Hours**

**Unit IV - Modern Physics**

Quantum Physics: Development of quantum theory - De Broglie wavelength - Schrödinger's wave equation - Time dependent - Time independent wave equations - Physical significance – Applications - Particle in a box (1d). X-rays**:** Scattering of X-rays - Compton Effect -Theory and experimental verification - Diffraction - Laue's method - Powder crystal method. **10 Hours**

**Unit V**

**New Engineering Materials**

Metallic glasses: Manufacturing – Properties – Uses. Shape Memory Alloys**:** Working Principle - Shape memory Effect - Applications. Nanomaterials**:** Preparation method - Sol gel technique – Mechanical - Magnetic characteristics - Uses. Ceramics**:** Classification – Crystalline - Non-crystalline - Bonded ceramics- Manufacturing methods - Slip casting - Isostatic pressing – Thermal and electrical properties. Bio-materials**:** Metals and alloys bio materials - Polymer bio materials - Ceramic bio material - Bio polymers.

**10 Hours**

**Total: 50 Hours**

**Textbooks**

1. Arumugam M., **"Engineering Physics"**, Fifth Edition, Anuradha Publications, Kumbokonam, 2006.

2. Palanisami P.K., **"Physics for Engineers",** Volume1, 2nd Reprint, Scitech Publications(India), Pvt Ltd, Chennai, 2002.

**References**

1. Avadhanulu M.N. and Kshirsagar P.G., **"A Text Book of Engineering Physics",** 7th Enlarged Revised Edition., S. Chand & Company Ltd., New Delhi, 2005.
2. Pillai S. O., **"Solid State Physics"**, Fifth Edition, New Age International Publication, New Delhi, 2003.
3. Rajendran V. and Marikani A., **"Physics I"**, First Reprint, Tata McGraw Hill Publishers Company Ltd, New Delhi, 2004.
4. Arthur Beiser., "**Concepts of Modern Physics**", Tata McGraw Hill Co. New Delhi, 1995.
5. Gaur R. K. and Gupta S. L., "**Engineering Physics**", Dhanpat Rai Publishers, New Delhi,

## 07G103 Engineering Chemistry

**3 0 0 3**

**Course Outcomes (COs)**

1. Select a polymer by considering their engineering requirement and identify the importance of nano materials.
2. Explore the concept of oxidation and reduction reactions related to engineering applications such as batteries and electroplating.
3. Gain information about the applications of polymer chemistry, nanotechnology and analyticaltechniques.

**Unit I -Chemistry of water and its industrial applications**

Hardness of water: Equivalents of calcium carbonate - Units of hardness- Degree of hardness and its estimation (EDTA method)-numerical problems on degree of hardness- pH value of water. Use of water for industrial purposes: boiler feed water-Scale-sludge-Caustic embitterment. Softening of hard water: external conditioning – Zeolite- ion exchange methods - Internal conditioning- Calgon- Phosphate methods. Use of water for domestic purposes: domestic water treatment - Disinfection of water-break point chlorination.

**10 Hours**

**Unit II - Electrochemistry for materials processing**

Electrolytic conductance: Kohlrausch's law and its applications: problems- Emf. Electrodics: single electrode potential - Nernst equation – problems - Hydrogen electrode - Calomel electrode - Glass electrode - pH measurement using glass electrode - Electrochemical series. Cells: Electrochemical cells - Cell reactions- Daniel cell - standard Weston cadmium cell - Electrode concentration cells, electrolytic concentration cells - Reversible cells - Irreversible cells - Electrolytic cells - Concept of electroplating - Electrode reactions of electroplating of Ni.

**10 Hours**

**Unit III - Chemistry of corrosion and its control**

Corrosion: Theories of corrosion – Chemical (Pilling-Bed worth rule) - Electrochemical (oxygen absorption - Hydrogen evolution) - Galvanic series. Types of corrosion: Galvanic corrosion - Differential aeration corrosion - Stress corrosion - Pitting corrosion - Waterline corrosion - Factors affecting corrosion. Methods of corrosion control: Sacrificial anodic protection- Impressed current method - Protective coatings – Metallic coating – Galvanizing – Tinning.

**10 Hours**

**Unit IV - Introduction to polymer and nanotechnology**

Polymers: Monomer – Functionality - Degree of polymerization - Classification based on source-applications. Types of polymerization: Addition – Condensation - Copolymerization - Addition polymerization by free radical mechanism only. Thermoplastic and thermosetting resins: Preparation-Properties and applications of epoxy resins- TEFLON- Nylon - Bakelite. Nanomaterials: Introduction-Bulk nano structured materials-Nano electrodes -Nanoclusters-Carbon nano tubes – Nano polymers - Applications. **10 Hours**

**Unit V - Instrumental techniques of chemical analysis**

Beer–Lambert's law – Problems. UV visible and IR spectroscopy: principle- Instrumentation (block diagram only) – Applications. Colorimetry: Principle - Instrumentation(block diagram only) - Estimation of iron by colorimetry. Flame photometry: principle - Instrumentation (block diagram) - Estimation of Na by flame photometry. Atomic absorption spectroscopy: Principle - Instrumentation (block diagram) - Estimation of Ni by atomic absorption spectroscopy.

**10 Hours**
**Total: 50 Hours**

**Textbooks**


1. Puri B.R., Sharma L.R., and Madan S. Pathania, "**Principles of Physical Chemistry**", Thirty eighth Edition, Shoban Lal Nagin Chand & Co., Jalandhar, 2000.
2. Jain P.C., and Monika Jain, "**Engineering Chemistry"**, Fourteenth Edition, Dhanpat Rai Publishing Company PVT Ltd, New Delhi. 2005.


**References**


1. Bahl B.S., Tuli G.D., and Arun Bahl, "**Essentials of Physical Chemistry**", Twenty fourth Edition, S.Chand & Company Ltd., New Delhi, 2004.
2. Kuriacose J.C., and Rajaram J., **"Chemistry in Engineering & Technology"**, Vol. 1&2, Tata McGraw Hill publishing company, New Delhi, 1996.
3. Kenneth J. Klabunde, **"Nanoscale Materials in Chemistry"**, Wiley Inter science, 2001.
4. Andre Arsenault and Geoffrey A. Ozin, "**Nanochemistry: A Chemical Approach to Nanomaterials",** First Edition, Royal Society of Chemistry, 2005.
5. Skoog and West, **"Fundamentals of Analytical Chemistry"**, Seventh Edition, Wiley, New York, 1996.


## 07G104 'C' Programming

**3 0 0 3**

**Course Outcomes (COs)**

1. Apply the data types, control structures and memory management concepts in C programming.
2. Design programs using control structures, loops, functions and pointers.
3. Develop the solutions for simple and moderate problems using built in and user defined functions in C.

**Unit I - Introduction to C**

About ANSI C Standard – Overview of compilers and interpreters – Structure of a C program – programming rules. Executing the program The C Character Set – Delimiters – The C Keywords – Identifiers – Constants – Variables – Rules for Defining Variables – Data Types – Declaring Variables – Initializing Variables – Type Conversion – Constant and Volatile Variables. Operators and Expressions: Priority of Operators and their Clubbing – Comma and Conditional Operators – Arithmetic Operators – Relational Operators – Logical Operators – Bitwise Operators Input and Output in C: Formatted Functions - Unformatted Functions – Commonly used Library Functions.

**10 Hours**

**Unit II - Decision Statements**

The if Statement - The if…..else Statement – Nested if-else Statement – The break Statement – The Continue Statement - The goto Statement -– The switch Statement – Nested Switch () Case– The Switch () Case and Nested Ifs. Loop Control Statements: The for Loop – Nested for Loops – The While loop – The do-while – The do-while Statement with while Loop. Arrays**:** Array Initialization – Definition of Array – Characteristic of Array – One-Dimensional Array – Predefined Streams – Two-Dimensional Array – Three or Multi Dimensional Arrays – The sscanf ( ) and sprintf ( ) Functions.

**10 Hours**

**Unit III - Working with strings and standard functions**

Declaration and Initialization of string – Display of strings with Different Formats – String Standard Functions – Applications of Strings. Pointers: Features of Pointers – Pointer Declaration – Arithmetic Operations with Pointers – Pointers and Arrays – Pointers and Two-Dimensional Arrays – Array of Pointers – Pointers to Pointers – Pointers and Strings – Void Pointers. Additional In C: Dynamic Memory Allocation – Memory Models – Linked Lists - Graphics

**10 Hours**

**Unit IV - Functions**

Definition of Function – Declaration of Function and Function Prototypes – The return Statement – Types of Functions – Call by Value and Reference – Functions Returning More Values – Function as an Argument – Function with Operators – Function and Decision Statement - Function and Loop Statements – Function with Arrays and Pointers – Recursion – Pointer to Function. Storage class: Automatic Variables – External Variables – Static Variables – Register Variables. Preprocessor Directives: The #define Directive – Undefining a Macro – Token Pasting a Stringizing Operators – The #include Directive – Conditional Compilation – The #ifndef Directive – The #error Directive – The #line Directive – Inline Directive – The #pragma Saveregs – The #pragma Directive – The predefined Macros in ANSI and Turbo C – Standard I/O Predefined Streams in stdio.h – The Predefined Macros in ctype.h.

**10 Hours**

**Unit V - Structure and Union**

Features of Structures – Declaration and Initialization of Structures – Structure within Structure – Array of Structures – Pointer to Structures – Structure and Functions – typedef – Bit Fields – Enumerated Data Type – Union – Calling BIOS and DOS Services – Union of Structures. Files: Streams and File Types – Steps for File Operations – File I/O – Structures Read and Write – Other File Functions – Searching Errors in Reading\Writing Files – Low Level Disk I/O – Command Line Arguments – Environment Variables – I/O Redirection.

**10 Hours**

**Total: 50 Hours**

**Textbook**

Ashok N Kamthane, "**Programming with ANSI and Turbo C**", 1st Edition Pearson, 2006.

**References**


1. Byron S. Gottfried "**Schaum's Outline of Programming with C**" 2nd edition McGraw Hill
2. Ritchie D.M, Kernighan B.W, "**C Programming Language**", PHI, 2000
3. Deitel & Deitel, "**C How to program**", Pearson Education, 2001
4. Herbert Schidt, "**C- The complete Reference**" McGraw Hill, 2002
5. Gary J Bronson, "**First book of ANSI C**", Third Edition, Thomson Learning.


## 07I105 Basics of Civil and Mechanical Engineering

**4 0 0 4**

**Course Outcomes (COs)**

1. Realize the fundamental philosophy of Civil engineering and enable them to work together in a multidisciplinary technical team.
2. Identify the nature of building components, functions, construction practices and material qualities.
   Demonstrate the manufacturing processes like casting, welding, machining operations and the construction and working of IC engines and refrigerators.
3. Demonstrate the working principle of boilers, turbines and various power plants utilizing conventional and non-conventional sources of energy.

**Unit I - Introduction to Civil Engineering**

History and development of Civil Engineering – Scope of Civil Engineering – Functions of Civil Engineers. Construction Materials: Characteristics of good building materials such as stones, bricks, A.C. sheets, G.I. sheets and Ceramic tiles, timber, cement, aggregates and concrete. Surveying: Definition and purpose – Classification – Basic principles – Measurement of length by chains and tapes – Calculation of area of a plot – Measurement of bearings and angles using a prismatic compass – Leveling – Contours and

their applications.
**10 Hours**

**Unit II - General concepts relating to Buildings**
Selection of site – Basic functions of buildings – Major components of buildings. Foundations: Purpose of foundation – Bearing capacity of soils – Types of foundations. Proper methods of construction of: Brick masonry – Stone masonry – Hollow Block masonry. Beams – Lintels – Columns – Flooring – Damp proof course – Surface finishes – Doors and windows – Roofing.

**10 Hours**

**Unit III - Importance of roads**
Classification of Highways – Cross sections of water bound macadam, bituminous and cement concrete roads – Traffic signs and signals. Importance of railways - Gauges – Components of a permanent way – Classification of bridges. Stress, Strain, Elastic Constants: Young's Modules, Bulk Modules, Poisson's ratio (no derivation) – simple problems. **10 Hours**

**Unit IV - Alternate Sources of Energy**
Solar, Wind, Tidal, Geothermal and Ocean Thermal Energy Conversion (OTEC). Power Plant: Classification of Power Plants- Steam - Nuclear, Diesel, Hydro, and Gas Turbine Power Plants. Types of Boilers – Boiler mounting & accessories – Cochran – Locomotive – Bobcock and Wilcox, Lamont boilers differences between fire tube and water tube boiler. Types of turbines- Working of a single stage impulse and reaction turbine.
**10 Hours**

**Unit V - Internal Combustion Engines**
Classification of IC engines, Main components of IC engines, working of a 4 stroke & 2 stroke petrol & diesel engine, differences between 4 stroke and 2 stroke engine. Refrigeration: Working Principle of vapour compression & vapour absorption system, domestic refrigerator.
**10 Hours**

**Unit VI- Manufacturing Processes**
Casting Pattern, Mould, Moulding Sand –Melting of Cast Iron – Cupola Furnace – Fettling – Casting Defects. Arc & Gas Welding, Soldering & Brazing, Extrusion, Forging, Rolling, & Drawing Processes. Lathe, Drilling & Milling – Types, Operations & Equipments. Classification of Engineering materials, Composition, Mechanical properties and uses of cast iron, mild steel, high carbon steel and high speed steel.
**10 Hours**

**Total: 60 Hours**

**Textbook**
Shanmugam G., Palanichamy M.S.,"**Basic Civil and Mechanical engineering**", Tata McGraw Hill Company, New Delhi, 2nd Edition, 2000.

**References**

1. Arunachalam N., "**Basic Civil Engineering**", Pratheba Publishers, Coimbatore, 2nd Edition, 2000.
2. Sarkar B. K.,"**Thermal Engineering**" Tata McGraw Hill Company, New Delhi.
3. Rao N., "**Manufacturing Technology: Foundry, Forming and Welding**", Tata McGraw Hill Company, New Delhi, Paperback Edition.
4. Ramesh babu V., "**Basic Civil Engineering**", Anuratha publishers,Kumbakonam, 2nd Edition, 2001.


## 07I106 Basics of Electrical Engineering

**3 0 0 3**

**Course Outcomes (COs)**

1. Analyze the power in single phase AC systems.
2. Derive an equation for self and mutual inductance for any range of Electrical and Magnetic circuits.
3. Design DC generator, DC Motor and AC induction machines.

**Unit I - Electric Circuits**
Definition of Voltage, Current, Power & Energy, Ohm's law, Kirchoff's Law & its applications – Simple problems, division of current in series & parallel circuits, generation of alternating EMF, definition of RMS value, average value, peak factor, form factor. Power in single phase AC – Three phase system.

**10 Hours**

**Unit II- Magnetic Circuits**
Definition of MMF, Flux, Reluctance, Properties of Flux lines, Self & Mutual Inductance, Ampere Turns, Series & parallel magnetic circuits, Comparison between Electric & magnetic circuits, Law of Electromagnetic induction, Fleming's Right & Left hand rule.
**10 Hours**

**Unit III - DC Machines**
Construction, Type, Principle of Operation & Working Principle of DC Generator, DC Motor,

**10 Hours**

**Unit IV - Transformers**
Construction and Working Principles – Single Phase transformer- Three Phase Transformer- Auto Transformer
**10 Hours**

**Unit V - AC Machines**
Construction, Type, Principle of Operation & Working Principle of AC machines and Induction machines

**10 Hours**
**Total: 50**

**Hours**
**Textbooks**


1. Edminister J A, **"Electric Circuits",** Schaum's Series. McGraw Hill, 2005
2. Nagsarkar T K & Sukhija M S, **"Basic of Electrical Engineering"**, Oxford Press 2005.


**References**


1. Thereja. B. L , "**A Text Book on Electrical Technology**", Niraja PublicationsEdition, 2005.
2. Van Valkenbergm, **"Electric Circuits and Network Analysis",** Prentice Hall (India) Pvt, Ltd, 2005.
3. Smarjith Ghosh, **"Fundamentals of Electrical and Electronics Engineering",** Prentice Hall (India) Pvt, Ltd, 2005.


## 07G001 Communication Skills – I

**3 0 0 3**

**Course Outcomes (COs)**
1. Communicate better with improved vocabulary and pronunciation.
2. Develop fluency and language competence at the intermediate Level.

**Unit I - Grammar and Vocabulary**
Word formation with prefixes and suffixes - Synonyms and antonyms – Verb patterns – Tenses – subject-verb agreement – Modal auxiliaries – Prepositions – Conditionals – Use of articles - Commonly confused, mispronounced and misspelt words – British and American vocabulary – Formal and informal English - Vocabulary building activities such as crossword, mind mapping, etc.

**10**

**Hours**

**Unit II - Listening**

Listening for and noting specific information, listening to identify topic, context, function, speaker's opinion, attitude, etc. - Extensive listening - Listening for general content – Listening to short conversations to fill up gapped texts - Intensive listening – Listening for specific information – Note-taking (guided and unguided).

**10 Hours**

**Unit III - Speaking**

Speech sounds – Syllables - Word stress – Sentence stress - Content words and Function words – Intonation and pause - Pronunciation of ed- words - First language intrusions - Accent neutralization - Pronunciation drills / tongue twisters.

**10 Hours**

**Unit IV - Reading**

Using dictionaries & Thesaurus - Predicting the content - Skimming the text – Understanding the gist – Identifying the topic sentence and its role in each paragraph – Scanning – Inferring / identifying lexical and contextual meanings – Transfer of information / note-making – Understanding discourse coherence – Sequencing of sentences. **10 Hours**

**Unit V - Writing**

Writing definitions and descriptions – paragraph writing (unity, coherence and use of cohesive expressions) - Formal and Informal letter writing - Process description (use of sequencing connectives) – Comparison and contrast - Reports – Proposals.

**10 Hours**

**Total: 50 Hours**

**Textbook**

Rizvi M Ashraf, **"Effective Communication"**, Tata McGraw – Hill Publishing Company Ltd., New Delhi, 2005.

**References**


1. Sharon J. Gerson, Steven M. Gerson, **"Technical Writing – Process and Product"**, 3rd Edition, Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2004.
2. Andrea J. Rutherford, **"Basic Communication Skills for Technology"**, 1st Edition, Pearson Education Asia (Singapore) Pvt. Ltd., Bangalore, 2001.
3. Nell Ann Pickett, Ann A. Laster, Katherine E. Staples, **"Technical English (Writing, Reading and Speaking)"**, 8th Edition, Pearson Education, USA, Addison Wesley Longman Inc., 2001.
4. Stevenson, Susan and Steve Whitmore, **"Strategies for Engineering Communication"**, Wiley Edition, 2002.
5. Mitra K. Barun, **"Effective Technical Communication – A Guide for Scientists and Engineers"**, Oxford University Press, New Delhi, 2006.


## 07G108 'C' Programming Laboratory

**0 0 3 2**

**Course Outcomes (COs)**

1. Develop, compile, debug and execute C programs
2. Use various c programming concepts like decision making and looping statement.
3. Develop applications using C programming for solving problems.

**Programs Using Decision-Making and Looping Statements:**

1. Write a program to calculate the simple interest, given the principle, period and rate of interest (Simple Interest = PNR /100)
2. Write a program to convert the temperature from Fahrenheit to Centigrade and vice versa. ( F = 1.8 x C +32 ; C = ( F- 32) /1.8 )
3. Write a program to find the largest of 3 numbers using the minimum possible checks. (Simple if)
4. Write a program to convert binary to decimal number using while loop.
5. Write a program to find all possible roots of quadratic equation using switch case.

6. Write a program to read a particular number and to check whether it is a prime number or not.
7. The Electricity Production company has to print up the bills for its customers at the following rate:

| | |
|---|---|
| For the 1st 50 KWH | rate is Rs.2 |
| For the next 100 KWH | rate is Rs.6 |
| For the next 200 KWH | rate is As.7 |
| For more than 350 KWH | rate is Rs.8 |

Write a program to do the above and the output should be in the following order Customer name, Number of Units and the Total Bill.

**Programs Using Functions:**

8. Write a program using function that will round a floating point number to an indicated decimal place. For example, the number 12.758
9. Would Yield the value 12.76 when it is rounded off to two decimal places.
10. Write a function exchange to interchange the values of two variables say X and Y
11. Write a recursive function that will generate and print first n Fibonacci series.

**Programs Using Arrays:**

12. Write a program to merge two different sized arrays and eliminate the duplicate from the merged array.
13. Write a menu driven program for inserting an element into an array and for deleting an element from the array. Program should also have the provision for deleting the duplicates in an array.
14. Write a program to multiply two matrices. Use separate functions to read, process and print the data in matrix form. Also find the trace and transpose of the given matrix.
15. A list of N numbers is given. Write a program to find:
    a. Their average and standard deviation.
    b. The number of integers, which are greater than equal to a specified number in the list.
16. Using arrays write a program to arrange the given set of N numbers in ascending order and hence to pick the greatest and the smallest number. And also find the presence of a specified number

**String Handling Programs:**

17. Write a program to count number of vowels, consonants, words, white spaces and other characters in a given line of text.
18. Write a program to check whether the given string is a palindrome or not.
19. Write a program to find the occurrence of a sub string in a main string and if found replace it with new string.
20. Write a program to sort the set of names in alphabetical order.
21. Write a program using gets O(Capital) and puts o (Small) which converts a given 'C' program typed in uppercase to a program in lowercase

**Programs using Structures**

22. Create a structure to store the following details:
    Rollno, Name, Mark1, Mark2, Mark3, Total, Average, Result and Class.
    Write a program to read Rollno, name and 3 subject marks. Find out the total, result and class as follows:
    a) Total is the addition of 3 subject marks.
    b) Result is "Pass" if all subject marks are greater than or equal to 50 else "Fail".
    c) Class will be awarded for students who have cleared 3 subjects
        i. Class "Distinction" if average >=75
        ii. Class "First" if average lies between 60 to 74 (both inclusive)
        iii. Class "Second" if average lies between 50 & 59 (both inclusive)

iv. Repeat the above program to manipulate 10 students' details and sort the structures as per rank obtained by them

22. Define a structure that can describe the employees with the fields Eno, Ename. Basic. Write a program to calculate DA = 32% of Basic. HRA = 15% of Basic. CCA = 10% of BASIC, PF = 150,0 of Basic and print all details with Net pay All processing should be using pointer notation.

**Programs using Pointers**

23. Write a program to count the number of consonants, vowels, digits, white spaces and other characters in a line of text using pointers
24. Write menu driven program to perform all string handling operations using pointers.
25. Write a program to sort a list of strings in an alphabetical order (using pointers with DMA)
26. Write a menu driven program to perform addition, subtraction and multiplication of matrices using pointers.
27. Write a program to search for an element using binary search.
28. Write a program for encryption of a given sentence and decryption of the same sentence .

## 07I109 Engineering Graphics

**2 0 3 4**

**Course Outcomes (COs)**

1. Assemble data and information of various components in visualized way.
2. Infer technical graphics assemblies
3. Do 2D modeling by means of AutoCAD

**Unit I - Concepts and Conventions**

Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning. Plane Curves: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – Construction of involutes of square, pentagon and circle. Projection of Points and Straight Lines: General principles of orthographic projection – First angle projection – Layout of views – Projection of points, located in all quadrant and straight lines located in the first quadrant – Determination of true lengths and true inclinations.

