# PONDICHERRY ENGINEERING COLLEGE, PUDUCHERRY – 605 014

## CURRICULUM AND SYLLABI FOR AUTONOMOUS STREAM

## B.TECH. (INFORMATION TECHNOLOGY) COURSES

**(FOR STUDENTS ADMITTED FROM ACADEMIC YEAR 2014-15 ONWARDS)**

## CURRICULUM[a]

**I SEMESTER**

| Subject Code | Subject | Category* | Periods | | | Marks# | | | Credits |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | CA | SE | TM | |
| **MA101** | Mathematics I | TB | 3 | 1 | - | 40 | 60 | 100 | 4 |
| **PH101** | Engineering Physics | TA | 4 | - | - | 40 | 60 | 100 | 4 |
| **CY101** | Engineering Chemistry | TA | 4 | - | - | 40 | 60 | 100 | 4 |
| **BE102** | Basic Electrical and Electronics Engineering | TC | 3 | 1 | - | 40 | 60 | 100 | 4 |
| **ME101** | Engineering Thermodynamics | TA | 3 | 1 | - | 40 | 60 | 100 | 4 |
| **CS101** | Computer Programming | TA | 3 | 1 | - | 40 | 60 | 100 | 4 |
| **ME102** | Engineering Graphics | EGD | 2 | - | 3 | 50 | 50 | 100 | 4 |
| **CS102** | Computer Programming Laboratory | LB | - | - | 3 | 60 | 40 | 100 | 2 |
| **BE103** | Basic Electrical and Electronics Laboratory | LB | - | - | 3 | 60 | 40 | 100 | 2 |
| **Total Credits** | | | | | | | | | **32** |

**II SEMESTER**

| Subject Code | Subject | Category* | Periods | | | Marks# | | | Credits |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | CA | SE | TM | |
| **MA102** | Mathematics II | TB | 3 | 1 | - | 40 | 60 | 100 | 4 |
| **PH102** | Material Science | TA | 4 | - | - | 40 | 60 | 100 | 4 |
| **CY102** | Environmental Science | TA | 4 | - | - | 40 | 60 | 100 | 4 |
| **BE101** | Basic Civil and Mechanical Engineering | TC | 4 | - | - | 40 | 60 | 100 | 4 |
| **CE101** | Engineering Mechanics | TB | 3 | 1 | - | 40 | 60 | 100 | 4 |
| **HS101** | Communicative English | TA | 4 | - | - | 40 | 60 | 100 | 4 |
| **PH103** | Physics Laboratory | LB | - | - | 3 | 60 | 40 | 100 | 2 |
| **CY103** | Chemistry Laboratory | LB | - | - | 3 | 60 | 40 | 100 | 2 |
| **ME103** | Workshop Practice | LB | - | - | 3 | 60 | 40 | 100 | 2 |
| **Total Credits** | | | | | | | | | **30** |

# **CA** – Continuous Assessment, **SE** – Semester Examination, **TM** – Total Marks

* **TA** – Theory Category A, **TB** – Theory Category B, **TC** – Theory Category C,
**LB** – Laboratory**, EGD** – Engineering Graphics / Drawing
**POD** – Practice Oriented Design, **TCP** – Theory Combined with Practice, **PR** - Practice

[a] ***Approved in 3rd Academic Council Meeting***

**III SEMESTER**

| Subject Code | Subject | Category* | Periods | | | Marks | | | Credits |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | CA | SE | TM | |
| **MA103** | Mathematics III | TB | 3 | 1 | - | 40 | 60 | 100 | 4 |
| **EC128** | Electronic Devices and Circuits | TA | 3 | 1 | - | 40 | 60 | 100 | 4 |
| **IT101** | Digital System Design and Computer Architecture | TA | 3 | 1 | - | 40 | 60 | 100 | 4 |
| **IT102** | Data Structures | TA | 3 | 1 | - | 40 | 60 | 100 | 4 |
| **IT103** | Object Oriented Programming | TA | 3 | 1 | - | 40 | 60 | 100 | 4 |
| **EC129** | Electronic Devices and Circuits Laboratory | LB | - | - | 3 | 60 | 40 | 100 | 2 |
| **IT104** | Data Structures and OOP Laboratory | LB | - | - | 3 | 60 | 40 | 100 | 2 |
| **IT105** | Digital Laboratory | LB | - | - | 3 | 60 | 40 | 100 | 2 |
| **Total Credits** | | | | | | | | | **26** |

**IV SEMESTER**

| Subject Code | Subject | Category* | Periods | | | Marks | | | Credits |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | CA | SE | TM | |
| **MA107** | Discrete Mathematics and Graph Theory | TB | 3 | 1 | - | 40 | 60 | 100 | 4 |
| **IT106** | Operating Systems | TA | 3 | 1 | - | 40 | 60 | 100 | 4 |
| **IT107** | Microprocessors and Applications | TA | 3 | 1 | - | 40 | 60 | 100 | 4 |
| **IT108** | Design and Analysis of Algorithms | TA | 3 | 1 | - | 40 | 60 | 100 | 4 |
| | Programme Elective I / General Elective I | TX$^{@}$ | 4 | - | - | 40 | 60 | 100 | 4 |
| **IT109** | Algorithms Laboratory | LB | - | - | 3 | 60 | 40 | 100 | 2 |
| **IT110** | Microprocessors Laboratory | LB | - | - | 3 | 60 | 40 | 100 | 2 |
| **IT111** | Operating Systems Laboratory | LB | - | - | 3 | 60 | 40 | 100 | 2 |
| **Total Credits** | | | | | | | | | **26** |

TX$^{@}$ - Theory Course (Category TA/ TB/ TC/TCP/POD)

**V SEMESTER**

| Subject Code | Subject | Category* | Periods | | | Marks | | | Credits |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | CA | SE | TM | |
| **IT112** | Computer Networks | TA | 3 | 1 | - | 40 | 60 | 100 | 4 |
| **IT113** | Java Programming | TA | 3 | 1 | - | 40 | 60 | 100 | 4 |
| **IT114** | DataBase Management System | TA | 3 | 1 | - | 40 | 60 | 100 | 4 |
| **-** | Programme Elective II | TX@ | 4 | **-** | - | 40 | 60 | 100 | 4 |
| **-** | Programme Elective III/ General Elective II | TX@ | 4 | **-** | - | 40 | 60 | 100 | 4 |
| **IT115** | Computer Networks Laboratory | LB | - | - | 3 | 60 | 40 | 100 | 2 |
| **IT116** | Java Programming Laboratory | LB | - | - | 3 | 60 | 40 | 100 | 2 |
| **IT117** | DataBase Management Systems Laboratory | LB | - | - | 3 | 60 | 40 | 100 | 2 |
| **Total Credits** | | | | | | | | | **26** |

**VI SEMESTER**

| Subject Code | Subject | Category* | Periods | | | Marks | | | Credits |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | CA | SE | TM | |
| **IT118** | Software Engineering | TA | 3 | 1 | - | 40 | 60 | 100 | 4 |
| **IT119** | Artificial Intelligence | TA | 3 | 1 | - | 40 | 60 | 100 | 4 |
| **IT120** | Web Technology | TA | 3 | 1 | - | 40 | 60 | 100 | 4 |
| **-** | Programme Elective IV | TX@ | 4 | **-** | - | 40 | 60 | 100 | 4 |
| **-** | Programme Elective V/ General Elective III | TX@ | 4 | **-** | - | 40 | 60 | 100 | 4 |
| **IT121** | Artificial Intelligence and Software Engineering Laboratory | LB | - | - | 3 | 60 | 40 | 100 | 2 |
| **IT122** | Web Technology Laboratory | LB | - | - | 3 | 60 | 40 | 100 | 2 |
| **IT123** | Software Development Laboratory | LB | - | - | 3 | 60 | 40 | 100 | 2 |
| **HS102** | General Proficiency | PR | - | - | 3 | 100 | - | 100 | 1 |
| **Total Credits** | | | | | | | | | **27** |

TX@ - Theory Course (Category TA/ TB/ TC/TCP/POD)

**VII SEMESTER**

| Subject Code | Subject | Category* | Periods | | | Marks | | | Credits |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | CA | SE | TM | |
| **IT124** | Information Security | TA | 3 | 1 | - | 40 | 60 | 100 | 4 |
| **IT125** | Web Services and XML | TA | 3 | 1 | - | 40 | 60 | 100 | 4 |
| **IT126** | Management Concepts and Strategies | TA | 3 | 1 | - | 40 | 60 | 100 | 4 |
| **-** | Programme Elective VI | TX@ | 4 | **-** | - | 40 | 60 | 100 | 4 |
| **-** | Programme Elective VII/ General Elective IV | TX@ | 4 | **-** | - | 40 | 60 | 100 | 4 |
| **IT127** | Web Services and XML Laboratory | LB | - | - | 3 | 60 | 40 | 100 | 2 |
| **IT128** | Project Work (Phase I) | PR | - | - | 3 | 100 | - | 100 | 2 |
| **IT129** | Professional Ethics and Practice | PR | - | - | 3 | 100 | - | 100 | 1 |
| **Total Credits** | | | | | | | | | **25** |

**VIII SEMESTER**

| Subject Code | Subject | Category* | Periods | | | Marks | | | Credits |
|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | CA | SE | TM | |
| **-** | Programme Elective VIII | TX@ | 4 | - | - | 40 | 60 | 100 | 4 |
| **-** | Programme Elective IX | TX@ | 4 | - | - | 40 | 60 | 100 | 4 |
| **-** | Programme Elective X/General Elective V | TX@ | 4 | - | - | 40 | 60 | 100 | 4 |
| **IT130** | Comprehensive Test and Viva-Voce | PR | - | - | 3 | 60 | 40 | 100 | 1 |
| **IT131** | Project Work (Phase II) | PR | - | - | 9 | 60 | 40 | 100 | 6 |
| - | Professional Development Courses (*3 one credit courses*) | PR | - | - | - | 100 | - | 300 | 3 |
| **Total Credits** | | | | | | | | | **22** |

TX@ - Theory Course (Category TA/ TB/ TC/TCP/POD)

**LIST OF PROGRAMME ELECTIVES**

| Sl. No. | Subject Code | Subject | Category |
|---|---|---|---|
| 1 | **ITP01** | System Software | TA |
| 2 | **ITP02** | Information Coding Techniques | TA |
| 3 | **ITP03** | C# and .Net programming | TCP |
| 4 | **ITP04** | Computer Hardware and Troubleshooting | TCP |
| 5 | **ITP05** | Real-Time Systems | TA |
| 6 | **ITP06** | Theory of Computation | TB |
| 7 | **ITP07** | Embedded Systems | TA |
| 8 | **ITP08** | Business Intelligence | TA |
| 9 | **ITP09** | Compiler Design | TA |
| 10 | **ITP10** | Component Technology | TCP |
| 11 | **ITP11** | Mobile Communication Networks | TA |
| 12 | **ITP12** | Image Processing | TA |
| 13 | **ITP13** | Object Oriented Analysis and Design | TA |
| 14 | **ITP14** | Software Project Management | TA |
| 15 | **ITP15** | Data Mining and Warehousing | TA |
| 16 | **ITP16** | Distributed Computing | TA |
| 17 | **ITP17** | High Speed Networks | TA |
| 18 | **ITP18** | Wireless Sensor Networks | TA |
| 19 | **ITP19** | Big Data and Hadoop Programming | TA |
| 20 | **ITP20** | Cloud Computing | TA |
| 21 | **ITP21** | Internet of Things | TA |
| 22 | **ITP22** | Virtualization Techniques | TA |
| 23 | **ITP23** | Augmented Reality | TA |

**LIST OF GENERAL ELECTIVES**

| Sl. No. | Subject Code | Subject | Category |
|---|---|---|---|
| 1 | **CEG01** | Entrepreneurship Development | TA |
| 2 | **CEG02** | Finite Element Analysis | TB |
| 3 | **CEG03** | Fluid Mechanics and Machines | TB |
| 4 | **CEG04** | Building Maintenance | TA |
| 5 | **CEG05** | Building Physics | TA |
| 6 | **CEG06** | Non Destructive Testing Methods | TA |
| 7 | **CEG07** | Building Automation and Smart Structures | TA |
| 8 | **CEG08** | Heath Monitoring of Structures | TA |
| 9 | **CEG09** | Remote Sensing and GIS | TA |
| 10 | **CEG10** | Experimental Stress Analysis | TA |
| 11 | **CEG11** | Environment Impact Assessment | TA |
| 12 | **CEG12** | Industrial Waste Disposal and Treatment | TA |
| 13 | **CEG13** | Project Management | TA |
| 14 | **CEG14** | Fluid Mechanics and Strength of Materials | TB |
| 15 | **MEG01** | Elements of Project Management | TA |
| 16 | **MEG02** | Fluid and Thermal machines | TA |
| 17 | **MEG03** | Industrial Automation | TA |
| 18 | **MEG04** | Industrial Refrigeration and Air-Conditioning | TA |
| 19 | **MEG05** | Quantitative Techniques for Engineers | TA |
| 20 | **MEG06** | Renewable energy | TA |
| 21 | **ECG01** | Consumer Electronics | TA |
| 22 | **ECG02** | Communication Theory | TA |
| 23 | **ECG03** | CMOS VLSI Design | TA |
| 24 | **ECG04** | Communication for Engineers | TA |
| 25 | **ECG05** | Avionics | TA |
| 26 | **CSG01** | Hardware and Troubleshooting | POD |
| 27 | **CSG02** | JAVA Programming | TCP |
| 28 | **CSG03** | Fundamentals of Operating Systems | TA |
| 29 | **CSG04** | Object Oriented Programming using C++ | TA |
| 30 | **CSG05** | Microprocessors and its Applications | TA |
| 31 | **EEG01** | Electrical Machines and Utilizations | TA |
| 32 | **EEG02** | Soft Computing Techniques | TA |
| 33 | **EEG03** | Power Generation Systems | TA |
| 34 | **EIG01** | System Design Using Advanced Microcontrollers | TA |

| | | | |
|---|---|---|---|
| 35 | **EIG02** | Measurement and Instrumentation | TA |
| 36 | **EIG03** | Process Instrumentation | TA |
| 37 | **EIG04** | PLC and Industrial Automation | TA |
| 38 | **EIG05** | Micro-Electro Mechanical Systems | TA |
| 39 | **EIG06** | Neural Networks and Fuzzy logic | TA |
| 40 | **CHG01** | Process Engineering Principles | TA |
| 41 | **CHG02** | Fundamentals of Momentum, Heat and Mass Transfer | TA |
| 42 | **CHG03** | Heat Transfer Analysis | TA |
| 43 | **ITG01** | Bio-Informatics | TA |
| 44 | **ITG02** | Principles of Programming Languages | TA |
| 45 | **ITG03** | Introduction to Operating Systems | TA |
| 46 | **ITG04** | Introduction to Database and Oracle | TA |
| 47 | **ITG05** | Business Process | TA |
| 48 | **MAG01** | Linear Algebra | TA |
| 49 | **MAG02** | Queuing Theory and Networks | TA |
| 50 | **MAG03** | Optimization Techniques | TA |
| 51 | **PHG01** | Introduction to Nanoscience and Nanotechnology | TA |
| 52 | **PHG02** | Nanotechnology and Nanoelectronics | TA |
| 53 | **PHG03** | Non Destructive Testing | TA |
| 54 | **PHG04** | Smart Materials and Structures | TA |
| 55 | **CYG01** | Cheminformatics | TA |
| 56 | **CYG02** | Instrumental Methods of Chemical Analysis | TA |
| 57 | **HSG01** | Soft skill and Personality Development | TA |
| 58 | **HSG02** | Engineering Economics and Management | TA |

