# DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
# CURRICULUM AND SYLLABI – REGULATIONS 2011

| S.NO | CODE | COURSE | HOURS/WEEK | | | CREDITS | MAXIMUM MARKS | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | | CA | FE | TOTAL |
| **SEMESTER - 1** | | **THEORY** | | | | | | | |
| 1 | 11USL101 | Communication Skills - I | 3 | 0 | 1 | 3 | 40 | 60 | 100 |
| 2 | 11USM101 | Engineering Mathematics - I | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 3 | 11USC102 | Chemistry for Computing Sciences | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 4 | 11UCK101 | Fundamentals of Computing | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 5 | 11USP102 | Physics for Computing Sciences | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 6 | 11UFK101 | Basics of Electrical and Electronics Engineering | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 7 | 11UCK102 | History of Science and Engineering | 1 | 0 | 0 | 1 | 100 | - | 100 |
| | | **PRACTICAL** | | | | | | | |
| 1 | 11USH111 | Physical Science lab I | 0 | 0 | 3 | 1 | 40 | 60 | 100 |
| 2 | 11UCK103 | Computing Practices Lab | 0 | 0 | 3 | 2 | 40 | 60 | 100 |
| 3 | 11UAK108 | Engineering Graphics Lab | 1 | 0 | 3 | 2 | 40 | 60 | 100 |
| | | **TOTAL** | **20** | **2** | **10** | **26** | | | |

| S.NO | CODE | COURSE | HOURS/WEEK | | | CREDITS | MAXIMUM MARKS | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | | CA | FE | TOTAL |
| **SEMESTER - 2** | | **THEORY** | | | | | | | |
| 1 | 11USL201 | Communication Skills - II | 3 | 0 | 1 | 3 | 40 | 60 | 100 |
| 2 | 11USM201 | Engineering Mathematics - II | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 3 | 11USC201 | Environmental Science and Engineering | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 4 | 11UCK201 | C Programming and Practices | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 5 | 11UAK201 | Engineering Mechanics | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 6 | 11USP202 | Science of Engineering Materials | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| | | **PRACTICAL** | | | | | | | |
| 1 | 11USH211 | Physical Sciences Lab II | 0 | 0 | 3 | 1 | 40 | 60 | 100 |
| 2 | 11UCK202 | C Programming Lab | 0 | 0 | 3 | 2 | 40 | 60 | 100 |
| 3 | 11UAK204 | Engineering Practices Lab | 0 | 0 | 3 | 2 | 40 | 60 | 100 |
| | | **TOTAL** | **18** | **3** | **10** | **26** | | | |

| S.NO | CODE | COURSE | HOURS/WEEK | | | CREDITS | MAXIMUM MARKS | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | | CA | FE | TOTAL |
| **SEMESTER - 3** | | **THEORY** | | | | | | | |
| 1 | 11USM301 | Engineering Mathematics- III | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 2 | 11UCK301 | Data Structures and Algorithms - I | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 3 | 11UCK302 | Digital Principles and System Design | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 4 | 11UCK303 | Industrial Psychology and Work Ethics | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 5 | 11UCK304 | Object Oriented Programming | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 6 | 11UCK305 | PC Hardware and Troubleshooting | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| | | **PRACTICAL** | | | | | | | |
| 1 | 11UCK306 | Data Structures Lab - I | 0 | 0 | 3 | 2 | 60 | 40 | 100 |
| 2 | 11UCK307 | Digital Lab | 0 | 0 | 3 | 2 | 60 | 40 | 100 |
| 3 | 11UCK308 | Object Oriented Programming Lab | 0 | 0 | 3 | 2 | 60 | 40 | 100 |
| | | **TOTAL** | **18** | **3** | **9** | **27** | | | |

| S.NO | CODE | COURSE | HOURS/WEEK | | | CREDITS | MAXIMUM MARKS | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | | CA | FE | TOTAL |
| **SEMESTER - 4** | | **THEORY** | | | | | | | |
| 1 | 11USM404 | Discrete Mathematics | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 2 | 11UCK401 | Data Structures and Algorithms - II | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 3 | 11UCK402 | Microprocessors and Interfacing | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 4 | 11UCK403 | System Software | 2 | 0 | 2 | 4 | 40 | 60 | 100 |
| 5 | 11UBK421 | Principles of Communication | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 6 | 11UCK404 | Operating System | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| | | **PRACTICAL** | | | | | | | |
| 1 | 11UCK405 | Data Structures Lab - II | 0 | 0 | 3 | 2 | 60 | 40 | 100 |
| 2 | 11UCK406 | Operating Systems Lab | 0 | 0 | 3 | 2 | 60 | 40 | 100 |
| 3 | 11UCK407 | Microprocessors Lab | 0 | 0 | 3 | 2 | 60 | 40 | 100 |
| | | **TOTAL** | **17** | **3** | **11** | **28** | | | |

| S.NO | CODE | COURSE | HOURS/WEEK | | | CREDITS | MAXIMUM MARKS | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | | CA | FE | TOTAL |
| **SEMESTER - 5** | | **THEORY** | | | | | | | |
| 1 | 11UCK501 | Database Management Systems | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 2 | 11UCK502 | Formal Languages and Automata Theory | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 3 | 11UCK503 | Internet Programming | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 4 | 11UCK504 | Computer Architecture | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 5 | 11UCK505 | Software Engineering | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 6 | 11USM502 | Probability and Queuing Theory | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| | | **PRACTICAL** | | | | | | | |
| 1 | 11UCK506 | Database Management Systems Lab | 0 | 0 | 3 | 2 | 60 | 40 | 100 |
| 2 | 11UCK507 | Internet Programming Lab | 0 | 0 | 3 | 2 | 60 | 40 | 100 |
| 3 | 11UCK508 | Mini Project (Individual) | 0 | 0 | 6 | 2 | 60 | 40 | 100 |
| | | **TOTAL** | **18** | **3** | **12** | **27** | | | |

| S.NO | CODE | COURSE | HOURS/WEEK | | | CREDITS | MAXIMUM MARKS | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | | CA | FE | TOTAL |
| **SEMESTER - 6** | | **THEORY** | | | | | | | |
| 1 | 11USM602 | Optimization Techniques | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 2 | 11UCK601 | Principles of Compiler Design | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 3 | 11UCK602 | Computer Networks | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 4 | 11UCK603 | Computer Graphics | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 5 | 11UCK604 | Distributed Computing | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 6 | | Elective - I | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| | | **PRACTICAL** | | | | | | | |
| 1 | 11UCK605 | Compiler Design Lab | 0 | 0 | 3 | 2 | 60 | 40 | 100 |
| 2 | 11UCK606 | Computer Networks Lab | 0 | 0 | 3 | 2 | 60 | 40 | 100 |
| 3 | 11UCK607 | Computer Graphics Lab | 0 | 0 | 3 | 2 | 60 | 40 | 100 |
| | | **TOTAL** | **18** | **2** | **9** | **26** | | | |

| S.NO | CODE | COURSE | HOURS/WEEK | | | CREDITS | MAXIMUM MARKS | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | | CA | FE | TOTAL |
| **SEMESTER - 7** | | **THEORY** | | | | | | | |
| 1 | 11UCK701 | Artificial Intelligence | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 2 | 11UCK702 | Object Oriented Analysis and Design | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 3 | 11UCK703 | Unix Internals | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 4 | | Elective - II | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 5 | | Elective - III | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| | | **PRACTICAL** | | | | | | | |
| 1 | 11UCK704 | Case Tools Lab | 0 | 0 | 3 | 2 | 60 | 40 | 100 |
| 2 | 11UCK705 | Unix Lab | 0 | 0 | 3 | 2 | 60 | 40 | 100 |
| 3 | 11UCK706 | Project Phase - I | 0 | 0 | 8 | 4 | 60 | 40 | 100 |
| | | **TOTAL** | **15** | **1** | **14** | **24** | | | |

| S.NO | CODE | COURSE | HOURS/WEEK | | | CREDITS | MAXIMUM MARKS | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | | CA | FE | TOTAL |
| **SEMESTER - 8** | | **THEORY** | | | | | | | |
| 1 | 11UCK801 | Cryptography and Network Security | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 2 | | Elective - IV | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 3 | | Elective - V | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| | | **PRACTICAL** | | | | | | | |
| 1 | 11UCK802 | Project Phase - II | 0 | 0 | 24 | 12 | 60 | 40 | 100 |
| | | **TOTAL** | **9** | **0** | **24** | **21** | | | |

L – Lecture T – Tutorial P – Practical

CA – Continuous Assessment FE – Final Exam

# LIST OF ELECTIVES

**Elective I**

| | |
|---|---|
| 11UCE601 | C# and .Net |
| 11UCE602 | Storage Management |
| 11UCE603 | Parallel Architectures and Embedded Systems |
| 11UCE604 | Digital Signal Processing |
| 11UCE605 | Management Information Systems |

**Electives II and III**

| | |
|---|---|
| 11UCE701 | Multimedia Systems |
| 11UCE702 | Grid Computing |
| 11UCE703 | Service Oriented Architecture |
| 11UCE704 | TCP/IP – Design and Implementation |
| 11UCE705 | Software Testing |
| 11UCE706 | Component Based System Design |
| 11UCE707 | Semantic Web |
| 11UCE708 | Open Source Tools and Components |
| 11UCE709 | Real Time Systems |

**Electives IV and V**

| | |
|---|---|
| 11UCE801 | Information Security |
| 11UCE802 | Mobile Computing |
| 11UCE803 | High Speed Networks |
| 11UCE804 | User Interface Design |
| 11UCE805 | Parallel Algorithms |
| 11UCE806 | Soft Computing |
| 11UCE807 | Cloud Computing |
| 11UCE808 | Total Quality Management |
| 11UCE809 | Data Warehousing and Data Mining |

| 11USL101 | COMMUNICATION SKILLS - I | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 0 | 1 | 3 |

*Course Objective*

- *To improve the language proficiency of the students in English with emphasis on LSRW skills and equip them to study academic subjects with greater facility with theoretical and practical components of the English syllabus.*

**UNIT I LISTENING SKILLS 9**

Listening for general content - Listening to fill up information - Intensive listening

Listening for specific purpose

**UNIT II SPEAKING SKILLS 9**

Introducing oneself in various situations - Describing objects, situation and people

Asking questions - Narrating incidents - Just a minute sessions - Day to Day Conversations - Debates

**UNIT III READING SKILLS 9**

Skimming the text - Understanding the gist of an argument - Inferring lexical and contextual meaning - Understanding discourse features - Recognizing coherence/ sequencing of sentences.

**UNIT IV WRITING SKILLS 9**

Paragraph writing - Extended Definition – Transcoding -Formal and informal letter

Note making - Editing a passage

**UNIT V LANGUAGE FOCUS 9**

Articles – Prepositions -Parts of speech – Tenses – Voice - Gerunds and infinitives - Conditionals - Nominal compounds - Word formation – Prefixes and Suffixes/ one form to another form - Synonyms and Antonyms

**NON DETAIL STUDY**

Chetan Bhagat, “Five Point Someone”, Rupa Publications, 2008.

**TOTAL HOURS: 45**

## TEXT BOOKS


1. Department of Humanities and Social Sciences, Anna University 'English for Engineers and Technologists', Combined Edition Volume I and II, Chennai: Orient Longman Private Limited, 2006.
2. Murphy, "Murphy's English Grammar", Cambridge University Press.2004


## REFERENCES


1. Bhaskaran and Horsburgh, "Strengthen Your English", , Oxford University Press.2006
2. Francis Soundararaj, "Speaking and Writing for Effective Business Communication", MacMillan, India Ltd., 2007.
3. Robert J. Dixon, 'Everyday Dialogues in English', Prentice-Hall of India Ltd., 2006.
4. John Seely, 'The Oxford Guide to Writing and Speaking', Oxford.2004

| 11USM101 | ENGINEERING MATHEMATICS - I | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 1 | 0 | 4 |

**(**Common to all branches**)**

*Course Objectives*

- To provide strong foundation to the students to expose various emerging new areas of applied mathematics and appraise them with their relevance in Engineering and Technological field.

**PREREQUISITE:**

**(i)** Matrices – rank of matrix, Linear dependence and linear independence

**(ii)** Differential Calculus – Differentiation of Implicit functions, parametric functions

**(iii)** Ordinary Differential equations – Basic terminologies like definition, formation, meaning of solution, variable and separable method, linear differential equations.

**UNIT I LINEAR ALGEBRA 9**

Euclidean n-space – Vector spaces – Subspaces – Linear combinations – Linear dependence and independences – Basis and dimensions – Applications to matrices: Rank of a matrix, Inner product spaces – Example of inner product spaces – Cauchy-Schwarz inequality– Orthonormal bases – Gram Schmidtt process.

**UNIT II MATRICES 9**

Characteristic equation – Eigen values and eigen vectors of a real matrix – Properties – Cayley-Hamilton theorem (excluding proof) – Orthogonal transformation of a symmetric matrix to diagonal form – Quadratic form – Reduction of quadratic form to canonical form by orthogonal transformation

**UNIT III APPLICATIONS OF DIFFERENTIAL CALCULUS 9**

Curvature in Cartesian co-ordinates – Centre and radius of curvature – Circle of curvature – Evolutes – Envelopes.

**UNIT IV FUNCTIONS OF SEVERAL VARIABLES 9**

Partial derivatives – Total derivatives – Differentiation of implicit functions – Jacobians – Taylor's expansion – Maxima and Minima – Method of Lagrangian multipliers.

**UNIT V ORDINARY DIFFERENTIAL EQUATIONS 9**

Higher order linear differential equations with constant coefficients – Method of variation of parameters – Cauchy's and Legendre's linear equations – Simultaneous first order linear equations with constant coefficients – Applications to Engineering problems.

**TOTAL HOURS: 45 + 15**

**TEXT BOOKS**


1. Erwin Kreyszig, "Advanced Engineering Mathematics", 8th Edition, Wiley India, 2006.
2. Grewal. B.S, "Higher Engineering Mathematics", 40th Edition, Khanna Publications, Delhi, (2007).


**REFERENCES**


1. Ramana B.V, "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, New Delhi, (2007).
2. Glyn James, "Advanced Engineering Mathematics", 7th Edition, Wiley India, (2007).
3. Jain R.K and Iyengar S.R.K," Advanced Engineering Mathematics", 3rd Edition, Narosa Publishing House Pvt. Ltd., (2007).

## 11USC102 CHEMISTRY FOR COMPUTING SCIENCES

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

*Course Objective*

- To provide strong foundation to the students to expose various emerging new areas of applied chemistry and appraise them with their relevance in Engineering and technological field.

**UNIT I CHEMISTRY IN EVERYDAY LIFE 9**

Applications of Chemistry in health and hygiene – Chemicals in medicines – analgesics, antiseptics, antacids, disinfectants –Chemicals in food preservatives – artificial sweetening agents –Water quality parameter and standards -types of hardness –estimation by EDTA method-characteristic of portable water –domestic water treatment –disinfection methods-Chlorination –UV treatment – Ozonation –desalination –reverse osmosis.

**UNIT II ANALYTICAL TECHNIQUES 9**

Laws of absorption- Principles- Instrumentation and applications- UV - Visible spectroscopy- IR spectroscopy- Colorimetry- Estimation of Iron by Colorimetry -Flame photometry- Estimation of Sodium by Flame Photometry- Atomic absorption spectroscopy- Estimation of Nickel by atomic absorption spectroscopy

**UNIT III CHEMISTRY OF NANO MATERIALS 9**

Nanomaterials - Synthesis - Chemical Vapour deposition – Solgels – Electro deposition-ballmilling – Properties of nanoparticles and applications- CNT – Fabrication – arc method – Pulsed laser deposition-Structures- properties and applications .

**UNIT IV POLYMERS 9**

Introduction – monomers and polymers – Nomenclature of polymers- Classification of polymers- Polymerization-Types- Mechanism of addition polymerization-Plastics-Classification-Compounding of plastics-Preparation, properties and uses of PVC, Teflon Nylon 6,6- Rubber – vulcanization of rubber- Synthetic rubber ( Butyl rubber and SBR)- Conducting polymers-Conducting mechanisms.

**UNIT V ELECTROCHEMISTRY AND CORROSION SCIENCE 9**

Electrochemical cells - single electrode potential –Measurement of emf - Reference electrode-standard hydrogen electrode-Calomel electrode - glass electrode and measurement of pH-Corrosion – chemical corrosion- electrochemical corrosion- galvanic corrosion – differential corrosion- Protective coatings –Electroplating of gold - Electroless plating- anodizing-Electrochemical machining of metals and alloys.

**TOTAL HOURS: 45**

**TEXT BOOKS**


1. Jain P.C & Monika Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company Ltd, New Delhi.
2. Dr. Dara S.S & Dr. Umare S.S, "Engineering Chemistry", S .Chand & Company Ltd, New Delhi.


**REFERENCES**


1. Dr. Ramachandran T, Dr Venkataraman H, Dr. Magudeswaran P N, "Chemistry for Engineers", Vijay Nicole imprints Private Limited, Chennai.
2. Dr. Sivakumar R. and Dr Sivakumar N, "Engineering Chemistry", Tata McGraw-Hill Publishing Company, New Delhi, 2009.
3. Kaiser A.B, "Electronic properties of conjugated polymers – basics, models and applications", Springer Verlag,(1997).

## 11UCK101 FUNDAMENTALS OF COMPUTING

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

*Course Objectives*

- *To understand the basic building blocks of digital computer*
- *To know the categories of software in day to day life*
- *To study the different number systems and their basic operations*
- *To introduce the problem solving techniques in computers and the essential office packages*

**UNIT I INTRODUCTION TO COMPUTERS 9**

Introduction- Characteristics of Computers-Evolution of Computers-Generations of Computers-Classification of Computers- The Computer System- Applications of Computers

**UNIT II COMPUTER HARDWARE 7**

Computer Architecture-Primary memory-Secondary Storage-Input Devices-Output Devices

**UNIT III COMPUTER SOFTWARE 8**

Introduction-Software: Definition-Relationship between Software and hardware-Software Categories-System Software-Application Software-Software Terminology.

**UNIT IV NUMBER SYSTEMS 10**

Number Representation – Decimal, Binary, Octal, Hexadecimal and BCD numbers – Binary Arithmetic – Binary addition – Unsigned and Signed numbers – one's and two's complements of Binary numbers – Arithmetic operations with signed numbers - Number system conversions

**UNIT V PROBLEM SOLVING AND OFFICE APPLICATION SOFTWARE 11**

Introduction-Developing a Program-Algorithm-Flowchart-Pseudo code (P-Code)-Program Testing and Debugging-Program Documentation-Programming Paradigms-Characteristics of a Good Program-Introduction to Programming Languages- Application Software Packages-Introduction to Office Packages.

**TOTAL HOURS: 45 + 15**

**TEXT BOOKS**


1. ITL Education Solutions Ltd, Research and Development Wing, “Introduction to Computer Science”, Fourth Impression, Pearson Education(India), 2009 (Chapters 1,3,4,5,6,7,8,9,10)
2. Peter Norton, “Introduction to Computers”, 7th edition, TMH, 2011.


**REFERENCES**


1. Ashok.N.Kamthane, “Computer Programming”, Third Impression, Pearson Education (India), 2008. (Chapters 1, 2, 3)
2. V. Rajaraman, “Fundamentals of Computers”, Fourth Edition, Prentice Hall of India Private Limited, 2007 (Chapters 2,6)

## 11USP102 PHYSICS FOR COMPUTING SCIENCES

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

*Course Objectives*

- To provide strong foundation to the students to expose various emerging areas of Applied Physics and appraise them with their relevance in Engineering and technological field.

### UNIT I LASER TECHNOLOGY AND FIBER OPTICS 9

Introduction, Principle – Spontaneous emission, Stimulated emission, Population Inversion, Pumping mechanisms - Types of Laser – He-Ne Laser, $CO_2$ , Semiconductor Laser. Applications – Lasers in Microelectronics, Drilling, Welding, Heat Treatment, Cutting and Holography. Principle, Modes of Propagation, Fabrication Techniques – Rod & Tube method, Crucible-Crucible Technique - Classification based on Materials, Refractive Index Profile and Modes. Splicing, Losses in Optical fiber. Light Sources for fiber Optics. Detectors, Fiber Optical Communication links.

### UNIT II QUANTUM PHYSICS AND MICROSCOPY 9

Development of quantum theory, Dual Nature of Matter and Radiation – de-Broglie wavelength, Uncertainty Principle, Schrodinger equation – Time dependent, Time independent. Particle in a box, Limitation of Optical Microscopy, Electron Microscopy, Transmission Electron Microscope, Scanning Transmission Electron Microscope and Application

### UNIT III ELECTRICAL AND THERMAL PROPERTIES 9

Electrical conductivity – Drude – Lorentz theory of metals (qualitative). Wiedmann-Franz law. Origin of band structure – band theory of solids, distinction between conductors, semiconductor and insulator based on band theory. Factors affecting resistivity of metals – Temperature, alloying, strain and magnetic filed with respective applications. Thermal conduction – Thermal conductivity, Flow of heat through compound media.

**UNIT IV SEMICONDUCTING MATERIALS AND DEVICES 9**

Elemental and compound semiconductors, Intrinsic and extrinsic semiconductors – Properties. Carrier concentration in intrinsic semiconductors. Carrier concentration in n-type and p-type semiconductors. Material preparation – Czochralski method and zone refining, doping methods (diffusion and ion implantation) Hall Effect in extrinsic semiconductors, LED, Solar cells, IC fabrication

**UNIT V NANO MATERIALS AND APPLICATIONS 9**

Introduction to nano materials - synthesis – plasma arcing – chemical vapour deposition – solgels – electrodeposition – ball milling - properties of nanoparticles and applications.

Carbon nanotubes: fabrication – arc method – pulsed laser deposition – chemical vapour deposition - structure – properties and applications.

**TOTAL HOURS:45**

**TEXT BOOKS**


1. William D Callister, Jr "Material Science and Engineering" John wiley and Sons, New York, 2007
2. Raghavan, V. "Materials Science and Engineering – A First Course" Prentice Hall of India, New Delhi 2004.


**REFERENCES**


1. Jayakumar, S "Materials Science", RK Publishers, Coimbatore 2006.
2. Shatter, J.P.Saxena, A, Antolorich, S D Sanders Jr. T.H. and Warner S.B., "The Science and Design of Engineering Materials" The McGraw Hill Co. Inc, New York 1999
3. Palanisamy, P.K. "Materials Science" SCITECH Publications, Chennai, 2003

| 11UFK101 | BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 1 | 0 | 4 |

*Course Objectives*

- *To provide the basic concepts of DC and AC circuits*
- *To provide the fundamentals of Energy conversion*
- *To study the performance of DC and AC machines*
- *To study the fundamentals of semiconductor devices and communication engineering.*
- *To study the various types of transducers and concepts of Communication Engineering*

**UNIT I FUNDAMENTAL OF DC CIRCUITS 9**

Charge, Current, Voltage Resistance, Inductance, Capacitance, Sources, ohm's laws, Series circuit, Parallel Circuit, Kirchoff's Laws, Mesh analysis and Nodal analysis, Superposition, Maximum power transfer theorem.