**10 Hours**

**Unit II**

Projection of Plane surfaces: Projection of polygonal surface and circular lamina inclined to one reference plane. Projection of Solids: Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method. Sectioning of Solids: Sectioning of solids like prisms, pyramids, cylinder and cone in simple vertical position by cutting planes inclined to one reference plane – Obtaining the true shape of section.

**10**

**Hours**

**Unit III - Development of surfaces**

Development of lateral surfaces of simple and truncated solids – Prisms, pyramids, cylinders and cones. Development of lateral surfaces of solids with square and cylindrical cutouts, perpendicular to the axis. Intersection of solids: Development of lateral surfaces of two Intersecting solids – Cylinder & cylinder – Prism & cylinder – Axis at right angles with no offset.

**10**

**Hours**

**Unit IV - Isometric projections**

Principles of isometric projection – Isometric scale – Isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones. Perspective projections: Perspective projection of solids like prisms, pyramids by visual ray method and vanishing point method.

**10**

**Hours**

**Unit V - Building Drawing**

Sectional front view of the wall from foundation to super structure, plan, elevation and section of single storied / office building with flat RCC roof and brick masonry walls having not more than two rooms.

**10**

**Hours**

**Total: 50 Hours**

**Textbooks**

1. Nataraajan K.V., "**A text book of Engineering Graphics**", Dhanalakshmi Publishers, Chennai, 2006.
2. Gopalakrishnan K., "**Engineering Drawing**" (Vol. I & II) Subhas Publications – 1998.

**References**

1. Bhatt N.D., "**Engineering Drawing**" Charotar publishing House 46th Edition, 2003.
2. Venugopal K., "**Engineering Graphics**", New Age International (P) Limited, 2002.
3. Narayana K.L. and Kannaiah P., "**Engineering Graphics**", Scitech Publications (pvt) Limited-2002.
4. Shah M.B. and Rana B.C., "**Engineering Drawing**", Pearson Education, 2005
5. Dhawan R.K., "**Text book of Engineering Drawings**", S.Chand and company limited, 1997.

## 07I110 Workshop Practice

**0 0 2 2**

**Course Outcomes (COs)**

1. Perform basic Carpentry, Fitting and Plumbing work.
2. Develope Fabrication in Sheet metal objects.
3. Rectify faults in house hold machineries such as Refrigerator, Air conditioner.

**Carpentry**

- Handling of carpentry tools – Practice in marking, sawing, planning, and chiseling to size – Making simple joints such as half lap joint, T joint, dovetail joint, and mortise & tenon joint.
- Use of modern materials like Plywood, Chip board, Nova-pan, and laminated sheets.
- Study of joints in door panels, wooden furniture, etc

**Fitting**

- Use of fitting tools – Practices in marking, filing and fitting to size.
- Making of simple mating – Preparing the joints like square joint, V - joint,

**Basic Machining**

- Simple Turning and Taper turning
- Drilling practice

**Plumbing**

- Preparation of plumbing line sketches for water supply and sewage lines
- Basic pipe connection using valves, taps, couplings, unions, reducers, and elbows in household fitting.
- Practice in mixed pipe connections: Metal, plastic, and flexible pipes used in house hold appliances.
- Study of pipe connections on the suction

**Demonstration**

- Domestic Refrigerator, Air conditioner, Centrifugal pump, Blower, and Single stage air compressor

**Second Semester**

**07G201 Engineering Mathematics II**

**3 2 0 4**

**Course Outcomes (COs)**

1. Achieve skills in variables and calculus which would enable them to devise engineering solutions for given situations they may encounter in their profession.
2. Identify, formulate and solve engineering problems.
3. Work with partial derivatives and multiple integrals in various situations and use correct mathematical terminology, notation, and symbolic processes in order to engage in work, study, and conversation on topics involving partial derivatives and multiple integrals with colleagues in the field of mathematics, science or engineering.
4. Recognize simply/multiply connected domains and the admissibility of continuous deformation between two contours.

**Unit I - Functions of Several Variables**

Functions of two variables-Partial derivatives- Total differential- Derivative of implicit functions-Taylor's expansion- Maxima and minima- Constrained Maxima and Minima by Lagrangian Multiplier method- Jacobians.

**10 Hours**

**Unit II - Multiple Integrals**

Double integration in polar and Cartesian Co- ordinates- Change of order of integration- Area as a double integral- Volume as triple integral in Cartesian Co ordinates- Change of variables.

**10 Hours**

**Unit III - Vector Calculus**

Curvilinear coordinates- Gradient- Divergence- Curl- Line- Surface and surface integrals- Statement of Green's- Gauss divergence and Stokes theorems- Verification and applications.

**10 Hours**

**Unit IV - Analytic Functions**

Cauchy- Riemann equations- Properties and analytic functions- Determination of harmonic conjugates- Milne's Thomson's method- Conformal mappings- Mappings of $w = z + a$ , $1/z$ , $az$ , $z^2$ - Bilinear transformation.

**10 Hours**

**Unit V - Complex Integration**

Cauchy's theorem- Statement and application of Cauchy's integral formula- Taylor and Laurent's series- Singularities- Classification- Residues- Cauchy's residue theorem- Contour integration- Circular and semi circular contours ( excluding poles on the real axis ). **10 Hours**

**Total: 50 Hours**

**Textbooks**

1. Lakshminarayanan. K .A et al., "**Engineering Mathematics –II",** 6th edition, Vikas Publishing House, New Delhi 2006.
2. Veerarajan T, "**Engineering Mathematics**", 5th Edition, Tata McGraw Hill Publications, New Delhi.

**References**

1. Kandasamy P. et al., "**Engineering Mathematics**, **Volume I&II"**, S. Chand & Co., New Delhi 2000.
2. Narayanan S, Manicavachagam Pillai, Ramaiah.T.K "**Advanced Mathematics for Engineering Students" Volume I**, S Viswanathan (Printers & Publishers) 2002.
3. Grewal B.S., "**Higher Engineering Mathematics**", Khanna Publications, New Delhi 2000.
4. Kreyszig, E, "**Advanced Engineering Mathematics"**, 8th Edition, John Wiley & Sons, Inc, Singapore (2002).

## 07G202 Environmental Science and Engineering

**3 0 0 3**

**Course Outcomes (COs)**

- Comprehend the importance of environment, its purpose, design, exploitation of natural resources and perspectives.
- Comprehend fundamental physical and biological principles that govern natural processes and role of professionals in protecting the environment from degradation.
- Appreciate current environmental challenges like pollution and its management.

**Unit I - Introduction to Environmental Studies and Natural Resources**

Environment: Definition- Scope - Importance – Need for public awareness. Forest resources: Use –Over exploitation- Deforestation - Case studies- mining - Effects on forests and tribal people. Water resources: Use – Over utilization of surface and ground water- Floods – Drought - Conflicts over water. Mineral resources: Use – 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.

**10 Hours**

**Unit II - Ecosystems and Biodiversity**

Concept of an ecosystem: Structure and function of an ecosystem – Producers - Consumers -Decomposers – Energy flow in the ecosystem – Ecological succession – Food chains - Food webs and ecological pyramids. Types of ecosystem: Introduction - Characteristic features - Forest ecosystem - Grassland ecosystem - Desert ecosystem - Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries). Biodiversity: Introduction– Definition (genetic - species –ecosystem) diversity. Value of biodiversity: consumptive use - Productive use – Social values – ethical values - Aesthetic values. Biodiversity level: global - National - Local levels. India as a mega diversity nation. Hotspots 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.

**10 Hours**

**Unit III - Environmental Pollution**

Pollution: Definition –Air pollution - Water pollution - Soil pollution - Marine pollution - Noise pollution - Thermal pollution - Nuclear hazards. Soil waste management: Causes - Effects - control measures of urban and industrial wastes. Role of an individual in prevention of pollution - Pollution case studies. Disaster management: floods – Earthquake - Cyclone - Landslides. Field study of local polluted site – Urban - Rural -

Industrial - Agricultural. **10 Hours**

**Unit IV- Social Issues and the Environment**

Sustainable development - from unsustainable to sustainable development – Urban problems related to energy. Water conservation - Rain water harvesting - Watershed management. Resettlement and rehabilitation of people: its problems – Concerns - Case studies. Environmental ethics: Issues - Possible solutions – Climate change - Global warming - Acid rain - Ozone layer depletion - Nuclear accidents - Nuclear 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.

**10 Hours**

**Unit V- Human Population and the Environment**

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: common plants – Insects – Birds. Field study of simple ecosystems – Pond – River - Hill slopes.

**10 Hours**

**Total: 50 Hours**

**Textbooks**


1. Miller T.G. Jr., **"Environmental Science",** Tenth Edition, Wadsworth Publishing Co., 2004.
2. Raman Sivakumar, **"Introduction to Environmental Science and Engineering"** Second Edition, Vijay Nicole Imprints, Chennai, 2006.


**References**


1. Bharucha Erach, **"The Biodiversity of India",** Mapin Publishing Pvt. Ltd., Ahmedabad India.
2. Divan S., **"Environmental Law and Policy in India"** Oxford University Press, New Delhi 2001.
3. Wager K.D., **"Environmental Management"**, W.B. Saunders Co., Philadelphia, USA, 1998.
4. Cunningham.W.P., **"Environmental Encyclopedia"**, Jaico Publising House, Mumbai, 2004.
5. Santosh Kumar Garg, Rajeshwari garg, smf Ranjni Garg **"Ecological & Environmental studies"** Khanna Publishers, Nai Sarak, Delhi.


## 07G203 Object Oriented Programming

**3 0 0 3**

**Course Outcomes (COs)**

- Apply the object-oriented programming principles and techniques to develop programs.
- Design programs using exception handling mechanisms and file concepts.
- Use object-oriented language to develop solutions for simple and moderate problems.

**Unit I - Introduction**

Need for object oriented programming – Difference between procedural languages and the object oriented approach- characteristics of object oriented languages – C and C++. C++ Basics: Basic programming construction – Output using cout – Input using cin –Variables –Integer variables – Character variables –Float variables – Manipulators – Type conversion.
**10 Hours**

**Unit II - Objects and Classes**
A Simple Class – C++ Objects as Physical Objects – C++ Object as Data Types – Constructors – Object as Function Arguments – Returning Objects from Functions – A Card Game Example – Structure and Classes – Classes, Objects and Memory - Static Class Data. Arrays: Array Fundamentals – Arrays as Class Member Data - Arrays of Objects – Strings.
**10 Hours**

**Unit III - Operator Overloading**
Overloading Unary Operators – Overloading Binary Operators – Data Conversion – Pitfalls of Operator Overloading and Conversion. Inheritance : Derived Class and Base Class - Derived Class Constructors – Overriding Member Functions - Inheritance in the English Distance Class – Class Hierarchies - Public and Private Inheritance – Levels of Inheritance – Multiple Inheritance – Ambiguity in Multiple Inheritance – Containership : Classes within Classes – Inheritance and Program Development.
**10 Hours**

**Unit IV - Pointers**
Addresses and Pointers - Pointers and Arrays – Pointers and Functions – Pointers and Strings – Memory Management: new and delete – Pointers to Objects - A Linked List Example – Pointers to Pointers – Debugging Pointers. Virtual Functions and Other Subtleties: Virtual Functions - Friend Function - Static Functions – Assignment and Copy-Initialization – The this Pointer.
**10 Hours**

**Unit V - Files and Streams**
Streams – String I/O – Character I/O – Object I/O – I/O with Multiple Objects – File Pointers – Disk I/O with Member Functions – Error Handling – Redirection – Command-Line Arguments – Printer Output – Overloading the Extraction and Insertion Operators. Exception: Throwing an Exception – The Try Block – Catching an Exception – Exception Specifications – Exceptions and Design Issues Class Templates : Class Template Definition – Class Template Instantiation – Member Function of Class Templates – Friend Declarations in Class Templates – Static Data Members of Class Templates – Nested Types of Class Templates - Members Templates – Class Templates and Compilation Model – Class Templates Specialization – Name Resolution in Class Templates – Namespaces and Class Templates - A Template Array Class.
**10 Hours**

**Total: 50 Hours**

**Textbooks**


1. Robert Lafore, "**Object- Oriented Programming in C++**" – Galgotia, Publications 2000.
2. Stanley B. Lippman, Josée Lajoie, "**C ++ Primer**", Third Edition – Addison Wesley 1998.


**References**


1. Malik D S, "**C++ Programming**" - Third Edition – Thomson 2007.
2. Ashok N. Kamthane "**Object – Oriented Programming with ANSI & Turbo C++**" Pearson Education 2004.
3. Venugopal K R and Rajkumar, Ravishankar T "**Mastering C++**" Tata McGraw Hill Publishing Co. Ltd., New Delhi


## 07I204 Semiconductor Physics and Optoelectronics

**3 0 0 3**

**Course Outcomes (COs)**

- Identify the suitability of magnetic materials for specific applications.
- Demonstrate magnetic and electrical properties of materials and gain the fundamentals of

polarizable solids.

- Demonstrate the basics of optoelectronic materials and their applications.

**Unit I - Conducting and Superconducting Materials**

Conducting Materials**:** Classical theory - Drude-Lorentz theory - Electrical conductivity- Thermal conductivity- Wiedemann - Franz law- Drawbacks of Classical theory- Quantum theory: Fermi distribution function- Density of energy states. Superconductivity: Superconducting phenomena - Properties of superconductors - Type I & Type II superconductors - High temperature superconductors – Applications. **10 Hours**

**Unit II - Semi conducting Materials**

Intrinsic Semiconductors**:** Carrier concentration- Calculation of density of holes and electrons- Fermi level and its variation with temperature- Mobility and conductivity – Determination of band gap. Extrinsic Semiconductors**:** Expression for carrier concentration - N-type and P-type semiconductors- Variation of Fermi level with temperature and impurity concentration- Hall effect: Theory- Determination of Hall coefficient - Uses. **10 Hours**

**Unit III - Dielectrics and Magnetic Materials**

Dielectrics**:** Basic Definitions: Electrical susceptibility- Dielectric constant-Electronic, ionic, orientation and space charge polarizations- Frequency and temperature dependence of polarization- Internal field, Claussius-Mosotti relation (derivation)-Dielectric loss- Dielectric breakdown- Uses Magnetic Materials: Origin of magnetic moment: Bohr magneton- Domain theory of ferromagnetism- Hysteresis- Soft and Hard magnetic materials- Ferrites- Applications. **10 Hours**

**Unit IV - Optoelectronic Switching Devices**

Analog and digital modulators: Pulse code modulation, Franz- Keldish and Stark effect modulators- Quantum well – Kerr effect – Pockel's effect- Electro absorption modulators- Optical switching: Self Electro optic Effect Device – Applications. . **10 Hours**

**Unit V - Optical Materials and Fiber Optics**

Optical Materials**:** Disc data storage – Recording and read out of information: CD – ROM, Differences between CD-ROM and floppy disc- Magneto optical recording and read out: Different storage and retrieval techniques. Fiber Optics**:** Principle of light transmission through fiber - Expression for acceptance angle and Numerical Aperture- Types of fibers - Losses in fibers: Attenuation - Dispersion- Light sources for fiber optic communication: LED - Fiber optic communication link- Modulators & Detectors-Fiber amplifiers- Soliton based coherent optical fiber communication.

**10 Hours**

**Total: 50 Hours**

**Textbooks**


1. Arumugam.M, **"Semi conductor Physics And Opto Electronics ",** Revised Edition, Anuradha Publications, Kumbokonam, , 2003.
2. Palanisami P.K, **"Material Science",** Scitech Publications(India),Pvt Ltd, Volume1, 2nd Edition Chennai,June 2003.


**References**


1. Pillai S. O., **"Solid State Physics",** Fifth Edition, New Age International Publications, New Delhi, , 2003.

2. Avadhanulu M.N. and Kshirsagar P.G., **"A Text Book of Engineering Physics"**, 7th Enlarged Revised Edition., Chand & Company Ltd., New Delhi, 2005.
3. Raghavan V, "Materials Science & Engineering," Prentice Hall of India, A first course,.New Delhi, 2001.
4. Rajendran.V & Marikani.A **"Materials Science",** First Reprint, Tata Mc Graw Hill Publishers Company Ltd, New Delhi, 2004.
5. Palanisami P.K, **"Semi conductor Physics And Opto Electronics",** Scitech Publications(India), Pvt Ltd, Chennai, 2003.

## 07I205 Data Structures and Algorithms I

**3 1 0 4**

**Course Outcomes (COs)**

- Analyze and determine the efficiency of algorithms by applying mathematical principles.
- Demonstrate the concept of abstract data types such as stacks and queues.
- Apply dynamic memory allocation techniques and file processing concepts.

**Unit I - Introduction to Computer Problem –Solving**

Introduction-Problem solving aspect -Top-Down design -Implementation of algorithms - Program verification - Efficiency of algorithms -Analysis of algorithms. **10 Hours**

**Unit II - Fundamental Algorithms**

Exchanging the values of two variables-Counting - Summation of a set of numbers -Factorial computing -Sine function computation -Generation of the Fibonacci sequence -Reversing the digits of an integer -Base conversions - Character to number conversion. **10 Hours**

**Unit III - Linear Data Structures**

Structure – Storage of Information – Linear Data Structures and their sequential storage representation – concepts and Terminology – Storage structure for arrays – Structures and Arrays of Structures – Stacks – Application of Stacks.
**10 Hours**

**Unit IV - Queues**

Queues – Simulation – Priority Queues Linear Data Structures and their linked storage representation – Pointers and Linked Allocation – Linked Linear Lists – Applications of Linked Linear Lists – Polynomial Manipulation.
**10 Hours**

**Unit V - Dynamic Memory Allocation**

Dynamic storage Management – Fixed Block Storage Allocation – First –fit Storage Allocation – Buddy System – File Structures – External Storage Devices – Sequential Files – Structure – Processing Indexed Sequential Files – Structure – Processing Direct Files – Structure Processing.

**10 Hours**

**Total: 50 Hours**

**Textbooks**

1. Tremblay, J.P. and Sorenson, P.G. "**An Introduction to Data Structures with Applications**", II edition, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2002.
2. Dromey R.G., "**How to Solve it by Computer**", Prentice Hall of India Private Limited, New Delhi, 1998.

**References**

1. Aho A.V., Hopcroft J.E. and Ullman J.D. "**Data Structures and Algorithms**", Pearson Education Asia, 2002
2. Nicklaus Wirth, "**Algorithms and Data Structures – Programmes**", Prentice Hall of India Pvt. Ltd., New Delhi, 2002

3. Langsam Y, Augenstein M.J and Tenenbaum A.M, "**Data Structures using C and C++**" II edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2002.

## 07I206 Electron Devices and Circuits

**3 1 0 4**

**Course Outcomes (COs)**

- Demonstrate the fundamental principles of semiconductor devices.
- Analyze and design amplifier circuits, oscillators and filter circuits employing BJT, FET devices.
- Analyze the basic parameters of electronic devices, their performance, and limiting factors.

**Unit I - Electronic Devices**

PN junction – Current equation – Junction capacitance – Breakdown characteristics – Varactor, tunnel , fast recovery - Schottky and Zener diodes- Ebers – Moll equation – Input output characteristics – Switching characteristics – 'h' parameters – Low frequency and high frequency equivalent circuits – RF transistors – Power transistors- Theory and characteristics of JFET and MOSFET – low frequency and high frequency equivalent circuits – Theory and characteristics of UJT, SCR and TRIAC

**10 Hours**

**Unit II - Rectifiers and Power Supplies**

Single and Polyphase rectifiers and analysis of filters circuits – Design of zener and transistor series voltage regulators- Switched mode power suppliers. **10 Hours**

**Unit III - Amplifiers**

Biasing circuits for transistors – FET and their analysis – CE, CC and CB amplifiers – FET amplifiers – frequency response – Cascade and Darlington connections – Analysis of Class A and B power amplifiers – Complementary symmetry amplifiers – Class C power amplifiers-Differential amplifiers – Common mode and difference mode analysis – Drift compensation – FET input stages – Chopper stabilizer amplifiers – Introduction to tuned amplifiers.

**10 Hours**

**Unit IV - Operational Amplifiers and Oscillators**

Advantages of negative feedback – Voltage /current, series /shunt feedback – Positive feedback – Op-amps- Chars and applications - Condition for oscillations, phase shift – Wien bridge, Hartley, Colpitts and crystal oscillators. **10 Hours**

**Unit V - Pulse Circuits, ADC and DAC**

RC wave shaping circuits – diode clampers and clippers – multivibrators – Schmitt triggers- signal generators using transistors and Operational amplifiers- Analog to Digital Converters- Digital to Analog Converters

**10 Hours**

**Total: 50 Hours**

**Textbooks**

1. Albert Paul Malvino, "**Electronic Principles**", Tata McGraw-Hill, 6th Edition, 2005
2. Ramakant A. Gayakwad, "**Op-Amps and Linear Integrated Circuits**", Prentice-Hall of India, 2005

**References**

1. Millman and Halkias, **"Integrated Electronics"**, McGraw-Hill, ISE, 1990.
2. Millman and Taub, Pulse, "**Digital and Switching Waveforms"**, McGraw-Hill, 1991.
3. David Bell, "**Electronic devices and circuits"**, 3rd edition 1999.

## 07G002 Communication Skills – II

**3 0 0 3**

**Course Outcomes (COs)**

1. Clear the BEC Vantage Level Examination conducted by the Cambridge ESOL.

**Unit I - Grammar and Vocabulary**

Impersonal passive – Cause and effect expressions – Indicators of purpose and function – Imperatives – Question patterns - Infinitives and gerunds – Mechanics of writing – Nominal compounds – Common errors – Vocabulary building strategies – Business vocabulary – Foreign words and phrases – Common idioms and phrases. **10 Hours**

**Unit II - Listening**

Listening practice – Active Listening - Listening to Short speeches/interviews -Comprehension tasks - Listening to speech segments (pronunciation, accent & intonation) – Listening to recorded telephonic conversation, TV / radio news in English (both American and British) – Listening to short and long conversations in different domains of activity - Discussing new inventions, products etc. **10 Hours**

**Unit III - Speaking**

Discourse Management – Interactive Communication (turn taking & sustaining the interaction by initiating and responding) - Giving personal information and expressing opinions - Giving information and expressing and justifying opinions - Speculating, comparing and contrasting - agreeing and disagreeing - Fielding /asking questions/question starters - Asking /giving directions - Essential Telephoning English - Giving logical reasons/ explanations - Debates, extempore speeches - Tips on developing fluency. **10 Hours**

**Unit IV - Reading**

Reading for structure and detail (Understanding general points and specific details; vocabulary and structure; structure and discourse features; understanding sentence structure) Error identification – Cloze - Reading strategies **10 Hours**

**Unit V - Writing**

Describing or comparing figures from graphic input – Making inferences – Report (describing, summarising) – Correspondence (explaining, apologising, reassuring, complaining) – Project proposal (describing, summarising, recommending, persuading) – Format, organization & register - Business letters – Notices – Agenda – Minutes – Memoranda. **10 Hours**

**Total: 50 Hours**

**Textbook**

Raman, Meenakshi and Sangeetha Sharma, **"Technical Communication – Principles and Practice"**, Oxford University Press, New Delhi, 2004.