**CONSOLIDATED CREDIT DISTRIBUTION**

| Sl. No. | Course type | Credits | | |
|---|---|---|---|---|
| | | **Theory** | **Lab/ Practice** | **Total** |
| 1 | Basic Sciences (Mathematics, Physics, Chemistry) | 32 | 4 | 36 |
| 2 | Basic Engineering Courses | 24 | 12 | 36 |
| 3 | Programme Core Courses | 56 | 24 | 80 |
| 4 | Programme Electives | 32 | - | 32 |
| 5 | General Electives | 08 | - | 08 |
| 6 | Project Work and Comprehensive Viva-voce | - | 09 | 09 |
| 7 | Humanities and Social Sciences | 08 | - | 08 |
| 8 | General Skill Development Courses | | | |
| | (a) Soft Skill Development | - | 01 | 01 |
| | (b) Professional Development and Ethics | - | 01 | 01 |
| | (c) Mandatory Courses | | 3 one credits | 3 one credits |
| | **Total** | **160** | **54** | **214** |

# SYLLABUS (Core Subjects)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Department :** Mathematics | | | **Programme :** B.Tech. | | | | | |
| **Semester :** One | | | **Category :** TB | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| MA101 | Mathematics I | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objectives** | • To introduce the ideas of differential and integral calculus<br>• To familiarize students with functions of several variables<br>• To introduce methods for solving differential equations | | | | | | | |
| **Outcome** | • Understands Calculus<br>• Functions of several variables<br>• Able to solve differential equations | | | | | | | |
| **UNIT – I** | | | | | **Hours: 09** | | | |
| Curvature, radius of curvature, evolutes and involutes. Beta and Gamma functions and their properties. | | | | | | | | |
| **UNIT – II** | | | | | **Hours: 09** | | | |
| Partial derivatives, Total derivative, Differentiation of implicit functions, Change of variables, Jacobians and their properties, Partial differentiation of implicit functions, Maxima and minima of functions of two variables, Lagrange's method of undetermined multipliers. | | | | | | | | |
| **UNIT – III** | | | | | **Hours: 09** | | | |
| Multiple Integrals, change of order of integration in double integrals, Applications: Plane areas (double integration), Change of variables (Cartesian to polar), volumes by solids of revolution, double and triple integrations (Cartesian and polar) – Center of mass and Gravity (constant and variable densities). | | | | | | | | |
| **UNIT – IV** | | | | | **Hours: 09** | | | |
| Exact equations, First order linear equations, Bernoulli's equation, orthogonal trajectories, growth, decay and geometrical applications. Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type. | | | | | | | | |
| **UNIT – V** | | | | | **Hours: 09** | | | |
| Linear differential equations of higher order - with constant coefficients, the operator D, Euler's linear equation of higher order with variable coefficients, simultaneous linear differential equations, solution by variation of parameters method. | | | | | | | | |
| **Total contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes:** | | | **Total Hours: 60** | | | |
| **Text Books:** | | | | | | | | |
| 1. Erwin Kreyszig, Advanced Engineering Mathematics (9th Ed), John Wiley & Sons, New Delhi, 2011.<br>2. Venkataraman M.K., Engineering Mathematics, Vol. I&II, National Publishing Company, Chennai, 2007.<br>3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008. | | | | | | | | |
| **Reference Books:** | | | | | | | | |
| 1. Sundaram V. et al, Engineering Mathematics, Vol. I& II, Vikas Publications, 6th Edition, 2007.<br>2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.<br>3. Bali N. and Goyal M., Advanced Engineering Mathematics, Laxmi Publications Pvt. Ltd., New Delhi, 9th Edition, 2011. | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|
| **Department :** Physics | | | | **Programme :** B.Tech. | | | | |
| **Semester :** One | | | | **Category :** TA | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| PH101 | Engineering Physics | 4 | - | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objectives** | • To provide a bridge between basic Physics and Engineering courses.<br>• To introduce the concepts and applications of Ultrasonics, Optics, Lasers, Optical Fibers, and wave mechanics and fundamentals of crystal structure. | | | | | | | |
| **Outcome** | • At the end of the course, Students would have adequate exposure to the concepts of the various topics of this Engineering Physics course and their real life applications. | | | | | | | |
| **UNIT – I** | **Acoustics and Ultrasonics** | | | | **Hours: 12** | | | |
| **Acoustics:** Factors affecting Acoustics of Buildings and their Remedies - Sabine's formula for Reverberation Time – sound absorption coefficient & its determination; **Ultrasonics:** Ultrasonic Waves- Properties-Production by Piezoelectric & Magnetostriction methods. Detection-acoustic grating and piezoelectric transducer methods. Applications of ultrasonic waves-Industrial applications, Medical application-sonogram. Flaw detection by ultrasonic NDT -Ultrasonic Pulse Echo Method. | | | | | | | | |
| **UNIT – II** | **Optics** | | | | **Hours: 12** | | | |
| **Interference:** Air Wedge – Michelson's Interferometer – Types of fringes- Determination of Wavelength of a light source– Antireflection Coatings -Interference Filter; **Diffraction:** Concept of Resolution of Spectral lines-Rayleigh's criterion -Resolving Power of Grating, Prism & Telescope; **Polarisation :** Basic concepts of Double Refraction and Optical Rotation- Quarter and Half Wave Plates – Specific Rotatory Power – Laurent's Half Shade Polarimeter-polarizing filters | | | | | | | | |
| **UNIT – III** | **Crystal Structure and Lattice Defects** | | | | **Hours: 12** | | | |
| **Crystal structure**: Space Lattice**,** Unit Cell, Lattice Parameters, Crystal Systems, Bravais Lattices- Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, HCP structures – Miller Indices- Powder X Ray Diffraction Method; **Lattice Defects**: Qualitative ideas of point, line, surface and volume defects and their influence on properties of solids | | | | | | | | |
| **UNIT – IV** | **Wave Mechanics** | | | | **Hours: 12** | | | |
| Matter Waves – de Broglie hypothesis – Uncertainty Principle – Schrodinger Wave Equations – Time Dependent – Time Independent – Application to Particle in a One Dimensional potential Box –Concept of Quantum Mechanical Tunneling (without derivation) – Applications of tunneling (qualitative) to Alpha Decay, Tunnel Diode, Scanning Tunneling Microscope. | | | | | | | | |
| **UNIT – V** | **Lasers and Fiber Optics** | | | | **Hours: 12** | | | |
| **Lasers** : Principles of Laser – Spontaneous and Stimulated Emissions - Einstein's Coefficients – population Inversion and Laser Action –optical resonators(qualitative)- Types of Lasers – Nd:YAG, $CO_2$ laser, GaAs Laser**-** Industrial & Medical applications of Lasers; **Fiber Optics**: Principle and Propagation of light in optical fiber– Numerical aperture and acceptance angle – Types of optical fibers-based on Material, refractive index profile, Modes of propagation(single & Multimode Fibres) -Qualitative ideas of attenuation in optical Fibers-Applications of Optical Fibers- Fibre Optic communication (Schematic), Active and passive fibre optic sensors, Endoscope | | | | | | | | |
| **Total contact Hours: 60** | **Total Tutorials: -** | **Total Practical Classes: -** | | | **Total Hours: 60** | | | |

**Text Books:**


1. Avadhanulu M N , Engineering Physics, S. Chand & Co, 2007.
2. V Rajendran, Engineering Physics, 2nd Edition, TMH, New Delhi 2011.


**Reference Books:**


1. Ajoy Ghatak, Optics, 5th Edition TMH, New Delhi, 2012.
2. K.R.Nambiar**,** Lasers, New Age International, New Delhi, 2008.
3. K. Thyagarajan and Ajoy Ghatak, Lasers Fundamentals and Applications, 2nd Edition, Springer 2010.
4. V Raghavan , Materials Science and Engineering- A First Course, 5th Edition, Prentice Hall of India, 2008.
5. Arthur Beiser, Concepts of Modern Physics, 6th Edition, TMH, New Delhi 2008.
6. A.S. Vasudeva, Modern Engineering Physics, S. Chand & Co, 2006.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Department :** Chemistry | | | | **Programme :** B.Tech | | | | |
| **Semester :** One | | | | **Category :** TA | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| CY101 | Engineering Chemistry | 4 | - | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objectives** | • To know the importance of chemistry in engineering education<br>• To understand the chemistry of industrial processes<br>• To apply the knowledge of chemistry to solve engineering problems | | | | | | | |
| **Outcome** | • Students will be able to understand and appreciate usefulness of chemistry concepts in the design, fabrication and maintenance of materials for engineering applications.<br>• Students will gain knowledge about the chemistry background of some of the important industrial processing techniques.<br>• With the knowledge gained in conceptual chemistry, engineering students will be able to approach confidently the design and development of futuristic materials to meet the requirement of industry and society. | | | | | | | |
| **UNIT – I** | **Water Treatment** | | | | **Hours: 12** | | | |
| Hardness of water – units and calcium carbonate equivalent. Determination of hardness of water- EDTA method. Disadvantages of hard water-boiler scale and sludge, caustic embrittlement, priming and foaming and boiler corrosion. Water softening methods – internal and external conditioning – lime-soda process, zeolite process and ion exchange process. Desalination – reverse osmosis and electro dialysis. Specifications for drinking water, BIS and WHO standards. | | | | | | | | |
| **UNIT – II** | **Industrial Polymers** | | | | **Hours: 12** | | | |
| Classification, types of polymerization reactions - mechanism of free radical, ionic and Ziegler-Natta polymerizations. Polymer properties - chemical resistance, crystallinity and effect of temperature. Polymer molecular weight - Mn and Mw. Thermoplastics and thermosets. Rubbers – vulcanization. Synthetic rubber - Buna S, Buna N, Silicone and Butyl rubber. Conducting polymers – classification and applications. Moulding constituents of plastic. Biodegradable polymers – preparation, properties and applications of PLA, PCL and PGA. Liquid crystalline polymers. | | | | | | | | |
| **UNIT – III** | **Electrochemical Cells** | | | | **Hours: 12** | | | |
| Galvanic cells, single electrode potential, standard electrode potential, electromotive series. EMF of a cell and its measurement. Nernst equation. Electrolyte concentration cell. Reference electrodes – hydrogen, calomel, Ag/AgCl and glass electrodes. Batteries - primary and secondary batteries, Laclanche cell, lead acid storage battery, Ni-Cd battery and alkaline battery. Fuel cells - $H_2$-$O_2$ fuel cell. | | | | | | | | |
| **UNIT – IV** | **Corrosion and Control** | | | | **Hours: 12** | | | |
| Chemical and electrochemical corrosion – Galvanic, pitting, stress and concentration cell corrosion. Factors influencing corrosion. Corrosion control methods - cathodic protection and corrosion inhibitors. Protective coatings - types of protective coatings - metallic coating - tinning and galvanizing, cladding, electroplating and anodizing. | | | | | | | | |
| **UNIT – V** | **Engineering Materials** | | | | **Hours: 12** | | | |
| Abrasives – Natural and artificial abrasives. Refractories – classification, properties and manufacture. Refractory bricks – silica bricks, fire clay bricks, high alumina bricks and silicon carbide bricks. Glass and ceramics – properties, manufacture and types of glass, ceramics – clays - types, fabrication of ceramic ware. Composite materials – classification. Processing of fibre-reinforced composites, applications. Glazing. | | | | | | | | |
| **Total contact Hours: 60** | **Total Tutorials: -** | **Total Practical Classes: -** | | | **Total Hours: 60** | | | |

**Text Books:**


1. P.C. Jain and Monika Jain, Engineering Chemistry, Dhanpat Rai and Sons, New Delhi, 2004.
2. S.S. Dara and S.S Umare, A Textbook of Engineering Chemistry, S. Chand & Co., Ltd. New Delhi, 2013.


**Reference Books:**


1. B. K. Sharma, Engineering Chemistry, Krishna Prakashan Media (P) Ltd., Meerut, 2001.
2. P. Kannan, A. Ravikrishnan, Engineering Chemistry, Sri Krishna Hi-tech. Publishing Company Pvt. Ltd, Chennai, 2009.
3. V.R. Gowariker, N.V. Viswanathan and J. Sreedhar, Polymer Science, New Age Intl (P) Ltd, Chennai, 2006.

| **Department :** Electronics and Communication Engineering / Electrical and Electronics Engineering | | | | | **Programme :** B.Tech | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester:** One | | | | | **Category :** TC | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| BE102 | Basic Electrical and Electronics Engineering | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objectives** | • To apply Kirchhoff's law to simplify the given circuit.<br>• To understand the concept of AC circuit and to simplify the given RL, RC, RLC series and parallel circuits.<br>• To understand the principle of electromagnetic induction and the working principle of electrical machines.<br>• The students understand the working principle of transistor, FET, MOSFET, CMOS and their applications.<br>• To design adders, subtractors and to gain knowledge on sequential logic circuits.<br>• To understand the need for communication and acquire knowledge on different communication systems.<br>• To have an overview of different emerging technologies in day-to-day applications. | | | | | | | |
| **Outcome** | • The students explored the basic terminology, laws and concepts of DC and AC circuits in electrical engineering.<br>• The students know the principle of operation of DC and AC electrical machines and different types of power plants.<br>• Will understand the importance of FET's, MOSFET's, CMOS and their applications.<br>• Will be able to design Combinational and Sequential circuits.<br>• Awareness towards different Communication Systems.<br>• Gain knowledge in the working principle of real time applications used in day today life like ATM, Microwave Oven, Bluetooth, WiFi and Computer Networks. | | | | | | | |
| **UNIT – I** | **DC Circuits** | | | | **Hours: 07** | | | |
| Definition of Voltage, Current, Power & Energy, circuit parameters, Ohm's law, Kirchoff's law & its applications – Simple Problems - Division of current in Series & parallel circuits - star/delta conversion - Node and mesh methods of analysis of DC circuits. | | | | | | | | |
| **UNIT – II** | **AC Circuits** | | | | **Hours: 08** | | | |
| Concepts of AC circuits – rms value, average value, form and peak factors – Simple RL, RC and RLC series and parallel circuits – Concept of real and reactive power – Power factor – Series and parallel resonance - Introduction to three phase system - Power measurement by two wattmeter method. | | | | | | | | |
| **UNIT – III** | **Electrical Machines and Power Plants** | | | | **Hours: 08** | | | |
| Law of Electromagnetic induction, Fleming's Right & Left hand rule - Principle of DC rotating machine, Single phase transformer, single phase induction motor and synchronous motor (Qualitative approach only) - Layout of thermal, hydro and nuclear power generation (block diagram approach only). Components of AC transmission and distribution systems – One line diagram. | | | | | | | | |
| **UNIT – IV** | **Electronics** | | | | **Hours: 07** | | | |
| Transistor as an Amplifier – RC Coupled Amplifier – Characteristics of JFET – MOSFET – CMOS – Block Diagram of SMPS – LED – LCD – Solar Cells.<br>Combinational Logic – Design of Half Adder - Half Subtractor –Full Adder – Full Subtractor – Sequential Logic – Ripple Counters – Shift Registers. | | | | | | | | |
| **UNIT – V** | **Communication** | | | | **Hours: 08** | | | |
| Need for Modulation – Block Diagram of Analog Communication System - AM, FM, PM Definitions & Waveforms – Comparison of Digital & Analog Communication System- Block Diagram of Digital Communication System – Electromagnetic Spectrum.<br>Wired & Wireless Channel – Block Diagram of Communication Systems – Satellite Communication – Cellular Mobile Communication – Fibre Optical Communication System. | | | | | | | | |
| **UNIT – VI** | **Overview of Emerging Technologies** | | | | **Hours: 07** | | | |
| Evolution of Mobile Communication Generations (1G, 2G, 2.5G, 3G and Beyond 3G) – Overview of Bluetooth, Wifi, WiMax, Sensor Networks and Wireless LANs –– Introduction to VLSI Technology and Embedded Systems – Internet | | | | | | | | |

of Things (IOT).
Microwave Ovens - RFID - Automated Teller Machines (ATM).

| Total contact Hours: 45 | Total Tutorials: 15 | Total Practical Classes: - | Total Hours: 60 |
|---|---|---|---|

**Text Books:**

**Electrical**


1. Edward Hughes, John Hiley, Keith Brown, Ian McKenzie Smith, Electrical and Electronics Technology, Pearson Education Limited, New Delhi, 2010.
2. Kothari D P and Nagrath I J, Basic Electrical Engineering, Tata McGraw Hill, 2009.
3. S.K. Sahdev, Fundamentals of Electrical Engineering and Electronics, Dhanpat Rai & Co, 2013.