**UNIT II AC CIRCUITS 9**

Fundamental of alternating quantities – Power in AC circuits, Three – phase power, Residential wiring: grounding and safety, Generations and distribution of AC power, Transformers – Construction and Working Principle.

**UNIT III PRINCIPLES OF ELECTRO MECHANICS 9**

Electromechanical Energy conversion - DC machines – Construction and Principle of Operation-Classification – EMF Equation – Applications – Three Phase Induction Motor- Construction, Types and Working Principle, Single Phase Induction Motor - Construction, Types and Working Principle – Basic Problems.

**UNIT IV SEMICONDUCTOR DEVICES 9**

Semiconductor Basics – PN Junction diode – Zener Diode – Bipolar function Transistor – Working and Characteristics - Rectifiers- Voltage regulators – Filters – UPS – SMPS. (Block Diagram Approach).

## UNIT V TRANSDUCERS AND COMMUNICATION ENGINEERING 9

Electrical Transducers – Classification – Resistive Inductive Capacitive Transducers – Piezo electric and photo electric transducers. Communication Systems: Radio, TV, Fax, Satellite & Optical Fiber (Block diagram approach only)

**TOTAL HOURS: 45 +15**

### TEXT BOOKS


1. Basic Electrical and Electronics Engineering, Ravish.R.Singh, Tata McgrawHill (TMH),2010
2. Basic Electrical, Electronics and Computer Engineering , R.Muthusubramanian, S.Salivahanan and K.A.Muraleedharan, Tata McgrawHill (TMH),2007.


### REFERENCES


1. Anokh singh, “Principles of Communication Engineering”, S.Chand and company, 2007.
2. B.L.Theraja, “ A Text Book of Electrical Engineering”, S.Chand & Co 2003.

## 11UCK102 HISTORY OF SCIENCE AND ENGINEERING

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

*Course Objectives*

- *To understand the basics of Computer Architecture and to study its evolution.*
- *To study the evolution of Operating System from batch processing to Grid & Cloud systems*
- *To study the evolution of programming languages from BASIC to VB.NET*
- *To understand the evolution of I/O devices*
- *To study the fundamentals of networks and to explore its progress.*

**UNIT I EVOLUTION OF COMPUTER ARCHITECTURE 3**

Definition – Computer Architecture – First Generation – Features – Vacuum Tube –Drum memory – Punch Cards - Harvard Architecture – Von Neumann Architecture - ENIAC - Second Generation – Features –Transistors – High – Magnetic core Memory – IBM 7090 – Third Generation – Features – Integrated Circuits – Semiconductor memory – cache memory – IBM's System/360 – Fourth Generation – Features – VLSI – Single Chip processor – Use of PC – 4004 Microprocessor – Intel 8080- Intel386 – Motorola 68000

**UNIT II EVOLUTION OF OPERATING SYSTEMS 3**

IBM 701 open shop – History and technical innovations of Batch Processing systems – Multiprogramming Systems – Timesharing – Concurrent Programming – Personal computing – Distributed systems – Grid and Cloud OS

**UNIT III EVOLUTION OF PROGRAMMING LANGUAGES 3**

1940-1950: Assembly language programming- ENIAC Coding System - 1950-1960: History of FORTRAN- LISP – ALGOL – COBOL - Importance of BNF notation in the evolution of Programming languages - 1960-1970: History of Simula - SNOBOL-BASIC -PL/I - Logo - 1970-1980: History of PASCAL – C – Smaltalk – Prolog - SQL - 1980-1990: History of C++ - Ada – Perl - TCL - 1990-1999: History of Python - Visual Basic-Ruby - Java – PHP - 2000 – Present : C# - VB.NET – XML - Prominent persons in the history of programming languages

**UNIT IV EVOLUTION OF I/O DEVICES 3**

Definition – Input and Output devices – Evolution of Input devices – Punched card reader- Magnetic tape - Keyboard – Pointing Devices - Mouse – Trackball- Touch Pad- Joystick – Graphics table – stylus – light pen – cyber glove – touch screen - Scanner - Game controllers – PowerPad – Digital Camera - Evolution of Output devices – History and Types of Monitors and Printers.

**UNIT V EVOLUTION OF NETWORKING 3**

Definition-Data Communication – Types of network – Internet – extranet- intranet – History of computer networks – PSTN – Telstar – Ethernet – ARPANET - ATM – NSFNET – Internet Networking methods – LAN – MAN – WAN – Wireless Networks – Definition – Wireless LAN – History of wireless networks – Radio Communication - AlohaNet - PRNET – WLAN – Cellular Systems

**TOTAL HOURS: 15**

**REFERENCES**

• Web Resources

| 11USH111 | PHYSICAL SCIENCE LAB I | L | T | P | C |
|---|---|---|---|---|---|
| | | 0 | 0 | 3 | 1 |

**AIM**

To provide exposure to the students with hands-on experience on scientific equipments

1. a) Particle size determination using diode laser.
   b) Determination of laser parameters – Wavelength and angle of divergence.
   c) Determination of acceptance angle in an optical fiber.
2. Determination of Band gap of a Semiconducting material.
3. Characteristics of LDR
4. Determination of thermal conductivity of a bad conductor – Lee's disc method.
5. Determination of Hysteresis Loss of a ferro-magnetic material.
6. Determination of Young's modulus of the material – Non uniform bending.

**DEMONSTRATION:**

7. Optical phenomena using Laser.

## 11UCK103 COMPUTING PRACTICES LAB

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

*Course Objective*

- *To enable the students to create technical reports, spread sheets and presentations*

**A) WORD PROCESSING**

1. Document creation, Text manipulation with Scientific notations.
2. Table creation, Table formatting and Conversion.
3. Mail merge and Letter preparation.
4. Drawing - flow Chart

**B) SPREAD SHEET**

5. Chart - Line, XY, Bar and Pie.
6. Formula - formula editor.
7. Spread sheet - inclusion of object, Picture and graphics, protecting the document and sheet.
8. Sorting and Import / Export features.

**C) PRESENTATION**

9. Creating a Demo Presentation (Getting Started)
10. Enhancing the slides (Changing the slide background, Apply Design Templates to a Presentation, Format the text in the slides, Modify the layout of a slide)
11. Inserting Objects into a slide (Inserting Graph, Organizational Chart, Word Art, Clip Art)
12. Using Autoshapes to create a drawing, Group and Ungroup Objects, Emboss Objects)
13. Enhancing (Apply Build Effects, Animation Effects, Transition Effects, Specify a Time period for transition and build effects, Rehearse slide timings)
14. Add Action Items and minutes of the meeting during the slide show
15. Modify the slide setup to match presentation requirements, Preview slides in grey Scale, Print Slides, notes pages, outline and handouts.

**HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS**

**HARDWARE**

LAN System with 33 nodes (OR) Standalone PCs – 33 Nos.

Printers – 3 Nos.

**SOFTWARE**

OS – Windows / UNIX Clone

Application Package – Office suite

**REFERENCES**


- University of California http://www.universityofcalifornia.edu
- University of Michigan http://www.umich.edu/
- University of Texas http://www.utexas.edu
- IIT Bombay http://www.cse.iitb.ac.in
- IISc Bangalore www.iisc.ernet.in
- University of Cambridge http://www.cam.ac.uk/

## 11UAK108 ENGINEERING GRAPHICS LAB

| L | T | P | C |
|---|---|---|---|
| 1 | 0 | 3 | 2 |

***Course Objective:***

- *To develop in students graphic skill for communication of concepts, ideas and design of engineering products.*

### UNIT I CURVES USED IN ENGINEERING PRACTICES 9

Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – Involutes – Drawing of tangents and normal to the above curves.

### UNIT II FREE HAND SKETCHING 9

General principles of orthographic projection – Need for importance of multiple views and their placement – First angle projection – Free hand sketching of multiple views from pictorial views of 3D objects.

### UNIT III PROJECTION OF POINTS, LINES AND SOLIDS 9

Projection of points and straight lines located in the first quadrant – Determination of true lengths and true inclinations of lines - Projection of polygonal surface and circular lamina inclined to any one reference plane - Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.

### UNIT IV SECTIONING OF SOLIDS AND DEVELOPMENT OF SURFACES 9

Sectioning of solids in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other – true shape of section. Development of lateral surfaces of prisms – pyramids – cylinders - cones and truncated solids.

### UNIT V ISOMETRIC PROJECTION 9

Principles of isometric projection – isometric scale – isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones. Introduction to Perspective projection.

**TOTAL HOURS: 45**

**TEXT BOOKS**

1. N.D. Bhatt, “Engineering Drawing”, Charotar Publishing House, 46th Edition, 2003.
2. Modeling software packages like solid edge, unigraphics and Auto CAD

**REFERENCES**


1. Dhananjay A.Jolhe, “Engineering Drawing with an introduction to AutoCAD” Tata McGraw Hill Publishing Company Limited, 2008.
2. Basant Agarwal and Agarwal C.M., “Engineering Drawing”, Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
3. K. R. Gopalakrishnana, “Engineering Drawing” (Vol. I & II), Subhas Publications, 1998.
4. K. V. Natrajan, “A text book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai (2006).

| 11USL201 | COMMUNICATION SKILLS - II | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 0 | 1 | 3 |

*Course Objective*

- *To make students confident to express themselves fluently and appropriately in social and professional contexts and enhance their written communication in business context*

**UNIT I BASIC COMMUNICATION THEORY 9**

Importance of communication -Stages of communication - Modes of communication - Barriers to Communication - Difference between Verbal and Non Verbal communication - Body Language - Psychological and cultural influence on communication

**UNIT II LISTENING AND ANALYSIS 9**

Listening to technical and Non technical material - Intensive listening - Note taking - Cloze Listening - Listening and interpreting the missing texts - Listening to lectures and speeches - Listening to discussions and explanations - Telephonic listening

**UNIT III BUSINESS CORRESPONDENCE 9**

Report writing - Instruction and Recommendations - Memoranda – Notice - Minutes of meeting - Letters and Emails (pertaining to business situations) - Resume and Job applications

**UNIT IV ORAL COMMUNICATION 9**

Basics of Phonetics - Presentation Skills - Role-plays - Group Discussions - Short Extempore - Debates - Conversation Practices

**UNIT V LANGUAGE FOCUS 9**

Introduction to technical writing - Concord – Subject verb agreement - Error detection - Punctuation - Idioms and phrases - American and British Words - One word Substitutes (Technical) - Foreign Phrases

**NON DETAIL STUDY**

Robert Kiyosaki, “Rich Dad Poor Dad” Warner Books, 1998.

**TOTAL HOURS: 45**

## TEXT BOOKS


1. Asraf M Rizvi, “Effective Technical Communication” Tata McGraw.2005
2. Department of Humanities and Social Sciences, Anna University ‘English for Engineers and Technologists’, Combined Edition Volume I and II, Chennai: Orient Longman Private Limited, 2006.


## REFERENCES


1. Boove, Counter R et al “Business Communication Today”, Pearsons Education,2002.
2. Jod O connor, “Better Pronunciation”, Cambridge Paperback, 2008.
3. Meenakshi Raman, “Technical Communication Principle and Practice”, OUP 2007.

| 11USM201 | ENGINEERING MATHEMATICS - II | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 1 | 0 | 4 |

**(**Common to all Branches**)**

*Course Objective*

- To provide strong foundation to the students to expose various emerging new areas of applied mathematics and appraise them with their relevance in Engineering and Technological field.

**PREREQUISITE:**

i) Three dimensional analytical geometry – Direction cosines and Direction ratios, equation of straight line and plane.

ii)Integration – Evaluation of single integrals – Definite integrals and its properties.

iii)Vector algebra – position vector – Dot and Cross product – Properties.

iv)Definition – examples – Modulus and amplitude form – Demovire's theorem – properties of complexvariable.

**UNIT I THREE DIMENSIONAL ANALYTICAL GEOMETRY 9**

Equation of a sphere – Plane section of a sphere – Tangent Plane – Equation of a cone –Right circular cone – Equation of a cylinder – Right circular cylinder.

**UNIT II INTEGRAL CALCULUS 9**

Double integration – Cartesian and polar coordinates – Change of order of Integration – Triple integration in Cartesian co-ordinates – Area as double integral – Volume as triple integral –Beta and Gamma integrals – Properties – Simple problems.

**UNIT III VECTORCALCULUS 9**

Gradient **–** Divergence and Curl **–** Directional derivative **–** Irrotational and Solenoidal vector fields **–** Vector integration: Green's theorem in a plane **–** Gauss divergence theorem **–** stokes' theorem(excluding proofs) **–** Simple applications involving cubes and rectangular parallelepiped**.**

**UNIT IV COMPLEX VARIABLES 9**

Functions of a complex variable – Analytic functions – Necessary conditions and Sufficient conditions(excluding proofs) – Cauchy - Riemann equation – Harmonic and orthogonal properties of analytic function – Harmonic conjugate – Construction of analytic functions – Conformal mapping: $w = c+z$, $w = cz$, $w = 1/z$ and Bilinear Transformation.

**UNIT V COMPLEX INTEGRATION 9**

Complex integration – Statement and applications of Cauchy's integral theorem and Cauchy's integral formula – Cauchy's and Jordan's Lemma(statement only) – Classification of singularities – Calculus of residues – Residue theorem – Application of residue theorem to evaluate real integrals along unit circle and semi-circle.

**TOTAL HOURS: 45 + 15**

**TEXT BOOKS**


1. Erwin Kreyszig, "Advanced Engineering Mathematics", 8th Edition, Wiley India, 2006.
2. Grewal. B.S, "Higher Engineering Mathematics", 40th Edition, Khanna Publications, Delhi, (2007).


**REFERENCES**


1. Ramana B.V, "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, New Delhi, 2007.
2. Glyn James, "Advanced Engineering Mathematics", 3rd Edition, Wiley India, 2007.
3. Jain R.K and Iyengar S.R.K, "Advanced Engineering Mathematics", 3rd Edition, Narosa Publishing House Pvt. Ltd., 2007.
4. George, B Thomas J.R. and Ross L. Finney, "Calculus and Analytical Geometry", 10th Edition, Addison Wesley, 2000.

| 11USC201 | ENVIRONMENTAL SCIENCE AND ENGINEERING | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 0 | 0 | 3 |

*Course Objectives*

- To learn the basic and create awareness of environment and ecology
- To know about the role of an individual in preserving the natural resources and about the various legislations, acts and NGO's that aims to control pollution

**UNIT I ENVIRONMENT & ECOSYSTEM** 9

Introduction – Components of the environment – People, society and environment – Need for public awareness – Scope and importance – Environmental problems and sustainable development. Ecosystem – Concept – Ecosystem degradation – Structure and functions of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Water cycle – Carbon cycle – Oxygen cycle – Nitrogen cycle – Energy cycle – Food chain – Food web – Ecological pyramid – Types of ecosystem – Forest – Grassland – Desert – Aquatic ecosystem- Case Studies in current scenario.

**UNIT II BIODIVERSITY & NATURAL RESOURCES** 9

Biodiversity – Introduction – Ecosystem, Species & Genetic diversity – Biogeographical classification of India – Value of biodiversity – Hotspots of biodiversity – Threats to biodiversity – Conservation of biodiversity. Resources – Introduction – Renewable & Non-renewable resources – Forest resource – deforestation – timber extraction – Water resources – Flood – Drought – Dam – Conflict over water – Food resource – Changes & effects by modern agricultural practices – Overgrazing – Land resource – landslide – Biomass – Some non-renewable sources – Mineral resources – Alternate energy sources- Case Studies in current scenario.

**UNIT III POLLUTION** 9

Pollution – Classification of pollutants – Cause, Source, Effect and Control measures - Air pollution – Causes, types & sources of air pollutant – Effect of air pollutants – Control of air pollution – Water pollution – Source and effects - Thermal pollution – Radioactive pollution – Marine pollution – Pesticidal pollution – Groundwater pollution – Land pollution – Sources and effects of soil pollutant – Solid waste – Methods of solid waste disposal – Soil degradation –

Solid waste management – Recovery and conversion methods – Noise pollution – Sources, effects and control measures – An Introduction to E-Waste Management- Case Studies in current scenario.

**UNIT IV LEGAL ACTS & MAJOR ENVIRONMENTAL CONCERNS 9**

Environmental legislations – Acts – Water act – Air act – Environment act – Land act – Wildlife protection act – Forest acts – Functions of CPCB & SPCB. Water conservation – Rainwater harvesting – Reducing water demand – Watershed management. Disaster – Tsunami – Bhopal gas disaster – Minamata tragedy – Polythene – Disaster management – Nuclear accident – Flood, Earthquake, Cyclone and Landslide. Major issues in environment – Climate change, Global warming, Acid rain and Ozone layer depletion- Case Studies in current scenario.

**UNIT V HUMAN POPULATION & ENVIRONMENT** 9

Population - Population explosion – Effects of population growth on resources – Urbanization - Family welfare programme – Environment and human health – Climate & health, Infectious & water related diseases, Cancer & environment – Human rights – Equity – Nutrition, health and human rights – HIV/AIDS – Women and child welfare - Role of information technology in protecting the environment – Role of individual in the prevention of pollution – Role of NGO's in protecting the environment- Case Studies in current scenario.

**TOTAL HOURS: 45**

**TEXT BOOKS**


1. Anubha Kaushik and C P Kaushik 'Environmental Science and Engineering' Third Edition, New age International(P) Limited, Publisher 2008. New Delhi
2. Aloka Debi, "Environmental Science and Engineering", Universities Press, 2008. (UNIT – 1, 2,3,4,5)


**REFERENCES**


1. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2006. (UNIT – 4: Major issues in environment)
2. Gilbert M. Masters, 'Introduction to Environmental Engineering and Science', Second Edition, Pearson Education, 2004.
3. Tyler Miller, Jr., 'Environmental Science, Brooks/Cole a part of Cengage Learning, 2006.

## 11UCK201 C PROGRAMMING AND PRACTICES

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

*Course Objectives*

- *To learn the control structures of C language*
- *To write programs using Functions & Pointers*
- *To use different data types and multi-dimensional arrays in programs*
- *To write programs using structures and files*

**UNIT I GETTING STARTED 9**

What is a Programming Language – What is a compiler - What is C – Getting started with C – The first C Program – Compilation and Execution – Receiving input – C instructions – Control instructions in C

**UNIT II DECISION, LOOP & CASE CONTROL STRUCTURE 9**

Decisions – if statement – if..else statement – Use of Logical operators – conditional operators. Loops – while loop – for loop – Odd loop – break statement – continue statement – do .. while loop – Decisions using switch – switch vs if else ladder – goto statement

**UNIT III FUNCTIONS & POINTERS 9**

What is a function? – Passing values between functions – scope rule of functions – Calling convention - Advanced features of functions – function declaration and prototypes – call by value and call by reference - An Introduction to Pointers – Pointer Notations – Back to function calls – Conclusions – Recursion – Recursion and Stack.

**UNIT IV DATA TYPES & ARRAYS 9**

Integers (long, short, signed and unsigned) – Chars (Signed and unsigned) – Floats and doubles – Few More issues on data types – storage classes in C – What are arrays – more on arrays – Pointers and Arrays – Two Dimensional Arrays – Array of Pointers – Three Dimensional Array

**UNIT V STRUCTURES & FILES 9**

Why use structures – array of structure - additional features of structures – Uses of Structures – Data Organization – File operations – Counting Characters, Tabs, Spaces, - A file copy program – File opening modes – String I/O in Files – Text Files and Binary Files – Low level Disk I/O – I/O under windows.

**TOTAL HOURS: 45 +15**

**TEXT BOOKS**


1. Yashavant P. Kanetkar, "Let Us C", BPB Publications, 10th Edition, 2009
2. B. W. Kernighan, Dennis M. Ritchie, "The C Programming Language", Pearson Education, 2003


**REFERENCES**


1. Samuel P. Harbison Ill, Guy L. Steele Jr., "C – A Reference Manual", Pearson Education, 5th edition, 2008.
2. Byron S. Gottfried, "Schaum's outline of theory and problems of programming with C", McGraw – Hill Professional, 1996.

| 11UAK201 | ENGINEERING MECHANICS | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 1 | 0 | 4 |

***Course Objective:***

- *Formulate problems in Statics and dynamics by choosing suitable system boundaries and identifying relevant forces and coordinate system*
- *Analyse the equilibrium of systems of forces in two and three dimensions*
- *Determine the loads and stresses experienced by components of common engineering structures such as trusses, frames and beams*
- *Describe and analyse the motion of particles and rigid bodies using three-dimensional vectors*
- *Apply the principles of impulse-momentum and work-energy to solve problems in the dynamics of simple machines.*

**BASICS:** Units and Dimensions, Law of Mechanics, Vectorial representation forces and moments , Vector Operations - Addition, subtraction, dot product, cross product

**UNIT I STATICS OF PARTICLES 9**

Coplanar forces, Resolution and composition of forces - Equilibrium of a particle - Forces in space - Equilibrium of particle in space - Application to simple problems.

**UNIT II STATICS OF RIGID BODIES 9**

Rigid Bodies: Moment of a force about a point - resultant of coplanar non concurrent force systems - Free body Diagram - Types of supports and reactions - Equilibrium of rigid bodies in two dimensions - problems in beams and simple frames only. Friction: Types of friction - Laws of Coulomb Friction - simple problems - ladder friction - screw and belt friction

**UNIT III PROPERTIES OF SURFACES AND SOLIDS 9**

Determination of centroid and centre of gravity of composite sections and solid objects. Area moment of inertia - parallel axis and perpendicular axis theorems - polar moment of inertia - problems on composite sections (comprises rectangle, triangle, circle and semi-circle only) - Introduction to mass moment of Inertia - thin rectangular plate.

**UNIT IV KINEMATICS OF PARTICLES 9**

Rectilinear motion of particles – Displacement – velocity - acceleration and their relationship - Relative motion - Curvilinear motion - Rectangular, Tangential and Normal components of acceleration - Problems in projectile motion and curved paths.

**UNIT V KINETICS OF PARTICLES 9**

Newton's second Law - D Alembert's principle - Dynamic equilibrium - Work Energy equation of particles - Principles of impulse and momentum - application to simple problems - Collision of Elastic bodies – Direct central impact.