**References**


1. Huckin N. Thomas and Leslie A. Olsen, **"Technical Writing and Professional Communication for Nonnative Speakers of English"**, 2nd Ed., McGraw-Hill, Singapore, 1991.
2. Herbert A.J., **"The Structure of Technical English"**, Longman, UK, 1965.
3. Pfeiffer, William Sanborn, **"Technical Communication – A Practical Approach"**, 6th Ed., Pearson Prentice Hall, New Jersey, 2006.
4. Guffey, Mary Ellen, **"Business Communication – Process and Product"**, 3rd Edition, Thamson South-Western, Bangalore, 2004.
5. Eisenberg, Anne. **"Effective Technical Communication"**, Singapore: McGraw-Hill, 1993.


## 07G208 Object Oriented Programming Laboratory

**0 0 3 2**

**Course Outcomes (COs)**

- Design, compile, debug and execute C++ programs.

- Make use of classes, constructors, destructors, inheritance, operator overloading and the Standard Template Library in C++.
- Develop applications using object oriented programming concepts.

**LIST OF EXPERMIENTS:**

1. Write a program to define a class to represent a BANKACCOUNT. Including the following members:
   Date members:
   Name of the depositor, Account Number, Type of account, Balance Amount in the account
   Member functions:
   To assign initial values (Use constructors to initialize the data)
   To deposit an amount
   To withdraw an account after checking the balance
   To display the name and the balance
   Note: Try to use all types of constructors
2. Write a program to add the two, three, four numbers of different data types using function overloading
3. Write a program to print a character string of a specified length using default argumented function
4. Write a program to computer tax using default arguments. A tax compute function takes two arguments amount and tax percentage. Default tax percent is 15% of income
5. Write a program to sort a set of numbers of generic data type using template function
6. Implement the above class with dynamic objects and use constructors and destructors
7. Implement the class STUDENT with necessary data members and member function to print the mark sheet of a student using array of object
8. Design three classes student exam and result the student class has data members such as those representing roll number name etc. Create a class exam by inheriting the student class. The exams add a subject marks as the data member. Derive the class result from the exam class and it has its data member as a total mark. Write an interactive program to implement this.
9. Consider an example of book shop which sells and books and video tapes. These two class books and tapes are inherited from the base class called media. The media class has data members for storing title and publication the book class has data members such as number of pages in a book and tape class has the playing time of a tape each class will have member function read() and show(). In the base class these members have to be defined as virtual functions. Write a program which models the class hierarchy for book shop and processing objects for these classes using pointers to the base class.
10. Write a program to define the class STRING and overload the following operators:
    i. » to read the string
    ii. « to print the string
    iii. + to combine two strings
    iv. = to assign a string to another string
    v. - to search the substring within a string and to remove the same
11. Write a program to keep track of number of instances created and alive for the class using static data member and static member functions.
12. Write a program to add the private data member of two different classes using friend function and friend class.
13. Write a custom manipulator to print "Rs.". Using this manipulator print the amount which is read as input.
14. Write a program to copy the content of one file to a new file by removing unnecessary spaces between words.
15. Write an exception handler to handle the exception of underflow.

## 07I209 Engineering Physics Laboratory

**0 0 2 1**

**Course Outcomes (COs)**

1. Acquire Knowledge about the various properties of matter.
2. Develop the Observation and analytical skills.
3. Compare and study the different optical properties.

**LIST OF EXPERMIENTS**

1. Torsion Pendulum – Determination of Moment of Inertia and Rigidity Modulus of wire.
2. Young's Modulus- Non uniform bending.
3. Lee's disc – Thermal conductivity of a bad conductor.
4. Melde's Apparatus – Frequency determination.
5. Single Optic Lever – Determination of Thickness.
6. Air wedge – Interference-Thickness of a thin wire.
7. Spectrometer- Dispersive power of prism.
8. Traveling microscope - Refractive index of a liquid and solid.
9. Energy Band Gap Apparatus – Determination of $E_g$ of semiconductor diode.
10. LASER- Determination of Wavelength and Particle Size.

## 07I210 Engineering Chemistry Laboratory

**0 0 2 1**

**Course Outcomes (COs)**

1. Estimate quantitatively the certain impurities present in water, which will be useful in industry.
2. Acquire basic knowledge about the conductance, rate of corrosion, pH, molecular weight of polymer and potential.

**LIST OF EXPERMIENTS**

1. **Weighing and preparation of standard solutions**
    a. Preparation of molar and normal solutions of the following substances - oxalic acid, sodium carbonate, sodium hydroxide, hydrochloric acid.
2. **Water Analysis**
    a. Determination of total hardness, temporary & permanent hardness of water by EDTA method.
    b. Determination of alkalinity in a water sample.
3. **pH**
    a. To find out the strength of given hydrochloric acid by sodium hydroxide.
4. **Conductometry**
    a. Conductometric titration of mixture of acids.
5. **Potentiometry**
    a. Redox titration – Iron Vs. dichromate.
6. **Spectrophotometry**
    a. To determine the iron content of an unknown solution by thiocyanate method
7. **Flame photometry**
    a. To determine sodium and potassium in water
8. **Viscometer**
    a. Determination of molecular weight of a polymer.
9. **Corrosion**
    a. Determination of corrosion rate by weight loss measurements.

**Third Semester**

**07G301 Engineering Mathematics III**

**Course Outcomes (COs)**

- Demonstrate basic knowledge of Laplace Transform, Fourier series, Boundary Value Problems, Complex Variable and differential calculus.
- Formulate and solve differential equation problems in the field of Industrial Organization Engineering.
- Provide adequate use of scientific language to formulate the basic concepts of engineering mathematics.

**Unit I - Partial Differential Equations**

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Solution of standard types of first order partial differential equations – Lagrange's linear equation – Linear partial differential equations of second and higher order with constant coefficients.

**9 Hours**

**Unit II - Fourier series**

Drichlet'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.

**9 Hours**

**Unit III - Boundary Value Problems**

Classification of second order quasi linear partial differential equations – Solutions of one dimensional wave equation – One dimensional heat equation – Steady state solution of two-dimensional heat equation (Insulated edges excluded) – Fourier series solutions in Cartesian coordinates.

**9 Hours**

**Unit IV - Fourier Transform**

Fourier integral theorem (without proof) – Fourier transform pair – Sine and Cosine transforms – Properties – Transforms of simple functions – Convolution theorem **9 Hours**

**Unit V - Z -Transform and Difference Equations**

Z-transform - Elementary properties – Inverse Z – transform – Convolution theorem -Formation of difference equations – Solution of difference equations using Z - transform.

**9 Hours**
**Tutorial: 15 Hours**

**Total: 60 Hours**

**Textbook**

1. K.A. Lakshminarayanan , V.Sundaram and R.Balasubramanian, "**Engineering Mathematics III**",Vikas Publishing House, New Delhi ,2006.

**References**

1. Kandasamy P , Thilagavathy.K and Gunavathy, " **Engineering Mathematics** " Volume III , S. Chand & Co., New Delhi,2008
2. Narayanan S, Manicavachagam Pillai, T K Ramaiah " **AdvancedMathematics for Engineering Students**" Volume II, S Viswanathan ( Printers & Publishers ) 2002.
3. Veerarajan T , " **Engineering Mathematics** " Tata McGraw Hill Publications , New Delhi 2000.
4. B S Grewal ., " **Higher Engineering Mathematics** ", Khanna Publications , New Delhi 2002.

## 07I302 Data Structures and Algorithms II

**3 0 0 3**

**Course Outcomes (COs)**

- Apply the fundamental principles of sorting and searching algorithms and perform time/space efficiency analysis.
- Design and implement abstract data types such as trees and graphs using C as the programming language for various real world problems.
- Analyze various algorithm design techniques and apply it to solve real time problems.

**Unit I Sorting**

Bubble sort, Insertion sort, Shell sort, Selection sort, Merge sort, Radix sort, Heap sort, Quick sort, External sorting. **10 Hours**

**Unit II Trees**

Implementation of trees, Binary tree, Expression tree, Binary search tree (Make Empty, Find, Find min and Find max, Insert, Delete, Average case Analysis), AVL trees (Single rotation, Double rotation), Splay trees, Tree traversals, B-tree (Insertion, Deletion), $B^+$tree.

**10 Hours**

**Unit III Searching and Hashing**

Binary searching, Linear searching, General Idea - Hash functions, Separate chaining, Open addressing, Linear probing, Rehashing, Extendible hashing. **10 Hours**

**Unit IV Graph Algorithms**

Definition- Topological sort- Shortest path algorithm (Unweighted shortest paths, Dijkstra's algorithm, Graphs with negative edge costs, Acyclic graphs, all-pairs shortest path), Network flow problems, Minimum spanning tree (Prim's algorithm, Kruskal's algorithm), Breadth First Search, Depth First Search.

**10 Hours**

**Unit V - Algorithm Design Techniques**

Greedy algorithm, Divide and conquer algorithm, Dynamic Programming, Randomized algorithm, Backtracking algorithms. **10 Hours**

**Total: 50 Hours**

**Textbooks**

1. M.A. Weiss, "**Data Structures and algorithm analysis in C**", Second edition, Pearson Education Asia, 2002.
2. Jean-Paul Trembley, **"An introduction to Data structures with applications",** Second Edition, Tata Mc-Graw Hill, 2003.

**References**

1. Y.Langsam, M.J. Augenstein and A.M.Tenenbaum, **"Data structures using C and C++",** Second Edition, Prentice – Hall of India, 2000.
2. Richard F.Gilberg, Vohrouz A.Forouzan, "**Data Structures: A Pseudo code Approach with C",** Thomson Brooks/COLE, 1998.
3. Aho, J.E.Hopcroft and J.D.Ullman, **"Data structures and algorithms",** Addison-Wesley Publishing Company, 1983.

## 07I303 Computer Architecture

**3 1 0 4**

**Course Outcomes (COs)**

- Demonstrate the fundamental fabrication principles of computer processor including memory.
- Design systems using programmable logic.
- Analyze the processor with pipeline process.

**Unit I - Basic Structure of Computers**

Functional units - Basic operational concepts - Bus structures - Software performance – Memory locations and addresses – Memory operations – Instruction and instruction sequencing – Addressing modes – Assembly language – Basic I/O operations – Stacks and queues. **9 Hours**

**Unit II - Design Methodology**

System Design – System Representation - Design Process - The Gate Level -The Register Level – Programmable Logic Devices- Register Level Design -The Processor Level - Processor Level Design.

**9 Hours**

**Unit III - Basic Processing Unit**

Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Micro programmed control - Pipelining – CPU Organization - Data Representation – Instruction Sets – Data path and control consideration – Superscalar operation.

**9 Hours**

**Unit IV - Memory System**

Basic concepts – Semiconductor RAMs - ROMs – Speed - size and cost – Cache memories - Performance consideration – Virtual memory- Memory Management requirements – Secondary storage.

**9 Hours**

**Unit V - I/O Organization**

Communication methods – Bus control - I/O and System Control – Programmed IO – Direct Memory Access and Interrupts – Buses – IO Processors – Operating Systems –Parallel Processing - Fault tolerance.

**9 Hours**

**Tutorial : 15Hours**
**Total : 60 Hours**

**Textbooks**

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, "**Computer Organization",** McGraw-Hill, 5th Edition ,2002.
2. John P.Hayes, "**Computer Architecture and Organization**", 3rd Edition, McGraw Hill, 1998.

**References**

1. William Stallings, "**Computer Organization and Architecture – Designing for Performance"**, 6th Edition, Pearson Education, 2003.
2. David A.Patterson and John L.Hennessy, "**Computer Organization and Design: The hardware / software interface**", 2nd Edition, Morgan Kaufmann, 2002.

## 07I304 System Software

**3 0 0 3**

**Course Outcomes (COs)**

- Demonstrate the fundamental working principles of linker, assembler, interpreter and compiler.
- Demonstrate the storage and access of variables from memory, computation of expressions and control structures.
- Use various system software tools for program development and execution.

**Unit I - Introduction**

Basic concepts-System software and Machine architecture-Instruction formats-Addressing modes-Simplified Instructional Computer-SIC/XE Machine Architecture.

**10 Hours**

**Unit II - Assemblers**

Basic Assembler Functions-Machine Dependent Assembler Features-Machine Independent Assembler Features-Assembler Design Options-One-Pass Assemblers-Multi Pass Assemblers.

**10 Hours**

**Unit III - Loaders and Linkers**

Basic Loader functions- Machine Dependent Loader Features-Machine Independent Loader Features-Loader Design Options-Linkage Editors-Dynamic Linking-Bootstrap Loaders.

**10 Hours**

**Unit IV - Macro Processors**

Basic Macro Processor Functions-Macro Call; Expansion; Conditional Expansion-Macro Processor - Machine Independent Macro Processor Features-Macro Definition; Design Options-Recursive Macro Expansion-General Purpose Macro Processors. **10 Hours**

**Unit V - Compilers and Utilities**

Introduction to Compilers-Different phases of a compiler-Simple one pass compiler-Code optimization techniques-System Software tools-Implementation of editors-Debuggers. **10 Hours**

**Total: 50 Hours**

**Textbooks**

1. D. M. Dhamdhere , "**System programming And Operating System**", TMH 2005 edition
2. Leland L Beck "**System Software - An Introduction to Systems Programming**" 3rd edition Pearson Education 2005.

**References**

1. Silberschatz, Galvin, Gagne, **"Operating System concepts** ", Wiley pub, 7th edition, 2008.
2. John Wiely. Nutt ,"**Operating Systems",** Pearson Education,2000.

3. Dietel , "**Operating Systems**", Pearson Education Second edition,2004

## 07I305 Digital System Design

**3 1 0 4**

**Course Outcomes (COs)**

- Analyze and design modular combinational logic circuits containing decoders, multiplexers, demultiplexers, decoders and adders.
- Use the concepts of state and state transition for analysis and design of sequential circuits.
- Apply the functionality of flip-flops for analysis and design of sequential circuits like counters and shift registers, and to perform simple projects with them.

**Unit I - Boolean algebra and Logic Gates**

Number system and conversions- Boolean algebra and Simplification- Minimum and maximum expansion - Sum of Products and product of sums- Minimization of Boolean functions - Karnaugh map Quine Mc Cluskey Method. Prime implications and Essential Prime Implicants

**10 Hours**

**Unit II - Combinational Logic**

Combinational Circuits- Design Procedure-Binary Adder-Subtractor, Decimal Adder - Binary Multiplier- Magnitude Comparator – Decoders - Encoders, Multiplexers, Demultiplexers - Design using standard ICs, Programmable Logic Devices. ROM, PAL, PLA and PGAs - Design Using PLDs.

**10 Hours**

**Unit III - Synchronous Sequential Logic**

Sequential Circuits - Latches- Flip-Flops- Analysis of Clocked Sequential Circuits - HDL For Sequential Circuits - State Reduction and Assignment- Design Procedure – Registers - Shift Registers - Ripple Counters - Synchronous Counters - HDL for Registers and Counters

**10 Hours**

**Unit IV - Asynchronous Sequential Logic**

Introduction. Analysis Procedure - Circuits With Latches - Design Procedure - Reduction of State and Flow Tables – Race - Free State Assignment – Hazards - Design Example. **10 Hours**

**Unit V - RTL and ICs:**

Register Transfer Level (RTL) Notation. Register Transfer Level in HDL - Binary Multiplier. Control Logic- Design With Multiplexers- Digital Integrated Circuits - Special Characteristics- Bipolar Transistor Characteristics- RTL and DTL Circuits. Transistor - Transistor Logic (TTL)- Emitter-Coupled Logic (ECL)- Metal - Oxide Semiconductor (MOS) - Complementary MOS (CMOS)- CMOS Transmission Gate Circuits – Switch - Lever Modeling With HDL.

**10 Hours**

**Total: 50 Hours**

**Textbook**

1. M.Morris Mano, "**Digital Design**", 4th edition, Pearson Education, 2006.

**References**

1. Charles H.Roth, Jr. "**Fundamentals of Logic Design**", 4th Edition, Jaico Publishing House, 2000.
2. Donald D.Givone, "**Digital Principles and Design**", Tata McGraw-Hill, 2003.

## 071306 Principles of Communication

**3 1 0 4**

**Course Outcomes (COs)**

- Demonstrate the working principles of different analog modulation techniques used in communication systems.
- Apply the fundamental concepts of digital modulation technique for data transmission.
- Demonstrate the basics of spread spectrum and multiple access techniques in wireless communication.

**Unit I - Amplitude Modulation: Transmission and Reception**

Principles of amplitude modulation – AM envelope, frequency spectrum and bandwidth, modulation index and percent modulation, AM power distribution, AM modulator circuits – Low level AM modulator, medium power AM modulator, AM transmitters – Low level transmitters, high level transmitters, Receiver parameters. AM reception: AM receivers – TRF, Super heterodyne receivers, Double Conversion AM receivers. **10 Hours**

**Unit II - Angle Modulation: Transmission and Reception**

Angle Modulation – FM and PM waveforms, phase deviation and modulation index, frequency deviation, phase and frequency modulators and demodulators, frequency spectrum of a angle modulated waves, Bandwidth requirement, Broadcast band FM, Average power FM and PM modulators – Direct FM and PM, Direct FM transmitters, Indirect transmitters, Angle modulation Vs. amplitude modulation. FM receivers: FM demodulators, PLL FM demodulators, FM noise suppression, Frequency Vs. phase Modulation.

**10 Hours**

**Unit III - Digital Modulation Techniques**

Introduction, Binary PSK, DPSK, Differentially encoded PSK, QPSK, M-ary PSK, QASK, Binary FSK, MSK, Duobinary encoding – Performance comparison of various systems of Digital Modulation.

**10 Hours**

**Unit IV - Baseband Data Transmission**

Sampling theorem, Quadrature sampling of bandpass signals, reconstruction of message from its samples, Signal distortion in sampling, Discrete PAM signals, power spectra of Discrete PAM signals, ISI Nyquist Criterion for Distortionless baseband binary transmission, eye pattern, baseband M-ary PAM systems, adaptive equalization for data transmission. **10 Hours**

**Unit V - Spread Spectrum and Multiple Access Techniques**

Introduction, Pseudo-noise sequence, DS spread spectrum with coherent binary PSK, Processing gain, FH spread spectrum, multiple access techniques, wireless communications, TDMA and CDMA, wireless communication systems, source coding of speech for wireless communications.

**10 Hours**

**Total: 50 Hours**

**Textbooks**


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


**References**


1. Simon Haykin, "**Communication Systems**", John Wiley & Sons, 4th edn.,2001.
2. Taub & Schilling, "**Principles of Communication Systems**", TMH, 2nd edn., 2003.
3. Martin S.Roden, "**Analog and Digital Communication System**", PHI, 3rd edn. 2002.
4. Blake, "**Electronic Communication Systems**", Thomson Delman, 2nd edn., 2002.

## 07G004 Professional Ethics

**3 0 0 3**

**Course Outcomes (COs)**

- Propose possible solutions using articulated ethical theories.
- Collect opinions based on reasoned ethical positions, supported with facts and evidence.
- Increase awareness on the ethical component of daily engineering decisions.

**Unit I - Human Values**

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 –Life and Messages of Bharathiyar – Periyar – Vivekanandar – Valluvar. **10 Hours**

**Unit II - Engineering Ethics**

Senses of 'Engineering Ethics' - Variety of moral issues - 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.

**10 Hours**

**Unit III - Engineering as Social Experimentation**

Engineering as experimentation - Engineers as responsible experimenters - Codes of ethics - A balanced outlook on law - The challenger - Case study – Life of BillGates — Life of Visveswaraiah – Edison & Einstiene - Steve Jobs. **10 Hours**

**Unit IV - Safety, Responsibilities and Rights**

Safety and risk - Assessment of safety and risk - Risk benefit analysis and reducing risk - The three mile island and chernobyl case studies – Fundamental Rights and Duties of Indian Citizens-Collegiality and loyalty - Respect for authority - Collective bargaining - Confidentiality - Conflicts of interest - Occupational crime - Professional rights - Employee rights - Intellectual Property Rights - Discrimination – Indian Constitution – Responsibilities of Citizen. **10 Hours**

**Unit V - Global Issues**

Multinational corporations - Environmental ethics and Environmental Protection Act - 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. **10 Hours**

**Total: 50 Hours**

**Textbook**

1. Govindarajan M, Natarajan S, Senthil Kumar V. S, “Engineering Ethics”, Prentice Hall of India, New Delhi, 2004.

**References**

1. Mike Matrin and Roland Schinzinger, “Ethics in engineering”, McGraw-Hill, New York 1996
2. Charles D. Fleddermann, “Engineering Ethics”, Pearson Education/ Prentice Hall, New Jersey, 2004 (Indian Reprint)
3. Charles E Harris, Michael S. Protchard and Michael J Rabins, “Engineering Ethics – Concepts and Cases”, Wadsworth Thompson Learning, United States, 2000 (Indian Reprint now available)

## 07I308 Data Structures and Algorithms Laboratory

**0 0 3 2**

**Course Outcomes (COs)**

- Master a variety of abstract data type (ADT) structures and their implementations.
- Apply the fundamental principles of sorting and searching techniques in program design.
- Apply various traversals techniques in solving real world problems.

**LIST OF EXPERIMENTS:**

To implement queue, stack, linked lists and to implement search, sort and traversal technique.

1. Queue implementation using arrays.
2. Stack implementation using arrays.
3. Singly, doubly and circular linked list implementation and all possible operations on List.
4. Queue and stack implementation using linked list.
5. Conversion of infix expression into polish and reverse polish expressions.
6. Binary search tree implementation using linked list and all possible operations on Binary search trees.
7. In order, preorder and post order traversals.
8. Quick sort, shell sort, bubble sort and radix sort implementation.
9. Binary search implementation.
10. Implementation of DFS and BFS.

## 07I309 System Software Laboratory

**0 0 3 2**

**Course Outcomes (COs):**

1. Develop coding for different editors to present the output information as specified by the user.
2. Design algorithms for linking the program with respective library function and load it into memory.
3. Evaluate the expressions and control structures with the help of ARB pointer, display array and symbol tables.

**LIST OF EXPERIMENTS:**

System software lab experiments implement based on the following:

1. Editors
2. Assemblers
3. Macro-processors
4. Linkers
5. Loaders

## 07I310 Digital System Design Laboratory

**0 0 3 2**

**Course Outcomes (COs):**

- Construct, analyze, and troubleshoot simple, combinational and sequential circuits.
- Design a simple state machine.
- Develop simple projects with combinational and sequential logic.

**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
7. Design and implementation of Shift registers
8. Design and implementation of Synchronous and Asynchronous counters
9. Coding combinational circuits using Hardware Description Language (HDL software required)
10. Coding sequential circuits using HDL (HDL software required)

## Fourth Semester

## 07I401 Probability and Statistics

**3 2 0 4**

**Course Outcomes (COs)**

- Present discrete data graphically and compute measures of centrality and dispersion.
- Apply rules of permutations and combinations, Bayes theorem, Random variable and conditional probability.
- Work with the normal distribution to test statistical hypotheses and compute confidence intervals.
- Constructs the probability distribution of a random variable based on a real-world situation and use it to compute expectation and variance.