**Electronics and Communication**


4. Jacob Millman and Christos C. Halkias, "Electronic Devices and Circuits" Tata McGraw Hill, 2008
5. R.L. Boylestad and L. Nashelsky, "Electronic Devices and Circuit Theory", PHI Learning Private Limited, Ninth Edition, 2008
6. Morris Mano, "Digital design", PHI Learning, Fourth Edition, 2008.
7. Wayne Tomasi, "Electronic Communication Systems- Fundamentals Theory Advanced", Fourth Edition, Pearson Education, 2001.
8. Rajendra Prasad , " Fundamentals of Electronic Engineering", Cengage learning , New Delhi, First Edition, 2011.
9. William Stallings, " Wireless Communication and Networks", Second Edition, Pearson Education, 2011.


**Reference Books:**

**Electrical**


1. R.Muthusubramaniam, S.Salivahanan and K.A. Muraleedharan, Basic Electrical Electronics and Computer Engineering, Tata McGraw Hill, 2004.
2. Rejendra Prasad, Fundamentals of Electrical Engineering. Prentice Hall of India, 2006.


**Electronics and Communication**


3. David. A. Bell, "Electronic Devices and Circuits", PHI Learning Private Ltd, India, Fourth Edition, 2008.
4. Donald P Leach, Albert Paul Malvino and Goutam Saha, "Digital Principles and Applications," 6th edition,Tata McGraw Hill Publishing Company Ltd.,New Delhi,2008.
5. Roddy and Collen, "Communication Systems", PHI learning, 2001.
6. George Kennedy and Bernard Davis, Electronics communication Systems, Tata McGraw-Hill Ltd, New Delhi, 2007.


**Web sites:**

1. www.electronics-tutorials.ws
2. www.*en.wikipedia.org/wiki/Telecommunication*
3. www.nptel.ac.in/courses/IIT-MADRAS/Basic_Electronics.../LECTURE1.pdf

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|---|---|---|---|---|---|---|---|---|
| **Department :** Mechanical Engineering | | | | **Programme :** B.Tech. | | | | |
| **Semester :** One | | | | **Category :** TA | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ME101 | Engineering Thermodynamics | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objectives** | • To convey the basics of the thermodynamic principles<br>• To establish the relationship of these principles to thermal system behaviors<br>• To develop methodologies for predicting the system behavior<br>• To establish the importance of laws of thermodynamics applied to energy systems<br>• To explain the role of refrigeration and heat pump as energy systems<br>• To develop an intuitive understanding of underlying physical mechanism and a mastery of solving practical problems in real world. | | | | | | | |
| **Outcome** | • Parallels are drawn between the subject and the student's everyday experience so that this course may be related to what the students already know.<br>• Students are made to understand the principles of thermodynamics and adjudge the viability of operation of any thermal system in real time applications<br>• Students are encouraged to make engineering judgments, to conduct independent exploration of topic of thermodynamics and to communicate the findings in a professional manner.<br>• Students are made to develop natural curiosity to explore the various facets of thermodynamic laws.<br>• While emphasizing basic laws, students are provided with modern tools to use in real time engineering problems. | | | | | | | |
| **UNIT – I** | | | | | **Hours: 09** | | | |
| Energy conversion and efficiencies of steam and nuclear power plants, internal combustion engines, gas turbine and refrigeration systems- Thermodynamic systems, properties and state - Thermodynamic equilibrium- path and point functions - Temperature - Zeroth law of thermodynamics – Pure substance - P, V and T surface – steam formation-quality-dryness fraction-Thermodynamic property diagrams and charts in common use. | | | | | | | | |
| **UNIT – II** | | | | | **Hours: 09** | | | |
| The concept of energy, work and heat – reversible work- internal energy -Perfect gas – specific heats – Joules law - enthalpy- Conservation of Energy principle for closed and open systems - First law of thermodynamics – Application of first law to a process (flow and non-flow) – Steady flow energy equation and its engineering application - Calculation of work and heat for different processes. | | | | | | | | |
| **UNIT – III** | | | | | **Hours: 09** | | | |
| Limitations of first law – Performance of heat engines – Reversible and irreversible processes – Statements of second law of thermodynamics - Carnot principle - Clausius inequality- Entropy – temperature entropy diagram – entropy change for a closed and open systems. | | | | | | | | |
| **UNIT –IV** | | | | | **Hours: 09** | | | |
| Air standard cycles: The air standard Carnot cycle - Air standard Otto cycle, diesel cycle, dual cycle and their comparison – Gas turbine - Brayton cycles and their efficiencies. | | | | | | | | |
| **UNIT – V** | | | | | **Hours: 09** | | | |
| Reverse Carnot cycle - COP - Vapor compression refrigeration cycle and systems (only theory) - Gas refrigeration cycle - Absorption refrigeration system – Liquefaction – Solidification (only theory). | | | | | | | | |
| **Total contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes: -** | | | **Total Hours: 60** | | | |
| **Text Books:** | | | | | | | | |
| 1. Nag, P. K., "Engineering Thermodynamics", 5th edition, McGraw - Hill Education India Pvt. Ltd., New Delhi, 2013.<br>2. Burghardt, M.D. and James A Harbach, "Engineering Thermodynamics", 4th edition, Harper Collins college publisher, N.Y.,1993. | | | | | | | | |
| **Reference Books:** | | | | | | | | |

1. Arora, C.P., “Thermodynamics”, Tata Mc Graw Hill Publishing Co. Ltd., New Delhi, 2003.
2. Wark, K., “Thermodynamics”, 4th edition , Mc Graw Hill, N.Y.,1985.
3. Huang, F.F., “Engineering Thermodynamics” 2nd edition, Macmillan Publishing Co. Ltd., N.Y., 1989.
4. Cengel, Y.A. and Boles, M.A., "Thermodynamics - An Engineering Approach", 7th edition, Tata Mc-Graw Hill Education, 2011.

**Web sites:**

1. http://nptel.iitm.ac.in/courses/Webcourse-contents/
2. http://ocw.mit.edu/courses/mechanical-engineering/

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|---|---|---|---|---|---|---|---|---|
| **Department :** Computer Science and Engineering | | | | | **Programme :** B.Tech. | | | |
| **Semester :** One | | | | | **Category :** TA | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| CS101 | Computer Programming | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objectives** | • To introduce the basics of computers and information technology.<br>• To educate problem solving techniques.<br>• To impart programming skills in C language.<br>• To practice structured programming to solve real life problems. | | | | | | | |
| **Outcome** | On successful completion of the course, students will be able to:<br>• Understand the basics of computers and its related components<br>• Have the ability to write a computer program to solve specified problems | | | | | | | |
| **UNIT – I** | | | | | **Hours: 09** | | | |
| History and Classifications of Computers – Components of a Computer – Working Principle of Computer – Hardware – Software and its Types – Applications of Computers –Network and its Types – Internet and its services – Intranet– Extranet – Generations of Programming Languages – Introduction to Number System – Introduction to MS-Office Package. | | | | | | | | |
| **UNIT – II** | | | | | **Hours: 09** | | | |
| Problem solving techniques – Program development life-cycle – Algorithm – Complexities of Algorithm – Flowchart – Pseudo code.<br>Introduction to C –C Program Structure – C tokens: Keyword, Identifiers, Constants, Variable, Data types (simple and user-defined) – Operators and its types – Operator Precedence – Expression Evaluation – Type Conversion – Input/output operations. | | | | | | | | |
| **UNIT – III** | | | | | **Hours: 09** | | | |
| Branching Statements – Looping Statements – Arrays – Multidimensional arrays.<br>Functions: Function Prototype, Passing Arguments to Function – Call by Value and Call by Reference – Nested function call – Library Functions – User-defined Functions – Recursion.<br>Strings – String I/O functions, String Library functions – Storage classes. | | | | | | | | |
| **UNIT – IV** | | | | | **Hours: 09** | | | |
| Structures – Arrays and Structures – Nested structures – Structure as Argument to functions– Union<br>Pointers – Declaration, Initialization and Accessing Pointer variable – Pointers and arrays – pointers as argument and return value – Pointers and strings - pointers and structures. | | | | | | | | |
| **UNIT – V** | | | | | **Hours: 09** | | | |
| Introduction to File Concepts in C – File types – I/O operations on files – File modes – Random access to files – Command line arguments.<br>Dynamic Memory Allocation: MALLOC, CALLOC, FREE, REALLOC<br>Introduction to preprocessor – Macro substitution directives – File inclusion directives –Compiler Control directives – Miscellaneous directives. | | | | | | | | |
| **Total contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes: -** | | | **Total Hours: 60** | | | |
| **Text Books:** | | | | | | | | |
| 1. J. B. Dixit, “Computer Fundamentals and Programming in C”, Firewall Media, 2009.<br>2. Balagurusamy. E, “Programming in ANSI C”, Tata McGraw Hill, Sixth edition, 2012. | | | | | | | | |
| **Reference Books:** | | | | | | | | |
| 1. Ashok N Kamthane, “Computer Programming”, Pearson education, Second Impression, 2008.<br>2. Venugopal.K and Kavichithra.C, “Computer Programming”, New Age International Publishers, First Edition, 2007. | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|
| **Department :** Mechanical Engineering | | | | **Programme :** B.Tech | | | | |
| **Semester :** One | | | | **Category :** EGD | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ME102 | Engineering Graphics | 2 | - | 3 | 4 | 50 | 50 | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objectives** | • To convey the basics of engineering drawing<br>• To explain the importance of an engineering drawing<br>• To teach different methods of making the drawing<br>• To establish the importance of projects and developments made in drawing that are used in real systems | | | | | | | |
| **Outcome** | • From what students have already learnt and know, relation has been brought about how to bring their vision into realities.<br>• Students are made to follow and understand the basic of mechanical drawing<br>• Students are encouraged to make engineering drawing of physical object representing engineering systems.<br>• Students are made to develop natural curiosity to explore the various facets of engineering drawings. | | | | | | | |
| **UNIT – 0** | | | | | **Not for exam** | | | |
| Introduction to Standards for Engineering Drawing practice, Lettering, Line work and Dimensioning. | | | | | | | | |
| **UNIT – I** | | | | | **Hours: T-06; P-09** | | | |
| Projection of Points and Projection of lines | | | | | | | | |
| **UNIT – II** | | | | | **Hours: T-06; P-09** | | | |
| Projection of Planes and Projections of solids in simple positions | | | | | | | | |
| **UNIT – III** | | | | | **Hours: T-06; P-09** | | | |
| Projection of solids in complicated positions | | | | | | | | |
| **UNIT – IV** | | | | | **Hours: T-06; P-09** | | | |
| Sections of solids - Development of Surfaces | | | | | | | | |
| **UNIT – V** | | | | | **Hours: T-06; P-09** | | | |
| Axonometric Projections: Isometric Projections (simple solids); Perspective Projections (planes and simple solids; Orthographic Projections | | | | | | | | |
| **Total contact Hours: 30** | **Total Tutorials: -** | **Total Practical Classes: 45** | | | **Total Hours: 75** | | | |

**Text Books:**

1. K.R. Gopalakrishna and Sudhir Gopalakrishna, Engineering Graphics, Inzinc Publishers, 2007.
2. K. Venugopal, Engineering Drawing and Graphics + Auto CAD, 4th edition, New Age International Publication Ltd., 2004.
3. BIS, Engineering Drawing practices for Schools & College, SP 46 : 2003

**Reference Books:**

1. N.D. Bhatt, Engineering Drawing, 49th edition, Charotar Publishing House, 2006.
2. K.V. Natarajan, A Text Book of Engineering Drawing, Dhanalakshmi Publishers, 2006.
3. David I cook and Robert N Mc Dougal, Engineering Graphics and Design with computer applications, Holt – Sounders Int. Edn. 1985.
4. James D Bethune and et. al., Modern Drafting, Prentice Hall Int.,