**TOTAL HOURS : 45 + 15**

**TEXT BOOKS**


1. S.Rajasekaran, G. Sankarasubramanian, "Fundamentals of Engineering Mechanics", Vikas Publishing House pvt. Ltd., New Delhi, 2006.
2. M.S. Palanichamy, S. Nagan, "Engineering Mechanics – Statics and Dynamics", Tata McGraw Hill publishing Company, New Delhi, 2008.


**REFERENCES**


1. Dr. N. Kottiswaran, "Engineering Mechanics – Statics and Dynamics", Sri Balaji Publication, 2008.
2. Beer F.P and Johnson E.R., "Vector Mechanics for Engineers – Statics and Dynamics", Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2001.
3. R.C. Hibbeler, "Engineering Mechanics", Pearson education Asia Pvt. Ltd, 2007.

## 11USP202 SCIENCE OF ENGINEERING MATERIALS

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

(Common to all Circuit Branches)

*Course Objective*

- To give an exposure to the Students on materials and their applications in the field of Technology, and also to create awareness towards the impact of the materials.

**UNIT I CRYSTAL STRUCTURE 9**

Definition of a Crystal – Crystal classification - Unit Cell – Bravais Lattice – Miller Indices – Bragg's Law – Determination of Crystal structure by Debye Scherrer method - Crystal imperfections – Point, Line and Surface imperfections - Burger Vector

**UNIT II COMPOSITIES 9**

Definition, Function of matrix and reinforcement in composites. Classifications of composites based on reinforcement. Types of composite materials – polymer, metallic and ceramic matrix composites(qualitative). Law of mixtures. Comparison with conventional materials. Applications in surgery, sports equipment.

**UNIT III DIELECTRIC MATERIALS AND DEVICES 9**

Definition of dielectrics. Electric dipole moment. Electric polarization. Dielectric constant. Electric susceptibility. Polarisation mechanisms – Electronic, Ionic, Orientation and Space charge polarization. Variation of dielectric constant with temperature and frequency. Dielectric breakdown - Dielectric Breakdown mechanisms. Classification of insulators on temperature basis. Capacitance and transducer.

**UNIT IV ADVANCED MATERIALS 9**

Shape Memory Alloy (SMA) – Characteristics, Properties of NiTi alloy, Application, Advantages and Disadvantages of SMA. Superconductivity – Types of superconductors High Tc Superconductors, Comparison with low Tc superconductors. Application of Superconductors, Metallic glasses – Preparation, Properties and Applications

**UNIT V BIO MATERIALS 9**

Definition and classification of biomaterials. Construction materials, Impact of biomaterials. Mechanical Properties – wound healing process. Tissue response to implants. Safety and efficiency testing. Bio-compatibility. Biodegradable ceramics – Biodegradable synthetic polymers. Silicone rubber. Plasma polymerization. Micoorganism in polymeric implants. Bio polymers. Polymer sterilization.

**TOTAL HOURS:45**

**TEXT BOOKS**


1. William D Callister, Jr "Material Science and Engineering" John wiley and Sons, New York, 2007
2. Shaffer, J.P.Saxena, A, Antolorich, S D Sanders Jr. T.H. and Warner S.B., "The Science and Design of Engineering Materials", The McGraw Hill Co. Inc, New York 1999


**REFERENCES**


1. Jayakumar, S "Materials Science", RK Publishers, Coimbatore 2006.
2. Raghavan, V. "Materials Science and Engineering – A First Course" Prentice Hall of India, New Delhi 2004.
3. James F Shackelford S, "Introduction to Materials Science for Engineers", Third Edition, Macmillan Publishing Company, Newyork, 1992.

| 11USH211 | PHYSICAL SCIENCES LAB II | L | T | P | C |
|---|---|---|---|---|---|
| | | 0 | 0 | 3 | 1 |

**AIM**

To provide exposure to the students with hands-on experience on scientific equipments

1. Comparative resistivities of alloy and metal – Meter Bridge.
2. Determination of efficiency of a solar cell.
3. Characteristics of photodiode.
4. Determination of lattice constant X-ray powder photograph.
5. Determination of Rigidity modulus- Torsion Pendulum
6. Determination of Young's modulus of the material – Non uniform bending

**DEMONSTRATION:**

7. Ultrasonic Cleaning.

| 11UCK202 | C PROGRAMMING LAB | L | T | P | C |
|---|---|---|---|---|---|
| | | 0 | 0 | 3 | 2 |

*Course Objective*

- *To gain mastery over the C language*

**List of Programs / Experiments can be setup by the faculty with the following**

1. Programming concepts involving I/O statements.
2. Programming concepts involving conditional statements.
3. Programming concepts involving looping statements.
4. Programming concepts involving functions.
5. Programming concepts involving Arrays (1D, 2D).
6. Programming concepts involving Pointers.
7. Programming concepts involving Structures.
8. Programming concepts involving Files.

*Note: The above programs will be tuned to the various fundamental principles in the specific engineering branches*

**TOTAL HOURS: 30**

## 11UAK204 ENGINEERING PRACTICES LAB

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

***Course Objective:***

- *To provide fundamental knowledge and hands on experience to the students on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.*

**GROUP A (MECHANICAL & CIVIL)**

**MECHANICAL ENGINEERING PRACTICE**

**Sheet Metal:** Study of tools, equipments and safety precautions, Different types of joints - knocked up, double grooving joints, Model making –Tray and Funnel.

**Welding:** Arc welding practice - butt joint, lap joints and tee joints, Demonstration of gas welding.

**CIVIL ENGINEERING PRACTICE**

**Plumbing:** Preparation of plumbing line sketches for (i) water supply lines (ii) sewage lines, Cutting and threading of PVC pipes**,** Basic pipe connection using valves, taps, couplings, unions, reducers, elbows in household fitting.

**Wood Work:** Sawing, planing, making common joints like T joint, dovetail joint, etc. using power tools, Study of joints in door panels and wooden furniture.

Basic Construction Tools: **Demonstration of power tools like rotary**

**TOTAL HOURS: 45**

| 11USM301 | ENGINEERING MATHEMATICS III | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 1 | 0 | 4 |

**(**Common to ECE, EEE, CSE & IT)

*Course Objective*

- To provide strong foundation to the students to expose various emerging new areas of applied mathematics and appraise them with their relevance in Engineering and Technological field.

**PRE-REQUISITE:**

Limit concepts, Integration, Periodic function, Basic terminologies of odd and even functions

**UNIT I FOURIER SERIES 9**

Dirichlet's conditions – General Fourier series – Odd and even functions – Half range sine series – Half range cosine series – Complex form of Fourier Series – Parseval's identity – Harmonic Analysis.

**UNIT II FOURIER TRANSFORMS 9**

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

**UNIT III PARTIAL DIFFERENTIAL EQUATIONS 9**

Formation of partial differential equations – Lagrange's linear equation – Solutions of standard types of first order partial differential equations - Linear partial differential equations of second and higher order with constant coefficients-Classification of PDE-Method of separation of variables.

**UNIT IV Z -TRANSFORMS AND DIFFERENCE EQUATIONS 9**

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

**UNIT V LAPLACE TRANSFORMS 9**

Laplace transforms – Conditions for existence – Transform of elementary functions – Basic properties – Transform of derivatives and integrals – Transform of unit step function and impulse functions – Transform of periodic functions. Definition of Inverse Laplace transforms as contour integral – Convolution theorem (excluding proof) – Initial and Final value theorems – Solution of linear ODE of second order with constant coefficients using Laplace transformation techniques.

**TOTAL HOURS: 45 + 15**

**TEXT BOOKS**


1. Grewal, B.S, 'Higher Engineering Mathematics' $40_{th}$ Edition, Khanna publishers, Delhi, (2007)
2. Erwin Kreyszig 'Advanced Engineering Mathematics' , Eighth edition - Wiley India (2007).


**REFERENCES**


1. Ramana.B.V. 'Higher Engineering Mathematics' Tata Mc-Graw Hill Publishing Company limited, New Delhi (2007).
2. Glyn James, 'Advanced Modern Engineering Mathematics', Third edition- Pearson Education (2007).
3. Bali.N.P and Manish Goyal 'A Textbook of Engineering Mathematics', Seventh Edition, Laxmi Publications (P) Ltd. (2007)

## 11UCK301 DATA STRUCTURES AND ALGORITHMS - I

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

*Course Objective*

- *The purpose of this course is to provide the students with solid foundations in the basic concepts of programming, Data Structures and Algorithm Analysis.*

**UNIT I INTRODUCTION TO ALGORITHM ANALYSIS AND DATA STRUCTURES 9**

**Introduction to Data Structures:** Concept of Data, Data type, Data structure, Abstract Data Types (ADT) - Concept of Primitive and Non primitive, linear and Non-linear, Static and Dynamic Data Structures.

**Analysis of algorithm:** frequency count and its importance in analysis of an algorithm, Time complexity & Space complexity of an algorithm, Big 'O', 'Ω' and 'θ' notations, Best, Worst and Average case analysis of an algorithm

**.UNIT II LIST ADT USING SEQUENTIAL ORGANIZATION 9**

Concept of sequential organization - Concept of Linear data structures - arrays as ADT, List ADT - Operations like insertion, deletion, traversal & other operations on this data structure – Algorithm Analysis, Storage representation of array - Row major and Column major, Multidimensional arrays

**Applications:** Polynomial Representation using arrays – Polynomial Addition, Ordered List

**UNIT III LIST ADT USING LINKED ORGANIZATION 9**

Limitations of static memory allocation - Dynamic memory allocation in C - Concept of linked organization - Singly linked list, Doubly linked list, Circular linked list - Operations like insertion, deletion, traversal & other operations on these data structures- Algorithm Analysis

**Applications:** Representation & manipulation of polynomials using linked lists.

**UNIT IV STACK 9**

Stacks: Concept of stack as ADT, Representation and Implementation of stack using sequential & Linked Allocation

**Applications:** Examples using implicit stack, Recursion Smulation using external stack, Arithmetic expression conversion & evaluation, reversing a string - well- formed parenthesis checking, The Tower of Hanoi Problem, 8-Queens Problem

**UNIT V QUEUES 9**

Queues: Concept of queue as ADT - Representation and implementation of linear queue & circular queue using sequential & linked organization. **Applications:** Josephus Problem – Job Scheduling - Double ended queue, Priority queue, Fibonacci Array, Yangvi Triangle

**TOTAL HOURS: 45**

**TEXT BOOKS**


1. Data Structures and Algorithm Analysis in C, Mark Allen Weiss, Addision wilsey, second edition, 2004.
2. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, “Introduction to Algorithms”, PHI Pvt. Ltd., 2001.
3. J. Tremblay, P. Soresan, “An introduction to data structures with Applications”, 2nd edition, Tata McGraw-Hill International Editions, 1984.


**REFERENCES**


1. A. Aho, J. Hopcroft, J. Ulman, “Data Structures and Algorithms”, Pearson Education, 1998.
2. A.V.Aho, J.E. Hopcroft and J.D.Ullman, “The Design and Analysis Of Computer Algorithms”, Pearson Education Asia, 2003.
3. Data Structures and Program Design in C, Robert Kruse, Tondo CL, Bruce Leung, Shashi Mogalla, 2nd edition, Pearson education, 2009.

| 11UCK302 | DIGITAL PRINCIPLES AND SYSTEM DESIGN | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 1 | 0 | 4 |

*Course Objectives*

- *To learn the basic methods for the design of digital circuits and fundamental concepts used in the design of digital systems.*
- *To understand different methods used for the simplification of Boolean functions*
- *To outline the formal procedures for the analysis and design of combinational circuits*
- *To introduce the concept of memories and programmable logic devices*
- *To design and implement synchronous sequential circuits*
- *To design and implement asynchronous sequential circuits*
- *To study the fundamentals of HDL in Verilog*

**UNIT I BOOLEAN ALGEBRA AND LOGIC GATES 12**

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

**UNIT II COMBINATIONAL LOGIC 12**

Combinational circuits – Analysis and design procedures - Circuits for arithmetic operations - Code conversion - Decoders and encoders - Multiplexers and demultiplexers - Memory and programmable logic

**UNIT III SYNCHRONOUS SEQUENTIAL LOGIC 12**

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

**UNIT IV ASYNCHRONOUS SEQUENTIAL LOGIC 12**

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

**UNIT V HDL USING VERILOG 12**

Introduction to Verilog – Language constructs and conventions – gate level modelling - data flow level modeling – behavioral modeling

**TOTAL HOURS: 60**

**TEXT BOOKS**


1. M.Morris Mano, "Digital Design", 3rd edition, Pearson Education.
2. T. R. Padmanabhan, B. Bala Tripura Sundari ,Design through Verilog HDL, John Wiley and Sons Publications.


**REFERENCES**


1. Charles H.Roth, Jr. "Fundamentals of Logic Design", 4th Edition, Jaico Publishing House.
2. Donald D.Givone, "Digital Principles and Design", Tata McGraw-Hill.
3. Stephen Brown and Zvonko Vranesic, Fundamentals of Digital Logic with Verilog Design, McGraw Hill.

| 11UCK303 | INDUSTRIAL PSYCHOLOGY AND WORK ETHICS | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 0 | 0 | 3 |

*Course Objectives:*

- *To create an awareness on Industrial Psychology and work ethics.*
- *To instill Moral and Social Values and Loyalty*
- *To appreciate the rights of Others*

**UNIT I HUMAN VALUES 9**

Morals, Values and Ethics – Integrity – Work Ethic – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – caring – Sharing – Honesty – Courage – Valuing Time – Co-operation – Commitment – Empathy – Self-Confidence – Character – Spirituality

**UNIT II ENGINEERING ETHICS 9**

Senses of 'Engineering Ethics' - variety of moral issued - types of inquiry - moral dilemmas - moral autonomy - Kohlberg's theory - Gilligan's theory - consensus and controversy – Models of Professional Roles - theories about right action - Self-interest - customs and religion - uses of ethicaltheories.

**UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION 9**

Engineering as experimentation - engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger case study

**UNIT IV SAFETY, RESPONSIBILITIES AND RIGHTS 9**

Safety and risk - assessment of safety and risk - risk benefit analysis and reducing risk - the three mile island and chernobyl case studies. Collegiality and loyalty - respect for authority - collective bargaining - confidentiality - conflicts of interest - occupational crime - professional rights - employee rights - Intellectual Property Rights(IPR)-discrimination.

**UNIT V GLOBAL ISSUES 9**

Multinational corporations - Environmental ethics - computer ethics - weapons development - engineers as managers-consulting engineers-engineers as expert witnesses and advisors -moral

leadership-sample code of Ethics like ASME, ASCE, IEEE, Institution of Engineers (India), Indian Institute of Materials Management, Institution of electronics and telecommunication engineers(IETE),India,etc.

Case Study: Work ethics and Social Ethics

**TOTAL HOURS: 45**

**TEXT BOOKS**


1. Mike Martin and Roland Schinzinger, “Ethics in Engineering”, McGraw-Hill, New York 1996.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, “Engineering Ethics”, Prentice Hall of India, New Delhi, 2004.


**REFERENCES**


1. Charles D. Fleddermann, “Engineering Ethics”, Pearson Education / Prentice Hall, New Jersey, 2004 (Indian Reprint)
2. 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)
3. John R Boatright, “Ethics and the Conduct of Business”, Pearson Education, New Delhi, 2003.

## 11UCK304 OBJECT ORIENTED PROGRAMMING

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

*Course Objectives*

- *To introduce object oriented programming paradigm and the importance of it in software development.*
- *To introduce the basic OOPS concepts*
- *To introduce the merits of OOPS*
- *To enable the student in developing simple applications using C++*

**UNIT I INTRODUCTION TO OBJECT-ORIENTED PROGRAMMING PARADIGM & C++ 9**

Object-oriented technology – Programming paradigms – Key concepts of object-oriented programming – objects – classes – method – abstraction – encapsulation – inheritance – polymorphism – Advantages of OOPS.

C++ - Input & output feature- Stream classes – Formatted & unformatted data – Unformatted & formatted console I/O operations – Bit fields – Manipulators - Declarations – Basic & user-defined data type in C++ - Typecasting - Operators in C++ – Control structures & loops in C++.

**UNIT II CLASSES, OBJECTS AND MEMBER FUNCTIONS IN C++ 9**

Classes & objects in C++ - Access specifiers – Member functions – Static member variables, member functions and object – Array of object – Inline function - friend function – Constructor and destructor – Copy constructor – Dynamic initialization using constructors – Dynamic operators and constructors.

**UNIT III INHERITANCE AND POLYMORPHISM 9**

Inheritance – Types of inheritance – Virtual base class – Abstract classes.Polymorphism – Overloading – Function overloading - Overloading unary and binary operators - Overloading new and delete operators – Overriding – Runtime binding – Virtual function – Pure virtual function – Introduction to Run Time Type Information.

**UNIT IV EXCEPTION HANDLING AND TEMPLATES IN C++ 9**

Exception handling – Principles – Exception handling mechanism – Multiple catch statement – Rethrowing exception – Specifying exception – Exceptions in constructors and destructors.

Generic programming – Templates – Class template – Function template – Templates with more parameters – Overloading of template functions – Member function templates.

**UNIT V FILE HANDLING, STRINGS AND NAMESPACE IN C++ 9**

File stream classes – File operations – File opening modes – File pointers and manipulators – Manipulators with arguments – Sequential read and write operations – Binary & ASCII files – Random access operation.Strings in C++ - String objects – Relational operators – String attributes – Accessing elements of strings – Namespace – Nested namespace.

**TOTAL HOURS: 45**

**TEXT BOOKS**


1. Ashok N. Kamthane, "Object-oriented programming with ANSI & Turbo C++", Pearson Education, 2009.
2. Bhushan Trivedi, "Programming with ANSI C++", Oxford University Press, 2009.


**REFERENCES**


1. K.R. Venugopal, Rajkumar and T. Ravishankar, "Mastering C++", Tata McGraw-Hill, 2008.
2. Bjarne Stroustrup, "The C++ Programming Language", 3rd Edition, Pearson Education, 2009.
3. Ira Pohl, "Object-Oriented Programming Using C++", Second Edition, Pearson Education, 2005.

## 11UCK305 PC HARDWARE AND TROBLESHOOTING

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

*Course Objectives*

- *To understand PC related concepts*
- *To study the various peipheral devices in the PC*
- *To enable the students to install, troubleshoot and maintain the PC*

**UNIT I INTRODUCTION 9**

Introduction - Computer Organization – Number Systems and Codes – Memory – ALU – CU – Instruction prefetch – Interrupts – I/O Techniques – Device Controllers – Error Detection Techniques – Microprocessor – Personal Computer Concepts – Advanced System Concepts – Microcomputer Concepts – OS – Multitasking and Multiprogramming – Virtual Memory – Cache Memory – Modern PC and User.

**UNIT II PERIPHERAL DEVICES 9**

Introduction – Keyboard – CRT Display Monitor – Printer – Magnetic Storage Devices – FDD – HDD – Special Types of Disk Drives – Mouse and Trackball – Modem – Fax Modem – CD ROM Drive – Scanner – Digital Camera – DVD – Special Peripherals.

**UNIT III PC HARDWARE OVERVIEW 9**

Introduction – Hardware BIOS DOS Interaction – The PC family – PC hardware – Inside the System Box – Motherboard Logic – Memory Space – Peripheral Interfaces and Controllers – Keyboard Interface – CRT Display interface – FDC – HDC.

**UNIT IV INSTALLATION AND PREVENTIVE MAINTENANCE 9**

Introduction – system configuration – pre installation planning – Installation practice – routine checks – PC Assembling and integration – BIOS setup – Engineering versions and compatibility – preventive maintenance – DOS – Virus – Data Recovery.

**UNIT V TROUBLESHOOTING 9**

Introduction – computer faults – Nature of faults – Types of faults – Diagnostic programs and tools – Microprocessor and Firmware – Programmable LSI's – Bus Faults – Faults Elimination process – Systematic Troubleshooting – Symptoms observation and analysis – fault diagnosis – fault rectification – Troubleshooting levels – FDD, HDD, CD ROM Problems.

**TOTAL HOURS: 45**

**Text Book:**

1. B. Govindarajalu, “IBM PC Clones Hardware, Troubleshooting and Maintenance”, 2/E, TMH, 2002.

**References:**

1. Peter Abel, Niyaz Nizamuddin, “IMB PC Assembly Language and Programming”, Pearson Education, 2007

2. Scott Mueller, “Repairing PC's”, PHI,1992

| 11UCK306 | DATA STRUCTURES LAB - I | L | T | P | C |
|---|---|---|---|---|---|
| | | 0 | 0 | 3 | 2 |

**LIST OF EXPERIMENTS**

1. C Programs explaining the concepts of using
    a) arrays
    b) Pointers
    c) Structures - Passing and returning structure as parameter for function
    d) Structures and Pointers
    e) Functions & Recursion
    f) String manipulations
2. Implementation of ordered list using arrays and performs list operations.
3. Polynomial manipulation using arrays
4. Implementation of linked list ( Singly & Doubly)
5. Polynomial manipulation using linked list
6. Stack Applications
    a) desk calculator
    b) Infix to postfix conversion
    c) Balancing parenthesis
    d) Reverse a string
    e) Tower of Hanoi problem
7. Implementation of linked queue
8. Queue Applications
    a) Job Scheduling
    b) Priority Queue
    c) Deque

**TOTAL HOURS: 45**

| 11UCK307 | DIGITAL LAB | L | T | P | C |
|---|---|---|---|---|---|
| | | 0 | 0 | 3 | 2 |

**LIST OF EXPERIMENTS**

1. Study of logic gates
2. Verification of Boolean theorems using digital logic gates
3. Design and implementation of combinational circuits using basic gates for arbitrary functions.
4. Design and implementation of binary adder / subtractor using basic gates.
5. Design and implementation of parity generator / checker using basic gates.
6. Design and implementation of magnitude comparator.
7. Design and implementation of code converter.
8. Design and implementation of Decoder/Encoder.
9. Design and implementation of applications using Decoder/Encoders.
10. Design and implementation of Multiplexer/Demultiplexer.
11. Design and implementation of applications using Multiplexers/Demultiplexers.
12. Study of flipflops.
13. Design and implementation of Shift registers.
14. Design and implementation of Synchronous and Asynchronous counters.
15. Simulation of combinational circuits using Hardware Description Language (Verilog HDL software required).
16. Simulation of sequential circuits using Hardware Description Language (Verilog HDL software required).