**Unit I - Probability And Random Variable**

Axioms of probability - Conditional probability - Total probability - Baye's theorem - Random variable - Probability mass function - Probability density functions - Properties- Moments - Moment generating functions and their properties. **9 Hours**

**Unit II - Standard Distributions**

Binomial, Poisson, Geometric, Negative Binomial, Uniform, Exponential, Gamma, Weibull and Normal distributions and their properties - Functions of a random variable **9 Hours**

**Unit III - Two Dimensional Random Variables**

Joint distributions - Marginal and conditional distributions – Covariance - Correlation and Regression - Transformation of random variables - Central limit theorem. **9 Hours**

**Unit IV - Testing of Hypothesis**

Sampling distributions – Testing of hypothesis for mean, variance, proportions and differences using Normal, t, Chi-square and F distributions - Tests for independence of attributes and Goodness of fit.

**9 Hours**

**Unit V - Design of Experiments**

Analysis of variance – One way classification – CRD - Two – way classification – RBD - Latin square.

**9 Hours**

**Tutorial: 15 Hours**

**Total: 60 Hours**

**Textbooks**

1. T.Veerarajan , " **Probability , Statistics and Random Processes** " ,Tata McGraw –Hill Publishing Company Limited, New Delhi , 2006.

2. Johnson. R. A., "**Miller & Freund's Probability and Statistics for Engineers**", Sixth Edition,Pearson Education, Delhi, 2000.

**References**


- Walpole, R. E., Myers, R. H. Myers R. S. L. and Ye. K, "**Probability and Statistics for Engineers and Scientists**", Seventh Edition, Pearsons Education, Delhi , 2002.
- Lipschutz. S and Schiller. J, "**Schaum's outlines - Introduction to Probability and Statistics"**, McGraw-Hill, New Delhi, 1998.
- Gupta, S.C, and Kapur, J.N., "**Fundamentals of Mathematical Statistics**", Sultan Chand, Ninth Edition , New Delhi ,1996.
- Ross. S., "**A first Course in Probability",** Fifth Edition, Pearson Education, Delhi 2002. (Chapters 2 to 8)


## 07I402 Software Engineering

**3 0 0 3**

**Course Outcomes (COs)**

- Plan and deliver an effective software engineering process based on development lifecycle models.
- Identify, document and analyze requirements, translate a requirement specification into an implementable designs using a structured and organized process.
- Apply software metrics and software testing techniques for change management.

**Unit I - Introduction**

Introduction –S/W Engineering Paradigm – Process models - System engineering – Computer based system – Verification – Validation – Life cycle process – Development process –System engineering hierarchy.

**10 Hours**

**Unit II - Requirement Analysis**

Requirement engineering process – Feasibility studies – Requirements – Elicitation – Validation and management – Software prototyping – Prototyping in the software process – Rapid prototyping techniques – User interface prototyping - Analysis and modeling – Data, functional and behavioral models – Structured analysis and data dictionary. **10 Hours**

**Unit III - Software Design**

Design 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. SCM – Need for SCM – Version control – Introduction to SCM process – Software configuration items.

**10 Hours**

**Unit IV - Testing**

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 .S/W testing strategies – Strategic approach and issues - Unit testing – integration testing – Validation testing – System testing and debugging. **10 Hours**

**Unit V - Software Project Management**

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-Use of CASE Tools

**10 Hours**

**Total: 50 Hours**

**Textbook**

1. Roger S.Pressman, **Software engineering- A practitioner's Approach**, McGraw-Hill International Edition, 5th edition, 2001.

**References**

1. Ian Sommerville, **Software engineering**, Pearson education Asia, 6th edition, 2000.
2. Pankaj Jalote- **An Integrated Approach to Software Engineering**, Springer Verlag, 1997.
3. James F Peters and Witold Pedryez, **"Software Engineering – An Engineering Approach"**, John Wiley and Sons, New Delhi, 2000.

## 07I403 Operating Systems

**3 1 0 4**

**Course Outcomes (COs)**

- Apply different algorithms for process scheduling and demonstrate the fundamental concepts of processes and threads.
- Identify the problems related to concurrency and apply synchronization methods.
- Evaluate security risks in operating systems and demonstrate OS security principles.

**Unit I - Introduction**

Computer System structures-Definition of OS- Structure of Operating Systems-Types of Operating systems-Operating System concepts-Operating System functions-System Calls-System Programs.

**10 Hours**

**Unit II - Process Management**

Introduction to processes – Process Scheduling-Threads- CPU Scheduling objectives, criteria –types of Scheduling algorithms-Performance comparison- Interprocess communication-Synchronization-Semaphores-Monitors-Classic problems of Synchronization. Deadlock Prevention, Recovery, Detection and Avoidance. **10 Hours**

**Unit III - Memory and Device Management**

Memory management requirements-Single contiguous allocation-Partitioned allocation-Paging-Virtual memory concepts-Swapping-Demand paging-Page replacement algorithms-Allocation of frames-Thrashing-Segmentation-Segmentation with Paging. **10 Hours**

**Unit IV - Device and File Management**

Principles of I/O hardware- I/O Software – Disks - Disk Scheduling Algorithms. File Concepts-Access Methods-Directory Structure-File System Implementation-Allocation methods- File Sharing –Security-Protection mechanism. **10 Hours**

**Unit V - Input/Output and File Systems**

I/ O management and disk scheduling - I/ O devices, organization of I/ O functions; OS design issues, I/ O buffering, disk scheduling, RAID, Disk cache, UNIX and Windows 2000 I/ O; File management - organization, directories, file sharing, record blocking, secondary storage management; Case study UNIX

**10 Hours**

**Total: 50 Hours**

**Textbook**

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

**References**


1. Harvey M. Deitel, "Operating Systems", Second Edition, Pearson Education Pvt. Ltd, 2002.
2. Andrew S. Tanenbaum, "Modern Operating Systems", Prentice Hall of India Pvt. Ltd, 2003.
3. William Stallings, "Operating System", Prentice Hall of India, 4th Edition, 2003.


## 07I404 Database Management Systems

**3 0 0 3**

**Course Outcomes (COs)**

- Design ER Diagrams for representing Entity-Relationship between the data elements for database applications.
- Create and manipulate database tables using SQL and design optimized database tables/views using the normalization techniques for real time database applications.
- Demonstrate the fundamental principles of database transactions and concurrency control mechanisms.

**Unit I**

Introduction to Database systems, Overview, File systems versus a DBMS, Describing and storing Data in a DBMS, Queries in a DBMS, Concurrent Access and Crash Recovery, Structure of a DBMS, Advantages of a DBMS, the Relational Model, Relations, Integrity Constraints, Enforcing integrity Constraints, Query Languages. Relational Algebra and Calculus, Preliminaries, Relational Algebra, Relational Calculus, Expressive Power of Algebra and Calculus – Data Models – Normalization.

**10 Hours**

**Unit II - SQL**

The Query language. The form of a Basic SQL Query, UNION, INTERSECT and EXCEPT, Nested Queries, introduction to Nested Queries, Correlated Nested Queries. Set Comparison Operators, Aggregate Operators. The GROUP BY and HAVING clauses. Null Values, Comparisons using Null values, logical connectives AND, OR and NOT, impact on SQL constructs, Outer Joins, Disallowing, Cursors, Basic cursor definition and usage, Properties of cursors, Dynamic SQL. Queries in complex integrity constraints, constraints over a single Table, Domain Constraints, Assertions: Ics over Several tables.

**10 Hours**

**Unit III - SECURITY, VIEWS AND SQL**

Introduction to Database security, Views, Destroying Altering Tables and views, Queries on Views, Update on views, Access control, Grant and Revoke on views and Integrity constraints, Mandatory Access control, Multilevel Relations and Polyinstantiation, Convert channels, DOD security levels, Additional issues related to security, Role of the Database Administrator, security in statistical Data base,Encryption.

**QUERY_BY_EXAMPLE (QBE)**

Introduction, Basic QBE Queries, Other features: Duplicates, Ordering Answer, Queries over Multiple relations, Negation in the Relation name column, Aggregates, The conditions Box, AND OR Queries, Unnamed columns, Updates, Restrictions on Update commands, Division and Relational Completeness.

**10 Hours**

**Unit IV - Evaluation of Relational Operators**

Introduction to Query processing, Access paths, Preliminaries : The Selection operation, No index Unsorted data, No index sorted data, B+ Tree index, Hash index, equality selection. General selection conditions, CNF and Index matching, selections without disjunction, selection with disjunction, The projection operation, Projection based on sorting, Projection based on Hashing, sorting versus hashing for projections, use of indexes for projections. The join operation, Nested loops join, sort-merge join, Hash – join General join conditions. The set operations, sorting for Union and Difference, Hashing for Union and difference, Aggregate Operations, Implementing Aggregation by using an index, The impact of Buffering.

**10 Hours**

**Unit V - Transaction Management**

Recovery – Concurrency – Security – Optimization – Type inheritance – Distributed Databases – Decision support – Temporal databases – Logic based Databases. **10 Hours**

**Total: 50 Hours**

**Textbooks**

1. Raghu Ramakrishnan **"Database Management Systems**",McGrawHill International Editions third edition 2007.
2. C.J. Date "**An Introduction to Database systems**",Seventh Edition 2006 Addison Wesley
3. R. Elmasri and S.B. Navathe, "**Fundamentals of Database Systems**", Addison-Wesley / Prentice Hall 5th edition 2007.

**References**

1. Bipin Desai "**Introduction to Database System**" Galgotia publications Ltd.,
2. Abraham siberschatz, Henry F.Korth S. Sudarshan "**Database system concepts**", 3rd Edition - McGraw Hill International Edition.

## 071405 Microprocessor and Microcontrollers

**3 0 0 3**

**Course Outcomes (COs)**

- Demonstrate the fundamental principles and operations of contemporary micro-controllers and microprocessors.
- Develop assembly language source code for applications that use I/O ports, timer and single/multiple interrupts.
- Interface 8051 micro-controller with I/O and other peripherals.

**Unit I - INTEL 8086/8088 Architecture**

Introduction to 8086/ 8088 - 8086/ 8088 architecture- Instruction Set & Assembler Directives - Assembly Language Programming with 8086/ 8088 - Special Architectural Features & Related Programming.

**9 Hours**

**Unit II - Communication Interfaces**

Basic Peripherals & their Interfacing with 8086/ 8088 - Special Purpose Programmable Peripheral Devices & their Interfacing. **9 Hours**

**Unit III - DMA, Floppy Disk & CRT Controller**

DMA Controller 8257 - DMA Transfers & Operations - Programmable DMA Interface 8237 - Floppy Disk Controller 8272 - CRT Controller 8275. **9 Hours**

**Unit IV - Multiprocessor Systems**

Interconnection Topologies - Software Aspects of Multiprocessor Systems - Numeric Processor 8087 - I/ O Processor 8089 - Bus Arbitration & Control - Tightly Coupled & Loosely Coupled Systems- Design of a PC Based Multiprocessor System. **9 Hours**

**Unit V - Introduction to Microcontrollers**

Architecture of 8051- Signal Description of 8051 - Register set of 8051 - Operational Features of 8051 - Memory & I/ O Addressing by 8051 - Interrupts of 8051 - Instruction Set of 8051 - Design of Microcontrollers 8051 based length measurement system. **9 Hours**

**Tutorial: 15 Hours**

**Total: 60 Hours**

**Textbook**

1. Ray A K, K M Bhurchandi, "**Advanced Microprocessor & Peripherals",** Tata McGraw Hill, 1st Edition, 2000

**References**

1. Douglas V Hall, **"Microprocessor & Interfacing",** Tata McGraw Hill, 2nd Edition, 1999
2. Rafiquzzuman M, **"Microprocessor theory & Applications",** Prentice Hall of India, 1994
3. Yuchenhiu, Glenn A Gibson, **"Microprocessor Systems - 8086/ 8088 Family",** Prentice Hall of India, 2nd Edition, 1986

## 07I406 Signals and Systems

**3 1 0 4**

**Course Outcomes (COs)**

- Demonstrate the fundamental concepts of signals, classification and its representation.
- Evaluate continuous time and discrete time signals in frequency domain.
- Characterize discrete time systems and its realization structure.

**Unit I - Representation of Signals**

Continuous and discrete time signals: Classification of Signals – Periodic aperiodic even – odd – energy and power signals – Deterministic and random signals – complex exponential and sinusoidal signals – periodicity – properties of discrete time complex exponential unit impulse – unit step impulse functions – Transformation in independent variable of signals: time scaling, time shifting. Determination of Fourier series representation of continuous time and discrete time periodic signals – Explanation of properties of continuous time and discrete time Fourier series. **9 Hours**

**Unit II - Analysis of Continuous Time Signals and Systems**

Continuous time Fourier Transform and Laplace Transform analysis with examples – properties of the Continuous time Fourier Transform and Laplace Transform basic properties, Parseval's relation, and convolution in time and frequency domains.

Basic properties of continuous time systems: Linearity, Causality, time invariance, stability, magnitude and Phase representations of frequency response of LTI systems -Analysis and characterization of LTI systems using Laplace transform:

Computations of impulse response and transfer function using Laplace transform. **9 Hours**

**Unit III - Analysis of Discrete Time Signals**

Spectrum of DT Signals, Discrete Time Fourier Transform (DTFT), Discrete Fourier Transform (DFT), Properties of DFT, FFT- Radix - 2 DIT and DIF algorithms

**Z - Transform in signal analysis**.

Basic principles of z-transform - z-transform definition – region of convergence – properties of ROC – Properties of z-transform – Poles and Zeros – inverse z-transform using Contour integration - Residue Theorem, Power Series expansion and Partial fraction expansion, Relationship between z-transform and Fourier transform. **9 Hours**

**Unit IV - Analysis of Discrete Time Systems**

Computation of Impulse response & Transfer function using Z Transform. – LTI-DT systems - Characterization using difference equation – Block diagram representation – Properties of convolution and the interconnection of LTI Systems – Causality and stability of LTI Systems.

**9 Hours**

**Unit V - Systems With Finite And Infinite Duration Impulse Response**

Systems with finite duration and infinite duration impulse response – recursive and non-recursive discrete time system – realization structures – direct form – I, direct form – II, Transpose, cascade and parallel forms. **9 Hours**

**Tutorial: 15 Hours**

**Total: 60 Hours**

**Textbook**


1. AlanV.Oppenheim, Alan S.Willsky with S.Hamid Nawab, **"Signals & Systems ",** 2nd edition, Pearson Education, 2003


**References**


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

## 07G003 Professional Communication

**2 0 2 3**

**Course Outcomes (COs)**

- Demonstrate efficiency in communication.
- Effectively present technical ideas.
- Confidently attend the interview process.

**1. Employment Communication**

Formal and Informal English - Curriculum Vitae and Job letters- Common Errors in English – Business Vocabulary – E-mail etiquette- Editing and proof reading - Organising Meetings –Negotiation skills.

**5 Hours**

**2. Interview Skills**

Goals & Types of Interviews – Preparing for the interviews - Dos and Don'ts During an Interview – Interview Blues – Attending the interviews- Interview process - Employer's expectations – General Etiquette – Postures and Gestures- Telephonic Interview Cues – Mock Interviews

**5 Hours**

**3. Group Discussion**

Definition - Process – Group Communication Strategies – Confidence Building – Personality Development – Leadership Qualities – Mock GDs **5 Hours**

**4. Presentation Skills**

Mind Mapping - Presentation Strategies – Developing and Delivering Effective Presentations – Informative and Persuasive Presentations – Guidelines for preparing Visual Aids – Mock Presentations

**5 Hours**

**5. Soft Skills**

Assertiveness – Self Confidence – Intelligent Quotient and Emotional Quotient – Motivation – Self Motivation – Sympathy vs Empathy – Interpersonal Communication Strategies – Time Management - Managing across cultures – Etiquette Grooming – Interpersonal skills – Body language

**5 Hours**

**6. Career Lab**

Team Building –Decision Making – Positive Thinking – Manage Stress – Business Success: Planning and Organising – Business Etiquette – Successful Meeting Skills. **10 Hours**

**7. English Lab**

Issues in English – English Pronunciation – Effective Communication – Presentations and Public Speaking – Speak Fluent English – Business Correspondence. **10 Hours**

**Total: 45 Hours**

**References**


1. Koneru Aruna, "**Professional Communication"**, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2008.
2. Raman Meenakshi, Sangeeta Sharma, "**Technical Communication – Principles and Practice"**, Oxford University Press, New Delhi, 2004
3. Guffey Mary Ellen, "**Business Communication – Process and Product"**, Thomson South – Western, Bangalore, 2000

**Software**

1. Effective Communication, Train2success, Zenith Global Consultants Limited, Mumbai
2. Business Etiquette, Train2success, Zenith Global Consultants Limited, Mumbai
3. Business Correspondence, Train2success, Zenith Global Consultants Limited, Mumbai
4. Team Building, Train2success, Zenith Global Consultants Limited, Mumbai
5. Positive Thinking, Train2success, Zenith Global Consultants Limited, Mumbai
6. Decision Making, Train2success, Zenith Global Consultants Limited, Mumbai
7. Speak Fluent English, Auralog, Global Software Publishing, Cambridgeshire

## 07I408 Operating Systems Laboratory

**0 0 3 2**

**Course Outcomes (COs):**

- Demonstrate system calls in Linux and write Shell programs.
- Simulate and analyze CPU scheduling algorithms including FCFS, SJF, Priority and Round Robin.
- Simulate and analyze semaphores, IPC and page replacement algorithms.

**LIST OF EXPERIMENTS:**

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

1. Shell programming
   - Command syntax
   - Write simple functions
   - Basic tests
2. Shell programming
   - Loops
   - Patterns
   - Expansions
   - Substitutions
3. Write programs using the following system calls of UNIX operating system:
   fork, exec, getpid, exit, wait, close, stat, opendir, readdir
4. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc)
5. Write C programs to simulate UNIX commands like ls, grep, etc.
6. Simulate the following CPU scheduling algorithms
   - Round Robin
   - SJF
   - FCFS
   - Priority
7. Implement the Producer – Consumer problem using semaphores.
8. Shared memory and IPC
9. Simulate Paging Technique of memory management
10. Simulate all page replacement algorithms
    - FIFO
    - LRU
    - LFU

## 07I409 DBMS Laboratory

**0 0 3 2**

**Course Outcomes (COs):**

- Design database for storing, accessing and manipulating the data for database applications.
- Create and manipulate the database tables, views using basic and advanced Structured Query Languages.
- Develop stand-alone and web based applications to generate reports, forms using front and back end tools.

**LIST OF EXPERIMENTS:**

1. Creating a database, simple queries.
2. Uses of select statement for queries using.

    i. AND, OR, NOT operation
    ii. Union, Intersection, Projection and Join operations
    iii. Sorting and grouping

3. Nested queries using SQL.
4. Built-in functions of SQL.
5. Update operations using SQL.
6. Use of SQL forms.
7. Use of indexes, creating views and querying in views.
8. Embedding SQL with C.
9. Library information system.
10. Student evaluation system.
11. Computerized quiz.
12. Computer center reservation of computing machines.
13. Income tax calculation.
14. Pay roll system.
15. Election processing system.

## 07I410 Microprocessor and Microcontrollers Laboratory

**0 0 3 2**

**Course Outcomes (COs)**

- Demonstrate the fundamental operations of micro-controller and microprocessors.
- Design and execute assembly language programs that use I/O ports, timer and single/multiple interrupts.
- Interface 8051 micro-controller with other peripherals.

**List of Experiments Study of Peripherals & interfacing**
**8085 Experiments:**

- 8-bit Addition, Multiplication &Division
- 16-bit Addition, Multiplication &Division
- Counters and Time Delay
- BCD to Hexadecimal & vice-versa
- Traffic light control
- Stepper motor control

**Constructors & Destructors:**

- Basic arithmetic & Logical operations
- Sorting & searching algorithms
- Data transfer instructions
- RAM size & system date
- Digital clock
- Key board & printer status
- Password checking
- Serial interface & parallel interface
- Trouble shooting

**Fifth Semester**

**07I501 Numerical Methods**

**3 2 0 4**

**Course Outcomes (COs)**

- Demonstrate the use of numerical methods in modern scientific computing.
- Apply numerical integration and differentiation.
- Choose an appropriate method considering accuracy requirements and available computing resources to solve practical problems.

**Unit I - Solution of Equations And Eigen Value Problems**

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

**9 Hours**

**Unit II - Interpolation And Approximation**

Lagrangian Polynomials - Divided difference - Interpolation with a cubic spline - Newton forward and backward difference formulae. **9 Hours**

**Unit III - Numerical Differentiation And Integration**

Derivatives from difference table - Divided difference and finite difference - 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.

**9 Hours**

**Unit IV - Initial Value Problems for Ordinary Differential Equations**

Single step Methods : Taylor Series and methods - Euler and Modified Euler methods - Fourth order Runge-Kutta method for solving first and second order equations - Multistep methods –Milne's and Adam's predictor and corrector methods. **9 Hours**

**Unit V - Boundary Value Problems**

Finite difference solution for the second order ordinary differential equations. Finite difference solution for one dimensional heat equation by implict and explict methods - one dimensional wave equation and two dimensional Laplace and Poisson equations. **9 Hours**

**Tutorial**: **15 Hours**
**Total: 60 Hours**

**Textbooks**

1. Kandasamy, P.Thilakavthy, K and Gunavathy, K ."**Numerical Methods**". S.Chand and Co. New Delhi, 1999
2. Venkatraman M.K., "**Numerical Methods**" National Pub. Company, Chennai, 1991.

**References**

1. Burden, R.L and Faries, T.D., "**Numerical Analysis**", Seventh Edition, Thomson Asia Pvt. Ltd., Singapore, 2002.
2. Veerarajan. T., Ramachandran T "**Numerical Methods**", Tata McGraw-Hill Publications, First Reprint, New Delhi, 2008
3. Gerald, C.F, and Wheatley, P.O, "**Applied Numerical Analysis**", Sixth Edition, Pearson Education Asia, New Delhi.2002.
4. Balagurusamy, E., "**Numerical Methods**", Tata McGraw-Hill Pub. Co. Ltd., New Delhi, 1999

## 07I502 Digital Signal Processing

**3 1 0 4**

**Course Outcomes (COs)**

1. Analyze the different properties of signals using transforms to find the suitability for designing signal processing applications.
2. Design and implement the digital IIR and FIR filters using suitable transformation techniques.
3. Analyze the performance of signals using finite word length effects and quantization noise.