**Web sites:**

1. http://www.3ds.com/products/catia/
2. http://en.wikipedia.org/wiki/CATIA

| **Department :** Computer Science and Engineering | | **Programme:** B.Tech. | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester :** One | | **Category :** LB | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| CS102 | Computer Programming Laboratory | - | - | 3 | 2 | 60 | 40 | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objectives** | • To study and understand the use of OS commands<br>• To get familiarity on MS-Office packages like MS-Word, MS-Excel and MS-Powerpoint<br>• To gain a hands on experience of compilation and execution of 'C' programs<br>• To inculcate logical and practical thinking towards problem solving using C programming. | | | | | | | |
| **Outcome** | On successful completion of the course, students will be able to:<br>• Have the ability to write a computer program to solve specified problems<br>• Problem solving ability will be gained by the students | | | | | | | |
| **Cycle - I** | **Fundamentals of Computing**<br>1. Study of OS commands<br>2. Use of mail merge in word processor<br>3. Use of spreadsheet to create Charts (XY, Bar, Pie) with necessary formulae.<br>4. Use of Power point to prepare a slide show. | | | | | | | **Hours: 09** |
| **Cycle - II** | **Programming Using C**<br>1. Study of Compilation and execution of simple C programs<br>2. Basic C Programs<br>a. Arithmetic Operations<br>b. Area and Circumference of a circle<br>c. Swapping with and without Temporary Variables<br>3. Programs using Branching statements<br>a. To check the number as Odd or Even<br>b. Greatest of Three Numbers<br>c. Counting Vowels<br>d. Grading based on Student's Mark<br>4. Programs using Control Structures<br>a. Computing Factorial of a number<br>b. Fibonacci Series generation<br>c. Prime Number Checking<br>d. Computing Sum of Digit<br>5. Programs using String Operations<br>a. Palindrome Checking<br>b. Searching and Sorting Names<br>6. Programs using Arrays<br>a. Sum of 'n' numbers<br>b. Sorting an Array<br>c. Matrix Addition, Subtraction, Multiplication and Transpose<br>7. Programs using Functions<br>a. Computing nCr<br>b. Factorial using Recursion<br>c. Call by Value and Call by Reference<br>8. Programs using Structure<br>a. Student Information System<br>b. Employee Pay Slip Generation<br>c. Electricity Bill Generation<br>9. Programs using Pointers<br>a. Pointer and Array | | | | | | | | **Hours: 36** |

| | | | |
|---|---|---|---|
| | b. Pointer to function<br>c. Pointer to Structure<br>10. Programs using File Operation<br>a. Counting No. of Lines, Characters and Black Spaces<br>b. Content copy from one file to another<br>c. Reading and Writing Data in File | | |
| **Total contact Hours: -** | **Total Tutorials: -** | **Total Practical Classes: 45** | **Total Hours: 45** |

| **Department :** Electronics and Communication Engineering / Electrical and Electronics Engineering | | **Programme :** B.Tech. | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester :** One | | **Category :** LB | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| BE103 | Basic Electrical and Electronics Engineering Laboratory | - | - | 3 | 2 | 60 | 40 | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objectives** | • To understand the basic electrical tools and their applications.<br>• To get trained in using different types of wiring.<br>• To find faults in electrical lamp and ceiling fan.<br>• To understand and apply Kirchhoff's laws to analyze electrical circuits.<br>• To study the operation of CRO and principle of fiber optic communication.<br>• To design adder and subtractors.<br>• To understand the frequency response of RC coupled amplifier. | | | | | | | |
| **Outcome** | • The students get exposure on the basic electrical tools, applications and precautions.<br>• The students are trained for using different types of wiring for various purposes in domestic and industries.<br>• The students are taught to find faults in electrical lamp and ceiling fan.<br>• Will be able to learn and use equipments like Signal Generator, Power Supply and CRO.<br>• To apply Kirchhoff's law for simplification of circuits.<br>• To design combinational circuits.<br>• To obtain the frequency response of Amplifiers. | | | | | | | |
| **List of Experiments** | **Electrical Lab**<br>1. Electrical Safety, Precautions, study of tools and accessories.<br>2. Practices of different joints.<br>3. Wiring and testing of series and parallel lamp circuits.<br>4. Staircase wiring.<br>5. Doctor's room wiring.<br>6. Bed room wiring.<br>7. Go down wiring.<br>8. Wiring and testing a ceiling fan and fluorescent lamp circuit.<br>9. Study of different types of fuses and A.C. and D.C. meters. | | | | | | | |
| **List of Experiments** | **Electronics and Communication Lab**<br>1. Study of Kirchoff's Laws.<br>2. Study of Fiber Optic Communication.<br>3. Study of Cathode Ray Oscilloscope.<br>4. Zener Diode as Voltage Regulator.<br>5. Design of Adder and Subtractor Circuits.<br>6. Frequency Response of RC Coupled Amplifier. | | | | | | | |
| **Total contact Hours: -** | **Total Tutorials: -** | **Total Practical Classes: 45** | | | **Total Hours: 45** | | | |

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|---|---|---|---|---|---|---|---|---|
| **Department :** Mathematics | | | | **Programme :** B.Tech. | | | | |
| **Semester :** Two | | | | **Category :** TB | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| MA102 | Mathematics II | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objectives** | • To acquaint with theory of Matrices<br>• Hyperbolic functions and theory of equations<br>• Vector calculus and statistics | | | | | | | |
| **Outcome** | • Understands Matrix theory<br>• Solving techniques of equations<br>• Understands Vectors and statistics | | | | | | | |
| **UNIT – I** | **Matrix Theory** | | | | **Hours: 09** | | | |
| Eigen values and Eigen vectors of a real matrix, Characteristic equation, Properties of Eigen values. Cayley-Hamilton Theorem, Diagonalisation of matrices .Reduction of a quadratic form to canonical form by orthogonal transformation and nature of quadratic forms. | | | | | | | | |
| **UNIT – II** | **Trigonometry and Theory of Equations** | | | | **Hours: 10** | | | |
| Trigonometry: Hyperbolic and circular functions, logarithms of complex number, resolving real and imaginary parts of a complex quantity.<br>Theory of equations: Relation between roots and coefficients, reciprocal equations, transformation of equations and diminishing the roots. | | | | | | | | |
| **UNIT – III** | **Finite Differences** | | | | **Hours: 09** | | | |
| Finite differences: Definitions and relation between operators ($\Delta, \nabla, \delta$, E, $\mu$, D), Solution of difference Equations, Solving Boundary value problems for ordinary differential equations using finite difference method. | | | | | | | | |
| **UNIT – IV** | **Vector Analysis** | | | | **Hours: 10** | | | |
| Gradient, divergence and curl, their properties and relations. Stoke's theorem and Gauss divergence theorem (without proof). Simple applications involving cubes, sphere and rectangular parallelepipeds. | | | | | | | | |
| **UNIT – V** | **Statistics** | | | | **Hours: 10** | | | |
| Moments, skewness and Kurtosis - Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions, Correlation and regression – Rank correlation. | | | | | | | | |
| **Total contact Hours: 48** | **Total Tutorials: 12** | **Total Practical Classes: -** | | | **Total Hours: 60** | | | |
| **Text Books:** | | | | | | | | |
| 1. Erwin Kreyszig, Advanced Engineering Mathematics (9th Ed), John Wiley & Sons, New Delhi, 2011.<br>2. Venkataraman M.K., Engineering Mathematics, Vol II&III, National Publishing Company, Chennai, 2011.<br>3. Kandasamy P. et al, Numerical Methods, S. Chand & Co., New Delhi, 2012. | | | | | | | | |
| **Reference Books:** | | | | | | | | |
| 1. Grewal B. S., Higher Engineering Mathematics, Khanna Publishers, New Delhi, 41stEdition, 2011.<br>2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.<br>3. Bali N. and Goyal M., Advanced Engineering Mathematics, Laxmi Publications Pvt. Ltd., New Delhi, 9th Edition, 2011. | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|
| **Department :** Physics | | | **Programme :** B.Tech. | | | | | |
| **Semester :** Two | | | **Category :** TA | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| PH102 | Material Science | 4 | - | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objectives** | • To impart knowledge to the Engineering students about the significance of Materials Science and its contribution to Engineering and Technology<br>• To introduce the Physical concepts and properties of Different category of materials and their modern applications in day-to-day life. | | | | | | | |
| **Outcome** | • Engineering Students would have gained fundamental knowledge about the various types of materials and their applications to Engineering and Technology. | | | | | | | |

| **UNIT – I** | **Dielectric Materials** | **Hours: 12** |
|---|---|---|

Dielectric Polarization and its Mechanisms – Calculation of Polarizabilities (for electronic and ionic polarizations only) - Temperature dependence of polarization-Internal Field in solids - Clausius-Mossotti relation.– Elementary ideas of Piezo-, Pyro- and Ferro-electric materials and Applications.

NLO materials and piezoelectric actuators (introductory concepts).

| **UNIT – II** | **Magnetic Materials and Superconductors** | **Hours: 12** |
|---|---|---|

**Magnetic Materials** : Origin of atomic magnetic moment – Bohr magneton-classification of magnetic materials (Dia, Para, Ferro, antiferro & Ferri) – Domain Theory of Hysteresis – Structure and Properties of Ferrites – Properties of Soft & Hard Magnetic Materials – Applications. Magnetic Hard Disk. Ferro-fluids and applications.

**Superconductors**: Basic concepts – properties of superconductors – Meissner effect – Type I and II superconductors – BCS theory (qualitative) - High Temperature Superconductors– Qualitative ideas of Josephson effect, quantum interference and SQUID – their applications.

| **UNIT – III** | **Semiconductors** | **Hours: 12** |
|---|---|---|

Semiconductors –Concept of Fermi Distribution Function, Fermi Energy Level- Derivation of Carrier concentration in intrinsic Semiconductors –Basic ideas of Electrical conductivity in intrinsic and extrinsic semiconductors - temperature dependence of carrier concentration and electrical conductivity in semiconductors (qualitative ideas), Hall effect in Semiconductors -- Application of Hall Effect. Basic Ideas of Compound Semiconductors (II-VI & III-V). Photovoltaic Effect-Solar photovoltaic cells.

| **UNIT – IV** | **Nuclear Reactors and Materials** | **Hours: 12** |
|---|---|---|

Mass Defect & Binding Energy of Nucleus - Disintegration in fission –Nuclear Reactors: BWR – FBR. Materials used in Nuclear Reactors; Materials for Moderator, coolant, reactor control elements containment shell. Nuclear Fuel materials and Fuel processing - Fuel enrichment.

Nuclear fusion reactions for fusion reactors-D-D and D-T reactions, Basic principles of Nuclear Fusion reactors

| **UNIT – V** | **Smart Materials and Nanomaterials** | **Hours: 12** |
|---|---|---|

Smart Materials: Introduction –definitions.

Shape Memory alloys (SMA): One way and two way Shape memory effect, pseudoelasticity, Properties and applications of SMA- features of Ni-Ti SMA alloy.

Liquid Crystals : Types – nematic, cholesteric, smectic- Application to Display Devices

Metallic Glasses: preparation by melt spinning. properties and applications

Nanomaterials : Introduction to Nano materials–Methods of synthesis (CVD, Laser Ablation, Solgel, Ball-milling Techniques), Properties and applications of nanomaterials.

$C_{60}$-Buck Minister Fullerence, carbon nanotubes– synthesis (Plasma arc, Pulsed Laser evaporation methods) Properties and applications.

| **Total contact Hours: 60** | **Total Tutorials: -** | **Total Practical Classes: -** | **Total Hours: 60** |
|---|---|---|---|

**Text Books:**


1. Avadhanulu M N, Engineering Physics, Vol.-II, S. Chand & Co, 2009.
2. Arthur Beiser, Concepts of Modern Physics, 6th Edition, TMH, New Delhi 2008. (For Unit V only)


**Reference Books:**


1. V Rajendran, Engineering Physics, 2nd Edition, TMH, New Delhi 2011.
2. B.S. Murty, P. Shankar, Baldev Raj, B.B. Rath, and James Murday, Text book of Nanoscience and Nanotechnology, Universities Press, Hyderabad 2012.
3. Ali Omar M, Elementary Solid State Physics, Addison Wesley Publishing Co., 2009.

4. Pillai S.O, Solid State Physics, 6th Edition – New Age International, 2005.
5. Vijayamohanan K Pillai and Meera Parthasarathy, Functional Materials, Universities Press Hyderabad, 2012.
6. Science of Engineering Materials, 2nd Edition, C.M. Srivastava and C. Srinivasan, New Age Int. (P) Ltd, New Delhi, 1997.

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|---|---|---|---|---|---|---|---|---|
| **Department :** Chemistry | | | | **Programme :** B.Tech. | | | | |
| **Semester :** Two | | | | **Category :** TA | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| CY102 | Environmental Science | 4 | - | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objectives** | • To widen the knowledge of environmental awareness and pollution<br>• To educate the importance of preserving the earth's resources and ecosystem<br>• To highlight the modern techniques and regulations to monitor and control pollution | | | | | | | |
| **Outcome** | • Students will be able to understand about the environment and natural resources we are blessed with.<br>• Students will become aware of environmental issues like pollution, dwindling natural resources and degrading ecosystem.<br>• Students will be inspired to act as environmentally friendly and work for sustainable development of the humanity. | | | | | | | |
| **UNIT – I** | **Ecosystem and Biodiversity** | | | | **Hours: 12** | | | |
| Concept of an ecosystem-structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of forest, grass land, desert and aquatic (fresh water, estuarine and marine) ecosystem. Biodiversity-definition-genetic, species and ecosystem diversity. Value of biodiversity–consumptive use, productive use, social, ethical, aesthetic and option values. Hot spots of biodiversity. Threats to biodiversity-habitat loss, poaching of wild life, human-wildlife conflicts. Wildlife protection act and Forest conservation act. Endangered and endemic species. Conservation of biodiversity-in-situ and ex-situ conservation of biodiversity. | | | | | | | | |
| **UNIT – II** | **Air Pollution** | | | | **Hours: 12** | | | |
| Environmental segments-lithosphere, hydrosphere, biosphere and atmosphere. Atmospheric layers. Pollution-definition and classification. Pollutants-classification. Causes, sources, effects and control measures of air pollutants-oxides of nitrogen, oxides of sulphur, oxides of carbon, hydrocarbon, chlorofluro carbons and particulates. Green house effect-causes and effects on global climate and consequences. Ozone depletion-causes, mechanism and effect on the environment. Smog-sulfurous and photochemical smog-effect on the environment. Acid rain-theory of acid rain and effects. Environmental protection act-air (prevention and control of pollution) act. | | | | | | | | |
| **UNIT – III** | **Water and Land Pollution** | | | | **Hours: 12** | | | |
| Water resources. Water pollution-causes and effects of organic water pollutants-pesticides and detergents. Causes and effects of inorganic water pollutants-heavy metal pollution due to Hg, Pb, Cr and Cu. Thermal pollution. Analysis of DO, BOD, COD and TOC. Water (prevention and control of pollution) act. Land pollution-Solid waste management-causes, effects and control measures of urban and industrial wastes. Radioactive pollution. | | | | | | | | |
| **UNIT – IV** | **Instrumental Pollution Monitoring** | | | | **Hours: 12** | | | |
| Classification of instrumental techniques. Electromagnetic radiations, properties, emission and absorption of radiation. Principle and Instrumentation of atomic absorption and emission spectrometry. Beer-Lamberts law. UV–visible spectrophotometry-Principle and instrumentation. IR spectroscopy - Principle and instrumentation. Chromatography–Introduction, Principle and Instrumentation of gas chromatography. Conductometry and potentiometry. Analysis of air pollutants-NOx, SOx and COx. | | | | | | | | |
| **UNIT – V** | **Energy and Environment** | | | | **Hours: 12** | | | |
| Energy resources-growing energy needs. Renewable and non-renewable energy resources and use of alternate-energy sources. Green Chemistry - Significance. Basic components of green chemistry – alternative starting materials, reagents, reaction conditions and final products. Atom economy. Industrial applications of green chemistry. From unsustainable to sustainable development. Role of an individual in prevention of pollution. | | | | | | | | |
| **Total contact Hours: 60** | **Total Tutorials:** | **Total Practical Classes:** | | | **Total Hours: 60** | | | |
| **Text Books:** | | | | | | | | |


1. Anubha Kaushik and C.P. Kaushik, Environmental Science and Engineering, New Age International (P) Ltd, New Delhi, 2009. (Unit I)
2. S.S. Dara, A Text Book of Environmental Chemistry and Pollution Control, S. Chand and Company Ltd, New Delhi, 2008. (Unit II, III, & V)
3. C.N. Sawyer, P.L. McCarty And G.F. Parkin, Chemistry for Environmental Engineering and Science, Tata McGraw-Hill Publishing Co Ltd, New Delhi, 2004. (Unit IV)

**Reference Books:**


1. K. Raghavan Nambiar, Text Book of Environmental Studies, Scitech Publications India Pvt. Ltd, Chennai, 2008.
2. A.K. De, Environmental Chemistry, New Age International (P) Ltd, New Delhi, 2006.
3. B.K. Sharma, Environmental Chemistry, Goel Publishing House, Meerut, 2001.
4. G.S. Sodhi, Fundamental Concepts of Environmental Chemistry, Narosa Publishing House, New Delhi, 2013.