**TOTAL HOURS: 45**

## 11UCK308 OBJECT ORIENTED PROGRAMMING LAB

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

*Course Objectives*

- *To introduce object oriented programming paradigm and the importance of it in software development.*
- *To introduce the basic OOPS concepts*
- *To introduce the merits of OOPS*
- *To enable the student in developing simple applications using C++*

**LIST OF EXPERIMENTS**

1. Functions in C++
   - Functions with default arguments
   - Implementation of Call by Value, Call by Address and Call by Reference
   - Inline function
2. Classes & objects illustrating the following concepts:
   - Constructor & destructor
   - Member variable & member function
   - Constant data members
   - Static member variable & functions
   - Copy constructor
   - Friend function
3. Compile time Polymorphism
   - Function overloading
   - Overloading unary and binary operator
   - Overloading new and delete operator
4. Inheritance
   - Single inheritance
   - Multiple inheritance
   - Multipath inheritance
   - Virtual base class

5. Runtime Polymorphism
    - Overriding
    - Virtual function
    - Run Time Type Information
6. File Handling
    - Sequential access
    - Random access
7. Simple ADT implementation (Linked list, Stack and Queue) using templates.
8. Exception handling mechanism.

**TOTAL HOURS: 45**

| 11USM404 | DISCRETE MATHEMATICS | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 1 | 0 | 4 |

(Common to CSE & IT)

*Course Objectives*

- To provide strong foundation to the students to expose various emerging new areas of applied mathematics and appraise them with their relevance in Engineering and Technological field.

**PREREQUISITE:**

Basic concepts – Notations – Subset – Algebra of sets – The power set – Ordered pairs and Cartesian product – Propositions – Logical connectives – Compound propositions – Conditional and biconditional – Truth tables **–** Binary operations **–** special types of binary operations.

**UNIT I PROPOSITIONAL CALCULUS 9**

Tautologies and contradictions – Contrapositive – Logical equivalences and implications – Normal forms – Principal conjunctive and disjunctive normal forms – Rules of inference – Predicates – Statement function – Variables – Free and bound variables – Quantifiers –Universe of discourse – Logical equivalences and implications for quantified statements – Theory of inference – The rules of universal specification and generalization.

**UNIT II RECURRENCE RELATION 9**

Recurrence – Introduction – Recurrence relation models – Solution of recurrence relation by substitution – Method of characteristic roots – Solution of non-homogeneous linear finite order recurrence relations – Divide and conquer recurrence relation – Master's theorem.

**UNIT III RELATIONS AND FUNCTIONS 9**

Relations – Representation of a relation – operations on relations – Equivalence relations – Patition and Equivalence classes – Partial ordering – Functions– Representation of functions – Type of functions – Composition of functions – Inverse functions –Characteristic function of a set – Permutation functions – Hashing function – Primitive recursive function.

**UNIT IV LATTICES AND BOOLEAN ALGEBRA 9**

Poset – Hasse diagram – Lattices and their properties – Sublattices – Lattice Homomorphism – Some special lattices – Boolean algebra –Properties of Boolean algebra – Dual and Principal of Duality – Subalgebra – Boolean Homomorphism – Karnaugh map.

**UNIT V GROUP THEORY 9**

Algebraic systems – Semigroups – Monoids – Sub semigroups and Submonoids – Groups – Order of a group – Group Homomorphism – Cosets – Normal subgroups – Coding theory– Encoders and decoders – Group codes – Hamming distance – Procedure for generating group codes –Error correction in group codes – Step by step procedure for Decoding group codes.

**TOTAL HOURS: 45 + 15**

**TEXT BOOKS**

1. Kenneth H.Rosen, "Discrete Mathematics and its Applications", Sixth Edition, Tata McGraw – Hill Pub. Co. Ltd., New Delhi, 2006.
2. Ralph. P. Grimaldi, "Discrete and Combinatorial Mathematics: An Applied Introduction", Fourth Edition, Pearson Education Asia, Delhi, 2002.

**REFERENCES**

1. Bernard Kolman, Robert C. Busby, Sharan Cutler Ross, "Discrete Mathematical Structures", Fourth Indian reprint, Pearson Education Pvt Ltd., New Delhi, 2003.
2. Trembly J.P and Manohar R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw–Hill Pub. Co. Ltd, New Delhi, 2003
3. T. Veerarajan, "Discrete mathematics with Graph theory and Combinatorics", Tata McGraw – Hill Pub. Co. Ltd., New Delhi, 2008.

| 11UCK401 | DATA STRUCTURES AND ALGORITHMS - II | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 1 | 0 | 4 |

*Course Objective*

- *The purpose of this course is to provide the students with solid foundations in the basic concepts of programming, Data Structures and Algorithm Analysis.*

**UNIT I SORTING TECHNIQUES 9**

Need of Sorting - Internal Sorting: Algorithms for Bubble sort, Selection sort, Insertion sort, Shell Sort, Radix sort, Quick sort and Merge sort. Analysis of each sorting technique for best, worst and average case - External Sorting

**UNIT II TREES AND BINARY TREES 9**

Tree Definition and Concepts – Representation of general tree – Application – Binary tree – Binary tree Traversals – Applications – Threaded Binary Tree – Forest - Huffman coding

**UNIT III SEARCHING TECHNIQUES 9**

Concepts of searching - Static Searching Table - Sequential searching - Dichotomy searching in sorted table- Indexed sequential searching table - Dynamic Searching - Binary search tree - Balanced binary search tree (AVL tree) - Splay Tree - M-branch balanced search trees (B-Tree) – Hash Searching Table

**UNIT IV GRAPH AND ALGORITHMS 9**

Graph Definition and Concepts - Graph ADT and Storage Implementation - Graph Traversal and Bi-Connectivity – Minimum Spanning Tree - Shortest Path Algorithms - Topological Sorting – Applications

**UNIT V ALGORITHM DESIGN METHODS 9**

Divide and Conquer – Decrease and Conquer - Backtracking – Hamiltonian Circuit problem – Subset-Sum problem – Branch and bound – Assignment problem – Knapsack problem – Traveling salesman problem.

**TOTAL HOURS : 45 + 15**

**TEXT BOOKS**


1. Data Structures and Algorithm Analysis in C, Mark Allen Weiss, Addision wilsey, second edition, 2004.
2. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, “Introduction to Algorithms”, PHI Pvt. Ltd., 2001.
3. J. Tremblay, P. Soresan, “An introduction to data structures with Applications”, 2nd edition, Tata McGraw-Hill International Editions, 1984.


**REFERENCES**


1. A. Aho, J. Hopcroft, J. Ulman, “Data Structures and Algorithms”, Pearson Education, 1998.
2. A.V.Aho, J.E. Hopcroft and J.D.Ullman, “The Design and Analysis Of Computer Algorithms”, Pearson Education Asia, 2003.
3. Data Structures and Program Design in C, Robert Kruse, Tondo CL, Bruce Leung, Shashi Mogalla, 2nd edition, Pearson education, 2009.

## 11UCK402 MICROPROCESSORS AND INTERFACING

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

*Course Objectives*

- *To have an in depth knowledge of the architecture and programming of 8-bit and 16-bit Microprocessors, Microcontrollers and to study how to interface various peripheral devices with them.*
- *To study the architecture and Instruction set of 8085 and 8086*
- *To develop assembly language programs in 8085 and 8086.*
- *To design and understand multiprocessor configurations*
- *To study different peripheral devices and their interfacing to 8085/8086.*
- *To study the architecture and programming of 8051 microcontroller.*

**UNIT I THE 8085 MICROPROCESSOR 9**

Introduction to microprocessor - 8085 Microprocessor architecture-Addressing modes-Instruction set-Programming the 8085 -Latest Microprocessor - Applications.

**UNIT II THE 8086 MICROPROCESSOR 9**

Intel 8086 microprocessor - Architecture - Signals- Instruction Set- Addressing Modes-Assembler Directives- Assembly Language Programming.

**UNIT III MULTIPROCESSOR CONFIGURATION 9**

Coprocessor Configuration – Closely Coupled Configuration – Loosely Coupled Configuration – 8087 Numeric Data Processor – Data Types – Architecture –8089 I/O –Communication between MPU and CPU.

**INTERFACING**

Memory interfacing and I/O interfacing with 8085 and 8086.

**UNIT IV PERIPHERAL CONTROLLERS 9**

Parallel communication interface –serial communication interface – timer-keyboard/display controller – interrupt controller –DMA controller (8237)

**UNIT V MICROCONTROLLERS 9**

Architecture of 8051 - Signals - Operational features - Memory and I/O addressing - Interrupts - Latest Microcontrollers -Applications.

**TOTAL HOURS: 45**

**TEXT BOOKS**


1. Ramesh S.Gaonkar, "Microprocessor - Architecture, Programming and Applications with the 8085", Penram International publishing private limited, fifth edition,2006.
2. Yu-cheng Liu, Glenn A.Gibson, "Microcomputer systems: The 8086 / 8088 Family architecture, Programming and Design", second edition,PHI 2006.


**REFERENCES**


1. A.K. Ray & K.M.Bhurchandi, "Advanced Microprocessors and peripherals-Architectures, Programming and Interfacing", second edition,TMH, 2006.
2. Douglas V.Hall, "Microprocessors and Interfacing: Programming and Hardware", TMH, Third edition,2006.
3. Mohamed Ali Mazidi, Janice Gillispie Mazidi, "The 8051 microcontroller and embedded systems", Pearson education, second edition, 2007.
4. Kenneth J.Ayala ,"The 8051 Microcontroller Architecture ,Programming and applications",second edition ,Penram International.

| 11UCK403 | SYSTEM SOFTWARE | L | T | P | C |
|---|---|---|---|---|---|
| | | 2 | 0 | 2 | 4 |

*Course Objectives*

- *To have an understanding of foundations of design of assemblers, loaders, linkers, and macro processors.*
- *To understand the relationship between system software and machine architecture.*
- *To know the design and implementation of assemblers*
- *To know the design and implementation of linkers and loaders.*
- *To have an understanding of macro processors.*
- *To have an understanding of system software tools.*

**UNIT I INTRODUCTION 9**

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

**UNIT II ASSEMBLERS 9**

Basic assembler functions - A simple SIC assembler – Assembler algorithm and data structures - Machine dependent assembler features - Instruction formats and addressing modes – Program relocation - Machine independent assembler features - Literals – Symbol-defining statements – Expressions - One pass assemblers and Multi pass assemblers - Implementation example - MASM assembler.

**UNIT III LOADERS AND LINKERS 9**

Basic loader functions - Design of an Absolute Loader – A Simple Bootstrap Loader - Machine dependent loader features - Relocation – Program Linking – Algorithm and Data Structures for Linking Loader - Machine-independent loader features - Automatic Library Search – Loader Options - Loader design options - Linkage Editors – Dynamic Linking – Bootstrap Loaders - Implementation example - MSDOS linker.

**UNIT IV MACRO PROCESSORS 9**

Basic macro processor functions - Macro Definition and Expansion – Macro Processor Algorithm and data structures - Machine-independent macro processor features - Concatenation of Macro Parameters – Generation of Unique Labels – Conditional Macro Expansion – Keyword Macro Parameters-Macro within Macro-Implementation example - MASM Macro Processor – ANSI C Macro language.

**UNIT V COMPILERS AND UTILITIES 9**

Introduction to compilers - Different phases of compiler - System software tools- Text editors - Overview of the Editing Process - User Interface – Editor Structure. - Interactive debugging systems - Debugging functions and capabilities – Relationship with other parts of the system – User-Interface Criteria.

**TOTAL HOURS: 45**

**TEXT BOOKS**


1. Leland L. Beck, "System Software – An Introduction to Systems Programming"**,** 3rd Edition, Pearson Education Asia, 2000.
2. D. M. Dhamdhere, **"**Systems Programming and Operating Systems"**,** Second Revised Edition, Tata McGraw-Hill, 1999.


**REFERENCES**


1. John J. Donovan "Systems Programming"**,** Tata McGraw-Hill Edition, 1972.

## 11UBK421 PRINCIPLES OF COMMUNICATION

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

*Course Objectives*

- *To Know the fundamentals of analog and digital communication*
- *To understand the various modulation techniques*
- *To have an introduction on multiple access techniques*

**UNIT I FUNDAMENTALS OF ANALOG COMMUNICATION 9**

Principles of amplitude modulation, AM envelope, frequency spectrum and bandwidth, modulation index and percent modulation, AM Voltage distribution, AM power distribution, Angle modulation - FM and PM waveforms, phase deviation and modulation index, frequency deviation and percent modulation, Frequency analysis of angle modulated waves. Bandwidth requirements for Angle modulated waves.

**UNIT II DIGITAL COMMUNICATION 9**

Introduction, Shannon limit for information capacity, digital amplitude modulation, frequency shift keying, FSK bit rate and baud, FSK transmitter, BW consideration of FSK, FSK receiver, phase shift keying – binary phase shift keying – QPSK, Quadrature Amplitude modulation, bandwidth efficiency, carrier recovery – squaring loop, Costas loop, DPSK.

**UNIT III DIGITAL TRANSMISSION 9**

Introduction, Pulse modulation, PCM – PCM sampling, sampling rate, signal to quantization noise rate, companding – analog and digital – percentage error, delta modulation, adaptive delta modulation, differential pulse code modulation, pulse transmission – Intersymbol interference, eye patterns.

**UNIT IV DATA COMMUNICATIONS 9**

Introduction, History of Data communications, Standards Organizations for data communication, data communication circuits, data communication codes, Error control, Error Detection, Error correction, data modems, Asynchronous modem, Synchronous modem, low-speed modem, medium and high speed modem, modem control.

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

Introduction, Pseudo-noise sequence, DS spread spectrum with coherent binary PSK, processing gain, FH spread spectrum, multiple access techniques – wireless communication, TDMA and

CDMA in wireless communication systems, source coding of speech for wireless communications.

**TOTAL HOURS : 45 +15**

**TEXT BOOKS**

1. Wayne Tomasi, “Advanced Electronic Communication Systems”, 5/e, Pearson Education, 2004.

2. Simon Haykin, “Communication Systems”, 4th Edition, John Wiley & Sons., 2001.

**REFERENCES**

1. H.Taub,D L Schilling ,G Saha ,”Principles of Communication”3/e,2007.

2. B.P.Lathi,”Modern Analog And Digital Communication systems”, 3/e, Oxford University Press, 2007

3. Blake, “Electronic Communication Systems”, Thomson Delmar Publications, 2002.

4. Martin S.Roden, “Analog and Digital Communication System”, 3rd Edition, PHI, 2002.

| 11UCK404 | OPERATING SYSTEM | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 0 | 0 | 3 |

*Course Objectives*

- *Our goal is to learn what an operating system is, what its parts are, how each of those parts work, and to become familiar with the inner workings of operating systems*
- *Define, explain, and apply operating systems concepts: Process management, CPU scheduling, Synchronization, Memory management and File system.*
- *Use the operating system interface.*
- *Gain experience in implementing and debugging operating system components, including the kernel module, synchronization primitives, and the file system.*
- *To gain knowledge in few operating systems that are presently used world wide*.

**UNIT I OS, PROCESS AND THREADS 12**

Overview of operating systems - functionalities, characteristics and types - Hardware concepts - CPU states, I/O channels, memory hierarchy, microprogramming. – Process concepts - operations on processes – process states – concurrent processes – process control block – process context – Threads Concepts

**UNIT II SCHEDULING AND SYNCHRONIZATION 12**

Job and processor scheduling – scheduling algorithms – process hierarchies – Problems of concurrent processes – critical sections – mutual exclusion – synchronization – process co-operation, producer and consumer processes – Critical section problem – Semaphores – init, wait, signal operations – Use of semaphores to implement mutex, process synchronization – Critical regions – Monitors.

**UNIT III IPC AND DEADLOCK 12**

Interprocess Communication (IPC) – Message Passing – Direct and Indirect – Deadlock – prevention – detection – avoidance – recovery – Algorithms.

**UNIT IV MEMORY MANAGEMENT 12**

Memory Management: Background – Swapping – Contiguous memory allocation – Paging – Segmentation – Segmentation with paging. Virtual Memory: Background – Demand paging – Process creation – Page replacement – Allocation of frames – Thrashing

**UNIT V SECONDARY STORAGE AND FILE MANAGEMENT 12**

Secondary Storage Management – disk components – disk scheduling – swap-space management – File organization – blocking and buffering – file descriptor – directory structure – UNIX file structure – Protection and Security – access rights – access matrix.

**TOTAL HOURS: 60**

**TEXT BOOKS**


1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, Operating System Concepts. Eighth edition. Addison-Wesley (2009).
2. Andrew S. Tanenbaum, Albert S. Woodhull, *"Operating systems: design and implementation"*, Third Edition, Pearson Prentice Hall (2006).


**REFERENCES**


1. William Stallings, ***"Operating Systems-Internals and Design Principles",*** Sixth Edition, Pearson Prentice Hall(2009).
2. Harvey M. Deitel, Paul J. Deitel, David R. Choffnes, ***"operating systems",***Third edition, Pearson Prentice Hall(2004).
3. Gary Nutt,Nabendu Chaki,Sarmistha Neogy, ***"Operating Systems"***, Third Edition,Pearson Education IndiaHall.
4. http://computer.howstuffworks.com/operating-system.htm
5. http://www.apple.com/macosx/
6. http://www.android.com/
7. http://www.brynosaurus.com/pub/os/oskit-hotos6.pdf
8. http://packages.ubuntu.com/dapper/oskit

| 11UCK405 | DATA STRUCTURES LAB - II | L | T | P | C |
|---|---|---|---|---|---|
| | | 0 | 0 | 3 | 2 |

1. Implementation of sorting techniques
    a. Insertion sort
    b. Selection sort
    c. Quick sort
    d. Shell sort
2. Implementation of expression tree and perform all tree traversals.
3. Implementation of searching Techniques
    a. Sequential search
    b. Binary search
    c. Implement a BST and perform search operations
    d. Hash Table Implementation
4. Represent a Graph ADT and perform BFS and DFS.
5. Implement a shortest path algorithm in Graph.
6. Perform topological sorting in graph.
7. Implement a Minimum Spanning tree Algorithm in graph.
8. Implement Traveling salesman problem.

| 11UCK406 | OPERATING SYSTEMS LAB | L | T | P | C |
|---|---|---|---|---|---|
| | | 0 | 0 | 3 | 2 |

**LIST OF EXPERIMENTS**

1. Write programs using the system calls of UNIX operating system.
2. Write programs using the I/O system calls of UNIX operating system.
3. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time.
4. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time.
5. Implement the Producer – Consumer problem using semaphores (using UNIX system calls)
6. Write C program to implement some memory management schemes.
7. Implement any file allocation technique (Linked, Indexed or Contiguous)

| 11UCK407 | MICROPROCESSORS LAB | L | T | P | C |
|---|---|---|---|---|---|
| | | 0 | 0 | 3 | 2 |

*Course Objectives*

- *To learn the assembly language programming of 8085, 8086 and 8051 and also to give a practical training of interfacing the peripheral devices with the processor.*
- To implement the assembly language programming of 8085, 8086 and 8051.
- To experiment the interface concepts of various peripheral device with the processor.

**LIST OF EXPERIMENTS**

1. Programming with 8085
2. Programming with 8086
3. Interfacing with 8085/8086-8255,8253
4. Interfacing with 8085/8086-8279,8251
5. 8051 Microcontroller based experiments for Control Applications.
6. Mini- Project

**TOTAL HOURS: 45**

## 11UCK501 DATA BASE MANAGEMENT SYSTEMS

| L | T | P | C |
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*Course Objectives*

- *To learn the fundamentals of data models and to conceptualize and depict a database system using ER diagram.*
- *To make a study of SQL and relational database design.*
- *To understand the internal storage structures using different file and indexing techniques which will help in physical DB design.*
- *To know the fundamental concepts of transaction processing- concurrency control techniques and recovery procedure.*
- *To have an introductory knowledge about the emerging trends in the area of distributed DB, OODB and XML.*

**UNIT I INTRODUCTION TO DATABASE SYSTEMS AND ER MODEL 9**

Introduction to Database systems-Database versus file systems,Architecture of a database, various components of a DBMS- Data Models- ER Model - entities, entity types, various types of attributes, relationships, relationship types and special features, ER diagram notation, examples- Reduction of ER model to relational schema.

**UNIT II RELATIONAL MODEL AND SQL 9**

Relational Data Model - Concept of relations, schema-instance distinction, keys- Relational algebra operations: selection, projection, cross product, various types of joins, division. SQL - Introduction, data definition in SQL, Table and key definitions, views. Querying in SQL- Integrity and Security-Embedded SQL.

**UNIT III RELATIONAL DATABASE DESIGN AND STORAGE STRUCTURE 9**

Relational Database Design – Principles of a good schema design-functional dependencies, Armstrong's axioms for FD's, closure of a set of FD's, minimal covers, definitions of 1NF, 2NF, 3NF and BCNF-Decompositions and desirable properties, multi-valued dependencies and 4NF.
Data Storage and Indexes - file organizations, primary and secondary index structures, B+ trees index structures – Static and dynamic hashing techniques, - Query Processing and optimization.

**UNIT IV TRANSACTION MANAGEMENT 9**

Transaction Management- Need for transactions, ACID Properties,States - Serializability-Recoverable and non-recoverable schedules-Cascadeless schedules.

Concurrency control and Recovery- Two-phase locking (2PL) protocol, Conservative, strict and rigorous 2PL, 2PL with lock conversions.Deadlock prevention, detection and recovery-Recovery concepts, Deferred and Immediate update, Shadow paging.

**UNIT V CURRENT TRENDS 9**

Distributed databases – Fragmentation, replication and transparency issues- Types of distributed database systems-Commit protocols.Object Oriented Database – complex data types-Inheritance-Array, Multiset and reference types.

Case Study: Database Security

**TOTAL HOURS: 45**

**TEXT BOOK**

1.Abraham Silberschatz, Henry F. Korth and S. Sudarshan- “Database System Concepts”, Sixth Edition, McGraw-Hill, 2010.

**REFERENCES**

1. Ramez Elmasri and Shamkant B. Navathe, “Fundamental Database Systems”, Fifth Edition, Pearson Education, 2008.

2. C.J.Date, A.Kannan, S.Swamynathan “An Introduction to Database System”, Eighth Edition, Pearson education, 2006.

| 11UCK502 | FORMAL LANGUAGES AND AUTOMATA THEORY | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 1 | 0 | 4 |

*Course Objectives*

- *To have an understanding of Computational languages*
- *To have a knowledge of regular languages and context free languages and its properties*
- *To know the relation between regular language, context free language and corresponding recognizers.*
- *To study the concept of Turing machines*

**UNIT I FINITE AUTOMATA 9**

Introduction: Alphabets - Strings and Languages; Automata and Grammars; Deterministic Finite Automata (DFA)-Formal Definition - Languages of DFA - Nondeterministic finite Automata (NFA) - NFA with epsilon transition - Equivalence of NFA and DFA - Minimization of Finite Automata – Applications and Limitation of FA.