**Unit I - Signals and Systems**

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

**10 Hours**

**Unit II - IIR Filter Design**

Structure of IIR – System Design of Discrete time IIR filter from continuous time filter – IIR filter design by Impulse Invariance. Bilinear transformation – Approximation derivatives – Design of IIR filter in the Frequency domain. **10 Hours**

**Unit III - FIR Filter Design**

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

**10 Hours**

**Unit IV - Finite Word Length Effects & Multirate Signal Processing**

Quantization noise – Derivation for quantization noise power – Fixed point and binary floating point number representation – Ccomparison – Over flow error – Truncation error – Co-efficient quantization error - Limit cycle oscillation – Signal scaling – Analytical model of sample and hold operations

Mathematical description of change of sampling rate - Interpolation and Decimation , Decimation by an integer factor - Interpolation by an integer factor - Sampling rate conversion by a rational factor - Filter implementation for sampling rate conversion. **10 Hours**

**Unit V - Digital Signal Processors**

Introduction to DSP architecture – Harvard architecture - Dedicated MAC unit - Multiple ALUs, Advanced addressing modes, Pipelining, Overview of instruction set of TMS320C5X and C54X.

**10 Hours**

**Tutorial: 10 Hours**

**Total: 60 Hours**

**Textbooks**

1. John G Proakis and Dimtris G Manolakis, "**Digital Signal Processing Principles, Algorithms and Application"**, PHI/Pearson Education, 2000, 3rd Edition.
2. B.Venkataramani & M. Bhaskar, Digital Signal Processor Architecture, Programming and Application, TMH 2002. (UNIT – V)

**References**

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

## 07I503 Object Oriented Analysis and Design

**3 0 0 3**

**Course Outcomes (COs):**

- Apply object oriented methodologies including Rambaugh, Jacobson and Booch methodologies for system analysis and design.
- Identify use case models and object relationships for system analysis.
- Design classes, attributes and methods and measure user satisfaction.

**Unit I - Introduction**

An Overview of Object Oriented Systems Development - Object Basics – Object Oriented Systems Development Life Cycle- The software development process- Building high quality software.

**10 Hours**

**Unit II - Object Oriented Methodologies**

Rumbaugh Methodology - Booch Methodology - Jacobson Methodology - Patterns – Frameworks – Unified Approach – Unified Modeling Language – Use case diagram - Class diagram - Interactive Diagram - Package Diagram - Collaboration Diagram - State Diagram - Activity Diagram.

**10 Hours**

**Unit III - Object Oriented Analysis**

Identifying use cases - Object Analysis – Use-case model - Classification – Approaches for Identifying Classes - Identifying Object relationships - Identifying Classes and their behaviors through Sequence/ Collaboration Modeling - Identifying Object Relationships, Attributes and Methods.

**10 Hours**

**Unit IV - Object Oriented Design**

Object Oriented Design Axioms - Designing Classes – Redefining attributes – Designing methods and protocols- Access Layer - Object Storage and Object Interoperability

**10 Hours**

**Unit V - Software Quality and Usability**

Designing Interface Objects – Software Quality Assurance – System Usability - Measuring User Satisfaction **10 Hours**

**Total: 50 Hours**

**Textbooks**

1. Ali Bahrami, "**Object Oriented Systems Development**", Tata McGraw-Hill, 1999
2. Martin Fowler, "**UML Distilled**", Second Edition, PHI/Pearson Education, 2004.

**References:**

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

## 07I504 Internet & Java Programming

**3 1 0 4**

**Course Outcomes (COs):**

- Demonstrate internet usage including DNS,WWW, FTP, E-mail and Telnet.
- Create HTML with JavaScript and CSS for web interface design.
- Develop Java programs using packages, interfaces, exceptions, multithreading, I/O streams and applets.

**Unit I - The Internet**

Understanding the INTERNET – Internet Resources – Hardware and software requirements – Internet service providers – Internet addressing - DNS – World Wide Web – File transfer protocol – Electronic Mail – Telnet – Finger –UUCP. **9 Hours**

**Unit II - Scripting Languages**
Hyper text markup language - Java Script Programming - Dynamic HTML - Cascading style sheets - Object model and Event model - Filters and Transitions - Active X Controls – Multimedia - Client side script. **11 Hours**

**Unit III - Java Programming**
History of Java – Data Types – Variables - Arrays – Control Structures – Classes and Objects – Constructors - Garbage Collection and Method finalize -static Class Members – Final Instance Variables – Inheritance – Method Overriding **9 Hours**

**Unit IV - Packages, Interfaces, Exceptions & Strings**
Packages – Defining Packages – Understanding CLASSPATH – Access protection - Importing Packages – Interfaces – Implementation of Interfaces – Extending the Interfaces – Exception handling – Using Try and catch Clauses – Multiple Catch and Nested try – throw – Throws - Finally – String Constructors – String Operations – String Buffer. **10 Hours**

**Unit V - Multithreading, I/O Streams and Applets**
Java Thread Model – Creating threads – Multiple threads -Thread Priorities – Synchronization – File – The Byte Stream Classes – The Character Stream Classes –Remote Method Invocation – The Applet class – Architecture – Simple Applet Display Methods – Passing Parameters to Applets.

**11 Hours**
**Total: 50 Hours**

**Textbooks**

1. Deital and Deital, Goldberg, "**Internet and World Wide Web, How to Program**", Fourth edition, Pearson Education, 2004.
2. Deital & Deital, "**Java How to Program**", Seventh Edition, Prentice Hall of India, 2008.

**References**

1. Patrick Naughton , Herbert Schildt , "**Java2-Complete Reference**", 4th edition, Tata Mc Graw Hill, 2000.
2. Gary Cornell, Cay S.Horstmann, "**Core Java Vol.1 and Vol.2**", Sun Microsystems Press, 1999.
3. Harly Hahn , "**The Internet –Complete Reference** " , Second Edition , Tata Mc Graw Hill, 1997.

## 07I505 Information Coding Techniques

**3 1 0 4**

**Course Outcomes (COs):**

- Analyze the fundamental parameters relevant to information theory and apply them in designing source coding algorithms fort text and voice.
- Use the source coding principles in designing image and video compression algorithms.
- Apply block codes, cyclic codes and convolution codes in designing reliable digital transmission systems.

**Unit I - Information Entropy Fundamentals**
Uncertainty, Information and Entropy – Source coding Theorem – Huffman coding – Shannon Fano coding – Discrete Memory less channels – Channel capacity – Channel coding Theorem – Channel capacity Theorem. **10 Hours**

**Unit II - Data and Voice Coding**
Differential Pulse code Modulation – Adaptive Differential Pulse Code Modulation – Adaptive subband coding – Delta Modulation – Adaptive Delta Modulation – Coding of speech signal at low bit rates – Linear Predictive Coding. **10 Hours**

**Unit III - Error Control Coding**
Linear Block codes – Syndrome Decoding – Minimum distance consideration – Cyclic codes – Generator Polynomial – Parity check polynomial – Encoder for cyclic codes – Ccalculation of syndrome – Convolutional Coding – Decoding using Viterbi Algorithm. **10 Hours**

**Unit IV - Text and Image Compression Techniques**
Principles- Text Compression – Static and Dynamic Huffman Coding - Arithmetic coding – Image Compression – Fidelity Criteria - Graphics Interchange format – Tagged Image File Format – Digitized Pictures - JPEG standards. **10 Hours**

**Unit V - Audio and Video Coding**
Perceptual coding, MPEG audio coders – Dolby audio coders – Video compression – Principles – Introduction to H.261 & MPEG Video standards. **10 Hours**

**Total: 50 Hours**

**Textbooks**

1. Simon Haykin, "**Communication Systems**", John Wiley and Sons, 4th Edition, 2007.
2. Fred Halsall, "**Multimedia Communications**", Applications Networks Protocols and Standards", Pearson Education, 2002.

**References**

1. Mark Nelson, "**Data Compression Book**", BPB Publication, 2004.
2. Watkinson J, "**Compression in Video and Audio**", Focal Press, London, 1995.

## 07I506 Computer Networks

**3 0 0 3**

**Course Outcomes (COs):**

- Demonstrate OSI reference model, TCP/IP reference model and various transmissions medium.
- Analyze the design issues of data link layer and network layer.
- Develop transport layer and application layer level applications.

**Unit I - Data Communications**
Components – Direction of Data flow – networks – Components and Categories – Types of Connections – Topologies –Protocols and Standards – The OSI Reference Model - The TCP/IP Reference Model – Transmission Media Guided Transmission Media - Magnetic Media - Twisted Pair - Coaxial Cable - Fiber Optics - Wireless Transmission - The Electromagnetic Spectrum - Radio Transmission - Microwave Transmission. Communication Satellites - Geostationary Satellites-Satellites versus Fiber.
**10 Hours**

**Unit II - Data Link Layer**
Data Link Layer Design Issues - Services Provided to the Network Layer - Framing - Error Control - Flow Control. Error Detection And Correction - Error-Correcting Codes - Error-Detecting Codes - A Simplex Stop-and-Wait Protocol - Sliding Window Protocols - A One-Bit Sliding Window Protocol - A Protocol Using Go Back N - A Protocol Using Selective Repeat - HDLC. - LAN - Ethernet IEEE 802.3 - IEEE 802.4 - IEEE 802.5 - IEEE 802.11 – FDDI - SONET – Bridges.

**10 Hours**

**Unit III - Network Layer**
Internetworks – Packet Switching and Datagram approach – IP addressing methods – Subnetting – Routing – Distance Vector Routing – Link State Routing – Routers. **10 Hours**

**Unit IV - Transport Layer**
Duties of transport layer – Multiplexing – De-multiplexing – Sockets – User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) – Congestion Control – Quality of services (QOS) – Integrated Services. **10 Hours**

**Unit V - Application Layer**
Domain Name Space (DNS) – SMTP – FTP – HTTP - WWW – Security – Cryptography.

**10 Hours**
**Total: 50 Hours**

**Textbook**

1. Behrouz A. Forouzan, "**Data communication and Networking**", Tata McGraw Hill, 2004.

**References**

1. James F. Kurose and Keith W. Ross, "**Computer Networking: A Top-Down Approach Featuring the Internet**", Pearson Education, 2003.
2. Larry L.Peterson and Peter S. Davie, "**Computer Networks**", Harcourt Asia Pvt. Ltd., Second Edition.
3. Andrew S. Tanenbaum, "**Computer Networks**", PHI, Fourth Edition, 2003.
4. William Stallings, "**Data and Computer Communication**", Sixth Edition, Pearson Education, 2000.

## 07G005 Engineering Economics

**3 0 0 3**

**Course Outcomes (COs)**

- Apply basic economics principles for forecasting product demands.
- Estimate the price of products and perform cost analysis.
- Analyze the impact of inflation, taxation, depreciation and perform financial planning, project scheduling.

**Unit I - Introduction**
Economic Activities – Nature of economics – Significance of economics – Managerial economics and other disciplines – Micro economics and macro economics – Normative and positive economics, objectives of the firm – Methods of managerial economics.

**10 Hours**

**Unit II - Demand Utility Analysis and Forecasting**
Concept of demand – Types of demand, factors determining demand – Law of demand – Elasticity of demand – Point elasticity and arc elasticity – Demand forecasting – Forecasting Methods

**10 Hours**

**Unit III - Production and Cost Analysis**
Production function – Least cost combination of inputs - Returns to scale and factor productivities – Statistical production – Laws of production – Concept and nature of cost – Accounting costs and economic costs – Determination of cost – Cost output relation and cost curves

**10 Hours**

**Unit IV - Pricing**

Determinants of price – Objectives of pricing – Market conduct, performance and structure – Types of competition – Pricing under different market structure – Price discrimination – Pricing methods in practice. **10 Hours**

**Unit V - Financial Accounting System**

Significance of accounting – Branches of accounting – Double entry book keeping –Journals and ledgers - Methods of accounting – Trial balance, balance sheet – Profit and loss account – Financial ratio analysis – Fund flow analysis – Cash flow analysis – Capital budgeting and its limitations

**10 Hours**
**Total: 50 Hours**

**Textbook**

1. Ramachandra Aryasri A and Ramana Murthy V V**, "Engineering Economics and Financial Accounting**"**,** Tata McGraw Hill Publishing Company Limited, New Delhi, 2006

**References**

1. Kesavan R, Elanchezhian C and Sunder Selwyn T**, Engineering Economics and Financial Accounting"** Laxmi Publication (P) Ltd , New Delhi, 2005
2. Mote V L Samuel Paul and Gupta G S**, "Managerial Economics – Concepts and Cases"** Tata McGraw Hill Publishing Company Limited , New Delhi, 1981
3. Maheswari S N, "**Financial and Management Accounting",** Sultan Chand & Sons, New Delhi, 1999

## 07I508 Digital Signal Processing Laboratory

**0 0 3 2**

**Course Outcomes (COs):**

1. Characterize sampled systems in time and frequency domain.
2. Apply z-transform, DTFT, DFT and DWT to analyze and design DSP systems.
3. Use DSP tools such as Matlab to analyze discrete systems and design FIR and IIR digital filters.

**LIST OF EXPERIMENTS:**

1. Generation of i/p Signals.
2. Analysis of linear system [with convolution and de-convolution operation]
3. Generation and detection of Amplitude Modulation
4. Generation of Frequency modulation and its detection
5. Generation and detection of PAM
6. Generation of BFSK and its detection
7. Pseudo Random Noise sequence generation
8. FIR filter design
9. IIR filter design
10. Implementation of FFT, Interpolation and decimation
11. Simulation of DS spread spectrum

**07I509 Case Tools Laboratory**

**0 0 3 2**

**Course Outcomes (COs):**

- Prepare system analysis and project planning document using object oriented software engineering methodology.
- Prepare software requirement analysis document using UML diagrams.
- Prepare test plans and test cases complying with UML diagrams.

**LIST OF EXPERIMENTS:**

Prepare the following documents any one of the experiments listed below and develop the Object Oriented Software Engineering Methodology.

1. Program Analysis and Project Planning.

Thorough study of the problem – Identify project scope, Objectives, Infrastructure.

2. Software requirement Analysis

Describe the individual Phases / Modules of the project, Identify deliverables.

3. Data Modeling

Use work products – Data dictionary, Use diagrams and activity diagrams, build and test class diagrams,

Sequence diagrams and add interface to class diagrams.

4. Software Development and Debugging
5. Software Testing

Prepare test plan, perform validation testing, Coverage analysis, memory leaks, develop test case

hierarchy, Site check and Site monitor.

**Suggested List of Applications**

1. Student Marks Analyzing System
2. Quiz System
3. Online Ticket Reservation System
4. Payroll System
5. Course Registration System
6. Expert Systems
7. ATM Systems
8. Stock Maintenance
9. Real-Time Scheduler
10. Remote Procedure Call Implementation

**07I510 Internet and Java programming Laboratory**

**0 0 3 2**

**Course Outcomes (COs):**

- Create web applications using HTML,CSS and Javascripts.
- Develop Java programs using packages, interfaces, exceptions and I/O streams.
- Develop Java programs using applets, multithreading and RMI.

**List of Experiments**

1. Exercises on creating HTML pages
2. Exercises on Cascading Style Sheets
3. Exercises on Filters and transitions
4. Exercises on Event Model
5. Simple programs using Control structures
6. write a java program to implement Interface and Inheritance
7. Write a java program to implement java package
8. Animation using Java Applets
9. Multi Threaded implementation of Producer Consumer Problem
10. Bubble sort implementation using RMI

**Sixth Semester**

**07I601 Electronic Commerce**

**3 0 0 3**

**Course Outcomes (COs)**

1. Assess the effect of changing technology in business decision makings and e-commerce models
2. Apply electronic payment systems and its security concepts in some other applications.
3. Develop Internet trading relationships including Business to Consumer, Business-to-Business, intra-organization with different recent multimedia technologies.

**Unit I - Multimedia Components**

Introduction – Electronic Commerce Framework – The Anatomy of E-Commerce Applications. The Network Infrastructure for E-Commerce-The Internet as a Network Infrastructure.

**10 Hours**

**Unit II**

Electronic Payment Systems, Interorganizational Commerce and EDI, EDI Implementation, MIME and Value added Networks.

**10 Hours**

**Unit III**

Advertising and Marketing on the Internet, Computer Based Education and Training, Technological Components of Education on-Demand, Digital Copy rights and Electronic Commerce, Software Agent.

**10 Hours**

**Unit IV**

The Corporate Digital Library – Dimensions of Internal Electronics Commerce Systems, Making a Business case for a document Library, Types of Digital documents, Issues behind document Infrastructure, Corporate data warehouses, Documents Active / Compound document architecture.

**10 Hours**

**Unit V**

Multimedia and Digital Video – Broad band Telecommunications – Mobile and Wireless Computing Fundamentals. **10 Hours**

**Total: 50 Hours**

**Textbook**

1. Kalakota & Whinston, "**Frontiers of Electronic Commerce",** Pearson Education, 2002.

**References**

1. Kamalesh K. Bajaj, "**E-Commerce: The Cutting Edge & Business",** Tata McGraw-Hill, 2003.
2. Brenda Kennan, **"Managing your E-Commerce Business",** PHI, 2001.
3. Bharat Bhaskar "**Electronic Commerce – Framework, Technology and Application",** TMH, 2003.
4. Effy Oz, **"Foundations of E-Commerce",** PHI, 2001.
5. Jim A Carter, "**Developing E-Commerce Systems**", PHI, 2001**.**

## 07I602 Management Information Systems

**3 0 0 3**

**Course Outcomes (COs)**

- Evaluate the importance of information systems in business and management activities.
- Acquire the principles and techniques for solving a wide range of problems related to the analysis, design and construction of management information systems.
- Design and implement a software system in the decision making process and to assess the impact of the Internet in the business scenario.

**Unit I - Introduction**

Technology of Information Systems – Concepts – Definition - Role and impact of MIS - Role and importance of management –Approaches to Management - Functions of the manager - Management as a control system - Database Management Systems - Concepts - Data Models - Database Design - MIS & Client Server Architecture.

Process of management - Planning – Organization – Staffing - Co-ordination and Controlling - Management by exception - MIS as a support to management - Organization structure and Theory –Basic Model and Organization structure - Organizational Behavior.

**10 Hours**

**Unit II - Decision Making and Information**

Decision making concepts - Methods – Tools and Procedures - Behavioral concepts in Decision making - Organizational Decision Making - Information concepts as a quality Product - Classification of the information - Methods of Data and information Collection - Value of the information - Human as a information Processor - Organization and Information System concepts – Control – Types - Handling System Complexity - Post Implementation Problems in Systems.

**10 Hours**

**Unit III - System Analysis and Design**

System analysis and design –Need for system Analysis - System Analysis of existing System - New Requirement - System Development Model - Structured Systems Analysis and Design - Computer System Design - Development of MIS - Development of long Range plans of the MIS - Ascertaining the class of information - Determining the Information Requirement - Development and implementation of the MIS Management of Quality - MIS Factors of success and failure.

**10 Hours**

**Unit IV - Decision Support Systems**

Deterministic systems – Artificial intelligence – Knowledge Based Expert System MIS and the role of DSS - Enterprise management systems – EMS – Enterprise Resource Planning (ERP) system – ERP basic features – Benefits – Sselection - Implementation – EMS and MIS.

**10 Hours**

**Unit V - Current Trends**

Knowledge management – Networks – Internet and Web based Information System – Electronic Commerce – Electronic Business – Commercial applications – Case Studies.

**10 Hours**

**Total: 50 Hours**

**Textbooks**

1. W.S.Jawadekar, "**Management Information Systems"**, Tata McGraw Hill Publishing Company Limited, 1997.
2. Kenneth C Landon and Jane P.Laudon, "**Management Information Systems** ", Prentice Hall, Sixth edition, 2000

**References**

1. Gordon B. Davis and Margerethe H.Olson, "**Management Information system"**, McGraw Hill 1988.
2. Jerome Karnter, "**Management Information System"**, III edition, PHI, 1990.
3. David Kroenke, "**Management Information System"**, Tata McGraw Hill.1989.
4. James A O'Brien, "**Management Information System"**, Tata McGraw Hill, 1999.

## 07I603 Information Security

**3 1 0 4**

**Course Outcomes (COs)**

- Identify the importance of cryptographic algorithms used in information security and categorize symmetric algorithms and public-key based asymmetric algorithms for encryption.
- Demonstrate the necessity for access control mechanism used for user authentication and authorization and enforce security using Secure Sockets Layer (SSL), Internet Protocol Security (IPSec) and Web security.
- Apply security tools such as firewalls and intrusion prevention systems to counter malicious software issues such as viruses and worms.

**Unit I -Symmetric Key Cryptography**

Security problem in computing – Elementary Cryptography – Mechanisms and Attacks – Block Cipher principles – Data Encryption Standard – Strength of DES – Evaluation Criteria for AES – AES Cipher.

**10 Hours**

**Unit II-Public Key Cryptography**

Principles of public Key Cryptosystems – RSA Algorithm – Key Management – Diffie Hellman Key Exchange –Elliptic Curve Cryptography. **10 Hours**

**Unit III - Message Authentication**

MD5 Message Digest Algorithm – Secure Hash Algorithm – HMAC – Digital signature Standard – Kerberos Version 5 – X.509 Authentication Service **10 Hours**

**Unit IV - E-mail Security and IP Security**

Pretty Good Privacy – S/MIME – IP Security Overview – IP Security Architecture – Authentication Header – Encapsulating Security Payload – Combining Security Associations – Key Management.

**10 Hours**

**Unit V - Web Security and Firewalls**

Web Security considerations – Secure Sockets Layer and Transport Layer Security – Secure Electronic Transactions – Intruders – Intrusion Detection – Password Management – Firewall design principles – Trusted systems. **10 Hours**

**Total: 50 Hours**

**Textbook**

1. William Stallings, "**Cryptography and Network Security**", Fourth Edition, Prentice Hall of India, 2008.

**References**

1. Charlie Kaufman, Radia Perlman, Mike Speciner, "**Network Security**", Second Edition, Prentice-hall, 2002.
2. Atul Kahate, "**Cryptography and Network Security**", Tata McGraw Hill, 2006

## 07I604 Visual Programming

**3 0 0 3**

**Course Outcomes (COs)**

- Demonstrate windows environment, message processing and design windows based applications using Microsoft Foundation Classes.
- Develop reusable windows components using DLL and ActiveX components.
- Develop real-time applications with databases using MFC ODBC.

**Unit I - Windows Programming**

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

**10 Hours**

**Unit II - Visual C++ Programming**

Application Framework – MFC library – Visual C++ Components – Event Handling – Mapping modes – Colors – Fonts – Modal and modeless dialog – Windows common controls – Bitmaps

**10 Hours**

**Unit III - The Document and View Architecture**

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

**10 Hours**

**Unit IV – Active-x and Component Object Model**

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 **10 Hours**

**Unit V - Advanced Concepts**

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- VC++ Networking issues – Winsock – WinInet – Building a web client – Internet Information Server – ISAPI server extension – Chat application – Playing and multimedia (sound and video) files **10 Hours**

**Total: 50 Hours**

**Textbooks**

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

**Reference**

1. Steve Holtzner, "**Visual C++ 6 Programming**", Wiley Dreamtech India Pvt. Ltd., 2003.

**07I605 TCP/ IP**

**3 1 0 4**

**Course Outcomes (COs)**

- Demonstrate the concepts on Internet Protocol and Transmission Control Protocol functions.
- Analyze different static and dynamic routing protocols and its performance.
- Develop socket programming applications using TCP and UDP.