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|---|---|---|---|---|---|---|---|---|
| **Department :** Civil Engineering / Mechanical Engineering | | | | | **Programme :** B.Tech | | | |
| **Semester :** Two | | | | | **Category :** TC | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| BE101 | Basic Civil and Mechanical Engineering | 4 | - | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objectives** | • To be able to differentiate the types of buildings according to national building code.<br>• To understand building components and their functions as well as different types of roads, bridges and dams<br>• To convey the basics of Mechanical Engineering<br>• To establish the necessity of basics of Mechanical Engineering to other engineering disciplines<br>• To explain the concepts of thermal plants used in power systems being a common issue<br>• To narrate the methods of harnessing renewable energies and their working principles<br>• To explain the role of basic manufacturing processes<br>• To develop an intuitive understanding of underlying working principles of mechanical machines and systems. | | | | | | | |
| **Outcome** | • Parallels are drawn between the subject and the student's everyday experience so that this course may be related to what the students already know.<br>• Students are made to understand the principles of Mechanical Engineering based on theories.<br>• Students are encouraged to make engineering judgments, to conduct independent exploration of topic of renewable energy systems and to communicate the findings in a professional manner.<br>• Students are made to develop natural curiosity to explore the various facets of mechanical equipment and machines.<br>• While emphasizing basic principles, students are provided with explanations used in real time engineering systems. | | | | | | | |
| **UNIT – I** | **Buildings and Building Materials** | | | | **Hours: 10** | | | |
| Buildings-Definition-NBC Classification - plinth area, floor area, carpet area, floor space index-construction materials-stone, brick, cement, cement-mortar, concrete, steel- their properties and uses. Impact of manufacture and use of building materials on the environment. | | | | | | | | |
| **UNIT – II** | **Buildings and their Components** | | | | **Hours: 10** | | | |
| Buildings: Types and Behaviour. Foundation: Soil classification – functions and types of foundations. Masonry: Types and uses. Floors: Types and functions. Roofs-Types and functions. Concepts of green building. | | | | | | | | |
| **UNIT – III** | **Basic Infrastructure** | | | | **Hours: 10** | | | |
| Surveying-Types, general principles, uses, instruments used. Roads - Components, types and their merits and demerits. Bridges-components and types of bridges. Dams-Purpose, types of dams and its components. Water supply-sources and quality requirements. Rainwater harvesting. | | | | | | | | |
| **UNIT – IV** | **IC Engines and Steam Generators** | | | | **Hours: 10** | | | |
| IC engines – Classification – Working principles - Diesel and petrol engines: two stroke and four stroke engines – Merits and demerits.<br>Steam generators (Boilers) – Classification – Constructional features (of only low pressure boilers) – Boiler mountings and accessories – Merits and demerits - Applications. | | | | | | | | |
| **UNIT – V** | **Conventional and Non-conventional Power Generation** | | | | **Hours: 10** | | | |
| Power Generation Systems – Convectional and Non-Conventional:<br>Hydraulic – Thermal – Nuclear power plants – Schemes and layouts (Description Only) Solar – wind –Geothermal - Wave – Tidal and Ocean Thermal Energy Conversion systems – Basic power plant schemes and layouts (Description only). | | | | | | | | |

| UNIT – VI | Introduction to Manufacturing Technology | Hours: 10 |
|---|---|---|

Machines: Lathe – Drilling machine – Grinding machine (Description only)
Machining Processes: Turning – Planning – Facing – Taper turning – Knurling – Chamfering – Drilling – Grinding
Moulding: Pattern making – Green and dry sand moulding – casting. Metal Joining – Arc and Gas welding – Brazing – Soldering (process description only).

| Total contact Hours: 60 | Total Tutorials: - | Total Practical Classes: - | Total Hours: 60 |
|---|---|---|---|

**Text Books:**

1. Natarajan, K V, Basic Civil Engineering, 11th Edition, Dhanalakshmi Publications, Chennai, 2011. (*For Units I to III*)
2. Lindberg, R.A.Process and Materials of Manufacture, PHI, 1999.
3. H.N.Gupta, R.C.Gupta and Arun Mittal, Manufacturing Processes, New Age Publications, 2001.
4. Nagpal, Power Plant Engineering, Khanna Publishers, Delhi, 1998.

**Reference Books:**

1. Purushothama Raj.P., Basic civil engineering, 3rd Edn., Dhanam Publications, Chennai, 2001.
2. Punmia, B.C., et.al Building Construction, Laxmi Publishers, New Delhi, 2012.
3. El.Wakil, M.M., Power Plant Technology, Mc Graw Hill Book Co., 1985.
4. Hajra Choudhry, et. al., Workshop Technology Vol. I and II, Media Promoters Publishers Pvt. Ltd., Bombay, 2004.

**Web sites:**

1. http://nptel.iitm.ac.in/courses/Webcourse-contents/
2. http://ocw.mit.edu/courses/mechanical-engineering/

| **Department :** Civil Engineering | | **Programme :** B.Tech. | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester :** Two | | **Category :** TB | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| CE101 | Engineering Mechanics | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objectives** | • To explain the importance of mechanics in the context of engineering.<br>• To understand the static equilibrium of particles and rigid bodies in two dimensions<br>• To introduce the techniques for analyzing the forces in the bodies.<br>• To study the motion of a body and to write the dynamic equilibrium equation. | | | | | | | |
| **Outcome** | • On successful completion of the course, a student would be able to identify and analyze the problems by applying the principles of engineering mechanics, and to proceed to advanced study on mechanical systems. | | | | | | | |
| **UNIT – I** | **Fundamentals Of Mechanics** | | | | **Hours: 09** | | | |
| Mechanics and its relevance, Force System, Definition- Force, Moment and Couple -Principle of Transmissibility, laws of mechanics, Resultant of force system – Concurrent and non-concurrent coplanar forces, Conditions of static equilibrium for coplanar force system, stability and equilibrium, concept of free body diagrams. | | | | | | | | |
| **UNIT – II** | **Application of Force System** | | | | **Hours: 09** | | | |
| Types loads and supports – simply supported beams, cantilever beams and plane trusses – reactions (Introduction only).<br>Friction: Laws of friction, Static dry friction, simple contact friction problems, body on inclined planes, ladders, wedges, simple screw jack. | | | | | | | | |
| **UNIT – III** | **Properties of Surfaces** | | | | **Hours: 09** | | | |
| Properties of sections – centroids, center of gravity, area moment of inertia, product moment of inertia, polar moment of inertia, radius of gyration, mass moment of inertia.<br>Principle of virtual work – work done – application to simple structural arrangements. | | | | | | | | |
| **UNIT – IV** | **Kinematics and Kinetics of Particles** | | | | **Hours: 09** | | | |
| Introduction of Dynamics – Types of Motion – D Alembert's principle – work energy method – work energy equation for translation and – Motion of connected bodies – work done by a spring – Impulse momentum equation – conservation of momentum – Impact of elastic bodies – oblique impart – Loss of kinetic energy. | | | | | | | | |
| **UNIT – V** | **Kinematics and Kinetics of Rigid Bodies** | | | | **Hours: 09** | | | |
| Circular Motion of Rigid bodies – Acceleration during circular motion – Rotation of rigid bodies – Angular motion – Relationship between Angular and linear motion – Kinetics of Rigid body rotation – General plane of motion – Kinematics – Instantaneous Axis of rotation – kinetics of Rolling bodies – Kinetics of General plane motion. | | | | | | | | |
| **Total contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes: -** | | | **Total Hours: 60** | | | |

**Text Books:**

1. Bhavikatti,S.S and Rajashekarappa,K.G., Engineering Mechanics, New Age International (P) Ltd, New Delhi, 2013.

**Reference Books:**

1. Timoshenko, S., Young, D.H., Rao, J.V. and Sukumar Pati, Engineering Mechanics, Fifth edition, McGraw Hill Education (India) Pvt. Ltd., 2013.
2. Beer, F.P and Johnson Jr. E.R, Vector Mechanics for Engineers, Vol. 1 Statics and Vol. 2 Dynamics, McGraw – Hill International Edition, 1997.

| **Department :** Humanities and Social Sciences | | **Programme** : B.Tech. | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester :** Two | | **Category :** TA | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| HS101 | Communicative English | 4 | - | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objectives** | • To improve the LSRW skills of I. B.Tech students<br>• To instill confidence and enable the students to communicate with ease<br>• To equip the students with the necessary skills and develop their language prowess | | | | | | | |
| **Outcome** | On successful completion of the module students should be able to:<br>• communicate effectively in English<br>• get rid of their inhibitions<br>• possess effective language skills<br>• improve their career prospects | | | | | | | |
| **UNIT – I** | **Basic Concepts of Communicative English** | | | | **Hours: 12** | | | |
| Definition – Importance – Process – Channels and Types – Barriers – Strategies for Effective Communicative – Listening Skills. | | | | | | | | |
| **UNIT – II** | **Comprehension and Analysis** | | | | **Hours: 12** | | | |
| Comprehension of Technical and Non – Technical Passages – Skimming. Scanning, Inferring – Note-making, Predicting and responding to context –Intensive Reading and Reviewing. | | | | | | | | |
| **UNIT – III** | **Writing** | | | | **Hours: 12** | | | |
| Paragraph and Essay – Report – Memorandum – Instructions – Job Application Letters – Resume – E-Mail Writing. | | | | | | | | |
| **UNIT – IV** | **Oral Communication** | | | | **Hours: 12** | | | |
| Basics of Phonetics- Presentation Skills- Group Discussions –Extempore- Debates- Role Plays. | | | | | | | | |
| **UNIT – V** | **Vocabulary and Language Through Literature** | | | | **Hours: 12** | | | |
| Analysis of<br>1. "English in India", R.K. Narayan<br>2. "Toasted English", R.K. Narayan<br>3. "Politics and the English Language", George Orwell<br>Contextual variations of language – interpretation of literary language – vocabulary building – nuances of language (grammar, pronunciation, spelling) – developing critical framework. | | | | | | | | |
| **Total contact Hours: 60** | **Total Tutorials: -** | **Total Practical Classes: -** | | | **Total Hours: 60** | | | |
| **Text Books:**<br>1. Ashraf M. Rizvi. Effective Technical Communication. New Delhi: Tata McGraw, 2005.<br>2. George Orwell. Essays. Penguin Books, 2000.<br>3. R.K.Narayan. A storyteller's World. Penguin Books, 1989. | | | | | | | | |
| **Reference Books:**<br>1. Daniel Jones. English Pronouncing Dictionary. Cambridge University Press, 2003.<br>2. Sanjay Kumar and Pushpalata. Communication Skills. New Delhi: OUP, 2011.<br>3. Nory Sankar Mukerjee. Business Communication: Connecting at Work. New Delhi: OUP, 2013. | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|
| **Department :** Physics | | **Programme :** B.Tech. | | | | | | |
| **Semester : Two** | | **Category : LB** | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| PH103 | Physics Laboratory | - | - | 3 | 2 | 60 | 40 | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objectives** | To provide a practical understanding of some of the concepts learnt in the theory course on Physics and Materials Science. | | | | | | | |
| **Outcome** | The Students would have gained practical experience about some of the Theoretical concepts learnt in the Physics and Materials Science courses. | | | | | | | |

**List of Experiments:**

**(Any 10 experiments including a maximum of 2 Demonstration experiments are to be performed.)**

Radius of curvature of a Lens - Newton's rings

1. Thickness of a thin object by Air – wedge
2. Spectrometer – Resolving power of a Prism
3. Spectrometer – Resolving power of a Transmission grating
4. Determination of wavelength of a Laser source using transmission grating, reflection grating (vernier calipers) & particle size determination
5. Determination of numerical aperture & Accptance angle of an optical fiber.
6. Laurent's Half shade polarimeter – Determination of specific rotatory power*
7. Spectrometer - Hollow prism / Ordinary & Extraordinary rays by Calcite Prism*
8. Determination of optical absorption coefficient of materials using laser*
9. Coefficient of Thermal conductivity - Radial flow method
10. Coefficient of Thermal conductivity – Lee's Disc method
11. Jolly's Bulb Apparatus experiment – determination of α
12. Magnetism: I – H curve
13. Field along the axis of a coil carrying current
14. Vibration magnetometer – calculation of magnetic moment & pole strength
15. Electrical conductivity of semiconductor – two probe / four probe method*
16. Hall effect in a semiconductor*
17. Michelson's Interferometer*

*Demonstration Experiments

| | | | |
|---|---|---|---|
| **Total contact Hours: -** | **Total Tutorials: -** | **Total Practical Classes: 45** | **Total Hours: 45** |

**Reference Book:**

1. Physics Practical Observation Manual Book issued by Dept. of Physics, Pondicherry Engineering College

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|---|---|---|---|---|---|---|---|---|
| **Department :** Chemistry | | **Programme :** B.Tech. | | | | | | |
| **Semester :** Two | | **Category :** LB | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| CY103 | Chemistry Laboratory | - | - | 3 | 2 | 60 | 40 | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objectives** | • To educate the principles involved in chemical analysis.<br>• To provide practical knowledge of handling chemicals and chemical analysis.<br>• To understand the importance of chemical analysis in various fields. | | | | | | | |
| **Outcome** | • Students will be able to understand chemical analysis and its usefulness in engineering, industry and other fields.<br>• Students will gain laboratory skills and that will give confidence in analyzing samples in engineering, industry and other fields.<br>• Students will gain knowledge about the principles and methods of listed methods of quantitative analyses. | | | | | | | |

**List of experiments: (Any 10 experiments)**

1. Determination of total, permanent and temporary hardness of water by EDTA method.
2. Determination of magnesium in water by complexometry.
3. Determination of calcium in lime stone by complexometry.
4. Determination of alkalinity of water.
5. Determination of percentage of acetic acid in vinegar.
6. Determination of ferrous ion in Mohr's salt.
7. Determination of lead dioxide by permanganometry.
8. Determination of ferrous and ferric ions in a solution by dichrometry.
9. Determination of iron by spectrophotometry.
10. Determination of dissolved oxygen in water.
11. Determination of COD of water sample.
12. Determination of available chlorine in bleaching powder.
13. Determination of chloride content in water by argentometry.
14. Determination of lead in polluted water by conductometry.
15. Preparation of potash alum from scrap aluminium.

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|---|---|---|---|
| **Total contact Hours: -** | **Total Tutorials: -** | **Total Practical Classes: 45** | **Total Hours: 45** |

**Text Books:**

1. Lab Manual, Department of Chemistry, Pondicherry Engineering College, Puducherry, 2014.

**Reference Books:**


1. V. Venkateswaran, R. Veeraswamy and A.R. Kulandaivelu, Basic Principles of Practical Chemistry, Sultan Chand & Sons, New Delhi, 2001.
2. J. Mendham, R.C. Denney, J.D. Barnes and M. Thomas, Vogel's Text Book of Quantitative Chemical Analysis, Pearson Education, New Delhi, 2002.