**UNIT II REGULAR EXPRESSION AND ITS PROPERTIES 9**

Regular expression (RE): Definition - Operators of regular expression and the precedence - Algebraic laws for Regular expressions - Kleen's Theorem - Regular expression to FA - DFA to Regular expression - Pumping Lemma for regular Languages - Application of Pumping Lemma; Closure properties of Regular Languages - Decision properties of Regular Languages

**UNIT III CONTEXT FREE GRAMMAR 9**

Context free grammar (CFG) and Context Free Languages (CFL): Definition - Derivations - Derivation trees - Ambiguity in Grammar - Useless symbols - Simplification of CFGs.

Push Down Automata (PDA): Description and definition - Instantaneous Description - Language of PDA: Acceptance by Final state, Acceptance by empty stack - Deterministic PDA - Equivalence of PDA and CFG: CFG to PDA and PDA to CFG

**UNIT IV PROPERTIES OF CONTEXT FREE GRAMMAR 9**

Normal forms for CFGs: Chomsky Normal Form and Griebach Normal Form - Closure properties of CFLs - Decision Properties of CFLs: Emptiness, Finiteness and Membership - Pumping lemma for CFLs.

**UNIT V TURING MACHINES 9**

Turing machines (TM): Basic model - Definition and representations - Instantaneous Description - Language acceptance by TM – Universal Turing machine – Programming techniques - Variants of Turing Machine - TM as Computer of Integer functions.

**TOTAL HOURS: 45+15**

**TEXT BOOKS**


1. J.E.Hopcroft, R.Motwani and J.D Ullman, “Introduction to Automata Theory, Languages and Computations”, Third Edition, Pearson Education, 2006.
2. Micheal Sipser, “Introduction of the Theory and Computation”, Second edition, Thomson Brokecole, 2005.


**REFERENCES**


1. Martin J. C., “Introduction to Languages and Theory of Computations”, Third Edition, TMH,2003.
2. K.L.P. Mishra and N.Chandrasekaran, “Theory of Computer Science: Automata, Languages and Computation”, Third edition, PHI

## 11UCK503 INTERNET PROGRAMMING

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

*Course Objectives*

- *To describe basic Internet Concepts.*
- *To learn the web designing languages such as HTML5 and PHP.*
- *To understand the concepts of JAVA for Internet programming.*
- *To learn scripting language – Java Script.*
- *To study the concepts of Server Side Programming.*

**UNIT I INRODUCTION TO WEB AND HTML5 9**

Introduction to web: History-Web System Architectur-HTML5: Images- Tables –Forms- Input and Data List and Page Structure Elements- Canvas

**UNIT II CSS AND JAVA SCRIPT 9**

Cascading Style Sheets-Java Scripts: Basics - Control structures - Functions - Arrays – objects. DOM-Event Handling

**UNIT III JAVA NETWORK PROGRAMMING 9**

Java Programming: Java basics – I/O streaming – files – Looking up Internet Address - Socket Programming – Client/server programs – E-mail Client – SMTP - POP3 programs – Web page retrieval.

**UNIT IV SERVLET 9**

Servlets – Simple Servlets – Web Server (Java web server / Tomcat / Web logic) – HTTP GET and POST requests – Session Tracking – Cookies – JDBC – Simple web application development and deployment.

**UNIT V INTRODUCTION TO PHP 9**

PHP: Introduction – Programming in web environment – variables – constants – data types – operators – Statements – Functions – Arrays – OOP – String Manipulation and regular

expression – File handling and data storage – PHP and SQL database – PHP and LDAP – PHP Connectivity

**TOTAL HOURS: 45**

**TEXT BOOKS**


1. Internet & World Wide Web How to Program, 5/e Paul J. Deitel, Harvey M. Deitel, Abbe, Pearson Higher Education, 2012.
2. Steven Holzner, "PHP: The Complete Reference", 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
3. Elliotte Rusty Harold, "Java Network Programming", O'Reilly Publishers, 2002


**REFERENCES**


1. R. Krishnamoorthy & S. Prabhu, "Internet and Java Programming", New Age International Publishers, 2004.
2. Thomno A. Powell, "The Complete Reference HTML and XHTML", fourth edition, Tata McGraw Hill, 2003.
3. Naughton, "The Complete Reference – Java2", Tata McGraw-Hill, 3rd edition, 1999.

## 11UCK504 COMPUTER ARCHITECTURE

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

*Course Objectives*

- *To learn about the various Interconnections of Computer System*
- *To know about the performance measures of Computer Design*
- *To enhance the knowledge about various types of Memory and IO components*
- *To know about the advanced concepts pipelining and superscalar architecture*

**UNIT I FUNDAMENTALS OF COMPUTER DESIGN 9**

Performance measures – cost price trends – principles of computer Design - Memory locations and addresses – Memory operations – Addressing modes

**UNIT II DATAPATH & CONTROL DESIGN 9**

Addition and subtraction of signed numbers – Design of fast adders – Multiplication of positive numbers - Signed operand multiplication and fast multiplication – Integer division – control design : Fundamental concepts – Execution of a complete instruction – Hardwired control – Microprogrammed control- RTLSim, a data path simulator for a MIPS-like CPU,MikroSim: a Microcode programmable CPU simulator

**UNIT III MEMORY & I/O SYSTEM 9**

Basic concepts – Semiconductor RAMs - ROMs – Speed - size and cost – Cache memories - Performance consideration – Virtual memory – Secondary storage. Accessing I/O devices – Interrupts – Direct Memory Access – Buses – Standard I/O Interfaces (PCI, SCSI, USB).

**UNIT IV ADVANCED CONCEPTS 9**

Pipelining – Basic concepts –structural hazards- Data hazards – control hazards – Superscalar operation -Pipeline performance -VLIW

**UNIT V ILP 9**

Processor level parallelism – Instruction level parallelism- Multiprocessors- Fault tolerence

**TOTAL HOURS: 45**

**TEXT BOOKS**

1.Carl Hamacher, Zvonko Vranesic and Safwat Zaky, 5th Edition "Computer Organization", McGraw-Hill, 2002.

2. David A.Patterson and John L.Hennessy, "Computer Organization and Design: The hardware/Software interface", 2nd Edition, Morgan Kaufmann, 2002.

**REFERENCES**

1. William Stallings, "Computer Organization and Architecture – Designing for Performance",6th Edition, Pearson Education, 2003.

2. John P.Hayes, "Computer Architecture and Organization", 3rd Edition, McGraw Hill, 1998.

## 11UCK505 SOFTWARE ENGINEERING

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

*Course Objectives*

- *To analyze software requirements*
- *To develop an efficient software system through group cohesiveness*
- *To use the testing tools and methods.*

**UNIT I SOFTWARE AND SOFTWARE ENGINEERING 9**

The Nature Of Software – The Unique Nature Of WebApps – Software Engineering – Software Process – Software Myths – Process Models – Generic –Perspective – Specialized – The Unified Process – Personal And Team Software Process – Agile Development – Agile Process- Extreme Programming – Other Agile Process Models – Software Engineering Knowledge – Core Principles – Guide Each Framework Activity.

**UNIT II REQUIREMENTS AND REQUIREMENT ENGINEERING PROCESS 9**

Understanding Requirements – Establish Ground Work – Eliciting Requirements – Developing Usecase- Negotiating Requirements- Validating Requirements- Requirements Modeling – Requirement Analysis –Scenario Based Modeling – UML Supplements – Data Modeling Concepts- Class Based Modeling – Flow Oriented Modeling – Creating Behavioral Modeling – Patterns For Modeling – Requirement Modeling For WebApps.

**UNIT III DESIGN CONCEPTS 9**

The Design Process- Design Concepts- Design Model – Software Architecture -Architectural Styles – Alternatives – Mapping To DFD – Component Level Design For WebApps – Component Based Development – User Interface Design – Analysis And Design – WebApps Interface Design- WebApps Design Quality – Aesthetic – Content- Architecture Design Of WebApps –Navigation Design – OOHDM.

**UNIT IV QUALITY MANAGEMENT 9**

Software Quality – Software Quality Dilemma – Achieving Software Quality - Review Techniques- Review Metrics And Their Use – Formal Review Techniques- SQA Task, Goal, And Metric – Formal Approach For SQA – Statistical Software Quality – Software Testing Conventional Applications- Basic Path Testing – Control Structure Testing- Black Box – Model Based Testing – Specialized Environment.

**UNIT V SOFTWARE MANAGEMENT AND PROCESS IMPROVEMENT 9**

The SCM Process- Configuration Management For WebApps – Project Management Concepts- The Management Spectrum – People- Process- Product- $W^5HH$ Principle - Software Reengineering – Reverse Engineering – Software Process Improvement – SPI Process – CMMI – Other SPI Framework – CASE Study On E-Commerce System Development.

**TOTAL HOURS: 45+15**

**TEXT BOOK**

1. Roger S. Pressman, "Software Engineering – A Practitioner Approach ", $7^{th}$ edition - McGraw Hill International Edition, 2011.

**REFERENCE**

1. Ian Sommerville, "Software Engineering", Addison-Wesley, 2004.

| 11USM502 | PROBABILITY AND QUEUING THEORY | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 1 | 0 | 4 |

*Course Objectives*

*At the end of the course, the students would*

- *Have a well – founded knowledge of Probability and standard distributions which can describe real life phenomena.*
- *Acquire skills in handling situations involving more than one random variable.*
- *Understand and characterize phenomena which evolve with respect to time in a probabilistic manner.*
- *Be exposed to basic characteristic features of a queuing system and acquire skills in analyzing queuing models.*

**UNIT I PROBABILITY AND RANDOM VARIABLE 9 + 3**

Probability concepts-Axioms of Probability – Basic theorems in Probability- Conditional probability - Total probability – Baye's theorem- Random variable - Probability mass function - Probability density function - Properties - Raw and Central Moments

**UNIT II STANDARD DISTRIBUTIONS 9 +3**

Binomial, Poisson, Geometric, Uniform, Exponential and Normal distributions and their properties – Moment Generating Functions for the above Distributions.

**UNIT III TWO DIMENSIONAL RANDOM VARIABLES 9 + 3**

Joint distributions - Marginal and conditional distributions – Covariance - Correlation and Regression.

**UNIT IV RANDOM PROCESSES AND MARKOV CHAINS 9 + 3**

Classification - Stationary process - Markov process - Poisson process - Markov chains - Transition probabilities- Birth and death process(concept only)

**UNIT V QUEUEING THEORY 9 + 3**

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

` **TOTAL HOURS: 60**

**TEXT BOOKS**

1. O.C. Ibe, “Fundamentals of Applied Probability and Random Processes”, Elsevier, 1st Indian Reprint, 2007 .

2. D. Gross and C.M. Harris, “Fundamentals of Queueing Theory”, Wiley Student edition, 2004 (For units 4 and 5).

**REFERENCES**

1.Veerarajan., T., “Probability, Statistics and Random Processes”, Tata McGraw-Hill, Second Edition, New Delhi, 2003.

2.Ross, S., “A first course in probability”, Sixth Edition, Pearson Education, Delhi, 2002.

3.Medhi J., “Stochastic Processes”, New Age Publishers, New Delhi, 1994.

4.Taha, H. A., “Operations Research-An Introduction”, Seventh Edition, Pearson Education Edition Asia, Delhi, 2002.

5. K.S. Trivedi, “Probability and Statistics with Reliability, Queueing and Computer Science Applications”, John Wiley and Sons, 2nd edition, 2002

| 11UCK506 | DATA BASE MANAGEMENT SYSTEMS LAB | L | T | P | C |
|---|---|---|---|---|---|
| | | 0 | 0 | 3 | 2 |

**Each student is asked to do a mini project**

**Design and implementation of the following for any one of the application development as mini project with all the following options.**

| | |
|---|---|
| Week 1 | Application selection and Table skeleton creation (minimum of 5 tables) and study |
| Week 2 | Study of SQL commands<br>Data Definition, Table Creation, Constraints |
| Week 3 | Insert, Select Commands, Update & Delete Commands. |
| Week 4 | Nested Queries & Join Queries |
| Week 5 | Views |
| Week 6-8 | Procedures and Functions, triggers |
| Week 9 | Embedded SQL |
| Week 10 | Design using Front end tools (any one of these Java/VB/ .Net) |
| Week 11 | Forms, Menu Design |
| Week 12 | Reports |
| Week 13 – 15 | Testing and Demonstration |

## 11UCK507 INTERNET PROGRAMMING LAB

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

1. Create an application using the features of HTML5
2. Create your own web site with the following.
    a. Cascading style sheets.
    b. Embedded style sheets.
    c. Inline style sheets.
3. Using java scripts do the client side validation for your application
4. Using servlet do the server side validation for your application.
5. Design and implementation of any one application using PHP-MySQL

## 11USM602 OPTIMIZATION TECHNIQUES

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

*Course Objectives:*

- *To create awareness about optimization in utilization of resources.*
- *To understand and apply optimization techniques to industrial operations.*

**UNIT I LINEAR PROGARMMING PROBLEM 9**

Formulation of an Linear Programming model- Graphical solution – Simplex Algorithm – Dual problem – Dual Simplex method - Artificial variables technique – Big M method and Two phase method.

**UNIT II TRANSPOTATION AND ASSIGNMENT MODELS 9**

Transportation problems- Methods of finding initial basic feasible solution – North west corner rule – Least cost method – Vogel's approximation method - MODI technique for optimum solution - Assignment problems – Hungarian algorithm – Traveling sales man problem.

**UNIT III NETWORK MODELS 9**

Shortest route – minimal spanning tree - maximum flow models – project network- CPM and PERT network-critical path scheduling.

**UNIT IV REPLACEMENT MODELS 9**

Replacement of items that deteriorate with time – value of money changing with time – not charging with time – optimum replacement policy – individual and group replacement. Sequencing problem: models with n jobs with 2 machines – problem with n jobs with m machines.

**UNIT V GAME THEORY AND SEQUENCING PROBLEM 9**

**Game Theory**: Concept of game - Two-person zero-sum game - Pure and Mixed Strategy Games - Saddle Point - Odds Method - Dominance Method and Graphical Method for solving Mixed Strategy Game.

**Sequencing Problem**: Johnsons Algorithm for n Jobs and Two machines, n Jobs and Three Machines, Two jobs and m Machines Problems.

**TOTAL HOURS: 45+15**

**TEXT BOOKS**


1. Wayne.L.Winston, Operations research applications and algorithms, Thomson learning,4th edition 2007.
2. Taha H.A, "Operation Research", Pearson Education, sixth edition, 2003


**REFERENCES**


1. Frederick.S.Hiller and Gerald.J.Lieberman, "Operations research concepts and cases", TMH (SIE) 8th edition.
2. J.K.Sharma, "Operations research theory and applications", Macmillan India, 3rd Edition, 2007.
3. Hira and Gupta " Problems in Operations Research", S.Chand and Co,2002.
4. 5. G Srinivasan, "Operations research principles and applications", PHI (EEE) 2007.
6. Wagner, "Operations Research", Prentice Hall of India, 2000.

## 11UCK601 PRINCIPLES OF COMPILER DESIGN

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

*Course Objectives*

- *To learn the basic design and implementation of a simple compiler for a small imperative language.*
- *To learn the underlying theories in compiler construction.*

**UNIT I INTRODUCTION AND LEXICAL ANALYSIS 9**

Compiler structure: analysis-synthesis model of compilation, various phases of a compiler, tool based approach to compiler construction.

Lexical analysis: Regular languages - tokens, lexeme and patterns, Issues in lexical analysis- Error reporting, Symbol table management, scanner generator – LEX.

**UNIT II SYNTAX ANALYSIS 6**

Syntax analysis: Context Free Languages & Grammars, ambiguous grammars, top down parsing - recursive descent parsing, grammar transformations, predictive parsing, bottom up parsing - LR parsers (SLR, CALR, LALR), Parser generator - YACC.

**UNIT III RUN TIME ENVIRONMENT 12**

Syntax directed definitions: inherited and synthesized attributes, dependency graph, evaluation order, bottom up and top down evaluation of attributes, L- and S-attributed definitions.

Run time system: Procedure activation, parameter passing, value return, memory allocation and scope.

**UNIT IV INTERMEDIATE CODE GENERATION 9**

Intermediate code generation: intermediate representations, translation of declarations, assignments, control flow, boolean expressions and procedure calls.

**UNIT V INTRODUCTION TO CODE GENERATION AND OPTIMIZATION 9**

Introduction - Code generation and instruction selection: issues in design of code generation, basic blocks and flow graphs, register allocation, code generation, DAG representation, code

generation from DAG, peep hole optimization, code generator generators – Principal sources of optimization.

**TOTAL HOURS: 45+15**

**TEXT BOOKS**


1. Compilers Principles, Techniques, and Tools, by A. V. Aho, R. Sethi, & J. D. Ullman, 2nd ed., ISBN 978-81317-2101-8, Pearson Ed., 2008
2. Engineering a Compiler, by Keith D. Cooper & Linda Troczon, (2nd ed.) ISBN 81-8147-369-8, Morgan Kaufmann, Elsevier, 2004


**REFERENCES**


1. S. Chattopadhyay, "Compiler Design", Prentice-Hall of India, 2005, ISBN 81-203-2725-X.
2. K. Louden, "Compiler Construction: Principles and Practice", Cengage Learning, ISBN 978-81-315-0132-0
3. J. R. Levine, T. Mason, D. Brown, "Lex & Yacc", O'Reilly, 2000, ISBN 81-7366 -061-X.

**11UCK602 COMPUTER NETWORKS**

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

*Course Objectives*

- *To understand the concepts of data communications.*
- *To study the functions of different layers.*
- *To introduce IEEE standards employed in computer networking.*
- *To make the students to get familiarized with different protocols and network*
- *components.*

**UNIT I DATA COMMUNICATIONS 9**

Uses of Computer Networks, Components, and Direction of Data flow, Networks Components and Categories, types of Connections, Topologies, and Reference models: OSI and TCP/IP. Multiple Access: Random Access, Controlled Access. LAN: Token Ring, FDDI, Ethernet- Fast Ethernet, Gigabit Ethernet, Wireless LANs: IEEE 802.11 a/b/g/n

**UNIT II DATA LINK LAYER 9**

Data Link Layer: Error Detection and Correction (Parity – LRC – CRC – Hamming code), Flow Control and Error control protocols (stop and wait – go back-N ARQ – selective repeat ARQ-sliding window), HDLC, Interconnecting devices.

**UNIT III NETWORK LAYER 9**

Network Layer: IP addressing methods – Subnetting, Routing Algorithms: Shortest path Algorithm, Flooding, Flow based routing, Distance vector routing, Link state routing, Hierarchical routing.

**UNIT IV TRANSPORT LAYER 9**

Transport Layer: Duties of transport layer, Multiplexing and Demultiplexing, Sockets, UDP, TCP. Congestion Control Techniques: Leaky bucket algorithm, Token bucket algorithm. +Congestion prevention Policies: Traffic shaping, Choke packets, Load Shedding, Jitter Control.

**UNIT V APPLICATION LAYER (Introduction only) 9**

Domain Name Space (DNS) – SMTP – FTP – HTTP –Wireless networks – adhoc – sensor networks

**TOTAL HOURS: 45**

**TEXT BOOKS**

1. Behrouz A. Forouzan, “Data communication and Networking”, 4/E,Tata McGraw-Hill, 2006.

2. William Stallings ,”Data & Computer Communications”, Sixth Edition,Pearson `Education, Asia, 2002.

**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.

**11UCK603 COMPUTER GRAPHICS**

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

*Course Objectives*

i) Know the fundamentals of computer graphics and its application areas

ii) Design of 2D objects and its transformations

iii) Design of 3D objects and its transformations and Projections

iv) Modeling of solid objects and their surfaces.

v) Focuses on basics of OPENGL

**UNIT I INTRODUCTION TO COMPUTER GRAPHICS & SCAN CONVERSION 10**

Overview of Computer Graphics, Storage Tube Graphics Displays, Calligraphic Refresh Graphics Displays, Raster Refresh (Raster-Scan) Graphics Displays, Cathode Ray Tube Basics, Color CRT Raster Scan Basics, Video Basics, The Video Controller, Mid-point criteria, Scan Converting Circles, Scan Converting Ellipses, Clipping Lines algorithms– Cyrus-Beck, Cohen-Sutherland and Liang-arsky,Clipping Polygons.

**UNIT II TWO-DIMENSIONAL TRANSFORMATIONS 8**

Transformations and Matrices, 2D Transformations, Homogeneous Coordinates and Matrix Representation of 2D Transformations, Translations and Homogeneous Coordinates, Rotation, Reflection, Scaling, Combined Transformation, Transformation of Points, Rotation About an Arbitrary Point, Reflection through an Arbitrary Line, A Geometric Interpretation of Homogeneous Coordinates, The Window to-Viewport Transformations.

**UNIT III THREE-DIMENSIONAL TRANSFORMATIONS 9**

Introduction, Three-Dimensional Scaling, Three-Dimensional Shearing, Three- Dimensional Rotation, Three-Dimensional Reflection, Three-Dimensional Translation, Multiple Transformation, Rotation about an Arbitrary Axis in Space, Matrix Representation of 3D Transformations, Composition of 3D Transformations, Projections-Types of parallel and Perspective Projections.

**UNIT IV SOLID MODELING & VISIBLE-SURFACE DETERMINATION 9**

Representing Solids, Regularized Boolean Set Operations, Sweep Representations, Spatial-Partitioning Representations - Techniques for efficient Visible-Surface Algorithms, Categories of

algorithms, Back face removal, The z-Buffer Algorithm, Scan-line method, Painter's algorithms (depth sorting), BSP trees, Visible-Surface Ray Tracing, comparison of the methods.

**UNITV ILLUMINATION AND SHADING & GRAPHICS PROGRAMMING USING OPENGL 9**

Illumination and Shading Models for Polygons, Reflectance properties of surfaces,Ambient, Specular and Diffuse reflections, Atmospheric attenutation, Phong's model, Gouraud shading, some examples. Why OpenGL, Features in OpenGL, OpenGL operations, Abstractions in OpenGL – GL, GLU & GLUT, 3D viewing pipeline, viewing matrix specifications, a few examples and demos of OpenGL programs.

TOTAL HOURS: 45

Course Outcome

Know the fundamentals of computer graphics and its application areas

Design of 2D objects and its transformations

Design of 3D objects and its transformations and Projections

Modeling of solid objects and their surfaces.

Focuses on basics of OPEGL

**TEXT BOOKS**

1. D. Hearn and M. Pauline Baker, Computer Graphics (C Version), Pearson Education, 2nd Edition, 2004.
2. J. D. Foley, A. Van Dam, S. K. Feiner and J. F. Hughes, Computer Graphics - Principles and Practice, Second Edition in C, Pearson Education, 2003.

**REFERENCES**

1. D. F. Rogers and J. A. Adams, Mathematical Elements for Computer Graphics, 2nd Edition, McGraw-Hill International Edition, 1990.
2. F. S. Hill Jr., Computer Graphics using OpenGL, Pearson Education, 2003.