**Unit I - Internet Protocols**

Internet Protocol-IP Header, IP fragmentation-SLIP-PPP - Subnetting and supernetting, Loop back interface - CIDR - ARP, ARP cache and RARP, Internet control message protocol - IPV6 introduction - Zero compression technique. **10 Hours**

**Unit II - Transmission Control Protocol**

TCP-services and connection establishment and termination, interactive dataflow, flow control, TCP finite state machine, TCP dump, TCP Half close, half open-Nagle algorithm, silly window syndrome-UDP - Network operating system - BOOTP-DHCP-DNS. **10 Hours**

**Unit III - Network Layer Performance**

IP Routing - Gateway - Router as switching-ifconfig-netstat - Static Routing - Dynamic routing protocols - Routing daemons -RIP-RIPv2-OSPF-Traceroute program-Link state Routing.

**10 Hours**

**Unit IV - Socket Programming**

Socket Abstraction, endpoint address creation, connection, sending and receiving options, using socket calls in programs. **10 Hours**

**Unit V - Socket Programming Applications**

TCP echo client server - UDP echo client server programs. FTP - TFTP telnet as Applications - Port numbers - Finger protocol. **10 Hours**

**Total: 50 Hours**

**Textbooks**

1. Behrouz A. Forouzam, "**TCP/ IP Protocol Suite"**, 3rd edition, Tata McGraw Hill, 2005
2. W. Richard Stevens, **"UNIX network programming**", VOl 1, 2nd Edition, Pearson Education Asia 2007

**References**

1. Douglas E. Comer, "**Internetworking with TCP/ IP**", Volume 1, 2, Forth Edition Pearson Education Asia 2000
2. Richard Stevens, "**TCP/IP Illustrated"**, Vol 1, 2, 3 Pearson education India, 1996

## 07G006 Total Quality Management

**3 0 0 3**

**Course Outcomes (COs)**

- Demonstrate Deming, Kaizen, Juran, Crosby TQM principles for strategic management.
- Use quality management tools in the organizations to analyze situations for enhancing the quality of products.
- Implement the impact of quality on profitability and to implement business strategies through effective and practical manner.

**Unit I - Introduction**

Definition of Quality, Dimensions of Quality, Quality Planning, Quality costs - Analysis Techniques for Quality Costs, Basic concepts of Total Quality Management, Historical Review, Quality Statements, Strategic Planning, Deming Philosophy, Juran Trilogy, Crosby philosophy, PDSA Cycle, 5S, Kaizen, Obstacles to TQM Implementation. **10 Hours**

**Unit II - TQM Principles**

Principles of TQM, Leadership – Concepts, Role of Senior Management, Quality Council, 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 – Supplier Partnership – Partnering, sourcing, Supplier Selection, Supplier Rating, Relationship Development, Performance Measures – Basic Concepts, Strategy, Performance Measure.

**10 Hours**

**Unit III - Statistical Process Control (SPC)**

The seven tools of quality, Statistical Fundamentals – Measures of central Tendency and Dispersion, Population and Sample, Normal Curve, Control Charts for variables X bar and R chart and attributes P, nP, C, and u charts, Process capability, Concept of six sigma, New seven Management tools.

**10 Hours**

**Unit IV - TQM Tools**

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, and FMEA – Stages of FMEA.

**10 Hours**

**Unit V - Quality Systems**

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. **10 Hours**

**Total: 50 Hours**

**Textbook**

1. Dale H.Besterfiled, et al., **"Total Quality Management",** Pearson Education, 2004.

**References**

1. James R.Evans & William M.Lidsay, **"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",** Butterworth – Hcinemann Ltd., Oxford. 1989.
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.

## 07I608 Networks Laboratory

**0 0 3 2**

**Course Outcomes (COs)**

1. Create socket programs using TCP and UDP.
2. Simulate address resolution protocols, TCP and FTP services.
3. Simulate different routing algorithms to select optimal network path during data transfer.

**List of Experiments**

1. Write a socket Program for Echo/ Ping/ Talk commands
2. Create a socket (TCP) between two computers and enable file transfer between them
3. Write a program to implement Remote Command Execution ( Two M/ Cs may be used )
4. Create a socket (UDP)
5. Write a code simulating ARP/ RARP
6. Create a socket for HTTP for web page upload & Download
7. Write a program for TCP module Implementation. (TCP services)
8. Write a program for File Transfer in client - server architecture using following methods. TCP/ IP
9. Write a program to implement RMI (Remote Method Invocation)
10. Perform a case study about the different routing algorithms to select the network path with its optimum and economical during data transfer.

Shortest path routing

Flooding

Flow based routing

Distance vector

Link State

Hierarchical

Broadcast/ Multicast routing

## 07I609 Visual Programming Laboratory

**0 0 3 2**

**Course Outcomes (COs)**

- Create event based windows applications using VC++.
- Customize dialog box,menus, accelerator, tooltip and toolbar.
- Develop reusable windows components using DLL and ActiveX components.

**List of Experiments**

**Windows SDK/ Visual C++**

1. Writing code for keyboard and mouse events.
2. Dialog Based applications
3. Creating MDI applications
4. Child window controls
5. Basic Drawing

**Visual C++**

1. Modal and Modeless dialogs
2. Document view Architecture, Serialization
3. Dynamic controls
4. Menu, Accelerator, Tool tip, Tool bar
5. Creating DLLs and using them
6. Data access through ODBC and DAO
7. Creating ActiveX control and using it

## 07I610 Technical Seminar

**0 0 3 2**

**Course Outcomes (COs)**

- Develop good communication skill.
- Design effective technical presentation.
- Interact technically in an open forum.

**OBJECTIVES**

Each student is expected to present a topic of interest in Engineering and Technology field during the Technical Seminar Session. The duration of presentation will be 10 minutes. In a session of three periods per week, 15 students are expected to present the seminar.

A faculty guide is to be allotted and he / she will guide and monitor the progress of the student and maintain attendance also. Each seminar presentation carries marks that are allotted based on the topic of discussion, presentation techniques, presentation skill and question and answer.

Students are encouraged to use various teaching aids such as over head projectors, power point presentation and demonstrative models. This will enable them to gain confidence in facing the placement interviews.

**Seventh Semester**
**07I701 Web Technology**

**Course Outcomes (COs)**

- Design web systems using HTML, VBscript, Javascript and CGI.
- Develop XML program with DTD and XML schema for validating the XML documents.
- Create multi-tier web applications using ASP and JSP.

**Unit I - Introduction**

HTML - Forms - Scripting Languages - VBScripting - Java Scripting - Web Concepts - Web Severs - Internet Web Server - Personal Web Server - Apache Web Server. **10 hours**

**Unit II - HTML and CGI**

HTML forms – CGI concepts – HTML tags emulation – Server browser communication – E-mail generation – CGI client side Applets – CGI Server side Applets – Authorization and Security. **10 hours**

**Unit III - DHTML and XML**

Cascading Style Sheets - Netscape DHTML - Microsoft DHTML - XML - Document Type Definition - XML SCHEMA - Extended Style Sheet - XHTML. **10 hours**

**Unit IV - Database- ASP**

Database, Relational Database model – Overview, SQL – ASP – Working of ASP – Objects – File System Objects – Session tracking and cookies – ADO – Access a Database from ASP – Server side Active-X Components – Web Resources **10 hours**

**Unit V - Servlets and JSP**

Introduction – Servlet Overview Architecture – Handling HTTP Request – Get and post request – Redirecting request – Multi-tier applications – JSP – Overview – Objects – Scripting – Standard Actions – Directives. **10 hours**

**Total: 50 Hours**

**Textbook**

1. Deitel & Deitel, Goldberg, "**Internet and World Wide Web – How to Program**", Pearson Education Asia, 2001.

**References**

1. Eric Ladd, Jim O' Donnel, "**Using HTML 4, XML and JAVA**", Prentice Hall of India – QUE, 1999.
2. Aferganatel, "**Web Programming: Desktop Management**", PHI, 2004.
3. Rajkamal, "**Web Technology**", Tata McGraw-Hill, 2001.

## 07I702 Data Mining and Data Warehousing

**3 0 0 3**

**Course Outcomes (COs)**

- Design data warehouse for business analytics.
- Apply data pre-processing algorithms to make data conducive for data analytics.
- Apply classification, prediction and clustering algorithms for data analytics.

**Unit I - Introduction**

Data Mining – Functionalities – Patterns Classification - Major issues - Data Warehouse and OLAP technology for data mining: Data warehouse - Multidimensional data model - Data warehouse architecture – Implementation - Development of data cube technology - Data mining to data warehousing. **10 Hours**

**Unit II - Data Preprocessing**

Reason for data preprocess - Data cleaning - Data integration and transformation - Data reduction - Discretization and concept hierarchy generation - Data mining primitives, Languages and System Architecture: data mining primitives - Data mining query language - Designing graphical user interfaces- Architectures of data mining Systems. **10 Hours**

**Unit III - Concept Description**

Data Generalization and Summarization - Analytical Characterization - Mining class Comparisons - Mining Descriptive Statistical Measures in Large databases - Discussion - Mining Association Rules in Large Databases: Association Rule Mining - Mining Single-Mining Multilevel Association Rules from Transaction Databases - Mining multidimensional Association Rules from Relational Databases and Data Warehouses - Association Mining to Correlation Analysis - Constraint Based Association Mining.

**10 Hours**

**Unit IV - Classification and Prediction**

Issues Regarding Classification and Predication - Classification by decision Tree Induction - Bayesian Classification - Classification by Backpropagation - Classification Based on Concepts from Association Rule Mining - Classification Methods -Prediction - Classifier Accuracy.

**10 Hours**

**Unit V - Cluster Analysis**

Types - Categorization of Major Clustering Methods - Partitioning Methods - Hierarchical Methods - Density Based Methods - Grid Based Methods - Model Based Clustering Methods - Outlier Analysis.

**10 Hours**

**Total: 50 Hours**

**Textbook**

1. Jiawei Han and Micheline Kamber, "**Data Mining concepts and Techniques"**, Morgan Kaufmann Publishers, 2002 ISBN 81-8147-049-4.

**Reference**

1. Michael J.A.Berry and Gordon S.Linoff, "**Mastering Data Mining-The art and Science of Customer relationship Management"**, Wiley2000,

## 071703 Multimedia and Graphics

**3 0 0 3**

**Course Outcomes (COs)**

- Implement algorithms for line, circle and ellipse with two dimensional graphics.
- Apply 2D geometric transformations, 2D viewing functions and 3D object representations.
- Use text,image, sound editing, painting, animation and multimedia authoring tools.
- Demonstrate multimedia compression and decompression techniques.

**Unit I - Output Primitives**

Introduction - Line - Curve and Ellipse Algorithms – Attributes – Two-Dimensional Geometric Transformations Two - Dimensional Viewing. **10 Hours**

**Unit II - Two Dimensional Graphics**

Two dimensional geometric transformations - Matrix representations and homogeneous coordinates, composite transformations; Two dimensional viewing - Viewing pipeline, viewing coordinate reference frame; widow-to-view port coordinate transformation, Two dimensional viewing functions; clipping operations -Point, line, and polygon clipping algorithms. **10 Hours**

**Unit III - Three Dimensional Graphics**

Three dimensional concepts; Three dimensional object representations - Polygon surfaces - Polygon tables - Plane equations - Polygon meshes; Curved Lines and surfaces, Quadratic surfaces; Blobby objects; Spline representations - Bezier curves and surfaces - B-Spline curves and surfaces.

**10 Hours**

**Unit IV - Multimedia Software**

Basic software tools - Text, image, and sound editing tools; painting and drawing tools, animation tools; making instant multimedia - Office suite; Multimedia authoring tools - Types, card and page based authoring tools, icon and time based authoring tools. **10 Hours**

**Unit V - Multimedia File Handling**

Compression & Decompression – Data & File Format standards – Multimedia I/O technologies - Digital voice and audio – Video image and animation – Full motion video – Storage and retrieval Technologies.

**10 Hours**

**Total: 50 Hours**

**Textbooks**


1. Donald Hearn & M. Paulin Baker, "**Computer Graphics**", Pearson Education, 2nd Edition, 2003
2. Prabat K Andleigh and Kiran Thakrar, **"Multimedia Systems and Design**", PHI, 2003.
3. Tay Vaughan, **"MULTIMEDIA Making It Work",** TMH, 5th Edition, 2001


**References**


1. Judith Jeffcoate, **"Multimedia in practice technology and Applications**", PHI,1998.
2. Foley, Vandam, Feiner, Huges, **"Computer Graphics: Principles & Practice**", Pearson Education, second edition 2003.
3. Weixel, Fulton, Barksdale, Morse, "**Multimedia Basics**", Easwar Press, 2004

## 07I704 Distributed Component Architecture

**3 0 0 3**

**Course Outcomes (COs)**

- Demonstrate the fundamental properties of component technology and java based component technologies.
- Develop components using CORBA technologies.
- Apply transactions and concurrency control techniques in distributed transactions.

**Unit I - Introduction**

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

**10 Hours**

**Unit II - Java Based Component Technologies**

Threads – Java Beans – Events and connections – Properties – Introspection – JAR files – reflection – Object serialization – Enterprise Java Beans – Distributed Object models – RMI and RMI-IIOP

**10 Hours**

**Unit III - CORBA Component Technologies**

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 **10 Hours**

**Unit IV - Distributed Systems**

Introduction to Distributed systems-examples of distributed systems, challenges-Architectural models-Fundamental models - Introduction to interprocess communications-External data representation and marshalling- Client server communication-Group communication – Case study: IPC in UNIX

**10 Hours**

**Unit V - Transaction and Concurrency Control – Distributed Transactions**

Transactions – Nested transaction – Locks - Optimistic concurrency control - Timestamp ordering - Comparison of methods for concurrency control - Introduction to distributed transactions - Flat and nested distributed transactions - Atomic commit protocols - Concurrency control in distributed transactions - Distributed deadlocks - Transaction recovery **10 Hours**

**Total: 45 Hours**

**Textbooks**

1. Clemens Szyperski, "**Component Software: Beyond Object-Oriented Programming**", Pearson Education publishers, 2003.
2. George Coulouris, Jean Dollimore, Tim Kindberg "**Distributed Systems Concepts and Design"** Third Edition – 2002- Pearson Education Asia.

**References**


1. Ed Roman, "**Mastering Enterprise Java Beans**", John Wiley & Sons Inc., 1999.
2. Mowbray, "**Inside CORBA**", Pearson Education, 2003.
3. Freeze, "**Visual Basic Development Guide for COM & COM+",** BPB Publication, 2001.
4. Hortsamann, Cornell, "**CORE JAVA Vol-II**" Sun Press, 2002.
5. A.S.Tanenbaum, M.Van Steen " **Distributed Systems**" Pearson Education 2004
6. Mukesh Singhal, Ohio State University, Columbus "**Advanced Concepts In Operating Systems**" McGraw-Hill Series in Computer Science, 1994.

## 07G007Creativity and Innovation

**3 0 0 3**

**Course Outcomes (COs)**

- Develop an understanding of the role of creativity and innovation for value creation and competitiveness.
- Reflect on theory and develop initiatives to achieve challenges in organizational culture.
- Acquire legal aspects of business, planning operations, team leadership and practices.

**Unit I - Creativity**

Concept and history of creativity, need for creativity, creative environment, stages of creativity process, creativity and intelligence, creativity in various contexts, economic view of creativity, measuring creativity, fostering creativity, creative problem solving – Brain storming and various techniques, lateral thinking. **10 Hours**

**Unit II - Innovation**

Definition, creativity vis-à-vis innovation, conceptualizing innovation, types of innovation, sources of innovation, goals of innovation, process of technological innovation, diffusion of innovation, factors contributing to successful technological innovation, failure of innovations, innovation management, measures of innovation. **10 Hours**

**Unit III - Project Planning and Evaluation**

Definition and purpose of project, collection of ideas, screening ideas, selection criteria for new projects, development of project plan, project evaluation – Purpose, kinds of evaluation, stages of evaluation process, techniques of project evaluation, project analysis, benefits and risks of new projects.

**10 Hours**

**Unit IV - Product Development and Evaluation**

Research and new product development – Process and types of new products, creative design, design of prototype – Purpose, process, and types, model preparation, testing and quality evaluation; marketing research – Purpose and process, types and methods; introducing new products, cost evaluation.

**10 Hours**

**Unit V - Protection of Innovation**

Intellectual property (IP), classes of IP – Industrial property and copyrights; Intellectual Property Rights (IPR); Patents, patentability, patent acts, governing laws, history of patent laws and acts, patent administration; patenting process – Patent application, patent search, prosecution, publication, examination, opposition, grant, renewal, patent rights; international code for patents, patents vis-à-vis economics. **10 Hours**

**Total: 50 Hours**

**Textbooks**


1. Tom Kelly, **"The Art of Innovation"**, Doubleday, Random House Inc. USA, 2001.
2. **"Managing Creativity and Innovation (Harvard Business Essentials)",** Harvard Business School, 2003.

**References**

1. Brain Twiss, "**Managing Technological Innovation",** Pitman Publishing Ltd., 1992.
2. Harry B. Watton, "**New Product Planning**", Prentice Hall Inc., 1992.
3. Paul Birch and Brian Clegg, "**Business Creativity – A Guide For Managers**", Kogan Page, London, 1995.
4. Leigh L. Thompson, Hoon-Seok Choi, "**Creativity and Innovation in Organizational Teams"**, Lawrence Erlbaum Associates, USA, 2006.
5. Paul E. Plsek, **"Creativity, Innovations and Quality",** Irwin Professional, USA, 1997.
6. Alan G. Robinson, Sam Stern, **"Corporate Creativity: How Innovation and Improvement Actually Happen**", Berrett-Koehler Publishers, USA, 1998.

## 07I708 Web Technology Laboratory

**0 0 3 2**

**Course Outcomes (COs)**

- Create interactive webpages using Javascript, VBscript and XML.
- Develop server-side programs using Active Server Pages and deploy in Internet Information Server.
- Design server-side programs using Servlets and Java Server Pages and deploy in Apache Tomcat server.

**List of Experiments:**

**Javascript**

1. Conditional statements
2. Pop-up boxes
3. Functions and loops

.**VBscript**

1. Date and time functions
2. Procedures
3. Built-in functions
4. Write a HTML program to design a web page using forms.
5. Write a CGI program for request – response communication.
6. Write a DHTML program for using Cascading Style Sheets
7. Write a XML program using DTD
8. Write a XML program using XML schema.

**ASP**

1. Request object
2. Response object
3. File System Objects
4. Cookies
5. ADO

**Programs using SERVLETS AND JSP**

## 071709 Multimedia and Graphics Laboratory

**0 0 3 2**

**Course Outcomes (COs)**

- Implement line, circle, ellipse drawing algorithms.
- Implement the 2D transformations and 3D clipping algorithms.
- Implement 3D transformations and visualization algorithms.

**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-view port mapping
4. To perform 3D Transformations such as translation, rotation and scaling.
5. To visualize projections of 3D images.
6. To convert between color models.

## Eighth Semester
## 07I801 Enterprise Resource Planning

**3 0 0 3**

**Course Outcomes (COs)**

- Evaluate the need for linking enterprise mission and goals with the implementation of ERP systems.
- Compare and demonstrate the use of modern software tools like SAP, Oracle Baan etc to aid and manage resources in organizations.
- Examine systematic planning mechanisms in an enterprise for application integration.

**Unit I -Introduction**

Integrated Management Information Seamless Integration-Supply Chain Management - Integrated Data Model - Benefits of ERP-Business Engineering and ERP - Definition of Business Engineering - Principle of business engineering - Business engineering with information technology.

**11 Hours**

**Unit II - Business Modelling for ERP**

Building the business model-ERP implementation-an Overview-Role of consultant, vendors and users, customization, precautions-ERP post implementation technology-Guidelines for ERP implementation.

**10 Hours**

**Unit III - ERP and the Competitive Advantage**

ERP domain MPGPRO - IFS/ Avalon - Industrial and financial systems - Baan IV SAP - Market Dynamics and dynamic strategy. **10 Hours**

**Unit IV - Commercial ERP Package**

Description - Multi - Client server solution - Open technology - User Interface-Application Integration.

**10 Hours**

**Unit V - Architecture**

Basic architectural Concepts - The system control interfaces - Services-Presentation interface - Database Interface. **9 Hours**

**Total: 50 Hours**

**Textbook**

1. Vinod Kumar Garg and N. K. Venkita Krishnan, **"Enterprise Resource Planning - Concepts and Practice",** Prentice Hall of India, 1998.

**Reference**

1. Jose Antonio Fernandz, **"The SAP R/ 3 Handbook",** Tata McGraw Hill, 1998.

## 07G008 Organizational Behaviors and Management

**3 0 0 3**

**Course Outcomes (COs)**

- Analyze people, individuals, and groups in structural organizations.
- Develop leadership, decision making,communication,and group dynamics within the organization.
- Use a structure group diagnostic model to analyze and resolve group/team performance problems

**Unit I**

Management and its environment: Management – Definition – Functions, evolution of modern management scientific management movement, development of management thoughts, different schools of management, forms of organization – Individual ownership – Partnership – Joint stock companies – Cooperative enterprises – Public sector undertakings – Corporate frame work – Share holders – Board of directors – Committees – Chief executive – Line and functional managers – Constraints – Environmental – Financial–Legal–Ttradeunions–Technology. **10 Hours**

**Unit II**

Management of Organisation: Planning – Nature and purpose – Objectives – Strategies – Policies and planning premises – Decision making, organizing – Nature and process – Premises departmenlisation – Line and staff – Decentralization – Organizational culture, staffing – Selection and training – Placement – Performance appraisal – Career strategy – Organizational development, leading – Managing human factor – Motivation, leadership – Communication, controlling – System and process of controlling – Controlling techniques , productivity and operations management – Preventive control, industrial safety.

**10 Hours**

**Unit III**

Individual Behaviour : Organizational behaviour – Definition – Organization – Managerial role and functions – Organizational approaches, individual behaviour – Causes – Environmental effect – Behaviour and performance, perception – Organizational implications, personality – Contributing factors – Dimension, motivation – Need theories – Process theories – Job satisfaction, learning and behaviour – Learning curves, work design and approaches. **10 Hours**

**Unit IV**

Group Dynamics: Group behaviour – Groups contributing factors – group norms, communication – Process – Barriers to communication – Effective communication, Leadership – Formal and informal characteristics – Managerial grid – Leadership styles – Group decision making – Leadership role in group decision, group conflict – Types – Causes – Conflict resolution – Inter group relations and conflict, organization centralization – Formal and informal – Organizational structures, organizational change and development – Change process – Resistance to change – O.D.Programme – Culture and ethics.

**10 Hours**

**Unit V**

Modern Management Concepts: Management by objectives (MBO) – Principles and steps – Advantages and disadvantages, management by exception (MBE), strategic management, planning for future direction – SWOT analysis – Evolving development strategies, information technology in management – Decision support systems – Corporate models – Business management games – Electronic commerce/business, newer concepts – Business process reengineering (BPR) – Enterprise resource planning (ERP) – Supply chain management (SCM) – Activity based management (ABM).