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|---|---|---|---|---|---|---|---|---|
| **Department :** Mechanical Engineering | | | | **Programme :** B.Tech. | | | | |
| **Semester :** Two | | | | **Category :** LB | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ME103 | Workshop Practice | - | - | 3 | 2 | 60 | 40 | 100 |

| | |
|---|---|
| **Prerequisite** | - |
| **Objectives** | • To convey the basics of mechanical tools used in engineering<br>• To establish hands on experience on the working tools<br>• To develop basic joints and fittings using the hand tools<br>• To establish the importance of joints and fitting in engineering applications<br>• To explain the role of basic workshop in engineering<br>• To develop an intuitive understanding of underlying physical mechanism used in mechanical machines. |
| **Outcome** | • Parallels are drawn between the subject and the student's everyday experience so that this course may be related to what the students already know.<br>• Students are introduced to basic hand tools used in various mechanical cutting operations.<br>• Students are encouraged to make simple joints and fittings.<br>• Students are made to develop natural curiosity to explore the various facets of basic cutting operations.<br>• While emphasizing basic operations, students are provided with modern hand tools to use in real time engineering jobs.<br>• Students are exposed to make objects like tray, welded joints. |

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|---|---|---|
| **UNIT – I** | **Fitting** | **Hours: 11** |

1. Study of tools and Machineries
2. Symmetric fitting
3. Acute angle fitting
4. Obtuse angle fitting

| | | |
|---|---|---|
| **UNIT – II** | **Welding** | **Hours: 11** |

1. Study of arc and gas welding equipment and tools
2. Simple lap welding (Arc)
3. Single V butt welding (Arc)
4. Corner joint (Arc)

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|---|---|---|
| **UNIT – III** | **Sheet Metal** | **Hours: 11** |

1. Study of tools and machineries
2. Funnel
3. Waste collection tray
4. Rectangular Box

| | | |
|---|---|---|
| **UNIT – IV** | **Carpentry** | **Hours: 12** |

1. Study of tools and machineries
2. Half lap joint
3. Corner mortise joint
4. Dovetail joint

| | | | |
|---|---|---|---|
| **Total contact Hours: -** | **Total Tutorials: -** | **Total Practical Classes: 45** | **Total Hours: 45** |

**Text Books:**


1. Hajra Choudhry, et al., Workshop Technology Vol. I and II, Media Promoters Publ. Pvt. Ltd., Bombay, 2004.
2. H.N.Gupta, R.C.Gupta and Arun Mittal, Manufacturing Processes, New Age Publications, 2001.


**Web sites:**

1. http://en.wikipedia.org/wiki/Category:Carpentry_tools
2. http://en.wikipedia.org/wiki/Welding

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|---|---|---|---|---|---|---|---|---|
| **Department :** Mathematics | | | | **Programme :** B.Tech. | | | | |
| **Semester :** Three | | | | **Category :** TB | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| MA103 | Mathematics - III | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | | | | | | | | |
| **Objectives** | • To introduce the ideas of Laplace and Fourier Transforms<br>• To familiarize students with of Complex Analysis<br>• To introduce Fourier series. | | | | | | | |
| **Outcome** | • Understands Transform Calculus<br>• Understand Complex Analysis<br>• Able to apply Fourier series | | | | | | | |
| **UNIT – I** | **Laplace Transform** | | | | | | | **Hours: 09** |
| Definition, properties. Transform of derivatives and integrals. Transform of unit step function, Transform of periodic functions. Initial and final value theorems, convolution theorem, Application to differential equations and integral equations. Evaluation of integral by Laplace transforms. | | | | | | | | |
| **UNIT – II** | **Complex Variable- Analytic Functions** | | | | | | | **Hours: 09** |
| Analytic functions – Necessary conditions Cauchy-Riemann equations (Cartesian and polar form) and sufficient conditions (excluding proof) – Harmonic and orthogonal properties of analytic function – Construction of analytic functions. Conformal mapping – Simple and standard transformations like w = z+c, cz, $z^2$ , $e^z$, sinz 1/z Bilinear transformation. (excluding Schwarz- Christoffel transformation) | | | | | | | | |
| **UNIT – III** | **Complex Integration** | | | | | | | **Hours: 09** |
| Complex integration, Cauchy's Integral theorem , Cauchy's integral formula and problems, Taylor's and Laurent's theorem (without proof) Classification of singularities.. Residues and evaluation of residues – Cauchy's Residue theorem – Contour integration:) Application of residue theorem to real integrals – unit circle and semicircular contour (excluding poles on boundaries | | | | | | | | |
| **UNIT – IV** | **Fourier Series** | | | | | | | **Hours: 09** |
| Dirichlet's conditions – General Fourier series Expansion of periodic function into Fourier series – Fourier series for odd and even functions –Half-range Fourier cosine and sine series – Change of interval – Related problems. Root Mean Square Value – Parseval's theorem on Fourier Coefficients. Complex form of Fourier series – Harmonic Analysis. | | | | | | | | |
| **UNIT – V** | **Fourier Transform** | | | | | | | **Hours: 09** |
| Fourier integral theorem (statement only), Fourier transform and its inverse, properties. Fourier sine and cosine transforms, their properties, convolution and Parseval's identity. | | | | | | | | |
| **Total contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes: -** | | | **Total Hours: 60** | | | |
| **Text Books:** | | | | | | | | |
| 1. M.K.Venkataraman, Engineering Mathematics, Vol. II & III, National Publishing Co., Madras, 2007.<br>2. Veerarajan T., Engineering Mathematics for first year, Tata-McGraw Hill,2014. | | | | | | | | |
| **Reference Books:** | | | | | | | | |
| 1. Grewal B. S., Higher Engineering Mathematics, Khanna Publishers, New Delhi, 41st Edition, 2011.<br>2. RamanaB.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.<br>3. Bali N. and Goyal M., Advanced Engineering Mathematics, Laxmi Publications Pvt. Ltd., New Delhi, 7th Edition, 2010. | | | | | | | | |

| **Department :** Electronics and Communication Engineering | | **Programme :** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester :** Three | | **Category :** TA | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| EC128 | Electronic Devices and Circuits | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Basic knowledge in electronics | | | | | | | |
| **Objective** | • To introduce the applications of PN junction diode and Zener diode<br>• To impart knowledge on BJT and FET.<br>• To introduce the feedback concept, construction and operation of oscillators, op-amp fundamentals and to gain thorough understanding of the applications of op-amp | | | | | | | |
| **Outcome** | On successful completion of this course students will be able to:<br>• Analyse the behaviour of PN junction, Zener diodes and other special devices.<br>• Gain knowledge in biasing of BJT, FET.<br>• Understand the working of Power amplifiers and oscillators. | | | | | | | |
| **UNIT – I** | **Diodes** | | | | | **Hours: 12** | | |
| Diode current equation , V-I characteristics of PN junction diode – Half wave and Full wave rectifiers with and without filters - Derivation of ripple factors and rectification efficiency- Clippers, Clampers - Zener diode and its application<br>LED, LCD, Schottky Barrier diode, Varactor diode, Tunnel diode and photodiode – construction, working and characteristics | | | | | | | | |
| **UNIT – II** | **Transistors** | | | | | **Hours: 12** | | |
| Construction, working & characteristics of BJT (CE, CB and CC configurations) and JFET , – operating point, Transistor biasing and bias circuits | | | | | | | | |
| **UNIT – III** | **Amplifiers** | | | | | **Hours: 12** | | |
| 'h' parameters- Small signal low frequency model of BJT -Analysis of CE, CB and CC amplifiers– Power Amplifier – Types – Transformer coupled Class A Amplifier – Class B Amplifier – Amplifier distortion- Class C and Class D amplifiers. | | | | | | | | |
| **UNIT – IV** | **Oscillators** | | | | | **Hours: 12** | | |
| Feedback concept, general characteristics of positive feedback, Barkhausen Criterion-Construction, working ,characteristics and derivation of frequency of oscillation for Hartley, Colpitts and Wien bridge oscillators - crystal oscillator | | | | | | | | |
| **UNIT – V** | **OP-AMP** | | | | | **Hours: 12** | | |
| Introduction to op-amp, Characteristics of op-amp, Op-amp parameters - Equivalent circuit - Applications: Inverting and non-inverting amplifier, summer, subtractor, voltage follower, differentiator, integrator, comparator, first order low pass and high pass active filters. | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes: -** | | | | **Total Hours: 60** | | |

**Text Books**

1. Jacob Millman and C. Halkias, Satya brataJit, Electronic Devices and circuits, Second edition, McGraw Hill Publications, 2007.
2. Theodore F.Bogart and etal, Electronic Devices and Circuits, Pearson Education, 2004
3. Allen Mottershed, Electron Devices and Circuits, PHI, 1996

**Reference Books**

1. Robert L.Boylestad and Louis Neshelsky, Electronic devices and circuit theory, 11th Edition, Prentice Hall India, 2012.
2. Jacob Millman and Arvin Grabel, Micro-Electronics, McGraw Hill, Fifth edition, 2008.
3. Ramakant A. Gayakwad , Op-amps and Linear Integrated Circuits ,Prentice Hall,2000

**Websites**

1. www. ecee.colorado.edu
2. www-inst.eecs.berkeley.edu
3. nptel lectures

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|---|---|---|---|---|---|---|---|---|
| **Department :** Information Technology | | | | **Programme :** B.Tech. (IT) | | | | |
| **Semester :** Three | | | | **Category :** TA | | | | |
| **Subject Code** | **Subject** | **Hours/Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT101 | Digital System Design and Computer Architecture | 3 | 1 | - | 4 | 40 | 60 | 100 |

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| **Prerequisite** | Knowledge in Basic Electronics |
| **Objective** | • To design a digital system, components or process to meet desired needs within realistic constraints<br>• To understand the basic operation of a computer<br>• To understand the design and organization of a Von-Neumann computer system. |
| **Outcome** | On successful completion of this course students will be able to:<br>• Analyze and design combinational, sequential and computer logic circuits.<br>• Familiar with the Von Neumann architecture, parallel, pipelined, superscalar, and RISC/CISC architectures. |

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| **UNIT – I** | **Combinational Logic** | **Hours: 10** |

Analysis and Design procedure - Adders – subtractors – code converters – binary parallel adder – decimal adder – magnitude comparator – encoders – decoders – multiplexers – demultiplexers - Binary Multiplier – Parity generator and checker

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| **UNIT – II** | **Sequential Logic** | **Hours: 12** |

Sequential circuits: latches – flip flops – analysis of clocked sequential circuits – state reduction and assignments - Registers and Counters: Registers – shift registers – ripple counters – synchronous counters – ring counters – up/down counters – modulus counters - Memory and Programmable Logic: Random Access Memory – memory decoding – error detection and correction – Read Only Memory - Programmable Logic Arrays – Programmable Array Logic – Sequential programmable devices

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| **UNIT – III** | **Introduction to Computer Architecture and Processor Design** | **Hours: 14** |

Basics of computer architecture, stored program organization (von Neumann architecture), Register Transfer language-Arithmetic Logic-Shift Micro operations, Instruction code timing and control, Instruction cycle Interrupt design of basic computer- Instruction sets and types, addressing modes - stack organization - Processor basics - CPU organization - Data representation - Instruction sets-Data path design - Fixed point arithmetic – ALU - floating point arithmetic, Control Unit - Basic concepts, hardwired control, micro programmed control, pipeline control.

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| **UNIT – IV** | **Memory and I/O Systems** | **Hours: 12** |

Memory Hierarchy- Virtual memory, High speed memories- Interleaved memories- Caches – Mapping policies- Associative memories- Input/output system- Programmed I/O, DMA and interrupts, I/O processors, I/O Interfaces (*PCI, SCSI, and USB*).

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| **UNIT – V** | **Parallel Processing and Advanced Topics** | **Hours: 12** |

Architectural classification schemes - Pipelining, Instruction and Arithmetic pipelining- Principles of designing pipelined processors - RISC Vs CISC- RISC architecture- Superscalar pipelining - Multicore architecture

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|---|---|---|---|
| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes: -** | **Total Hours: 60** |

**Text Books**

1. M. Morris Mano and Michael D. Ciletti, Digital Design: With an Introduction to the Verlog HDL, Kindle Edition, 2012.
2. M. Morris Mano, "Computer System Architecture", Third Edition, Prentice Hall of India, New Delhi, 2013.

**Reference Book**

1. R .Ananda Natarajan, "Digital Design", Prentice Hall of India, New Delhi, First Edition, 2015
2. Thomas L.Floyd, Digital Fundamentals, 11th edition, Pearson Education,2014.
3. William Stallings, Computer Organization and Architecture – Designing for Performance, 10th Edition, Kindle Edition, 2015.

**Websites**

1. nptel.ac.in/courses/117108040
2. https://www.wiziq.com/tutorials/computer-architecture

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|---|---|---|---|---|---|---|---|---|
| **Department :** Information Technology | | | | **Programme :** B.Tech. (IT) | | | | |
| **Semester :** Three | | | | **Category :** TA | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT102 | Data Structures | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Knowledge in C Programming | | | | | | | |
| **Objective** | • To introduce the primary data structures and the associated operations<br>• To understand the applications of data structures with case studies<br>• To learn the implementation issues of the data structures | | | | | | | |
| **Outcome** | On successful completion of this course students will be able to:<br>• Choose appropriate data structures and use them in problem solving<br>• Solve problems in optimal way by selecting appropriate data structures | | | | | | | |
| **UNIT – I** | **Sorting And Searching Techniques** | | | | | **Hours: 12** | | |
| Primitive And Abstract Data Types: Data types – abstract data type – data structures –classification.<br>Sorting algorithms – Insertion sort- selection sort – shell sort – bubble sort – quick sort – heap sort- merge sort – radix sort – searching – linear search – binary search. | | | | | | | | |
| **UNIT – II** | **Lists** | | | | | **Hours: 12** | | |
| Array implementation – linked list – doubly linked list – circular linked list – multi linked lists – applications of linked lists – representation of polynomials and sparse matrices. | | | | | | | | |
| **UNIT – III** | **Stacks and Queues** | | | | | **Hours: 12** | | |
| Stack ADT – array and linked implementation of stacks – queue ADT – array and linked list implementation of queues – application of stacks and queues –expression evaluation – priority queues – double ended queues | | | | | | | | |
| **UNIT – IV** | **Non-Linear Data Structures** | | | | | **Hours: 12** | | |
| Binary tree – array and linked implementation of binary trees – application of trees – tree traversals – graphs – representation – breadth first search – depth first search – spanning trees – application of graphs | | | | | | | | |
| **UNIT – V** | **Advanced Search Techniques** | | | | | **Hours: 12** | | |
| Binary tree indexing – binary search tree – B-tree indexing – B+ trees – Trie indexing – AVL trees - Hash table – hash functions – collision resolution and open addressing | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes: -** | | | **Total Hours: 60** | | | |

**Text Books**

1. Ellis Horowitz, Sartaj Sahni and Susan Anderson-Freed, Fundamentals of Data Structures in C, Universities Press, 2nd Edition, 2008
2. Mark Allen Weiss, Data Structures and Algorithm Analysis in C, 2nd edition, Pearson Education, 1997

**Reference Books**

1. Jean Paul Tremblay and Paul G.Sorenson, An Introduction to data structures with applications, 2nd edition, Tata McGraw-Hill, 2001.
2. Alfred V. Aho, John E. Hopcroft and Jeffry D. Ullman, Data Structures and Algorithms, Pearson Education, New Delhi, 2006
3. ReemaThareja, Data Structures Using C, Oxford University Press, 2011.