Scheme of Evaluation

## 11UCK604 DISTRIBUTED COMPUTING

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

*Course Objectives*

- *To understand the genesis of distributed computing*
- *To know the application of distributed computing*
- *To understanding the technology and tool kits to facilitated the distributed computing*

**UNIT I INTRODUCTION 9**

Characterization of Distributed Systems - Examples - Resource Sharing and the Web - Challenges - System Models - Architectural and Fundamental Models - Networking and Internetworking - Types of Networks - Network Principles - Internet Protocols - Case Studies.

**UNIT II PROCESSES AND DISTRIBUTED OBJECTS 9**

Inter process Communication - The API for the Internet Protocols - External Data Representation and Marshalling - Client-Server Communication - Group Communication - Distributed Objects and Remote Invocation - Communication Between Distributed Objects - Remote Procedure Call.

**UNIT III OPERATING SYSTEM SUPPORT AND SECURITY 9**

The OS Layer - Protection - Processes and Threads - Communication and Invocation – OS Architecture - Security - Overview - Cryptographic Algorithms - Digital Signatures - Cryptography Pragmatics

**UNIT IV OPERATING SYSTEM ISSUES 9**

Distributed File Systems - File Service Architecture - Clocks, Events and Process States - Synchronizing Physical Clocks - Logical Time And Logical Clocks - Global States - Distributed Debugging - Distributed Mutual Exclusion – Elections – Multicast Communication Related Problems.

**UNIT V DISTRIBUTED TRANSACTION PROCESSING 9**

Transactions - Nested Transactions - Locks - Optimistic Concurrency Control - Timestamp Ordering - Comparison - Flat and Nested Distributed Transactions - Atomic Commit Protocols - Concurrency Control in Distributed Transactions - Distributed Deadlocks - Transaction Recovery

**TOTAL HOURS: 45**

**TEXT BOOKS**


1. George Coulouris, Jean Dollimore and Tim Kindberg, Distributed Systems Concepts and Design, Pearson Education, 3rd Edition, 2002.
2. Andrew S Tanenbaum , Maartenvan Steen,Distibuted Systems –Principles and Pardigms,Pearson Education, 2002


**REFERENCES**


1. Sape Mullender, Distributed Systems, Addison Wesley, 2nd Edition, 1993.
2. Albert Fleishman, Distributes Systems- Software Design and Implementation, Springer-Verlag, 1994
3. M.L.Liu, Distributed Computing Principles and Applications, Pearson Education, 2004.
4. Mugesh Singhal,Niranjan G Shivaratri,Advanced Concepts in Operating Systems,Tata McGraw Hill Edition, 2001

| 11UCK605 | COMPILER DESIGN LAB | L | T | P | C |
|---|---|---|---|---|---|
| | | 0 | 0 | 3 | 2 |

1. Implementation of lexical analyzer for a subset of C and LEX
2. Implementation of symbol table (front end)
3. Implementation of a syntax analyzer using YACC
4. Implementation of semantic analysis for the given grammar.(static checking)
5. Implement the front end of a compiler that generates the three address code for a simple language with: one data type integer, arithmetic operators, relational operators, variable declaration statement, one conditional construct, one iterative construct and assignment statement.
6. Implement the back end of the compiler which takes the three address code generated in problems 5, and produces the 8086 assembly language instructions that can be assembled and run using a 8086 assembler. The target assembly instructions can be simple move, add, sub, jump. Also simple addressing modes are used.

## 11UCK606 COMPUTER NETWORKS LAB

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

1. Implementation of the following applications using TCP & UDP Sockets
    a. Echo client and echo server
    b. FTP
    c. Remote command execution
    d. Chat
    e. Concurrent server
    f. DNS

2. Implementation of Remote Method Invocation/Remote Procedure Call

3. Simulation of ARP/RARP

4. Simulation of bit stuffing and Hamming code

5. Simulation of sliding window protocol like Go back N and Selective Repeat

6. Simulation of Routing Protocols using Network Simulators like NS / Glomosim / OPNET

| 11UCK607 | COMPUTER GRAPHICS LAB | L | T | P | C |
|---|---|---|---|---|---|
| | | 0 | 0 | 3 | 2 |

1. Implementation of Bresenham's Algorithm
    - Line
    - Circle
    - Ellipse
2. 2D and 3D transformation
    - Translation
    - Rotation
    - Scaling
    - Reflection
    - Shearing of objects
3. Cohen Sutherland 2D clipping and windowing

## 11UCK701 ARTIFICIAL INTELLIGENCE

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

*Course Objectives*

- To provide a strong foundation of fundamental concepts in Artificial Intelligence
- To provide a basic exposition to the goals and methods of Artificial Intelligence
- To enable the student to apply these techniques in applications which involve reasoning and learning.

### UNIT I AGENTS AND PROBLEM SOLVING I 9

Artificial Intelligence: Definition-Turing Test-Relation with other Disciplines-History of AI-Applications - Agent: Intelligent Agent-Rational Agent - Nature of Environments-Structure of Agent.-Problem Solving Agent - Problems: Toy Problems and Real-world Problems-Uninformed Search Strategies - comparison of uninformed search strategies.

### UNIT II PROBLEM SOLVING II 9

Informed Search Strategies-Greedy best-first search-A* search-Heuristic functions-Local search Algorithms and Optimization problems - Online Search Agent-Constraint Satisfaction Problems-Backtracking Search for CSPs –Local Search for Constraint Satisfaction Problems-Structure of Problems -Adversarial Search-Optimal Decision in Games-Alpha-Beta Pruning-Imperfect Real Time Decisions-Games that Include an Element of Chance.

### UNIT III KNOWLEDGE REPRESENTATION 9

First-Order Logic-Syntax and Semantics of First-Order-Logic-Using First-Order-Logic-Knowledge Engineering in First-Order-Logic.- Inference in First-Order-Logic- Inference rules-Unification and Lifting-Forward Chaining-Backward Chaining-Resolution.

### UNIT IV LEARNING 9

Learning from Observations- Forms of Learning-Learning Decision –Ensemble Learning - A Logical Formulation of Learning-Knowledge in Learning-Explanation Based Learning-Learning using Relevance Information-Inductive Logic Programming.

**UNIT V APPLICATIONS** **9**

Communication -Communication as action -A formal grammar for a fragment of English - Syntactic Analysis - Augmented Grammars - Semantic Interpretation - Ambiguity and Disambiguation - Discourse Understanding - Grammar Induction - Information Extraction- Information Retrieval - Machine Translation - Case Study of AI languages.

**TOTAL HOURS: 45**

**TEXT BOOKS**


1. Stuart Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach", 3rd Edition, Pearson Education / Prentice Hall of India 2010(yet to be published).
2. Nils J. Nilsson, "Artificial Intelligence: A new Synthesis", Harcourt Asia Pvt. Ltd,2003.


**REFERENCES**


1. Elaine Rich and Kevin Knight, "Artificial Intelligence", 2nd Edition, Tata McGraw-Hill, 2003.
2. Patrick Henry Winston, "Artificial Intelligence", Pearson Education / PHI, 2004.

| 11UCK702 | OBJECT ORIENTED ANALYSIS AND DESIGN | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 0 | 0 | 3 |

*Course Objectives*

- *Introduce the basics of objects, classes project development*
- *Build Strong foundation on Object Oriented System Development*
- *Enable the Student to Design and Manage of Object Oriented System*

**UNIT I OBJECT ORIENTED DESIGN AND MODELING 9**

The Object Model – Classes And Objects – Modeling as design techniques- Class modeling- Advanced class modeling – State modeling – Advanced State modeling – Interaction modeling – Advanced interaction modeling.

**UNIT II OBJECT ORIENTED METHODOLOGIES AND UML 9**

Object Oriented Methodology: Rumbaugh, Booch, Jacobson, Shaler/Mellor, Coad/Yardon – Patterns – Frame Works – The Unified Approach – UML

**UNIT III OBJECT ORIENTED ANALYSIS 9**

Identify Use Cases – Use Case Model – Documentation – Classification – Identifying Classes – Noun Phrases Approach – Common Class Pattern Approach – Use Case Driven Approach – Identifying Object Relationship, Attributes And Models.

**UNIT IV OBJECT ORIENTED DESIGN AND MANAGEMENT 9**

Design Process – Design Axioms – Designing Classes – Access Layer Design – View Layer Design. Managing Analysis and Design – Evaluation Testing – Coding – Maintenance – Metrics

**UNIT V IMPLEMENTATION MODELING 9**

Implementation over view- fine-tuning classes, generalization - realizing association – testing- Case Study: Foundation Class Library – Client/Server Computing.

**TOTAL HOURS: 45**

**TEXT BOOKS**


1. Ali Bahrami, Object Oriented System Development, Mc Graw Hill International Edition, 1999.
2. M.R.Blaha, J.R.Raumbaugh, Object oriented modeling and design with UML, 2ed, Pearson education, 2005.
3. Grady Booch, Robert A. Maksimchuk, Michael W.Engle, Bobbiijyoung Jim Conallen, Kelliahoustol ,"Object Oriented Analysis and Design with Applications" ,3rd Edition,2007, Addison Wesley Professional.


**REFERENCES**


1. Larman, Applying UML & Patterns: An Introduction to Object Oriented Analysis and Design, Pearson Education, 2nd Edition, 2003.
2. Bernd Bruegge, Allen H. Dutoit, "Object Oriented Software Engineering using UML, Patterns and Java", Pearson Education 2nd Edition 2004.

**11UCK703 UNIX INTERNALS**

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

*Course Objectives*

- *To understand the differences between UNIX, LINUX and GNU and their specifications*
- *To study the concept of buffers and file system*
- *To understand the file system calls and Process concepts in Unix*
- *To learn the concepts of process scheduling and memory management in unix*

**UNIT I GENERAL OVERVIEW OF THE SYSTEM 9**

Unix Operating System, Linux and GNU, The UNIX Architecture, Features, POSIX and Single UNIX Specification, Commands, Command Structure, Understanding the man configuration

**UNIT II BUFFER CACHE 9**

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

**UNIT III SYSTEM CALLS FOR FILE SYSTEM 9**

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

**UNIT IV THE PROCESS 9**

Process basics, Process Status, System Process, Mechanism of ProcessCreation, Running Jobs, Killing Processes, Customizing the Environment:Environment Variables, Aliases, Command History, In line Command Editing,Initialization Scripts.

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

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

**TOTAL HOURS: 45 + 15**

**TEXT BOOKS**

1. Sumitabha Das, “UNIX Concepts and Applications”, Fourth Edition, Tata McGraw Hill Publishing Co. Ltd., New Delhi, 20082.

2. Maurice J. Bach, “The Design of the Unix Operating System”, Prentice Hall of India, New Delhi, 2004.

**REFERENCE**

1. N. P. Gopalan, “ Begineers Guide to Unix”, PHI Learning, New Delhi, 2009

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

| 11UCK704 | CASE TOOLS LAB | L | T | P | C |
|---|---|---|---|---|---|
| | | 0 | 0 | 3 | 2 |

Prepare the following documents for any one of the experiment and develop the software using software engineering methodology.

- Problem Analysis and Project Planning Thorough study of the problem – Identify project scope, Objectives, infrastructure
- Software Requirement Analysis Describe the individual Phases/ modules of the project, Identify deliverables.
- Data Modelling Use work products – data dictionary, use case diagrams and activity diagrams, build and test class diagrams, sequence diagrams and add interface to class diagrams.
- Software Development and Debugging
- Software Testing Prepare test plan, perform validation testing, coverage analysis, memory leaks, develop test case hierarchy, Site check and site monitor

**List of Experiments**

1. Course Registration System
2. Quiz System
3. Online ticket reservation system
4. Remote computer monitoring
5. Student marks analysing system
6. Expert system to prescribe the medicines for the given symptoms
7. ATM system
8. Platform assignment system for the trains in a railway station
9. Stock maintenance.

**Software Required**

Case Tools: Rational Suite, Win runner,

Languages: C/C++/JDK 1.3,JSDK, INTERNET EXPLORER, UML

Front End: VB, VC++, Developer 2000

Back End: Oracle, MS-Access, SQL

| 11UCK705 | UNIX LAB | L | T | P | C |
|---|---|---|---|---|---|
| | | 0 | 0 | 3 | 2 |

1. Simple shell script programming
2. Simple Programs with basic Unix Commands
3. Program to implement Dining philosophers problem using IPC
4. Program to implement Readers Writers problem using shared memory
5. Program using errno and perror()
6. Programs to perform signal handling
7. Developing cron jobs
8. Study of Unix kernel data structures
9. Program to perform CPU Scheduling
10. Programs to perform process management – fork, exec
11. Program to perform file management
12. Program to perform process swapping

| 11UCK801 | CRYPTOGRAPHY AND NETWORK SECURITY | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 0 | 0 | 3 |

*Course Objectives*

- *To know the methods of conventional encryption.*
- *To understand the concepts of public key encryption and number theory*
- *To understand authentication and Hash functions.*
- *To learn the network security tools and applications.*

**UNIT I INTRODUCTION & SYMMETRIC-KEY CRYPTOGRAPHY 9**

Security Goals, Attacks, Services And Mechanism, Techniques - Traditional Symmetric-Key Ciphers - Introduction, Substitution Ciphers, Transposition Ciphers, Stream and Block Ciphers - Data Encryption Standard (DES) - Introduction, DES Structure, DES Analysis, Multiple DES, Security of DES – AES

**UNIT II ASYMMETRIC-KEY CRYPTOGRAPHY 9**

Number theory concepts- Prime numbers- Fermat & Euler theorem –Chinese Remainder Theorem- Miller Rabin primality testing - Introduction, RSA Cryptosystem, Elgamal Cryptosystem, Elliptic curve cryptosystems.

**UNIT III INTERGRITY, AUTHENTICATION AND HASH FUNCTION 9**

Message Integrity – Message Authentication – Cryptographic hash functions – SHA –Digital Signature – Digital Signature Schemes – RSA Digital signature scheme – DSS.

**UNIT IV KEY MANAGEMENT 9**

Symmetric-key Distribution, Kerberos, Symmetric- Key Agreement, Public- Key Distribution - Public Announcement, Trusted Center, Controlled Trusted Center, Certification Authority

**UNIT V NETWORK SECURITY 9**

Email Security - PGP - SSL – TLS – IP security

**TOTAL HOURS: 45**

**TEXT BOOKS**

1. Behrouz A.Forouzan “Cryptography and Network Secuity”, The McGraw-Hill Companies, 2007.

2 . William Stallings, “Cryptography And Network Security – Principles and Practices”, Prentice Hall of India, 5th Edition.

**REFERENCES**

1. Cryptography and Network security, Atul Kahate, Tata McGraw-Hill Pub company Ltd., 2 edition,New Delhi 2009.

2. Network Security: The Complete Reference by Roberta Bragg, Mark Phodes- Ousley, Keith Strassberg Tata McGraw-Hill, 2008.

3. Charlie Kaufman, Radia Perlman, and Mike Speciner, “Network Security: PRIVATE Communication in a PUBLIC World “, Prentice Hall. 2007

| 11UCE601 | C# AND .NET | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 0 | 0 | 3 |

*Course Objectives*

- *The student will gain knowledge in the concepts of the .NET framework as a whole and the technologies that constitute the framework.*
- *The student will gain programming skills in C# both in basic and advanced levels.*
- *By building sample applications, the student will get experience and be ready for large-scale projects.*

**UNIT I INTRODUCTION TO C# 8**

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

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

Classes, Objects, Inheritance, Polymorphism, Interfaces, Operator Overloading, Delegates, Events, Errors and Exceptions.

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

Building Windows Applications, Accessing Data with ADO.NET.

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

Programming Web Applications with Web Forms, Programming Web Services.

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

Assemblies, Versioning, Attributes, Reflection, Viewing MetaData, Type Discovery, Reflecting on a Type, Marshaling, Remoting, Understanding Server Object Types, Specifying a Server with an Interface, Building a Server, Building the Client, Using SingleCall, Threads.

**TOTAL HOURS: 45**

**TEXT BOOKS**

1. E. Balagurusamy, “Programming in C#”, Tata McGraw-Hill, 2004. (Unit I, II)
2. J. Liberty, “Programming C#”, 2nd ed., O’Reilly, 2002. (Unit III, IV, V)

**REFERENCES**

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

## 11UCE602 STORAGE MANAGEMENT

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

*Course Objectives*

- *Evaluate storage architectures, including storage subsystems, SAN, NAS, and CAS.*
- *Define backup, recovery, disaster recovery, business continuity, and replication.*
- *Understand logical and physical components of a storage infrastructure.*
- *Identify components of managing and monitoring the data center.*
- *Define information security and identify different storage visualization technologies*

**UNIT I INTRODUCTION TO STORAGE TECHNOLOGY 9**

Concepts of storage networking – Business applications defined for Storage – Sources of Data and states of data creation – Data center requirements and evolution – Managing complexity – I/O and the five pillars of technology – Storage infrastructure – Evolution of storage – Information lifecycle management.

**UNIT II STORAGE SYSTEMS ARCHITECTURE 9**

Storage architectures – Device overviews – Peripheral connectivity – Components and concepts – Magnetic disk storage – Disk systems – Disk arrays – RAID storage arrays – Magnetic tape storage – Physical vs. Logical disk organization – Caching properties and algorithms connectivity options – Differences in bus and network architectures.

**UNIT III INTRODUCTION TO NETWORK STORAGE 9**

Putting storage on the Network – The NAS Hardware – Software architecture – Network connectivity – NAS as a storage system – NAS connectivity options – Connectivity protocols – Management principles – Storage Area Networks: Architecture – Hardware devices – Host bus adaptors – Connectivity – Content Addressable Storage (CAS): Elements – Connectivity options – Standards and Management principles – Hybrid storage solutions overview.

**UNIT IV INTRODUCTION TO INFORMATION AVAILABILITY 9**

Business continuity and disaster recovery basics: Local business continuity techniques – Remote business continuity techniques – Storage design and implementations of the Business continuity plan – Managing availability – Disaster recovery principles & techniques.

**UNIT V MANAGING AND STORAGE VIRTUALIZATION 9**

Managing Availability: Availability metrics – Implementing the plan – Finding the holes – Maintaining serviceability capacity planning – Management tools – Overview information security virtualization – Different virtualization – Technologies and processes including file and block level virtualization.

**TOTAL HOURS: 45**

**TEXT BOOKS**

1. Robert Spalding," Storage Networks: The Complete Reference" Tata McGraw Hill Publishing Company, New Delhi, 2003.

2. Marc Farley Osborne," Building Storage Networks", Tata McGraw Hill Publishing Company, New Delhi, 2000.

**REFERENCES**

1.J Gerald Kowalski and T.Mark Mayburk," Information storage and Retrieval Systems", Springer International Edition, New Delhi, 2006.

2.Ulf Troppens, Rainer Erkens and Wolfgang Muller "Storage Networks Explained" Wiley &Sons, USA, 2004.

3.Richard Barker and Paul Massiglia, "Storage Area Network Essentials: A Complete Guide to Understanding and Implementing SANs", Wiley India.

4. Meet Gupta, "Storage Area Network Fundamentals", Pearson Education Limited, 2002.

5. EMC Educational Services, "Information Storage and Management", Wiley India.

| 11UCE603 | PARALLEL ARCHITECTURE AND EMBEDDED SYSTEMS | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 0 | 0 | 3 |

*Course Objectives*

- *To equip students with the fundamental concepts and tools of parallel computing and embedded system design.*
- *Includes the principles of parallel algorithm design, parallel computer architectures and programming models for shared and distributed memory systems.*
- *Covers the design issues involved in embedded systems, the applications and programming languages and processor architectures used for embedded systems and real time systems.*

**UNIT I INTRODUCTION 9**

Parallel Processing Architectures: Parallelism in sequential machines, Abstract model of parallel computer, Multiprocessor architecture, Pipelining, Array processors, Parallel programming models, Parallelism Paradigms**:** Data flow computing, Systolic architectures, Functional and logic paradigms, Distributed shared memory, Performance of Parallel Processors.

**UNIT II INTRODUCTION TO EMBEDDED SYSTEMS 9**

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

**UNIT III DEVICES AND BUSES FOR DEVICES NETWORK 9**

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

**UNIT IV EMBEDDED PROGRAMMING IN C, C++ 9**

Programming in assembly language (ALP) vs. High Level Language - C Program Elements, Macros and functions -Use of Pointers - NULL Pointers - Use of Function Calls – Multiple

function calls in a Cyclic Order in the Main Function Pointers – Function Queues and Interrupt Service Routines Queues Pointers – Concepts of EMBEDDED PROGRAMMING in C++ - Objected Oriented Programming – Embedded Programming in C++, 'C' Program compilers – Cross compiler – Optimization of memory codes.

**UNIT V REAL TIME OPERATING SYSTEMS 9**

Definitions of process, tasks and threads – Clear cut distinction between functions – ISRs and tasks by their characteristics – Operating System Services- Goals – Structures- Kernel - Process Management – Memory Management – Device Management – File System Organisation and Implementation – I/O Subsystems - Task scheduling models - Handling of task scheduling and latency and deadlines as performance metrics – Co-operative Round Robin Scheduling – Cyclic Scheduling with Time Slicing – Preemptive Scheduling Model strategy by a Scheduler – Critical Section Service by a Preemptive Scheduler – Fixed (Static) Real time scheduling of tasks - Remote Procedure Calls (RPCs), Case Studies of Programming with RTOS.

**TOTAL HOURS: 45**

**TEXT BOOKS**


1. Hawang Kai and Briggs F. A., .*Computer Architecture and Parallel Processing.*, McGraw Hill
2. Rajkamal, Embedded Systems Architecture, Programming and Design, TATA McGraw-Hill, First reprint Oct. 2003
3. Steve Heath, Embedded Systems Design, Second Edition-2003, Newnes,


**REFERENCES**


1. Jorden H. F. and Alaghaband G., .*Fundamentals of Parallel Processing*
2. David E.Simon, An Embedded Software Primer, Pearson Education Asia, First Indian Reprint 2000.
3. Wayne Wolf, Computers as Components; Principles of Embedded Computing System Design – Harcourt India, Morgan Kaufman Publishers, First Indian Reprint 2001

## 11UCE604 DIGITAL SIGNAL PROCESSING

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

*Course Objectives*

- *To understand the basics of signals and system by analyzing the various transformations available and determine their use to DSP*
- *To study on the various digital filtering techniques and how to apply to DSP*
- *To study on the ways to estimate signal parameters, and transform a signal into a form that is more informative.*
- *To give students a flavour on the applications of DSP in the areas of speech*

**UNIT I SIGNALS AND SYSTEMS 9**

Basic elements of DSP – concepts of frequency in Analog and Digital Signals – sampling theorem – Discrete – time signals, systems – Analysis of discrete time LTI systems – Z transform – Convolution (linear and circular) – Correlation.