**10 Hours**

**Total: 50 Hours**

**Textbook**

1. Herold Koontz and Heinz Weihrich , **"Essentials of Management",** 2000

**References**

1. Jit S.Chandran,"**Organisational Behaviours**", 2000
2. Ernest Dale, **"Management Theory and Practice**", McGraw Hill Books, 1973.
3. Richard pettinger,**"Mastering organizational behaviour"**, Macmillan publishers Ltd, 2002.

**07I805 Project Work**

**0 0 24 12**

**Course Outcomes (COs)**

- Implement the theoretical and practical courses studied to develop real time applications as a product.

**Electives**

**07I001 Indian Constitution and Society**

**3 0 0 3**

**Course Outcomes (COs)**

- Analyze the dynamics of Indian politics since Independence, and demonstrate processes of continuity and change in Indian politics.
- Plan and analyze the market structure in different environments causing market failure and demonstrate activities leading to improvement.
- Situate Indian domestic and foreign politics in a broader comparative perspective for governing divided societies

**Unit I**

Historical Background – Constituent Assembly of India – Philosophical foundations of the Indian Constitution – Preamble – Fundamental Rights – Directive Principles of State Policy – Fundamental Duties – Citizenship – Constitutional Remedies for citizens. **10 Hours**

**Unit II**

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

**10 Hours**

**Unit III**

State Government – Structure and Functions – Governor – Chief Minister – Cabinet – State Legislature – Judicial System in States – High Courts and other Subordinate Courts. **10 Hours**

**Unit IV**

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

**10 Hours**

**Unit V**

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

**10 Hours**

**Total: 50 Hours**

**Textbooks**


1. Durga Das Basu, "**Introduction to the Constitution of India**", Prentice Hall of India, New Delhi, 1998
2. R.C.Agarwal, "**Indian Political System** ", S.Chand and Company, New Delhi (1997).
3. Maciver and Page, "**Society: An Introduction Analysis** ", Mac Milan India Ltd., New Delhi.
4. K.L.Sharma, "**Social Stratification in India: Issues and Themes** ", Jawaharlal Nehru University, New Delhi (1997).


**References**


1. Sharma, Brij Kishore, "**Introduction to the Constitution of India**", Prentice Hall of India, New Delhi, 1998
2. U.R.Gahai, "**Indian Political System** ", New Academic Publishing House (1998), Jalaendhar.
3. R.N. Sharma, "**Indian Social Problems** ", Media Promoters and Publishers Pvt. Ltd, 1999
4. Yogendra Singh, "**Social Stratification and Charge in India** ", Manohar, New Delhi, 1997

## 07I002 Resource Management Techniques

**3 0 0 3**

**Course Outcomes (COs)**

- Recognize the importance and value of operations research and mathematical modeling in solving practical problems in industry.
- Formulate a managerial decision problem into a mathematical model.
- Design operation research models and use them in real-life problems

**Unit I**

Principal components of decision problem - The phases of operations research - Formulation and Graphical solution - Resources allocation problem. The simplex method - Sensitivity analysis- Revised simplex method. **10 Hours**

**Unit II**

Duality and networks: definition of dual problem – Primal - Dual Relationships - Dual Simplex Methods - Post optimality analysis - Transportation and Assignment models - Shortest Route problems - Maximal Flow Problems. **10 Hours**

**Unit III**

Integer Programming: Cutting plane algorithm - Branch and Bound methods. Multistage (Dynamic) programming - Solution of LP by Dynamic Programming. **10 Hours**

**Unit IV**

Classical Optimization Theory: Unconstrained External Problem, Newton - Raphson method- Equality constraints - Jacobean Methods - Lagrangean Method, Kuhn - Tucker conditions-Simple problems. **10 Hours**

**Unit V**

Project Scheduling: Network diagram representation-Critical path method - Time charts and resource leveling-PERT. **10 Hours**

**Total: 50 Hours**

**Textbook**

1. Taha H.A., "**Operation Research**",Prentice Hall od India, 1999, Sixth Edition.

**References**

1. Billey E. Gillet, "**Introduction to Operations Research-A Computer Oriented Algorithm Approach",** TMH, New Delhi, 1979.
2. Philip and Ravindran, **"Operations Research",** John Wiley, 1992.
3. M.J. Bazara, Jarvis, H. Sherali, **"Linear Programming and Network Flows"**, John Wiley, 1990.

## 07I003 Intellectual Property Rights

**3 0 0 3**

**Course Outcomes (COs)**

- Recognize how owners are granted certain exclusive rights to a variety of intangible assets, such as musical, literary, and artistic works, discoveries and inventions.
- Demonstrate about common types of intellectual property rights like copyright, trademarks, patents, industrial design rights, trade dress, and in some jurisdictions trade secrets.

**Unit I**

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

**10 Hours**

**Unit II**

IP – Patents – Copyrights and related rights – Trade Marks and rights arising from Trademark registration – Definitions – Industrial Designs and Integrated circuits – Protection of Geographical Indications at national and International levels – Application Procedures. **10 Hours**

**Unit III**

International convention relating to Intellectual Property – Establishment of WIPO – Mission and Activities – History – General Agreement on Trade and Tariff (GATT). **10 Hours**

**Unit IV**

Indian Position Vs WTO and Strategies – Indian IPR legislations – commitments to WTO-Patent Ordinance and the Bill – Draft of a national Intellectual Property Policy – Present against unfair competition. **10 Hours**

**Unit V**

Case Studies on – Patents (Basumati rice, turmeric, Neem, etc.) – Copyright and related rights – Trade Marks – Industrial design and Integrated circuits – Geographic indications – Protection against unfair competition. **10 Hours**

**Total: 50 Hours**

**Textbook**

1. Subbaram N.R. "**Handbook of Indian Patent Law and Practice**", S. Viswanathan (Printers and Publishers) Pvt. Ltd., 1998.

**References**

1. Intellectual Property Today : Volume 8, No. 5, May 2001, [www.iptoday.com].
2. Using the Internet for non-patent prior art searches, Derwent IP Matters, July 2000. [www.ipmatters.net/features/000707_gibbs.html.

## 07I004 Health Care Information Systems

**3 0 0 3**

**Course Outcomes (COs)**

- Apply unified medical language system for medical information management and retrieval.
- Develop the various functional modules involved in the hospital management system.
- Conduct an assessment on information technology needs of a healthcare organizational unit.

**Unit I - Understanding Computer Basics**

Introduction – Computers numbering system – ASCII Characters: American standard code for Information Interchange – General structure of computers -Operating systems For PCs – Programming languages – Foundation ontology-NLP systems for Knowledge discovery – Machine translation technology –Speech Recognition. **10 Hours**

**Unit II - Computer-based Medical Information Retrieval**

Introduction – MEDLARS – Unified Medical Language System – Semantic nets – Finding useful medical information from Internet – Microprocessors – Database Approach to laboratory computerization – Automated clinical laboratories – Automated methods in Hematology – Chromosome analysis by computer – Computerized cytology and histology – Intelligent laboratory information system

**10 Hours**

**Unit III - Hospital Management System**

Introduction – HMIS – Functional areas – Modules forming HMIS – Computerized physician order entry(POE) – HMIS and Internet – Pre-requisites for HMIS – Why HMIS fails – Integrated hospital information systems – Health information system – Disaster management plan – Advantages of HMIS – Artificial Intelligence – What is an Expert system – Material and methods.

**10 Hours**

**Unit IV - Computer-assisted Patient Education and Healthcare Information**

Introduction – Health online – Electronic communication with patients – Importance of behaviour modification – Patient self-management education – Mobility – EMG controlled limbs – Blind and visually handicapped – Computer aids for deaf – Computer speech generation and recognition – Robot – Capabilities of robots – Robots in surgical training**.** **10 Hours**

**Unit V - Tele-medicine and Drug Discovery**

Introduction – Medical peripheral devices – Applications of tele-medicine – Satelite based tele-medicine projects – Tele-Medicine and the internet – Military medicine – Palm-top personal digital assistant – Basic applications – Medical applications –Molecular modeling by computer – Computational representation of molecules – Pharmacophores – New drugs for cancer – From gene to screen - Knowledge based discovery – Pharmaco-metabolomics**.** **10 Hours**

**Total: 50 Hours**

**Textbook**

1. Dr.Ramchandra Lele, "**Computers In Medicine** ",Tata McGraw-Hill Publishing Company Limited, New-Delhi, First reprint 2006.

**Reference**

1. Mohan Bansal, M S, "**Medical Informatics - A Primer** , Tata McGraw-Hill Publishing Company Limited , New-Delhi , 2003 Edition.

## 07I005 Embedded Systems

**3 0 0 3**

**Course Outcomes (COs)**

- Apply instruction sets, timers for embedded micro controller.
- Develop embedded software to control hardware systems.
- Design real time embedded systems using the concepts of RTOS.

**Unit I - Review of Embedded Hard Ware**

Gates - Timing Diagram - Memory - Microprocessor - Buses - Direct Memory Access - Interrupts - Built ins on the Microprocessor - Convention Used on Schematic - Schematic - Interrupts Microprocessor Architecture - Interrupt Basics - Shared Data Problem - Interrupt Latency.

**10 Hours**

**Unit II - Microchip PIC Micro Controller**

Introduction - CPU Architecture - Registers - Instruction Sets - Addressing Modes - Loop Timing - Timers - Interrupts Timing - I/ O Exception - I2 C Bus Operation - Serial EEPROM - Analog to Digital Converter - UART - Baud Rate - Data Handling - Initialization - Special features - Serial Programming - Parallel Slave Port **10 Hours**

**Unit III - Embedded Microcomputer System**

Motorola MC68H11 Family Architecture - Registers - Addressing Modes Programs - Interfacing Methods - Parallel I/ O Interface - Parallel Port Interface - Memory Interfacing - High Speed I/ O Interfacing - Interrupts- Interrupt Service Routine - Features of Interrupts - Interrupt Vector - Priority - Timing Generation & Measurement - Input capture - Output Compare - Frequency measurement - Serial I/ O Devices - RS 232, RS485 - Analog Interfacing - Applications.

**10 Hours**

**Unit IV - Software Development**

Round Robin - Round Robin with Interrupts - Function - Queue Scheduling Architecture & Algorithms - Introduction to - Assemblers, Compliers, Cross Compliers, Integrated Development environment(IDE) - Object Oriented Interfacing - Recursion - Debugging Strategies - Simulators.

**10 Hours**

**Unit V - Real Time Operating System**

Task & Task States - Tasks & Data - Semaphores & Shared Data - Operating System Services - Message Queues - Timer Functions - Event Memory Management - Interrupt Routines & RTOS Environment - Basic design Using RTOS. **10 Hours**

**Total: 50 Hours**

**Textbooks**

1. David E. Simon, "**A Software Primer**", Pearson Education Asia, 2001
2. Jonartthan W. Valvano, "**Embedded Micro Computer System: Real Time Interfacing**", Thomson Learning, 2001

**References**

1. Burns, Alan & Wellings, "**Real Time Systems & Programming Languages**", 2nd Edition, 1997
2. Grehan Moore & Cyliax, "**Real Time Programming: A Guide to 32 bit Embedded Development"**, Addison Wesley, 1998
3. Heath Steve, "**Embedded System Design**", Newnes, 1997
4. John B Peatman, "**Design with PIC Microcontroller**", Pearson Education Asia, 1998

## 07I006 Digital Image Processing

**3 0 0 3**

**Course Outcomes (COs)**

- Apply the basic principles of digital images and image processing algorithms on 2D systems.
- Enhance image, restoration and color model using compression and segmentation.
- Discover practical applications of image processing using image segmentation techniques.

**Unit I - Digital Image Fundamentals**

Digital image - Applications of digital image processing - Elements of digital image processing systems - Vidicon camera - Line scan CCD sensor - Area sensor - Flash A/D converter - Display - Elements of visual perception - Structure of the human eye - Luminance - Brightness - Contrast - Mach band effect - Image fidelity criteria - Colour models - RGB, CMY, HIS mathematical preliminaries of 2D systems - Convolution - Fourier transform - ZS transform - Toeplitz and circulant matrices - Orthogonal and unitary matrices. **10 Hours**

**Unit II - Image Transform**

Properties of unitary transform - 2D DFT- DCT- DST- Discrete wavelet transform - Discrete Hadamard - Walsh - Hotelling transform - SVD transform - Slant, Haar transforms. **10 Hours**

**Unit III - Image Enhancement and Restoration**

Contrast stretching - Intensity level slicing - Histogram equalization - Spatial averaging - Directional smoothing - Median filtering - Non linear filters - Maximum, minimum, geometric mean, Harmonic mean contra-Harmonic mean, Lp mean filters - Edge detection - Roberts, Sobel, Isotropic, Kinsch, Campass gradient, Laplacian operators - Degradation model - Unconstrained and constrained restoration - Inverse filtering - Removal of blur caused by uniform linear motion - Wiener filtering - Geometric transformations for image restoration. **10 Hours**

**Unit IV - Image Compression**

Huffman coding - Truncated Huffman coding - B2, binary codes, arithmetic coding - Bit plane coding - Contrast area coding - Run length encoding - Transform coding JPEG and MPEG coding schemes.

**10 Hours**

**Unit V - Image Segmentation**

Pixel based approach - Feature threshold - Choice of feature - Optimum threshold - Threshold selection methods - Region based approach - Region growing - Region splitting - Region merging, split and merge.

**10 Hours**

**Total: 50 Hours**

**Textbooks**

1. Gonzalez, R. C and Woods, R. E, "**Digital Image Processing** ", Addition - Wesley, 2007
2. Anil. K. Jain "**Fundamentals of digital image processing**", PHI, 2005

**References**

1. Umbaugh, S. E, "**Computer vision and image processing**", Prentice Hall International, Inc, 2002
2. William. K. Pratt, "**Digital image processing**". Wiley Inter science, 2004
3.

## 07I007 Principles of Compiler Design

**3 0 0 3**

**Course Outcomes (COs)**

- Apply the formal attributed grammars for specifying the syntax and semantics of programming languages
- Acquire working knowledge of the major phases of compilation, lexical analysis, parsing, semantic analysis, and code generation.
- Design and implement a significant portion of a compiler for a language.

**Unit I - Introduction to Compiling**

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. **10 Hours**

**Unit II - Syntax Analysis**

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

**10 Hours**

**Unit III - Intermediate Code Generation**

Intermediate languages – Declarations – Assignment Statements – Boolean Expressions – Case Statements – Back patching – Procedure calls. **10 Hours**

**Unit IV - Code Generation**

Issues in the design of code generator – The target machine – Runtime Storage management – Basic Blocks and Flow Graphs – Next-use Information – A simple Code generator – DAG representation of Basic Blocks – Peephole Optimization. **10 Hours**

**Unit V- Code Optimization and Run Time Environments**

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

**10 Hours**

**Total: 50 Hours**

**Textbook**

1. Alfred Aho, Ravi Sethi, Jeffrey D Ullman, "**Compilers Principles, Techniques and Tools**", Pearson Education Asia, 2003.

**References**


1. Allen I. Holub "**Compiler Design in C**", Prentice Hall of India, 2003.
2. C. N. Fischer and R. J. LeBlanc, "**Crafting a compiler with C**", Benjamin Cummings, 2003.
3. J.P. Bennet, "**Introduction to Compiler Techniques**", Second Edition, Tata McGraw-Hill, 2003.
4. Henk Alblas and Albert Nymeyer, "**Practice and Principles of Compiler Building with C**", PHI, 2001.
5. Kenneth C. Louden, "**Compiler Construction: Principles and Practice**", Thompson Learning, 2003


## 07I008 Geographical Information System

**3 0 0 3**

**Course Outcomes (COs)**

- Analyze hardware components, software components and data types of geographical information system.
- Apply appropriate data structures for geographical data analysis.
- Design, compile and develop a set of analytical tools into a system appropriate to the problem

**Unit I - Introduction**

Maps – Definition – Types of Maps – Characteristics of Maps – Map Projections – GIS – Definition – Components of GIS – Hardware, Software and Organisational Context – GIS software

**10 Hours**

**Unit II - Data and Data Input**

Data Types – Spatial and Non-Spatial – Spatial Data – Points, Lines and Polygons – Non-spatial data – Nominal, Ordinal, Interval and Ratio – Digitizer – Scanner – Editing and Cleaning – Georeferencing

**10 Hours**

**Unit III - Data Structure and Analysis**

Raster and Vector Data Structure – Raster data storage – Run length, Chain and Block Coding – Vector Data Storage – Topology – Topological Models – Arc Node Structure – Surface Data – DEM – Gridded DEM and TIN structure- Applications of DEM **10 Hours**

**Unit IV - Data Analysis and Data Quality**

Reclassification – Measurement – Buffering – Overlaying – SQL for Queries – Neighbourhood and zonal operations – Data Quality – Components of data quality - Sources of errors in GIS – Meta data

**10 Hours**

**Unit V - Data Output and GIS Applications**

Output – Maps, Graphs, Charts, Plots, Reports – Printers – Plotters – Fields of application – Natural Resource Management, Parcel based, AM/FM applications examples – Case study: Urban growth studies using GIS **10 Hours**

**Total: 50 Hours**

**Textbooks**


1. Anji Reddy, "**Remote Sensing and Geographical Information Systems"**, BS Publications 2001
2. M.G. Srinivas (Edited by), "**Remote Sensing Applications"**, Narosa Publishing House, 2001.

**References**

1. Burrough P.A., "**Principles of GIS for Land Resources Assessment"**, Oxford Publication.1986.
2. Star J. and Estes. J., "**GIS – An Introduction"**, Prentice Hall, USA, 1990.
3. Robert Lauriniand Derek Thompson, "**Fundamentals of Spatial Information Systems ",** Academic Press, 1996.

## 07I009 Natural Language Processing

**3 0 0 3**

**Course Outcomes (COs)**

- Construct context free grammar, stochastic part of speech tagging for spoken languages and implement top-down parser algorithm.
- Design probabilistic context free grammar for spoken languages.
- Design statistical parser for spoken languages.

**Unit I - Introduction**

Introduction: 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. **10 Hours**

**Unit II - Syntax**

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 – The noun phrase – Coordination – Agreement – The 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 – A Basic Top-Down parser – Problems with the basic Top-Down parser – The early algorithm – Finite-State parsing methods.

**10 Hours**

**Unit III - Advanced Features and Syntax**

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**.**

**10 Hours**

**Unit IV - Semantic**

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 – WordNet: A database of lexical relations – The Internal structure of words – Creativity and the lexicon. **10 Hours**

**Unit V - Applications**

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 – The transfer metaphor – The interlingua idea: Using meaning – Direct translation – Using statistical techniques – Usability and system development.

**10 Hours**

**Total: 50 Hours**

**Textbook**

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

**Reference**

1. James Allen, "**Natural Language Understanding**", Pearson Education, 2003.

## 07I010 Mobile Communication

**3 0 0 3**

**Course Outcomes (COs)**

- Organize the functionalities and components of mobile communication with various wireless media controls.
- Demonstrate 802.11 standards, QoS issues and wireless ATM standards.
- Choose the right architecture for mobile architecture and messaging.
- Create a secure environment for mobile and wireless networks.

**Unit I - Introduction**

Introduction - wireless transmission - radio propagation - signals and propagation - antennas - multiplexing and modulation - spectrum - operation of cellular systems, planning a cellular system, analog & digital cellular systems. **10 Hours**

**Unit II - Wireless Media**

Wireless Media access control protocols - SDMA - FDMA - TDMA - CDMA - comparison. Telecommunication systems - GSM - DECT - TETRA - UMTS and IMT - 2000, satellite systems - GEO 139, LEO 139, MEO 140. Routing - localization - handover - broadcast systems - overview. Cyclic repetition of data - digital audio broadcasting - digital video broadcasting.

**10 Hours**

**Unit III - Wireless LAN and ATM**

Wireless LAN - IEEE 802.11 standards - HIPERLAN - Blue tooth technology and protocols. Wireless Local Loop technologies. Wireless ATM - motivation - working group - services - reference model - functions - radio access layer - handover - location management - addressing - mobile QoS issues, delays, error and packet loss, error control schemes - Access point control protocol.

**10 Hours**

**Unit IV - Mobile Application Architecture and Messaging**

Choosing the right architecture - Application Architecture - Smart Client - Messaging Types - Messaging Value Chain. **10 Hours**

**Unit V - Mobile and Wireless Security**

Security Primer - Creating a Secure environment - Threads - Technologies - Other Security Measures - WAP Security - Smart Client Security - Overview of Smart Client Architecture - Mobile Operating Systems. **10 Hours**

**Total: 50 Hours**

**Textbooks**

1. Jochen Schiller, "**Mobile Communications**", Addision Wesley, 2000
2. Martyn Mallick, "**Mobile and Wireless Design Essentials**", Wiley Dreamtech India Pvt. Ltd., 2003,

**References**

1. Uyless Black, "**Mobile and Wireless Networks**", Prentice Hall, 1996
2. Willian C. Y. Lee, "**Mobile Communication Design Fundamentals**", John Wiley, 1993

## 07I011 Satellite and Optical Communication

**3 0 0 3**

**Course Outcomes (COs)**

- Demonstrate the fundamental principles of satellite services, Kepler laws, orbital plane and coordinate systems.
- Demonstrate direct broadcast satellite services,outdoor and indoor receiver units and satellite mobile services.
- Demonstrate the working principle of fiber optical transmissions, fiber optical receivers and digital transmission systems.

**Unit I -Introduction**

Introduction – Frequency Allocations for Satellite Services – Intelsat – U.S.Domsats – Polar Orbiting Satellites – Problems – Kepler's First Law – Kepler's Second Law – Kepler's Third Law – Definitions of Terms for Earth-orbiting Satellites – Orbital Elements – Apogee and Perigee Heights – Orbital Perturbations – Effects of a Nonspherical Earth – Atmospheric Drag – Inclined Orbits – Calendars – Universal Time – Julian Dates – Sidereal Time – The Orbital Plane – The Geocentric-Equatorial Coordinate System – Earth Station Referred to the IJK Frame – The Topcentric-Horizon Co-ordinate System – The Sub-satellite Point – Predicting Satellite Position.

**10 Hours**

**Unit II - Geostationary Orbit & Space Segment**

Introduction – Antenna Look Angels – The Polar Mount Antenna – Limits of Visibility – Near Geostationary Orbits – Earth Eclipse of Satellite – Sun Transit Outage – Launching Orbits – Problems – Power Supply – Attitude Control – Spinning Satellite Stabilization – Momentum Wheel Stabilization – Station Keeping – Thermal Control – TT&C Subsystem – Transponders – Wideband Receiver – Input Demultiplexer – Power Amplifier – Antenna Subsystem – Morelos – Anik-E – Advanced Tiros-N Spacecraft **10 Hours**

**Unit III - Direct Broadcast Satellite Services**

Introduction – Orbital Spacings – Power Rating and Number of Transponders – Frequencies and Polarization – Transponder Capacity – Bit Rates for Digital Television – MPEG Compression Standards – Forward Error Correction – Home Receiver Outdoor Unit (ODU) – Home Receiver Indoor Unit (IDU) – Downlink Analysis – Uplink - Problems - Satellite Mobile Services – VSATs – Radarsat – Global Positioning Satellite System – Orbcomm. **10 Hours**

**Unit IV - Optical Fibers**

Evolution of fiber optic system- Element of an Optical Fiber Transmission link - Ray Optics-Optical Fiber Modes and Configurations – Mode theory of Circular Wave guides - Overview of Modes- Key Modal concepts- Linearly Polarized Modes – Single Mode Fibers-Graded Index fiber structure.