**Websites**

1. https://onlinecourses.nptel.ac.in/programming101
2. http://www.extension.harvard.edu/courses/data-structures

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|---|---|---|---|---|---|---|---|---|
| **Department :** Information Technology | | | **Programme :** B.Tech. (IT) | | | | | |
| **Semester :** Three | | | **Category :** TA | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT103 | Object Oriented Programming | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | C Programming | | | | | | | |
| **Objective** | • To understand the concepts of object-oriented programming OOP<br>• To implement the OOP concepts using C++. | | | | | | | |
| **Outcome** | • Analyze and design a problem using an object-oriented approach.<br>• Implement the problem using C++ Programming Language. | | | | | | | |
| **UNIT – I** | | | | | | **Hours: 12** | | |
| Object Oriented Programming - Concepts – Objects – Classes – Methods - Messages –Abstraction - Encapsulation – Inheritance – Abstract Classes – Polymorphism. Introduction To C++ – Classes – Access Specifiers – Function and Data Members –Function Overloading – Friend Functions – Static Members – Objects – Pointers and Objects – Constant Object–Nested – Local Classes. | | | | | | | | |
| **UNIT – II** | | | | | | **Hours: 12** | | |
| Constructors – Default Constructor – Parameterized Constructors – Constructor with Dynamic Allocation – Copy Constructor – Destructors – Operator Overloading – Overloading through Friend Functions – Overloading Assignment Operator – Type Conversion – Explicit Constructor**.** | | | | | | | | |
| **UNIT – III** | | | | | | **Hours: 12** | | |
| Function and Class Templates - Exception Handling – Try-Catch-Throw Paradigm – Exception Specification – Terminate and Unexpected Functions – Uncaught Exception. | | | | | | | | |
| **UNIT – IV** | | | | | | **Hours: 12** | | |
| Inheritance – Public, Private, and Protected Derivations – Multiple Inheritance – Virtual Base Class– Composite Objects Runtime Polymorphism – Virtual Functions – Pure Virtual Functions – RTTI – Type Id – Dynamic Casting – RTTI and Templates – Cross Casting – Down Casting. | | | | | | | | |
| **UNIT – V** | | | | | | **Hours: 12** | | |
| Streams and Formatted I/O – I/O Manipulators - File Handling – Random Access – Object Serialization – Namespaces - Standard Namespace – ANSI String Objects – Standard Template Library. | | | | | | | | |
| **Total Contact Hours:45** | **Total Tutorials: 15** | **Total Practical Classes: -** | | | | **Total Hours: 60** | | |
| **Text Books** | | | | | | | | |
| 1. B.Trivedi, “Programming with ANSI C++”, Oxford University Press, 2012. | | | | | | | | |
| **Reference Books** | | | | | | | | |
| 1. Ira Pohl, “Object Oriented Programming using C++”, Pearson Education, Second Edition Reprint, 2004.<br>2. S. B. Lippman, Josee Lajoie, “Barbara E. Moo, “C++ Primer”, Fourth Edition, Pearson Education, 2005.<br>3. B. Stroustrup, “The C++ Programming Language”, Third Edition, Pearson Education,2004.<br>4. D. S. Malik, “C++ Programming: From Problem Analysis to Program Design”, 2012.<br>5. E. Balaguruswamy, “Object-Oriented Programming with C++” ,Sixth Edition, TMH,2013. | | | | | | | | |
| **Websites** | | | | | | | | |
| 1. http://www.cplusplus.com | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|
| **Department :** Electronics and Communication Engineering | | | | **Programme :** B.Tech. (IT) | | | | |
| **Semester :** Three | | | | **Category :** LB | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| EC129 | Electronic Devices and Circuits Laboratory | - | - | 3 | 2 | 60 | 40 | 100 |
| **Prerequisite** | Knowledge in theoretical background of the subject | | | | | | | |
| **Objective** | • To study the performance characteristics of BJT and FET<br>• To observe the oscillator characteristic and to analyse the waveforms.<br>• To test and examine the applications of operational amplifiers. | | | | | | | |
| **Outcome** | On successful completion of the course, students will be able to:<br>• Conceptually analyse the basic concepts, techniques and applications of electronic devices and circuits.<br>• Enhance their technical skills by analyzing the waveforms obtained at various stages of the circuit.<br>• Carry out design of the various electronic circuits suitable for specific applications | | | | | | | |
| **Cycle - I** | 1. VI characteristics of semiconductor diodes.<br>2. Diode clipping circuits.<br>3. Diode clamping circuits.<br>4. Half wave and Full wave rectifier circuits<br>5. Characteristics of CB transistor configuration.<br>6. Input and Output characteristics of CE transistor configuration. | | | | | **Hours: 23** | | |
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| **Cycle - II** | 1. Characteristics of FET, Determination of drain resistance, mutual conductance and amplification factor.<br>2. Hartley oscillator and Wien-bridge oscillator.<br>3. Class B push-pull power amplifier.<br>4. Applications of OP-Amps - Adder, Subtractor, Integrator and Differentiator.<br>5. Active low pass and high pass filters using Op-amp. | | | | | **Hours: 22** | | |
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| **Total contact Hours: -** | **Total Tutorials: -** | **Total Practical Classes: 45** | | | | **Total Hours: 45** | | |

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|---|---|---|---|---|---|---|---|---|
| **Department :** Information Technology | | | | **Programme:** B.Tech. (IT) | | | | |
| **Semester :** Three | | | | **Category :** LB | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT104 | Data Structures and OOP Laboratory | - | - | 3 | 2 | 60 | 40 | 100 |

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| **Prerequisite** | Knowledge in C Programming Language and<br>theoretical Background of C++ Programming Language | |
| **Objective** | • To introduce the Object orientation concepts - abstraction, encapsulation, classes and objects, inheritance and polymorphism<br>• To study and compare the various sorting, searching and hashing methods<br>• Learn to implement each data structure and use it for an application | |
| **Outcome** | On successful completion of the course, students will be able to:<br>• Develop efficient programs for a given problem choosing suitable data structure | |
| **Cycle - I** | **Programs using C++ concepts**<br>1. Implement Programs to demonstrate the use of Classes, Objects, Constructor and Destructor, Control Structures, Arrays and Pointers.<br>2. Implement Programs to demonstrate the use of different types of overloading and type casting.<br>3. Implement Programs to demonstrate the use of Virtual Base Classes, Pure Virtual Function and various types of Inheritance.<br>4. Implement Programs to demonstrate the use of different types of Polymorphism<br>5. Implement Programs to demonstrate the use of Exception Handling<br>6. Implement Programs to demonstrate the use of Templates and Stream Processing | **Hours: 23** |
| | | |
| **Cycle - II** | **Data structures Using C**<br>1. Implement Sorting techniques and compare their Performance (execution time, storage and number of comparisons)<br>a. Insertion sort<br>b. Selection sort<br>c. Shell sort<br>d. Bubble sort<br>e. Quick sort<br>f. Heap sort<br>g. Merge sort<br>h. Radix sort<br>2. Implement Searching techniques and compare their performance<br>a. Linear<br>b. Binary<br>3. Implement stack and queue operations and any one application<br>a. Using array<br>b. Using singly linked list<br>c. Using doubly linked list<br>4. Develop a program to evaluate the given infix expression<br>a. Operand stack and operator stack Implementation<br>b. Introduce operators with varying priority and association<br>5. Implement the following queue structures for an application<br>a. Priority queue<br>b. Double ended queue<br>6. For the following problems develop a program using appropriate data structures<br>a. Polynomial addition<br>b. Sparse matrix addition<br>7. Implement Binary tree(integer/string data) representation and traversal | **Hours: 22** |

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| | techniques<br>a. Using arrays<br>b. Using linked lists<br>8. Implement Binary search tree(integer/string data)representation and traversal<br>a. Using arrays<br>b. Using linked lists<br>9. Implement Graph representation and traversal techniques<br>a. Using adjacency matrix<br>b. Using adjacency list<br>10. Develop a program to implement Single Source Shortest path algorithm<br>11. Implement the following Tree structures with Insertion and deletion operation<br>a. $B^+$ Tree<br>b. AVL Tree<br>12. Implement and compare the various Hashing and Collision resolution techniques like<br>Linear, quadratic, random, rehashing and linking | |

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| **Total contact Hours:** | **Total Tutorials:** | **Total Practical Classes: 45** | **Total Hours: 45** |

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|---|---|---|---|---|---|---|---|---|
| **Department :** Information Technology | | | | **Programme:** B.Tech. (IT) | | | | |
| **Semester :** Three | | | | **Category :** LB | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT105 | Digital Laboratory | - | - | 3 | 2 | 60 | 40 | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objective** | • To perform fundamental operations on digital circuits.<br>• To apply the concepts of basic combinational logic circuits, sequential circuit elements, and programmable logic in the laboratory setting.<br>• To design the combinational and sequential circuits using Verilog Hardware Description Language (VHDL). | | | | | | | |
| **Outcome** | On successful completion of the course, students will be able to:<br>• Design combinational and sequential digital circuits<br>• Design complex digital circuits using VHDL | | | | | | | |
| **Cycle - I** | Implementation of logic circuits using gates<br>1. Full adder/full subtractor<br>2. Implementation of logic functions using universal gates only<br>3. Code converters<br>4. Parity generator and Checker<br>5. Design of priority encoder<br>6. Implementation of Boolean functions using MUX<br>7. Design of decoder, Demultiplexer | | | | | | **Hours: 22** | |
| | | | | | | | | |
| **Cycle - II** | Implementation of circuits using MSI<br>1. Synchronous counters<br>2. Asynchronous counters<br>3. Binary multiplier<br>4. Decimal Adder<br>5. Universal shift register<br>6. Design of Arithmetic unit<br>Design and Implementation of combinational circuits using Verilog Hardware Description Language (VHDL)<br>1. Combinational circuits – Adder/ Subtractor, Binary multiplier<br>2. Sequential circuits – Flip flops, counters. | | | | | | **Hours: 23** | |
| **Total contact Hours: -** | **Total Tutorials: -** | **Total Practical Classes: 45** | | | | **Total Hours: 45** | | |

| **Department :** Mathematics | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester : Four** | | **Category : TB** | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| MA 107 | Discrete Mathematics and Graph Theory | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Set Theory, Matrix Algebra and Basic mathematics. | | | | | | | |
| **Objective** | To familiarize the students with the<br>• Rules and Techniques to recognize valid logical argument<br>• the basic idea of logic with the algebra of proposition and predicate logic<br>• Graphs with all types and trees with all algorithms | | | | | | | |
| **Outcome** | On successful completion of this course, the students will be able to:<br>• Develop knowledge of logical connectivity, compound propositions, formal symbols of propositional logic and find exact value of expressions.<br>• Use the formal symbol to predicate logic<br>• Apply graph theory in real time network problems, data structures etc which can be convert into theoretical aspects to get the solution. | | | | | | | |
| **Unit I** | | | | | | **Hours: 12** | | |
| Connectives, Statement formulae, well-formed formulae-Tautologies. Equivalence of Statement formulae, Duality law-Tautological implications- Functionally complete set of connectives-NAND and NOR connectives. | | | | | | | | |
| **Unit II** | | | | | | **Hours: 12** | | |
| Principal conjunctive and disjunctive normal forms Inference calculus-validity of conclusion using truth table-Rules of inference -Derivation process-Conditional proof-Indirect method of proof- Derivation of validity of conclusion by these methods | | | | | | | | |
| **Unit III** | | | | | | **Hours: 12** | | |
| Predicate calculus: Predicates, The statement function, variables and quantifiers-Predicate formulas-symbolizing the statement. Inference theory of the predicate calculus-Rules of specification and generalization-Derivation of conclusion using the rules of inference theory. | | | | | | | | |
| **Unit IV** | | | | | | **Hours: 12** | | |
| Graphs-Applications of graphs-Incident and degree-pendant and isolated vertices-Number of odd vertices in a graph-Isomorphism of graphs-sub graphs -Walks-paths and circuits- Connected graphs –Euler graphs-operations on complete graphs- More on Euler graphs – Konigsberg bridge problem. | | | | | | | | |
| **Unit V** | | | | | | **Hours: 12** | | |
| Hamilton paths and circuits -Trees-properties of Trees with proof-Pendant vertices in a Tree-Distance and Center in a Tree-rooted and binary trees-spanning trees-Fundamental Circuits-Distance between spanning trees shortest spanning trees-Kruskal's algorithm | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes: -** | | | **Total Hours: 60** | | | |
| **Text Books** | | | | | | | | |
| 1. J.P.Tremblay and R.Manohar, Discrete Mathematical Structures with applications to Computer science, Tata McGraw-Hill Publishing company pvt. Ltd., New Delhi, 2002.<br>2. Narsingh Deo, Graph Theory with applications to Engineering and Computer science, Prentice-Hall of India pvt. Ltd., New Delhi, 2002. | | | | | | | | |
| **Reference Books** | | | | | | | | |
| 1. Kenneth H.Rosen, Discrete Mathematics and its Applications, Fifth edition, Tata McGraw-Hill Publishing company pvt. Ltd., New Delhi, 2003.<br>2. C.L.Liu, Elements of Discrete Mathematics, Second Edition, McGraw-Hill Book Company, New York 1988.<br>3. F.Harary, Graph Theory, Narosa Publishing House, New Delhi –Chennai- Mumbai, 1988.<br>4. Douglas B.West, Introduction to Graph Theory, Second Edition (Indian) Pearson Education Singapore) Pvt.Ltd, 2002. | | | | | | | | |

| **Department :** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester : Four** | | **Category : TA** | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT106 | Operating Systems | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objective** | • To grasp a fundamental understanding of operating systems<br>• To learn the concepts and creation computer processes , threads and process synchronization<br>• To learn the various resource managements of operating systems | | | | | | | |
| **Outcome** | On successful completion of this course, the students will be able to:<br>• Understand fundamental operating system abstractions such as processes, threads, files, semaphores, IPC abstractions, shared memory regions, etc.,<br>• Understand the principles of concurrency and synchronization,<br>• Understand basic resource management techniques (scheduling or time management, space management) and principles and how they can be implemented. | | | | | | | |
| **UNIT – I** | **Introduction** | | | | | | | **Hours: 12** |
| Operating system structure – operations – Services – system calls – Protection and Security - Distributed and Special purpose systems – virtual machines – Operating System debugging - Operating system generation | | | | | | | | |
| **UNIT – II** | **Process management** | | | | | | | **Hours: 12** |
| Processes – Threads: Multicore programming – Multithreading models – Implicit threading – Thread libraries - Threading issues - CPU Process scheduling – Process synchronization - Deadlocks | | | | | | | | |
| **UNIT – III** | **Memory management** | | | | | | | **Hours: 13** |
| Swapping – Contiguous Memory allocation – Paging – Segmentation – Segmentation with Paging -Virtual Memory – Demand Paging – Process creation – Page Replacement–Allocation of frames–Thrashing | | | | | | | | |
| **UNIT – IV** | **Storage management and Security** | | | | | | | **Hours: 13** |
| Mass storage structure - File-system interface – File-system implementation – I/O systems – System protection – System security | | | | | | | | |
| **UNIT – V** | **Case Study** | | | | | | | **Hours: 10** |
| Linux system (latest version): Design principles – Kernel modules – Process management- Scheduling – Memory management – File system – Input and output - Inter process communication – Network structure - Security – Windows OS (latest version): Design principles – System components – Terminal services and fast user switching - File system - Networking - Programmer Interface | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes:** | | | | | | **Total Hours: 60** |
| **Text Books** | | | | | | | | |
| 1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, Operating System Concepts, Ninth Edition, John Wiley & Sons (ASIA) Pvt. Ltd, 2012. | | | | | | | | |
| **Reference Books** | | | | | | | | |
| 1. William Stallings, Operating System: Internals and Design Principles, Prentice Hall of India, 8th Edition, 2014.<br>2. Harvey M. Deitel, Paul Deitel and David R. Choffnes, Operating Systems, Third Edition, Pearson Education Pvt. Ltd, 2003.<br>3. Andrew S. Tannenbaum and Herbert Bos, Modern Operating Systems, Fourth Edition, Prentice Hall, 2014.<br>4. Gary J. Nutt, Operating Systems, Third Edition, Addison Wesley, 2003. | | | | | | | | |
| **Websites** | | | | | | | | |
| 1. https://www.wiziq.com/tutorials/operating-systems | | | | | | | | |