**UNIT II FREQUENCY TRANSFORMATIONS 9**

Introduction to DFT – Properties of DFT – Filtering methods based on DFT – FFT Algorithms - Decimation – in – time Algorithms, Decimation – in – frequency Algorithms – Use of FFT in Linear Filtering – DCT.

**UNIT III IIR FILTER DESIGN 9**

Structures of IIR – Analog filter design – Discrete time IIR filter from analog filter – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives– (LPF, HPF, BPF, BRF) filter design using frequency translation.

**UNIT IV FIR FILTER DESIGN 9**

Structures of FIR – Linear phase FIR filter – Filter design using windowing techniques, Frequency sampling techniques – Finite word length effects in digital Filters

**UNIT V APPLICATIONS 9**

Multirate signal processing – Speech compression – Adaptive filter – Musical sound processing – Image enhancement.

**TOTAL HOURS: 45**

**TEXT BOOKS**

1. John G. Proakis & Dimitris G.Manolakis, “Digital Signal Processing – Principles, Algorithms & Applications”, Fourth edition, Pearson education / Prentice Hall, 2007.

2. Emmanuel C..Ifeachor, & Barrie.W.Jervis, “Digital Signal Processing”, Second edition, Pearson Education / Prentice Hall, 2002.

**REFERENCES**

1. Sanjit K. Mitra, “Digital Signal Processing – A Computer Based Approach” ,Tata McGraw Hill, Third Edition, 2007 .

2. Alan V.Oppenheim, Ronald W. Jchafer & Hohn. R.Back, “Discrete Time Signal Processing”, Pearson Education, Second Edition, 2001.

3. Andreas Antoniou, “Digital Signal Processing”, Tata McGraw Hill,2006.

| 11UCE605 | MANAGEMENT INFORMATION SYSTEMS | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 0 | 0 | 3 |

*Course Objectives*

- *To know the broad business perspectives*
- *To get the analytical and critical thinking skills*
- *To design and implement solutions that enhance organizational performance*

**UNIT I INFORMATION SYSTEM AND ORGANIZATION 9**

Matching the Information System Plan to the Organizational Strategic Plan – Identifying Key Organizational Objective and Processes and Developing an Information System Development – User role in Systems Development Process – Maintainability and Recoverability in System Design.

**UNIT II REPRESENTATION AND ANALYSIS OF SYSTEM STRUCTURE 9**

Models for Representing Systems: Mathematical, Graphical and Hierarchical (Organization Chart, Tree Diagram) – Information Flow – Process Flow – Methods and Heuristics – Decomposition and Aggregation – Information Architecture – Application of System Representation to Case Studies.

**UNIT III SYSTEMS, INFORMATION AND DECISION THEORY 9**

Information Theory – Information Content and Redundancy – Classification and Compression – Summarizing and Filtering – Inferences and Uncertainty – Identifying Information needed to Support Decision Making – Human Factors – Problem characteristics and Information System Capabilities in Decision Making.

**UNIT IV INFORMATION SYSTEM APPLICATION 9**

Transaction Processing Applications – Basic Accounting Application – Applications for Budgeting and Planning – Other use of Information Technology: Automation – Word Processing – Electronic Mail – Evaluation Remote Conferencing and Graphics – System and Selection – Cost Benefit – Centralized versus Decentralized Allocation Mechanism.

## UNIT V DEVELOPMENT AND MAINTENANCE OF INFORMATION SYSTEMS 9

Systems analysis and design – System development life cycle – Limitation – End User Development – Managing End Users – off– the shelf software packages – Outsourcing – Comparison of different methodologies.

**TOTAL HOURS: 45**

### TEXT BOOKS


1. Laudon K.C, Laudon J.P, Brabston M.E, “Management Information Systems - Managing the digital firm”, Pearon Education, 2004.


### REFERENCES


1. Turban E.F, Potter R.E, “Introduction to Information Technology”; Wiley, 2004.
2. Jeffrey A.Hoffer, Joey F.George, Joseph S. Valachich, “Modern System Analysis and Design”, Third Edition, Prentice Hall, 2002.

| 11UCE701 | MULTIMEDIA SYSYEMS | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 0 | 0 | 3 |

*Course Objectives*

- *To learn the compression and decompression techniques along with its issues*
- *To learn the various multimedia elements such as data format, hardware devices and software tools*
- *To have an introduction to multimedia OS.*

**UNIT I INTRODUCTION TO MULTIMEDIA SYSTEMS 9**

Introduction to multimedia branch – Global structure – Media and data streams – Medium, Properties of multimedia system, Traditional data stream and continuous media data stream characteristics, Information units – Hardware and software requirements - Uses of multimedia – Steps for creating multimedia presentation.

**UNIT II MULTIMEDIA ELEMENTS 10**

Sound – Basic sound concepts, Representation of sound, Audio formats – Music – MIDI basic concepts, devices, messages, MIDI and SMPTE timing standards, MIDI software.

Images and graphics – Image representation, Image & graphics format, Computer image processing and image synthesis.

Video and animation – Video signal representation, Digitalization, Computer video format. Computer based animation – Basic concepts, Animation languages, Methods of controlling animation and Display of animation.

**UNIT III MULTIMEDIA DEVICES AND TOOLS 9**

Hardware devices – Connections, storage devices, input devices and output hardware devices. Software tools – Word processors, OCR software, Painting tools, 3-D modeling & animation tools, image editors, sound editing tools, video formats and QuickTime for Windows and Macintosh. Multimedia authoring tools – Types – Card based tools, Icon based tools and Time based tools.

**UNIT IV DIGITAL VIDEO AND IMAGE COMPRESSION 9**

Evaluating a compression system - Redundancy and visibility - Video compression techniques - Standardization of an algorithm - The JPEG image compression standard - ITU –T Standards - MPEG motion video compression standard - DVI Technology.

**UNIT V MULTIMEDIA OS AND MULTIMEDIA APPLICATION DEVELOPMENT 8**

Multimedia operating system – Introduction, Real time and multimedia, resource management. Multimedia application development – Introduction, Software life cycle overview, ADDIE model, Conceptualization, Content collection and processing, Story, Flowline, Script, Storyboard, Implementation, Authoring metaphors, Testing and feedback, Final delivery, Documentation and Case study.

**TOTAL HOURS: 45**

**TEXT BOOKS**


1. Ralf Steinmetz and Klara Nahrstedt, “Multimedia: Computing, Communications & Applications”, Pearson Education, 2008. (Unit 1, 2, 5-Multimedia OS)
2. Ranjan Parekh, “Principles of multimedia”, Tata McGraw Hill, 2006. (Unit 1, 5 – Multimedia application development)
3. Tay Vaughan, “Multimedia: Making it work”, Tata McGraw Hill, 7th Edition. (Unit 3)
4. John F. Koegel Buford, “Multimedia systems”, Pearson Education, 2003. (Unit 4)


**REFERENCES**


1. Prabhat K. Andleigh and Kiran Thakrar, "Multimedia systems design", Prentice Hall of India private limited, 2002.
2. Ashok Banerji and Ananda Ghosh, "Multimedia technologies", Tata McGraw Hill publishers, 2009.

| 11UCE702 | GRID COMPUTING | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 0 | 0 | 3 |

*Course Objectives*

- *To understand the genesis of grid computing*
- *To know the application of grid computing*
- *To understand the technology and tool kits that facilitate the grid computing*

**UNIT I GRID COMPUTING 9**

Introduction - Definition and Scope of grid computing

**UNIT II GRID COMPUTING INITIALIVES 9**

Grid Computing Organizations and their roles – Grid Computing analog – Grid Computing road map.

**UNIT III GRID COMPUTING APPLICATIONS 9**

Merging the Grid sources – Architecture with the Web Devices Architecture.

**UNIT IV TECHNOLOGIES 9**

OGSA – Sample use cases – OGSA platform components – OGSI – OGSA Basic Services.

**UNIT V GRID COMPUTING TOOL KITS 9**

Globus GT 4 Toolkit – Architecture, Programming model, High level services – OGSI .Net middleware Solutions.

**TOTAL HOURS: 45**

**TEXT BOOK**

1. Joshy Joseph & Craig Fellenstein, “Grid Computing”, PHI, PTR-2003.

**REFERENCE**

1. Ahmar Abbas, “Grid Computing: A Practical Guide to technology and Applications”, Charles River media – 2003.

## 11UCE703 SERVICE ORIENTED ARCHITECTURE

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

*Course Objectives*

- *To learn about the emerging science and technology of Service Oriented Architecture.*
- *Aspects of computer science, business and engineering will be explored*

**UNIT I INTRODUCTION 9**

Roots of SOA – Characteristics of SOA - Comparing SOA to client-server and distributed internet architectures – Anatomy of SOA- How components in an SOA
interrelate - Principles of service orientation

**UNIT II WEB SERVICES AND SOA 9**

Web services – Service descriptions – Messaging with SOAP –Message exchange Patterns – coordination –Atomic Transactions – Business activities – Orchestration – Choreography - Service layer abstraction – Application Service Layer – Business Service
Layer – Orchestration Service Layer

**UNIT III SERVICE ORIENTED ANALYSIS 9**

Service oriented analysis – Business-centric SOA – Deriving business services- service modeling - Service Oriented Design – WSDL basics – SOAP basics – SOA composition guidelines – Entity-centric business service design – Application service design –
Taskcentric business service design

**UNIT IV INTRODUCTION TO SERVICE ORIENTED DESIGN 9**

SOA platform basics – SOA support in J2EE – Java API for XML-based web services (JAX-WS) - Java architecture for XML binding (JAXB) – Java API for XML Registries (JAXR) - Java API for XML based RPC (JAX-RPC)- Web Services Interoperability Technologies (WSIT) - SOA support in .NET – Common Language Runtime - ASP.NET web forms – ASP.NET web services – Web Services Enhancements (WSE)

**UNIT V SERVICE ORIENTED DESIGN 9**

WS-BPEL basics – WS-Coordination overview - WS-Choreography, WS-Policy, WS Security

**TOTAL HOURS: 45**

**TEXT BOOKS**


1. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2005.
2. Thomas Erl, "SOA Principles of Service Design "(The Prentice Hall Service-Oriented Computing Series from Thomas Erl), 2005.


**REFERENCES**


1. Newcomer, Lomow, "Understanding SOA with Web Services", Pearson Education, 2005.
2. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services, An Architect's Guide", Pearson Education, 2005.
3. Dan Woods and Thomas Mattern, "Enterprise SOA Designing IT for Business Innovation" O'REILLY, First Edition, 2006

| 11UCE704 | TCP/IP DESIGN AND IMPLEMENTATION | L | T | P | C |
|---|---|---|---|---|---|
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*Course Objectives*

- *To understand the internals of the TCP/IP protocols*
- *To understand how TCP/IP is actually implemented*
- *To understand the interaction among the protocols in a protocol stack.*

**UNIT I INTRODUCTION 9**

Protocol Layering, Motivation for Internetworking, TCP/IP Internet, Internet services, History, Internet Architecture Board, Future growth and technology, Underlying Network Technologies, Approaches to Network Communication, Wide and Local Area networks, Ethernet technology, Switched Ethernet, Internetworking Concept and Architectural Model.

**UNIT II NETWORK LAYER 9**

Classful Internet Addresses, CIDR, Mapping Internet Addresses to Physical Addresses (ARP), Internet Protocol: Connectionless Datagram delivery, Forwarding IP datagrams, Error and Control Messages, Internet Multicasting, IP Switching and MPLS, Mobile IP, Private Network Interconnection (NAT, VPN).

**UNIT III ROUTING 9**

Routing Architecture: Cores, Peers, and algorithms, Routing between peers (BGP), Routing with an Autonomous System (RIP, OSPF).

**UNIT IV TRANSPORT LAYER 9**

User Datagram Protocol (UDP), Reliable Stream Transport Service (TCP).

**UNIT V APPLICATION LAYER 9**

Bootstrap and Autoconfiguration (DHCP), Domain Name System (DNS), File Transfer and Access (FTP, TFTP, NFS), Electronic Mail (SMTP, POP, IMAP, MIME), World Wide Web (HTTP), Voice and Video over IP (RTP, RSVP, QoS).

**TOTAL HOURS: 45**

**TEXT BOOK**

1. Internetworking with TCP/IP - Volume 1: Principles, Protocols, and Architecture by Douglas E. Comer, 5th Edition, Pearson Education Inc., 2006 (Chapter 10, 1, 2, 3, 4, 9, 5, 6, 7, 8, 16, 17, 18, 19, 13, 14, 15, 11, 12, 22, 23, 25, 26, 27, 28).

**REFERENCES**


1. TCP/IP Illustrated, Volume 1: The Protocols by W. Richard Stevens and G. Gabrani, Pearson Education Inc., 1994.
2. TCP/IP Illustrated, Volume 2: The Implementation by Gary R. Wright and W. Richard Stevens, Pearson Education Inc., 1995.

| 11UCE705 | SOFTWARE TESTING | L | T | P | C |
|---|---|---|---|---|---|
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**Course Objectives**

- *To identify the need for testing*
- *To learn and build skills for software testing in syntax level*
- *To develop and validate a test plan*
- *To select and prepare test cases*
- *To prepare testing policies and standards*
- *To use testing aids and tools*
- *To test after maintenance and enhancement changes*
- *To measure the success of testing efforts*

**UNIT I INTRODUCTION 9**

Testing as an Engineering Activity – Testing as a Process – Testing fundamentals – Software Testing Principles – The Tester's Role in a Software Development Organization – Origins of Defects - Cost of defects - Defect Classes –Defect Repository -Test Design – Defect Examples – Developer/Tester Support for Developing a Defect Repository – Defect Prevention Strategies

**UNIT II TEST CASE DESIGN 9**

Test Case Design Strategies –Black Box Approach to Test Case Design -Random Testing – Requirements based testing – Boundary Value Analysis – Decision tables - Equivalence Class Partitioning - State-based testing – Cause-effect graphing – Error guessing - Compatibility testing – User documentation testing – Domain testing- White Box Approach to Test design – Test Adequacy Criteria – Static testing vs Structural testing – Code functional testing - Coverage and Control Flow Graphs –Covering Code Logic – Paths-The Role of paths in White box Based Test Design – Code complexity testing – Evaluating Test Adequacy Criteria.

**UNIT III LEVELS OF TESTING 9**

The Need for Levels of Testing – Unit Test – Unit Test Planning –Designing the Unit Tests - The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – System Testing – Acceptance testing –

Performance testing - Regression Testing –Internationalization testing – Ad-hoc testing - Alpha , Beta Tests – testing OO systems – Usability and Accessibility testing – Configuration testing - Compatibility testing –Testing the documentation – Website testing

**UNIT IV TEST MANAGEMENT 9**

People and organizational issues in testing – organization structures for testing teams – testing services - Test Planning – Test management – test process – Test Reporting

**UNIT V TEST AUTOMATION 9**

Software test automation – skills needed for automation – scope of automation – Design and architecture for automation – Generic requirement for test tool/framework – challenges in automation - Test metrics and measurements –Project, progress and productivity metrics

**TOTAL HOURS: 45**

**TEXT BOOKS**

1. Ilene Burnstein, “Practical Software Testing”, Springer International Edition, 2003.
2. Srinivasan Desikan and Gopalaswamy Ramesh, “Software Testing – Principles and Practices”, Pearson education, 2006.

**REFERENCES**

1. Ron Patton, “ Software Testing”, Second Edition, Sams Publishing, Pearson education, 2007
2. Renu Rajani, Pradeep Oak, “Software Testing – Effective Methods, Tools and Techniques”, Tata McGraw Hill, 2004.
3. Edward Kit, “Software Testing in the Real World – Improving the Process”, Pearson Education, 1995.
4. Boris Beizer, “Software Testing Techniques” – 2nd Edition, Van Nostrand Reinhold, New York, 1990.
5. Aditya P. Mathur, “Foundations of Software Testing – Fundamental algorithms and techniques”, Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008

## 11UCE706 COMPONENT BASED SYSTEM DESIGN

| L | T | P | C |
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*Course Objectives*

- *To Introduce in depth of JAVA, Corba and .Net Components*
- *To give idea to deal with Fundamental properties of components, technology, architecture and middleware.*
- *To learn Component Frameworks and Development*

**UNIT I INTRODUCTION 9**

Software Components – objects – fundamental properties of Component technology – modules – interfaces – callbacks – directory services – component architecture – components and middleware

**UNIT II JAVA BASED COMPONENT TECHNOLOGIES 9**

Threads – Java Beans – Events and connections – properties – introspection – JAR files – reflection – object serialization – Enterprise Java Beans – Distributed Object models – RMI and RMI-IIOP

**UNIT III CORBA COMPONENT TECHNOLOGIES 9**

Java and CORBA – Interface Definition language – Object Request Broker – system object model – portable object adapter – CORBA services – CORBA component model – containers – application server – model driven architecture

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

COM – Distributed COM – object reuse – interfaces and versioning – dispatch interfaces – connectable objects – OLE containers and servers – Active X controls – .NET components - assemblies – appdomains – contexts – reflection – remoting

**UNIT V COMPONENT FRAMEWORKS AND DEVELOPMENT 9**

Connectors – contexts – EJB containers – CLR contexts and channels – Black Box component framework – directory objects – cross-development environment – component-oriented programming – Component design and implementation tools – testing tools - assembly tools

**TOTAL HOURS: 45**

**TEXT BOOK**

1. Clemens Szyperski, "Component Software: Beyond Object-Oriented Programming", Pearson Education publishers, 2003

**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.

| 11UCE707 | SEMANTIC WEB | L | T | P | C |
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*Course Objectives*

- *The course is designed to equip graduate level students with the latest developments in the Semantic Web scenario.*
- *Semantic Web is an exciting new development for the future of the WWW.*
- *Semantic technologies represent a fascinating combination of web technology, database technology, modeling, formal logic, and artificial intelligence.*
- *Students will be introduced to many useful Semantic Web concepts and tools.*
- *Finally, students will gain a broad understanding of the most challenging problems and what progress has been made towards solving these problems.*

**UNIT I INTRODUCTION 9**

History – Semantic Web Layers –Semantic Web technologies – Semantics in Semantic Web – **XML:** Structuring – Namespaces – Addressing – Querying – Processing

**UNIT II RDF 9**

RDF and Semantic Web – Basic Ideas - RDF Specification – RDF Syntax: XML and Non- XML - RDF elements – RDF relationship: Reification, Container, and collaboration – RDF Schema – Editing, Parsing, and Browsing RDF/XML-RQL-RDQL

**UNIT III ONTOLOGY 9**

Why Ontology – Ontology movement – OWL – OWL Specification - OWL Elements – OWL constructs: Simple and Complex – Ontology Engineering : Introduction – Constructing ontologies – Reusing ontologies – On-To-Knowledge Semantic Web Architecture

**UNIT IV LOGIC AND INFERENCE 9**

Logic – Description Logics - Rules – Monotonic Rules: Syntax, Semantics and examples – Non-Monotonic Rules – Motivation, Syntax, and Examples – Rule Markup in XML: Monotonic Rules, and Non-Monotonic Rules

**UNIT V APPLICATIONS OF SEMANTIC WEB TECHNOLOGIES 9**

RDF Uses: Commercial and Non-Commercial use– e-Learning – Web Services — Horizontal information – Data Integration – Future of Semantic Web

**TOTAL HOURS: 45**

**TEXT BOOKS**


1. Grigorous Antoniou and Van Hermelen - "A Semantic Web Primer"-The MIT Press – 2004
2. "Spinning the Semantic Web: Bringing the world wide web to its full potential" – The MIT Press – 2004


**REFERENCES**


1. Shelley Powers – "Practical RDF" – O'reilly publishers – First Indian Reprint : 2003
2. Alexander Maedche, "Ontology Learning for the Semantic Web", Springer; 1 edition, 2002
3. John Davies, Dieter Fensel, Frank Van Harmelen, "Towards the Semantic Web: Ontology – Driven Knowledge Management", John Wiley & Sons Ltd., 2003.
4. Michael C. Daconta, Leo J. Obrst, Kevin T. Smith, "The Semantic Web: A Guide to the Future of XML, Web Services, and Knowledge Management", Wiley,2003

| 11UCE708 | OPEN SOURCE TOOLS AND COMPONENTS | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 0 | 0 | 3 |

*Course Objectives*

- *To understand the importance of FOSS and Linux packages*
- *To learn different open source non relational databases.*
- *To have an introductory knowledge about the python and perl script*
- *To know the fundamental concepts of Ruby*
- *To work with different open source tools*

**UNIT I FOSS PHILOSOPHY AND LINUX PACKAGE 9**

Introduction to Software Terminologies- Overview of Free/Open Source Software-- Definition of FOSS & GNU--History of GNU/Linux and the Free Software Movement , Advantages of Free Software and GNU/Linux, FOSS usage , trends and potential—global and Indian-Free Software Licenses(GPL, LGPL, AGPL). Installing software – from source code as well as using binary packages-Understanding build systems -- constructing make files and using make, using autoconf and autogen to automatically generate make files tailored for different development environments.

**UNIT II OPEN SOURCE NON RELATIONAL DATABASES 9**

NoSQL definition-relational Vs non relational database-working with NoSQL-Running MongoDB-Getting A Database Connection-Inserting Data into A Collection-Accessing Data From a Query-CouchDB-Developing with CouchDB-Example application-Deploying CouchDB.

**UNIT III PYTHON AND PERL 9**

Python-Introduction-Data Structure-OOP-Python Connectivity with open source Database; Perl-Introduction- OOP-Perl Connectivity with open source Database.

**UNIT IV RUBY 9**

Ruby-getting started- Arrays and Hashes- Control Structures- Regular Expressions- Blocks and Iterators- basic input and output-classes- objects- and variables- modules- exceptions, catch, and throw.

**UNIT V OPEN SOURCE TOOLS** **9**

Record save/ audio/video from screen using: Cam Studio; Create schematic drawings using: XCircuit; protect the computer against viruses using: ClamWin; Create/edit 3d graphics using: Nebula; Edit an image using: GIMP; Download an entire website using: webfetch.

**TOTAL HOURS: 45**

**TEXT BOOKS**


1. Linux in easy steps, Fifth Edition, Mike Mcgrath; TMH Edition ;2010
2. Programming Ruby: The Pragmatic Programmers' Guide; Second Edition; Dave Thomas, with Chad Fowler and Andy Hunt
3. CouchDB: Definitive Guide; J.Chris Anderson; First Edition; O'Reilly series.
4. Wesley J.Chun, Core Python Programming, Prentice Hall, 2007
5. Martin C. Brown, "Perl: The Complete Reference", 2nd Edition, Tata McGraw-Hill
6. Publishing Company Limited, Indian Reprint 2009.