**10 Hours**

**Unit V - Fiber Optical Receivers & Digital Transmission System**

PIN and APD diodes – Photo detector noise, SNR, Detector Response time, Avalanche Multiplication Noise – Comparison of Photo detectors – Fundamental Receiver Operation – preamplifiers, Error Sources – Receiver Configuration – Probability of Error – Quantum Limit.Point-to-Point links System considerations – Link Power budget – Rise - time budget –Noise Effects on System Performance-Operational Principles of WDM, Solitons - Erbium-doped Amplifiers. Basics on concepts of SONET/SDH Network. **10 Hours**

**Total: 50 Hours**

**Textbooks**


1. Gerd Keiser, "**Optical Fiber Communication**" McGraw–Hill International, Singapore, 3rd edition., 2000
2. Dennis Roddy, "**Satellite Communications**", McGraw-Hill Publication Third edition 2001


**References**


1. J.Senior, "**Optical Communication, Principles and Practice**", Prentice Hall of India, 1994.
2. J.Gower, "**Optical Communication System**", Prentice Hall of India, 2001.
3. Timothy Pratt – Charles Bostian & Jeremy Allmuti, "**Satellite Communications**", John Willy & Sons (Asia) Pvt. Ltd. 2004
4. Wilbur L. Pritchars Henri G.Suyder Hond Robert A.Nelson, "**Satellite Communication Systems Engineering**", Pearson Education Ltd., Second edition 2003.
5. M.Richharia, "**Satellite Communication Systems**", Macmillan Press Ltd. Second Edition 2003.

## 07I012 Neural and Fuzzy Logic Control

**3 0 0 3**

**Course Outcomes (COs):**

- Demonstrate the basic architecture, learning laws of neural networks.
- Apply Fuzzy systems and Fuzzy logic control theory for designing Fuzzy systems.
- Design of Neural and Fuzzy logic control based applications for specific problems.

**Unit I - Basic Architectures**

Introduction - Biological neuron - Artificial neuron - Neuron modeling - Learning rules - Single layer - Multi layer feed forward network - Back propagation - Learning factors.

**10 Hours**

**Unit II - Neural Network for Control**

Feed back networks - Discrete time hop field networks-Transient responses of continuous time networks - Applications of artificial neural network-Process identification - Neuro controller for inverted pendulum.

**10 Hours**

**Unit III - Fuzzy Systems**

Classical sets - Fuzzy sets - Fuzzy relations – Fuzzification - Defuzzification - Fuzzy rules.

**10 Hours**

**Unit IV - Fuzzy Logic control**

Membership function - Knowledge base - Decision making logic - Optimisation of membership function using neural networks - Adaptive fuzzy systems - Introduction to genetic algorithm.

**10 Hours**

**Unit V - Applications of FLC**

Fuzzy logic control - Inverted pendulum - Image processing - Home heating system - Blood pressure during anesthesia - Introduction to neuro fuzzy controller.

**10 Hours**

**Total: 50 Hours**

**Textbooks**


1. James Freeman A. and David Skapura M., **"Neural Networks – Algorithms, Application and Programming techniques",** Addison Wesley Publishing Company, 1991
2. George Klir & Tina Floger , **"Fuzzy Sets, Uncertainty and Information",** PHI, 2000
3. D. Drainkov, Hellendoom, "**An introduction to Fuzzy Control",** Narosa Publication, 2000


**References**


1. Timothy J. Ross, **"Fuzzy Logic with Engineering Applications",** McGraw - Hill International Editions, 1995.
2. Robert J. Schalkoff, **"Artificial Neural Networks",** McGraw-Hill International Editions, 1997.

## 07I013 Grid Computing

**3 0 0 3**

**Course Outcomes (COs)**

- Demonstrate Grid architecture and applications.
- Build and manage Open Grid Service Architecture based grids.
- Integrate applications with middle ware platforms and manage grid environments.

**Unit I - Introduction**

Grid Computing values and risks - History of Grid computing - Grid computing model and protocols - overview of types of Grids. **10 Hours**

**Unit II - Types of Grids**

Desktop Grids: Background - Definition - Challenges - Technology - Suitability - Grid server and practical uses; Clusters and Cluster Grids; HPC Grids; Scientific in sight - application and Architecture - HPC application development environment and HPC Grids; Data Grids; Alternatives to Data Grid - Data Grid architecture. **10 Hours**

**Unit III - Architecture and Management**

The open Grid services Architecture - Analogy - Evolution - Overview - Building on the OGSA platform - implementing OGSA based Grids - Creating and Managing services - Services and the Grid - Service Discovery - Tools and Toolkits - Universal Description Discovery and Integration (UDDI).

**10 Hours**

**Unit IV - Native Programming and Software Applications**

Desktop supercomputing - parallel computing - parallel programming paradigms - problems of current parallel programming paradigms - Desktop supercomputing programming paradigms - parallelizing existing applications - Grid enabling software applications - Needs of the Grid users - methods of Grid deployment - Requirements for Grid enabling software - Grid enabling software applications.

**10 Hours**

**Unit V - Applications, Services and Environments**

Application integration - application classification - Grid requirements - Integrating applications with Middleware platforms - Grid enabling Network services - managing Grid environments - Managing Grids - Management reporting - Monitoring - Data catalogs and replica management - portals - Different application areas of Grid computing. **10 Hours**

**Total : 50 Hours**

**Textbook**

1. Ahmar Abbas, "**Grid Computing, A Practical Guide to Technology and Applications**", Firewall media, 2004

**References**

1. Joshy Joseph, Craig Fellenstein, "**Grid Computing**", Pearson Education, 2004
2. Foster, "**Grid Blue print foe new computing**", 2001

**07I014 C# and .NET**

**3 0 0 3**

**Course Outcomes (COs)**

- Display proficiency in shell programming with the use of shell commands.
- Use OOP tools when developing C# programs, build components using .Net SDK.
- Develop windows applications with ADO .Net and .Net assemblies.

**Unit I - Basics Of .NET and C#**

UNIX Operating System - History - Commands - System Structure - Shell, Shell Programming - System/ Calls - Unix Communications - Architecture - Kernel Data structures - File sub - System and Process - Sub - System - User - Kernel modes - Process States and Transitions - Sleep and Wakeup.

**10 Hours**

**Unit II - C# & OOP**

C# data types - Variables - Operators - Statements - Input/ output - Control flow - Methods - Debugging and error handling - Namespaces - Array - Structs - OOP concepts - Classes - Abstract data type - Constructors - Destructors - Conversions - Inheritance - Operator overloading.

**10 Hours**

**Unit III - Interface and Inheritance**

Interfaces - Indexes - Delegates - Events - Variable argument Lists - Collection - Reflection - Events - Variable argument lists - Collection - Reflection - Dynamic creation and invocation - Preprocessor.

**10 Hours**

**Unit IV - I/O & Windows Programming**

File and Folder operations - Dates and Times - browsing the Internet - Windows Form Controls - Advanced windows - Form features using dialogs. **10 Hours**

**Unit V - Web & Database**

Developing Windows Applications - Accessing data with ADO.NET, .NET assemblies, Web programming basics - Web services - Case Study. **10 Hours**

**Total : 50 Hours**

**Textbooks**


1. Stanley B. Lippman, "**C# Primer: A practical approach**", Pearson Education, 1991
2. Eric Gunnerson, "**A Programmers Introduction to C#",** A Press, 2000


**References**


1. Ben Albahari, Pter Drayton, Brad Merrill, "**C# Essentials**", Oreilly & Associates, 2001
2. E. Balagurusamy, "**Programming in C#** ",Tata McGraw Hill, 2002
3. Conard. J., et.al., "**Introducting .Net**", wrox Press, 2000
4. David. S. Platt, "**Introducing Microsoft. Net**", Microsoft Press, 3rd, Edition, 2003

**071015 Bioinformatics**

**3 0 0 3**

**Course Outcomes (COs):**

- Use medical vocabulary, medical language system and biological information networks.
- Maintain electronic patient record and telemedicine peripherals.
- Design sequence alignment algorithms and statistical decision trees.

**Unit I - Coding**

Common Health Care Language - Coding Techniques - Coded & Quasi Quaded Data - Medical Vocabulary - Industry Wide Communication Standards HL7 - Unified Medical Language System - Quality of Care Paradigms - Risk management Bio Ethics. **10 Hours**

**Unit II - Information Networks**

Internet Facilities used in the Web Browser STTP 5 - HTTP - HTML - URL - European Molecular Biology Network - National Center for Bio Technology Information. **10 Hours**

**Unit III - Patient Record Maintenance**

Electronic Patient Record - Models or ERP - Environmental Services - Metrics - Tele Medicine - Community Networks - Tele Medicine Peripherals & Equipment Selection - Anatomy of Video Conference Technology. **10 Hours**

**Unit IV - Protein Information Re-Sources**

Biology Data Basics - Primary Secondary Data Basics - Protein Pattern Data Basics - DNA Sequence Data Basics - DNA Analysis - Genes Structure and DNA Sequences - Interpretation of EST Structures - Different Approaches to EST Analysis. **10 Hours**

**Unit V - Alignment Techniques**

Data Base Searching - Comparison of Two Sequences - Identity & Similarity - Global & Global Similarity - Global & Local Alignment - Multiple Sequence Alignment - Data Basis of Multiple Alignment - Secondary Data Base. Expert System - Statistical Decision Tree - Integration of Decision Support in Clinical Processors - Genome Project. **10 Hours**

**Total: 50 Hours**

**Textbooks**


1. T. K. Attwood and D. J Perry Smith, "**Introduction to Bio Informatics**", Prentice Hall,1st Edition, 2001
2. Jean Mickel Clavere & Cadrienotredom "**Bio Informatics - A beginners guide**" Wiley Green Tech, 2003


**References**


1. Bernser E. S., "**Clinical Decision Support System: Theory & Practice**", Springer Verlag; 1st Edition, 1998
2. Coiera E. Chajsman "**Guide to Medical Informatics: The Internet & Telemedicine",** Oxford University Press, 1st Edition, 1997

## 07I016 Software Testing Methods and Tools

**3 0 0 3**

**Course Outcomes (COs)**

- Apply software testing fundamentals and testing design strategies to enhance software quality.
- Design test cases for unit test, integration test, system test, regression and acceptance test.
- Manage test plan components, test measurements and reviews.

**Unit I - Software Testing Fundamentals**

Testing as an Engineering Activity - Role of Process in Software Quality - Testing as a Process- The six essentials of software testing - Basic Definitions: Software Testing Principles - The role of a software tester - Origins of Defects - Defect Classes- and The Defect Reposi **9 Hours**

**Unit II - Testing Design Strategies**

Introduction to Testing Design Strategies - The Smarter Tester - Test Case Design Strategies - Black Box testing - Random Testing - Equivalence Class Partitioning - Boundary Value Analysis - Cause and error graphing and state transition testing - Error Guessing - Black-box testing and COTS - White-Box testing - Test Adequacy Criteria - Coverage and Control Flow Graphs-Covering Code Logic – Paths - White-box Based Test Design - Additional White Box Test Design Approaches - Evaluating Test Adequacy Criteria.

**11 Hours**

**Unit III - Levels of Testing**

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 – Types-of system testing - Regression Testing- Alpha - Beta and Acceptance Tests. **10 Hours**

**Unit IV - Test Management**

Introductory 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

**10 Hours**

**Unit V - Test Measurements and reviews**

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. **10 Hours**

**Total: 50 Hours**

**Textbook**

1. Ilene Burnstein, "**Practical Software Testing**", Springer International Edition, Chennai, 2003.

**References**


1. Edward Kit, "**Software Testing in the Real World – Improving the Process**", Pearson Education, New Delhi, 1995
2. Elfriede Dustin, "**Effective Software Testing**", Pearson Education, New Delhi, 2003
3. Renu Rajani and Pradeep Oak, "**Software Testing – Effective Methods, Tools and Techniques"**, Tata McGraw,Hill, New Delhi, 2003.


## 07I017 Soft Computing

**3 0 0 3**

**Course Outcomes (COs)**

- Apply basics of neuroscience and Fuzzy systems for problem solving.
- Design Fuzzy and Artificial Neural network systems.
- Apply Genetic Algorithm and heuristic search techniques for problem solving.

**Unit I - Basics of Neuroscience and Ann Models**

The Brain as a Neural Network - Basic Properties of Neurons - Neuron Models - Rosenblatt's Perception - The widrow - Hoff LMS Learning Algorithm - Order of a Predicate and a Perceptron - Complexity of Learning using Feedforward Networks.

**10 Hours**

**Unit II - Fuzzy Systems**

Fuzzy Sets and Fuzzy Reasoning - Fuzzy Matrices - Fuzzy Functions - Decompositions - Fuzzy Automata and Languages - Fuzzy Control Method - Fuzzy Decision Making.

**10 Hours**

**Unit III - Neuro - Fuzzy Systems**

Introduction to Neuro - Fuzzy Systems - Fuzzy System Design Procedures - Fuzzy Sets and Logic Background - Fuzzy/ ANN Design and Implementation.

**10 Hours**

**Unit IV - Authentication Genetic Algorithms**

Introduction - Robustness of Traditional Optimization and Search Techniques - The goals of optimization - Computer Implementation - Data Structures, Reproduction, Crossover and Mutation - Mapping Objective Functions to fitness form - Some Applications of Genetic Algorithms.

**10 Hours**

**Unit V - Artificial Intelligence**

AI technique - Level of the Model - Problems, Problem Spaces and Search - Issues in the Design of Search Programs - Heuristic Search Techniques - Knowledge Representations and Mappings.

**10 Hours**

**Total: 50 Hours**

**Textbooks**

1. N. K. Bose and P. Liang, "**Neural Network Fundamentals"**
2. Timothy J. Ross, "**Fuzzy Logic with Engineering Applications"**, McGraw - Hill International Editions, 1995

**References**

1. Elaine Rich and Kelvin knight, "**Artificial Intelligence"**, McGraw - Hill, 2000.
2. David E. Goldberg, **"Genetic Algorithms - In Search, optimization and Machine Learning",** Pearson Education.
3. Robert J. Schalkoff, **"Artificial Neural Networks",** McGraw - Hill International Editions, 1997.
4. Freeman J. A. & D. M. Skapura, "**Neural Networks: Algorithms, Applications and Programming Techniques",** Addison Wesley, 1992.
5. G. J. Klir & B. Yuan, **"Fuzzy Sets & Fuzzy Logic"**, PHI, 1995.
6. Melanie Mitchell, **"An Introduction to Genetic Algorithm",** PHI, 1998

## 07I018 Artificial Intelligence & Expert Systems

**3 0 0 3**

**Course Outcomes (COs):**

- Apply forward and backward reasoning algorithms, searching algorithms and optimization algorithms to create problem solving agents.
- Represent knowledge using propositional logic, inference rules and Bayesian networks.
- Design simple expert systems.
- Design algorithms for robotics and machine vision.

**Unit I - Introduction**

Concept of AI, approaches – Application areas Problem formulation - Problem solving agents -Forward & Backward reasoning- Graphs & Trees - Measuring problem solving performance - Search Strategies - Genetic Algorithms, terminology. **10 Hours**

**Unit II - Knowledge Representation**

Relational knowledge & Procedural knowledge Propositional Logic – Syntax & semantics- Inference rules - Inference methods - Knowledge engineering process - Handling uncertain knowledge- Bayesian networks – Learning - Pattern recognition. **10 Hours**

**Unit III - Knowledge Based Systems**

Expert systems – Components, Characteristic features of expert systems – Rule based system architecture- Using domain knowledge - Expert system shell - Explaining the reasoning and knowledge acquisition - Applications. **10 Hours**

**Unit IV - AI in Robotics**

State space search - Block word & robot example - Path selection - Monkey & Banana problem AND – OR graph - Means end analysis in a robotic problem - Robot problem solving as a production system - Triangle table- Robot learning - Robot task planning -Phases in task planning - Symbolic spatial relationships - Obstacle avoidance - Graph planning. **10 Hours**

**Unit V - Machine Vision**

Introduction - Functions in a vision system - Imaging devices - Lighting - A-D conversion – Quantization - Encoding image storage - Image data reduction - Segmentation techniques - Feature extraction - object recognition - training the vision system - Robotic applications of machine vision

**10 Hours**

**Total: 50 Hours**

**Textbooks**


1. Stuart Russel, Peter Norvig, **"Artificial Intelligence: A Modern Approach- 2 /e",** 2003, Pearson Education.
2. Elaine Rich, Kevin Knight, **"Artificial Intelligence"** 2/e, 1991, TMH.


**References**


1. Dan W. Patterson, **"Introduction to Artificial Intelligence & Expert Systems",** Seventh Indian Reprint 1999, EEE, PHI.
2. Rex Mauss, Jessica Keyes, **"Handbook of Expert Systems in Manufacturing**", Tata McGraw Hill, 2002
3. Groover, Weiss, Nagel, Odrey, **"Industrial Robotics – Technology, Programming and Applications",** Tata McGraw Hil, 2000.
4. Fu, Gonzalez and Lee, "Robotics: Control, Sensing, Vision and Intelligence", Tata McGraw Hill, 2003


## 07I019 Fault Tolerant Computing Systems

**3 0 0 3**

**Course Outcomes (COs):**

- Apply the standard design methodologies for designing fault tolerant computing systems.
- Use self checking circuits to design a fail safe system with PLA.
- Design testable combinational logic circuits and sequential circuits.

**Unit I - Basic Concepts**

Failure and Faults, reliability and failure rate, relation between eligibility and Mean - Time - Between failures, maintainability and availability, reliability of series and parallel systems, Modeling of faults, stuck at, Bridging (short - circuit), stuck open, transient and intermittent faults.

**Test Generation**

Fault diagnosis of digital systems, Test generation for combinational logic circuits - Conventional methods, Random testing, transition count testing and signature analysis. **10 Hours**

**Unit II - Fault Tolerant Design**

Basic concepts - Static, dynamic, Hybrid, and self - Purging redundancy, Shift - Over Modular Redundancy (SMR). Triple Modular redundancy, SMR. Reconfiguration, use of error correcting codes. Time redundancy, software redundancy, fail soft - Operation, examples of practical fault tolerant systems, Introduction to fault Tolerant Design of VLSI Chips. **10 Hours**

**Unit III - Self Checking Circuits & Fail Safe Design**

Design of Totally self - Checking checkers, checkers using m - out of - n codes, Berger codes and low cost residue code. Self - Checking sequential Machines, partially self checking circuits.

**Fail Safe Design**

Strongly fault secure circuits, failsafe Design of sequential circuits using partition theory and Berger codes, totally self - Checking PLA design. **10 Hours**

**Unit IV - Design For Testable Combination Logic Circuits**

Basic concepts of test ability, controllability and observability. The read - Muller expansion technique, three level OR - AND - OR design, use of control logic and syndrome - Testable design.

**10 Hours**

**Unit V- Design of Testable Sequential Circuits**

The scan - Path technique - Level sensitive scan design (LSSD) and Random Access scan technique, built - in - test, built - in - test of VLSI chips, design for autonomous self - Test, Designing Testability into logic Boards. **10 Hours**

**Total: 50 Hours**

**Textbook**

1. Parag K. Lala, "**Fault Tolerant and Fault Testable, Hardware design"**, PHI 1995

**References**

1. LALA, **"Digital systems design using PLD's"**, PHI 1990
2. N. N. Biswas, **"Logic Design theory"**, PHI 1990
3. Shem, toy Levei, Ashok K. Agarwala, **"Fault Tolerant System design"**, Tata McGraw Hill, 1994
4. Pradhan K. K., **"Fault Tolerant Computing - Theory and Techniques"**, Vol - I and II, PHI 1986

## 07I020 XML and Web Services

**3 0 0 3**

**Course Outcomes (COs)**

- Apply the wide range of tools and techniques for parsing XML documents.
- Use Web Services Description Languages (WSDL) for describing network services of any particular application using concepts like: ports, messages, bindings and services.
- Publish and discover Web Services with Universal Description, Discovery and Integration (UDDI).

**Unit I - XML Technology Family**

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

**10 hours**

**Unit II - Architecting Web Services**

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.

**10 hours**

**Unit III - Web Services Building Blocks**

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 **10 hours**

**Unit IV - Implementing XML in E-Business**

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.

**10 hours**

**Unit V - XML Content Management and Security**

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 **10 hours**

**Total: 50 Hours**

**Textbook**

1. Ron Schmelzer et al. **" XML and Web Services**", Pearson Education, 2002.

**References**

1. Keith Ballinger, **".NET Web Services Architecture and Implementation**", Pearson Education, 2003.
2. David Chappell, "**Understanding .NET A Tutorial and Analysis**", Addison Wesley, 2002.
3. Kennard Scibner and Mark C.Stiver, " **Understanding SOAP**", SAMS publishing, 2001
4. Alexander Nakhimovsky and Tom Myers, "XML Programming: Web Applications and Web Services with JSP and ASP", Apress, 2002.

## 07I021 Software Agents

**3 0 0 3**

**Course Outcomes (COs)**

- Acquire the basic concepts of software agents.
- Design multi-agent systems using agent markup languages.
- Master agent security and issues related for mobile authentication.

**Unit I -Agents Overview and Introduction**

Introduction to software agents - Agent definition-Architectures-Approaches-Languages Programming paradigms-Agent vs. objects-aglets - Agent reasoning.

**9 Hours**

**Unit II - Java Agents**

Processes-threads - Daemons-components - Javabeans - Activex - Sockets, RPC'S-Distributed computing-Aglets programming-Jini architecture-Actors and agents-Typed and proactive messages.

**10 Hours**

**Unit III - Multi Agent Systems**

Multiagent systems-Interactive agents-Reactive agents-Cognitive agents-Ecommerce agents-Interaction protocols-Agent coordination-Self interested agents in ecommerce applications.

**10 Hours**

**Unit IV - Mobile Agents**

Interface agents and mobile agents - Agent communication languages. Agent Markup Languages: DAM - DAML-OIL - Semantic web-Agent knowledge representation-Agent adaptability-Belief desire intension - Mobile agents - Mobile agent applications

**11 Hours**

**Unit V - Agents and Security**

Agent security issues - Mobile agents security - Digital Signatures - Protecting agents malicious hosts un trusted agents - Black box security - Authentication for agents - Security issues for aglets.

**10 Hours**

**Total: 50 Hours**

**Textbooks**


1. Bigus & Bigus, Wiley, **"Constructing Intelligent Agents with JAVA**",2001.
2. Bradshaw, **"Software Agents",** MIT Press, 2000.


**References**


1. Alan Kirman, Jean-Benoit Zimmermann, **"Economics with Heterogeneous Interacting Agents",** Springer Verlag, September 2001.
2. R. Cowan, Nicolas Jonard, Cowan, Robin Wehia, "**Conference 2001 Maastricht**".
3. Springer Verlag, **"Heterogeneous Agents Interactions and Economic Performance",** 2003.