***On-line materials***

1. http://www.gnu.org/
2. http://nosql-database.org/
3. http://camstudio.org/
4. http://opencircuitdesign.com/xcircuit/
5. http://www.clamwin.com/
6. http://www.gimp.org/

| 11UCE709 | REAL TIME SYSTEMS | L | T | P | C |
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*Course Objectives*

- *To know about the specification and design techniques of a Real Time System.*
- *To understand about real time task communication and synchronization*
- *To have a vast knowledge of queuing models and Real Time System integration.*

**UNIT I BASIC REAL TIME CONCEPTS 9**

Basic computer architecture – some terminology - real time design issues – example real time systems – input and output – other devices – language features.

**UNIT II REAL TIME SPECIFICATION AND DESIGN TECHNIQUES 9**

Natural languages – mathematical specification – flow charts – structured charts – pseudocode and programming design languages – finite state automata – data flow diagrams – petri nets – Warnier Orr notation – state charts – polled loop systems – phase / sate driven code – coroutines – interrupt – driven systems – foreground/background system – full featured real time operating systems

**UNIT III INTERTASK COMMUNICATION AND SYNCHRONIZATION 9**

Buffering data – mailboxes – critical regions – semaphores – deadlock – process stack management – dynamic allocation – static schemes – response time calculation – interrupt latency – time loading and its measurement – scheduling is NP complete – reducing response times and time loading – analysis of memory requirements – reducing memory loading – I/O performance

**UNIT IV QUEUING MODELS 9**

Probability functions – discrete- basic buffering calculation – classical queuing theory – little's law – erlong's formula – faults, failures, bugs and effects – reliability-testing – fault tolerance – classification of architecture – distributing systems – Non Von Neuman architecture

**UNIT V HARDWARE/SOFTWARE INTEGRATION 9**

Goals of real time system integration – tools - methodology -software Heinsberg uncertainity principle – real time applications

**TOTAL HOURS: 45**

**TEXT BOOK**

1. Philip A.Laplante, “Real time system design and analysis – an engineer's handbook

**REFERENCES**


1. C.M.Krishna and Kang G Shin, "Real time systems", TMH, 1997
2. Stuart Bennelt, "Real time computer control – and introduction", Pearson education, 2003.
3. Allen Burns, Andy Wellings, “Real Time Systems and Programming Languages”, Pearson Education, 2003.

| 11UCE801 | INFORMATION SECURITY | L | T | P | C |
|---|---|---|---|---|---|
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*Course Objectives*

- *To know the legal, ethical and professional issues in Information Security.*
- *To know the aspects of risk management.*
- *To become aware of various standards in this area.*
- *To know the technological aspects of Information Security.*

**UNIT I INTRODUCTION TO INFORMATION SECURITY 9**

History - What is Information Security? - Critical Characteristics of Information - NSTISSC Security Model - Components of an Information System - Securing the Components - Balancing Security and Access - The Systems Development LifeCycle(SDLC) - The Security SDLC.

**UNIT II SECURITY INVESTIGATION 9**

Need for Security - Business Needs – Threats – Attacks. Legal, Ethical and Professional Issues in information security.

**UNIT III RISK MANAGEMENT 9**

Risk Management – Risk Identification – Risk Assessment – Risk Control Strategies – Selecting Risk Control Strategy.

**UNIT IV LOGICAL DESIGN 9**

Information Security Policy, Standards and Practices. Information Security Blueprint – ISO 17799/BS7799 – NIST Security models –IETF Security Architecture – VISA International Security Model – Design of Security Architecture. Continuity Strategies.

**UNIT V PHYSICAL DESIGN 9**

Security Technology - Intrusion Detection System- Scanning and Analysis Tools – Access Control Devices. Cryptography – Principles – Tools –Attacks of Cryptosystems. Access Control Devices, Physical Security, Security and Personnel.

**TOTAL HOURS: 45**

**TEXT BOOKS**

1. Dr.Michael E.Whitman, Herbert J. Mattord “Principles of Information Security” Second Edition.
2. Mark Merkow, James Breithaupt “Information Security: Principles and Practices” First Edition, Pearson Education.

**REFERENCES**


1. Whitman, “Principles of Information Security”, Second Edition, Pearson Education
2. William Stallings, “Cryptography and Network Security: Principles and Practices”, Third Edition, Pearson Education.
3. “Security in Computing ”, Charles P.Pfleeger and Shari Lawrence Pfleeger, Third Edition.

| 11UCE802 | MOBILE COMPUTING | L | T | P | C |
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*Course Objectives*

- *To learn the basics of Wireless voice and data communications technologies.*
- *To build working knowledge on various telephone and satellite networks.*
- *To study the working principles of wireless LAN and its standards.*
- *To build knowledge on various Mobile Computing algorithms.*

**UNIT I WIRELESS COMMUNICATION FUNDAMENTALS 9**

Introduction – Wireless transmission – Frequencies for radio transmission – Signals –Signal Propagation – Multiplexing – Modulations – Spread spectrum – MAC – SDMA – FDMA – TDMA – CDMA.

**UNIT II TELECOMMUNICATION NETWORKS 9**

Telecommunication systems – GSM – GPRS – DECT – UMTS – Satellite Networks - Broadcast Systems – DAB - DVB.

**UNIT III WIRLESS LAN 9**

Wireless LAN – IEEE 802.11 - Architecture – services – MAC – Physical layer – Blue Tooth.

**UNIT IV MOBILE NETWORK LAYER 9**

Mobile IP – Dynamic Host Configuration Protocol - Routing – DSDV – DSR – Alternative Metrics.

**UNIT V TRANSPORT AND APPLICATION LAYERS 9**

Traditional TCP – Classical TCP improvements – WAP

**TOTAL HOURS: 45**

**TEXT BOOKS**


1. Jochen Schiller, “Mobile Communications”, PHI/Pearson Education, Second Edition, 2003.
2. William Stallings, “Wireless Communications and Networks”, PHI/Pearson Education, 2002.


**REFERENCES**


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

## 11UCE803 HIGH SPEED NETWORKS

| L | T | P | C |
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*Course Objectives*

- *To understand the concepts of ATM and Frame Relay Networks*
- *Illustrate the congestion and Traffic management in packet switching networks*
- *Understand TCP and ATM Congestion Control Mechanism*
- *Define the integrated and differentiated services*

**UNIT I HIGH SPEED NETWORKS 9**

Frame Relay Networks – Asynchronous transfer mode – ATM Protocol Architecture, ATM logical Connection, ATM Cell – ATM Service Categories – AAL. High Speed LANs: Fast Ethernet, Gigabit Ethernet, Fiber Channel – Wireless LANs: applications, requirements – Architecture of 802.11

**UNIT II CONGESTION AND TRAFFIC MANAGEMENT 9**

Queuing Analysis- Queuing Models – Single Server Queues – Effects of Congestion – Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.

**UNIT III TCP AND ATM CONGESTION CONTROL 9**

TCP Flow control – TCP Congestion Control – Retransmission – Timer Management – Exponential RTO back off – KARN's Algorithm – Window management – Performance of TCP over ATM. Traffic and Congestion control in ATM – Requirements – Attributes – Traffic Management Frame work, Traffic Control – ABR traffic Management – ABR rate control, RM cell formats, ABR Capacity allocations – GFR traffic management.

**UNIT IV INTEGRATED AND DIFFERENTIATED SERVICES 9**

Integrated Services Architecture – Approach, Components, Services- Queuing Discipline, FQ, PS, BRFQ, GPS, WFQ – Random Early Detection, Differentiated Services

**UNIT V PROTOCOLS FOR QOS SUPPORT 9**

RSVP – Goals & Characteristics, Data Flow, RSVP operations, Protocol Mechanisms – Multiprotocol Label Switching – Operations, Label Stacking, Protocol details – RTP – Protocol Architecture, Data Transfer Protocol, RTCP.

**TOTAL HOURS: 45**

**TEXT BOOKS**


1. William Stallings, "HIGH SPEED NETWORKS AND INTERNET", Pearson Education, Second Edition, 2002.
2. Warland & Pravin Varaiya, "HIGH PERFORMANCE COMMUNICATION NETWORKS", Jean Harcourt Asia Pvt. Ltd., II Edition, 2001.


**REFERENCES**


1. Irvan Pepelnjk, Jim Guichard and Jeff Apcar, "MPLS and VPN architecture", Cisco Press, Volume 1 and 2, 2003
2. M.Steen Strub, Routing in Communication networks,Prentice Hall International New York,1995
3. William Stallings,High speed Networks TCP/IP and ATM Design Principles,Prentice Hall,New York,1998.
4. James P.G Sterbenz and Joseph D.Touch "High Speed Networking: A Systematic approach to high-bandwidth low latency communication"Wiley, 2001

## 11UCE804 USER INTERFACE DESIGN

| L | T | P | C |
|---|---|---|---|
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*Course Objectives*

- *To learn the basic characteristics of graphics and web interfaces*
- *To learn the basics of Human Computer Interaction*
- *To learn the basics of WIMP interfaces*
- *To build skills in working with multimedia interfaces for the web*
- *To learn the principles of evaluating interfaces*

**UNIT I INTRODUCTION 9**

Human – Computer Interface – Characteristics Of Graphics Interface – Direct Manipulation Graphical System – Web User Interface –Popularity –Characteristic & Principles.

**UNIT II HUMAN COMPUTER INTERACTION 9**

User Interface Design Process – Obstacles –Usability –Human Characteristics In Design – Human Interaction Speed –Business Functions –Requirement Analysis – Direct – Indirect Methods – Basic Business Functions – Design Standards – General Design Principles – Conceptual Model Design – Conceptual Model Mock-Ups.

**UNIT III WINDOWS 9**

Characteristics– Components– Presentation Styles– Types– Managements–Organizations– Operations– Web Systems– System Timings - Device– Based Controls Characteristics– Screen – Based Controls –Human Consideration In Screen Design – Structures Of Menus – Functions Of Menus– Contents Of Menu– Formatting – Phrasing The Menu – Selecting Menu Choice– Navigating Menus– Graphical Menus. Operate Control – Text Boxes– Selection Control– Combination Control– Custom Control– Presentation Control.

**UNIT IV MULTIMEDIA 9**

Text For Web Pages – Effective Feedback– Guidance & Assistance–Internationalization– Accessibility– Icons– Image– Multimedia – Coloring.

**UNIT V EVALUATION 9**

Conceptual Model Evaluation – Design Standards Evaluation – Detailed User Interface Design Evaluation.

**TOTAL HOURS: 45**

**TEXT BOOKS**

1. Wilbent. O. Galitz ,"The Essential Guide To User Interface Design", John Wiley& Sons, 2001.
2. Deborah Mayhew, "The Usability Engineering Lifecycle", Morgan Kaufmann, 1999

**REFERENCES**

1. Ben Sheiderman, "Design The User Interface", Pearson Education, 1998.
2. Alan Cooper, "The Essential Of User Interface Design", Wiley – Dream Tech Ltd.,2002.
3. Sharp, Rogers, Preece, 'Interaction Design', Wiley India Edition, 2007

## 11UCE805 PARALLEL ALGORITMS

| L | T | P | C |
|---|---|---|---|
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*Course Objectives*

- *To study various design techniques and representative algorithms on shared memory and network models of parallel computation*
- *To study algorithms for sorting, searching, selection, trees, graphs, data structures, etc., and new and emerging models in distributed and network computing arena and applications.*

**UNIT I COMPUTATIONAL MODELS 9**

Sequential model, need of alternative model, parallel computational models such as PRAM, LMCC, Hypercube, Cube Connected Cycle, Butterfly, Perfect Shuffle Computers, Tree model, Pyramid model, Fully Connected model, PRAM-CREW, EREW models, simulation of one model from another one.

**UNIT II PERFORMANCE MEASURES 9**

Performance Measures of Parallel Algorithms, speed-up and efficiency of PA, Cost- optimality, An example of illustrate Cost- optimal algorithms- such as summation, Min/Max on various models.

**UNIT III SORTING AND MERGING ALGOITHMS 9**

Parallel Sorting Networks, Parallel Merging Algorithms on CREW/EREW/MCC, Parallel Sorting Networks on CREW/EREW/MCC/, linear array

**UNIT IV SEARCHING AND MATRIX ALGORITHMS 9**

Parallel Searching Algorithm, Kth element, Kth element in X+Y on PRAM, Parallel Matrix Transportation and Multiplication Algorithm on PRAM, MCC, Vector-Matrix Multiplication, Solution of Linear Equation, Root finding.

**UNIT V GRAPH ALGORITHMS 9**

Graph Algorithms - Connected Graphs, search and traversal, Combinatorial Algorithms- Permutation, Combinations, Derrangements.

**TOTAL HOURS: 45**

**TEXT BOOKS**

1. M.J. Quinn, “Designing Efficient Algorithms for Parallel Computer”, McGrawHill.
2. S.G. Akl, “Design and Analysis of Parallel Algorithms”
3. S.G. Akl, ”Parallel Sorting Algorithm” by Academic Press

**REFERENCES**

1. C. Xavier, Sundararaja S. Iyengar, “Introduction to parallel algorithms “
2. Cosnard, Trystram. *Parallel Algorithms and Architectures*. International Thomson Computer Press

| 11UCE806 | SOFT COMPUTING | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 0 | 0 | 3 |

Course Objectives

- *To introduce the ideas of fuzzy sets, fuzzy logic and use of heuristics based on human experience*
- *To become familiar with neural networks that can learn from available examples and generalize to form appropriate rules for inferencing systems*
- *To provide the mathematical background for carrying out the optimization associated with neural network learning*
- *To familiarize with genetic algorithms and other random search procedures useful while seeking global optimum in self-learning situations*
- *To introduce case studies utilizing the above and illustrate the intelligent behavior of programs based on soft computing*

**UNIT I INTRODUCTION 9**

Introduction to soft computing-Characteristics of Soft Computing- Advantages, Applications and Scope of Soft computing. Soft Computing Constituents and Conventional Artificial Intelligence-introduction to**:** Biological and Artificial Neural Network-Fuzzy sets and Fuzzy logic systems-Genetic Algorithm- Hybrid Systems.

**UNIT II ARTIFICIAL NEURAL NETWORK 9**

Basic Models and Terminologies of Artificial Neural Network- Supervised Learning Neural Networks: Perceptrons-Adaptive Linear Neuron-Back propagation Multilayer Perceptron-Applications.Learning from Reinforcement: Temporal Difference Learning-Art of Dynamic Programming-Q-Learning-Applications. Unsupervised Learning and other Neural Networks: Kohenen self-organizing Networks-Learning vector organization-Hebbian Learning-Hopfield-Network-Applications.

**UNIT III FUZZY LOGIC 9**

Fuzzy systems and applications: fuzzy sets- fuzzy reasoning- fuzzy inference systems- fuzzy control- fuzzy clustering- applications of fuzzy systems..-Case Study: Implement various

primitive Operations on Fuzzy Sets with Dynamic components and verify the laws associated with fuzzy set

**UNIT IV GENETIC ALGORITHMS 9**

Simple GA-Classification of Genetic Algorithm- crossover and mutation- genetic algorithms in search and optimization- Applications: Pattern Recognitions- Image Processing- Biological Sequence Alignment and Drug Design- Robotics and Sensors- Information Retrieval Systems- Share Market Analysis-NaturalLanguageProcessing.

**UNIT V HYBRID SYSTEMS 9**

Integration of Neural Networks, Fuzzy Logic, and Genetic Algorithms: Types of Hybrid systems:Sequential,Auxiliary and Embedded Hybrid systems, Neuro-fuzzy systems: neuro-fuzzy modeling-neuro-fuzzycontrol -Neuro Fuzzy Hybrids - Neuro-Genetic Hybrids ,Fuzzy-Genetic Hybrids-Genetic Algorithm based Back propagation Networks-Fuzzy Back propagation Networks-Simplified Fuzzy ARTMAP-Fuzzy Associative Memories-Fuzzy Logic controlled Genetic Algorithms-Applications.

**TOTAL HOURS: 45**

**TEXT BOOKS**


1. J.S.R.Jang, C.T.Sun and E.Mizutani, “Neuro-Fuzzy and Soft Computing”, PHI, 2004, Pearson Education 2004.
2. S. Rajasekaran and G.A.V.Pai, “Neural Networks, Fuzzy Logic and Genetic Algorithms”, PHI, 2003.


**REFERENCES**


1. S.N.Sivanandam,S.N.Deepa,”Principles of Soft Computing”,Wiley India(P) Ltd,First Edition,2007.
2. Timothy J.Ross, “Fuzzy Logic with Engineering Applications”, McGraw-Hill, 1997.
3. Davis E.Goldberg, “Genetic Algorithms: Search, Optimization and Machine Learning”, Addison Wesley, N.Y., 1989.

| 11UCE807 | CLOUD COMPUTING | L | T | P | C |
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*Course Objectives*

- *To learn the latest technology and also develop the infrastructure needed for various services in the distributed environment.*

**UNIT I CLOUD COMPUTING BASICS, BENEFITS AND LIMITATIONS 9**

Cloud Computing Overview, Applications, Intranets and the Cloud, First Movers in the Cloud, When you use cloud computing, Benefits, Limitations, Security Concerns.

**UNIT II CLOUD COMPUTING TECHNOLOGY 9**

Hardware and Infrastructure, Clients, Security, Network, Services, Platforms, Web Applications and APIs, Cloud Storage Overview.

**UNIT III VIRTUALIZATION TECHNOLOGY 9**

Virtual Machine Technology, System Virtual Machines, Virtual Machines and Elastic Computing, Virtual Machine migration, Virtualization application in Enterprises, Desktop virtualization, Server consolidation, Automating infrastructure management, pitfalls of virtualization.

**UNIT IV SOFTWARE-AS-A-SERVICE (SaaS) AND ENTERPRISE ARCHITECTURE 9**

Emergence of SaaS, SaaS architectures, Dev 2.0 Platforms, Cloud Computing, Enterprise Data and Processing, Enterprise Components, Application Integration and SOA, Enterprise Technical Architecture.

**UNIT V MAPREDUCE AND EXTENSIONS 9**

Parallel Computing, MapReduce Model, Parallel Efficiency and MapReduce, Relational Operations using MapReduce, Enterprise Batch Processing using MapReduce- Case study.

**TOTAL HOURS: 45**

**TEXT BOOKS**

1. Anthony T. Velte, Toby J. Velte, and Robert Elsenpeter, “Cloud Computing – A practical Approach”, TMH. (Unit-1 and Unit-2)
2. Gautam Shro, “ Enterprise Cloud Computing Technology, Architecture, Applications” (online book) (Unit-3 to Unit-5)

**REFERENCE**

1. Michael Miller, “Cloud Computing”, Pearson Education, New Delhi, 2009

## 11UCE808 TOTAL QUALITY MANAGEMENT

| L | T | P | C |
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*Course Objectives*

- *To understand the Total Quality Management concept and principles and the various tools available to achieve Total Quality Management.*
- *To understand the statistical approach for quality control.*
- *To create an awareness about the ISO and QS certification process and its need for the industries.*

**UNIT I INTRODUCTION 9**

Definition of Quality, Dimensions of Quality, Quality Planning, Quality costs - Analysis Techniques for Quality Costs, Basic concepts of Total Quality Management, Historical Review, Principles of TQM, Leadership – Concepts, Role of Senior Management, Quality Council, Quality Statements, Strategic Planning, Deming Philosophy, Barriers to TQM Implementation.

**UNIT II TQM PRINCIPLES 9**

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

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

The seven tools of quality, Statistical Fundamentals – Measures of central Tendency and Dispersion, Population and Sample, Normal Curve, Control Charts for variables and attributes, Process capability, Concept of six sigma, New seven Management tools.

**UNIT IV TQM TOOLS 9**

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

**UNIT V QUALITY SYSTEMS 9**

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

**TOTAL HOURS: 45**

**TEXT BOOK**

1. Dale H.Besterfiled, et al., Total Quality Management, Pearson Education, Inc. 2003. (Indian reprint 2004). ISBN 81-297-0260-6.

**REFERENCES**

1. James R.Evans & William M.Lidsay, The Management and Control of Quality, ($5^{th}$ Edition), South-Western (Thomson Learning), 2002 (ISBN 0-324-06680-5).

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.

| 11UCE809 | DATA WAREHOUSING AND DATA MINING | L | T | P | C |
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*Course Objectives*

- *To introduce the concept of data mining with in detail coverage of basic tasks, metrics, issues, and implication. Core topics like classification, clustering and association rules are exhaustively dealt with.*
- *To introduce the concept of data warehousing with special emphasis on architecture and design.*

**UNIT I INTRODUCTION TO DATA MINING 9**

Relation to Statistics – Databases – Data Mining Functionalities – Steps in Data Mining Process – Architecture of a Typical Data Mining Systems – Classification of Data Mining Systems – Overview of Data Mining Techniques.

**UNIT II DATA PREPROCESSING AND CONCEPT DESCRIPTION 9**

Data Preprocessing – Data Cleaning – Integration – Transformation – Reduction – Discretization Concept Hierarchies – Concept Description Data Generalization and Summarization Based Characterization – Mining Association Rules in Large Databases.

**UNIT III CLASSIFICATION AND CLUSTERING 9**

Classification and Prediction Issues Regarding Classification and Prediction – Classification by Decision Tree Induction – Bayesian Classification – Other Classification Methods – Prediction – Clusters Analysis – Types of Data in Cluster Analysis – Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical Methods.

**UNIT IV DATA WAREHOUSING 9**

Data Warehousing Components – Multi Dimensional Data Model – Data Warehouse Architecture – Data Warehouse Implementation – Mapping the Data Warehouse to Multiprocessor Architecture – OLAP – Need – Categorization of OLAP Tools.

**UNIT V APPLICATIONS** **9**

Applications of Data Mining – Social Impacts of Data Mining – Tools – An Introduction to DB Miner – Case studies – Mining WWW – Mining Text Databases – Mining Spatial Databases – Case Studies.

TOTAL HOURS: 45

**TEXTBOOK**

1. Jiawei Han, Micheline Kamber, "Data Mining Concepts and Techniques", Morgan Kaufmann Publishers, 2002.

**REFERENCES**

1. Alex Berson, Stephen J Smith, “Data Warehousing, Data Mining & OLAP”, Tata Mcgraw Hill, 2004.

2. Usama M. Fayyad, Gregory Piatetsky , Shapiro, Padhrai Smyth and Ramasamy Uthurusamy, "Advances In Knowledge Discovery And Data Mining", The M.I.T Press, 1996.

3. David Hand, Heikki Manila, Padhraic Symth, “Principles of Data Mining”, PHI 2004.

4. W.H.Inmon, “Building the Data Warehouse”, 3rd Edition, Wiley, 2003.