| Department : Information Technology | | Programme : B.Tech. | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester: IV** | | | | | | | | |
| **Course Code** | **Course Name** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| **IT107** | **Microprocessors and Applications** | **3** | **1** | **-** | **4** | **40** | **60** | **100** |
| **Prerequisite** | Electronic Devices and Circuits, Digital System Design | | | | | | | |
| **Objective** | • To understand the architectures and the instruction set of 8085 microprocessor<br>• To understand the architectures of 8255, 8251, 8259, 8253, 8257 and 8259 interfaces<br>• To learn the assembly language program using 8085 instruction set | | | | | | | |
| **Outcome** | On successful completion of this course, students will be able to:<br>• Understanding the inner working components of the microprocessor and microcontrollers<br>• Developing assembly language program using 8085 instruction set<br>• Developing various I/O programs for 8085 | | | | | | | |
| **UNIT – I** | **Intel 8085 Microprocessor** | | | | | **Hours: 12** | | |
| Introduction - Need for Microprocessors – Intel 8085 Hardware - Architecture – Internal Registers – Arithmetic and Logic Unit – Control Unit – Instruction word size - Addressing modes – Instruction Set – Assembly Language Programming - Stacks and Subroutines - Timing Diagrams. Evolution of Microprocessors. | | | | | | | | |
| **UNIT – II** | **Intel 8085 Interrupts and DMA** | | | | | **Hours: 12** | | |
| 8085 Interrupts – Software and Hardware Interrupts – 8259 Programmable Interrupt Controller - Data Transfer Techniques – Synchronous, Asynchronous and Direct Memory Access (DMA) and 8257 DMA Controller- 8253 Programmable Interval Timer. | | | | | | | | |
| **UNIT – III** | **Memory & I/O Interfacing** | | | | | **Hours: 12** | | |
| Types of memory – Memory mapping and addressing – Concept of I/O map – types – I/O decode logic – Interfacing key switches and LEDs – 8279 Keyboard/Display Interface - 8255 Programmable Peripheral Interface – Concept of Serial Communication – 8251 USART – RS232C Interface. | | | | | | | | |
| **UNIT – IV** | **Intel 8086 Microprocessor** | | | | | **Hours: 12** | | |
| Introduction-Intel 8086 Hardware – Architecture – Internal Registers – Arithmetic and Logic Unit – Control Unit – Addressing modes – Instruction Set – Assembler Directives.<br>Assembly Language Programming - Subroutines - Timing Diagrams -External memory Addressing – Bus cycles – Interrupt Processing. | | | | | | | | |
| **UNIT – V** | **Comparative Study of Intel Microprocessors** | | | | | **Hours: 12** | | |
| 80186 - 80286 – 80386 – 80486 architectures. Pentium and Pentium Pro processors. Pentium II, III, 4 and Core processors | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes: -** | | | | **Total Hours: 60** | | |
| **Text Books** | | | | | | | | |
| 1. Ramesh S. Gaonkar, "Microprocessor Architecture, Programming and Applications with 8085", Penram International Publications, Fifth Edition.<br>2. Barry B. Brey, "The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386 and 80486, Pentium, Pentium Pro Processor, Pentium II, Pentium III Pentium 4 – Architecture, Programming and Interfacing, 8th Edn., Pearson Education, 2009.<br>3. Krishna Kant, "Microprocessors and Microcontrollers – Architectures, Programming and System Design 8085, 8086, 8051, 8096", PHI, 2008. | | | | | | | | |
| **Reference Books** | | | | | | | | |
| 1. N. Senthil Kumar, M Saravanan and S. Jeevananthan, "Microprocessors and Microcontrollers", Oxford University Press, 2010. | | | | | | | | |

2. A. P. Godse and D.A Godse, “Microprocessors and Microcontrollers”, Technical Publications, Fourth Edition, 2008.

**Web sites**

1. http://infocenter.arm.com/help/index.jsp?topic=/com.arm.doc.dai0211a/index.html
2. http://www.arm.com/products/processors/classic/arm7/index.php
3. http:// www.embeddedindia.com/
4. http://www.intel.in/

| **Department :** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester :** Four | | **Category :** LB | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT109 | Algorithms Laboratory | - | - | 3 | 2 | 60 | 40 | 100 |
| **Prerequisite** | Knowledge in C++ Programming Language | | | | | | | |
| **Objective** | To introduce the implementation of the following design techniques using C++<br>• Divide conquer method, Greedy method, Dynamic programming, Backtracking and Branch and bound | | | | | | | |
| **Outcome** | On successful completion of this course, the students will be able to:<br>• Learn to implement the complex tasks using various design techniques. | | | | | | | |

1. Implement divide and conquer technique for the following problems with appropriate class abstraction — **Hours: 9 × 5 = 45**
   - Finding maximum and minimum for an application having more than 1000 records - compare the performance with traditional iterative method
   - Quick sorting for any specified order for an application with more than 1000 records
   - Merge sorting for any specified order for an application with more than 1000 records
   - Improved merge sorting for any specified order for an application with more than 1000 records – compare results with the above problem.
   - Sparse matrix multiplication with the order of matrix more than 10×10 – compare results with the traditional matrix multiplication
2. Implement Greedy technique for the following problems with suitable object oriented concepts used
   - Knapsack problem with more than 10 objects
   - Job sequencing with deadlines
   - Prim's algorithm with more than 10 vertices in the graph
   - Kruskal's algorithm with more than 10 vertices in the graph
   - Optimal storage on tapes with more than 100 files
   - Optimal merge patterns with more than 100 patterns
   - Dijkstra's algorithm with more than 10 vertices in the graph
3. Implement dynamic programming technique for the following problems with suitable object oriented concepts used
   - Multi stage graph solution using forward and backward approach for a graph with more than 10 vertices
   - All pairs shortest paths algorithm for a graph with more than 10 vertices
   - Warshall's and Floyd's algorithms for a graph with more than 10 vertices
   - Optimal binary search tree implementation for a data set with less than 10 keywords
   - 0 / 1 knapsack problem with more than 10 items
   - Traveling salesman problem with more than 10 cities
4. Implement backtracking technique for the following problems to output all solutions (with suitable object oriented concepts used)
   - 8 queen's problem
   - Sum of subsets
   - Graph coloring
   - Hamiltonian cycle
5. Implement branch and bound technique for the following problems (with suitable object oriented concepts used)

| | | | |
|---|---|---|---|
| | • 8 /15 puzzle problem using LC branch and bound<br>• 8 / 15 puzzle problem using FIFO Branch and bound<br>• Knapsack problem using LC branch and bound<br>• Traveling salesman problem using LC branch and bound<br>• Assignment Problem using LC branch and bound | | |
| **Total contact Hours: -** | **Total Tutorials: -** | **Total Practical Classes: 45** | **Total Hours: 45** |

| Department : Information Technology | | Programme : B.Tech. | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester: IV** | | | | | | | | |
| **Course Code** | **Course Name** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| **IT110** | **Microprocessors Laboratory** | **-** | **-** | **3** | **2** | **60** | **40** | **100** |
| **Prerequisite** | Electronic Devices and Circuits, Digital System Design | | | | | | | |
| **Objective** | • To understand the architectures and the instruction set of 8085 microprocessor with 8255, 8251, 8259, 8253, 8257 and 8259 interfaces<br>• To learn assembly language programming using 8085 instruction set<br>• To learn assembly language programming using 8086 instruction set | | | | | | | |
| **Outcome** | On successful completion of this course students will be able to:<br>• Understanding the inner working components of the microprocessor and microcontrollers<br>• Developing assembly language program using 8085 and 8086 instruction sets<br>• Developing various I/O programs for 8085 | | | | | | | |

**LIST OF EXPERIMENTS**

**Experiment Using 8085 Microprocessor**

- Study of 8085 Microprocessor Trainer Kit
- 8-bit Arithmetic Operations (Addition, Subtraction, Multiplication and Division)
- Block Operations (Move, Exchange, Compare, Insert and Delete)
- Code Conversions
- Digital Clock simulation
- Moving Display
- Serial Communication
- Music Synthesizer Interface
- Stepper motor control
- Elevator Simulation
- Traffic Light Control

**Experiments Using 8086 Microprocessor**

- Study of 8086 Microprocessor Trainer Kit
- 8-bit Arithmetic Operations (Addition, Subtraction, Multiplication and Division)
- Block Operations (Move, Exchange, Compare, Insert and Delete)
- Code Conversions
- Digital Clock simulation
- Moving Display
- Serial Communication
- Music Synthesizer Interface
- Stepper motor control
- Elevator Simulation
- Traffic Light Control

| **Total Contact Hours: -** | **Total Tutorials: -** | **Total Practical Classes: 45** | **Total Hours: 45** |
|---|---|---|---|

| **Department :** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester :** Four | | **Category :** LB | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT111 | Operating Systems Laboratory | - | - | 3 | 2 | 60 | 40 | 100 |
| **Objective** | • To learn shell programming in UNIX/LINUX operating system<br>• To simulate the scheduling algorithms<br>• To implement dining philosopher, reader-writer problems using synchronization mechanisms.<br>• To simulate and learn the concept of memory management and file systems. | | | | | | | |
| **Outcomes** | On successful completion of this course, the students will be able to:<br>• Write shell programs in UNIX/LINUX OS<br>• Develop kernel of an OS<br>• Develop utilities for an OS | | | | | | | |

**List of Exercises**

1. Study of basic Unix/Linux commands.
2. Shell Programming
   - Programs using the following system calls of Unix/Linux operating system:
     fork, exec, getpid, exit, wait, close, stat, opendir, readdir
   - Programs using the I/O system calls of UNIX operating system (open,read,write,etc).
3. Simulation Exercises
   - Simulations of Unix/Linux commands like ls, grep, etc.
   - Simulation of scheduling algorithms (CPU and Disk).
   - Implementation of synchronization problems using Semaphore.
   - Simulation of basic memory management schemes.
   - Simulation of virtual memory management schemes.
   - Simulation of file systems.

**Reference Books/Websites**


1. William Stallings, Operating System, Prentice Hall ofIndia,6th Edition,2009.
2. Harvey M. Deitel, Operating Systems, Second Edition, Pearson Education Pvt. Ltd, 2002.
3. Gary J. Nutt, Operating Systems: A Modern Perspective, Second Edition, Addison Wesley, 2001.
4. A. Tannenbaum, Modern Operating Systems.2nd Edition, Prentice Hall, 2001.
5. Charles Crowley, Operating System, A Design-Oriented Approach, Tata McGraw-Hill, 1999.
6. http://www.inf.ed.ac.uk/teaching/courses/os/prac
7. http://www.scribd.com/doc/7137624/OS-Practical-File
8. http://www.cl.cam.ac.uk/freshers/raspberrypi/tutorials/os/introduction.html


| **Total Contact Hours:** | **Total Tutorials:** | **Total Practical Classes: 45** | **Total Hours: 45** |
|---|---|---|---|

| **Department:** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester :** Five | | **Category :** TA | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT112 | Computer Networks | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Digital System Design and Computer Architecture | | | | | | | |
| **Objective** | • To get the idea of choosing the required functionality at each layer for a given application and trace the flow of information from one node to another node in the network.<br>• To understand the division of network functionalities into layers, the component required to build different types of networks and identifying the solution for the functionalities in each layer**.** | | | | | | | |
| **Outcome** | • Understand the Layered Architecture of Computer Networks.<br>• Understand the operation of the main components of computer networks.<br>• Learn various network protocols and algorithms. | | | | | | | |
| **UNIT – I** | **Introduction to Computer Networks** | | | | | **Hours: 12** | | |
| Need for Networking - Service Description –connectionless and Connection-Oriented Services – Circuit and Packet Switching – Access Networks and Physical Media – Wireless Links and Characteristics – Queuing Delay and Packet Loss – Internet Protocol stack – OSI Reference Model - Service Models – History of Computer Networking and the Internet. | | | | | | | | |
| **UNIT – II** | **Application Layer**: | | | | | **Hours: 12** | | |
| Principles of Network Applications – The Web and HTTP – FTP – Electronic Mail – SMTP – Mail Message Formats and MIME – DNS – Socket Programming with TCP and UDP. Multimedia Networking: Internet Telephony – RTP – RTCP – RTSP. | | | | | | | | |
| **UNIT – III** | **Transport Layer** | | | | | **Hours: 12** | | |
| Transport Layer Services – Multiplexing and Demultiplexing – UDP – Reliable Data Transfer – Go-Back-N and Selective Repeat. Connection-Oriented Transport: TCP – Segment Structure – RTT estimation – Flow Control – Connection Management – Congestion Control – TCP Delay Modeling – SSL and TLS. Integrated and Differentiated Services: Intserv – Diffserv. | | | | | | | | |
| **UNIT – IV** | **Network Layer** | | | | | **Hours: 12** | | |
| Circuit Switching - Packet Switching Virtual Circuit Switching – IP – ARP – DHCP – ICMP – Routing – RIP – OSPF – Sub netting – CIDR – Inter domain Routing – BGP – IPV6 Basic Features – Inter Domain Multicast – Congestion Avoidance in Network Layer. | | | | | | | | |
| **UNIT – V** | **Data Link Layer** | | | | | **Hours: 12** | | |
| Layer Services– Framing - Error correction and detection – Link Level Flow Control – Medium Access – Ethernet – Token Ring –FDDI – Wireless LAN – Bridges and Switches. | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes: -** | | | | **Total Hours: 60** | | |

**Text Books**


1. James F. Kurose, Keith W. Ross, “Computer Networking, A Top-Down Approach Featuring the Internet”, Third Edition, Pearson Education, 2006.
2. William Stallings, “Data and Computer Communications”, Eighth Edition, Pearson Education, 2011.


**Reference Books**


1. Larry L. Peterson, Bruce S. Davie, “Computer Networks: A Systems Approach”, Fifth Edition, Morgan Kaufmann Publishers Inc., 2011.
2. 
3. Nader F. Mir, “Computer and Communication Networks”, First Edition, Pearson Education, 2007.
4. Ying-Dar Lin, Ren-Hung Hwang and Fred Baker, Computer Networks: An Open Source Approach “, McGraw Hill Publisher, 2011.
5. Behrouz A. Forouzan, “Data communication and Networking”, Tata McGraw-Hill, 2004.

| **Department:** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester :** Five | | **Category :** TA | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT113 | Java Programming | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Object Oriented Programming | | | | | | | |
| **Objective** | • To understand the basics of Java<br>• To learn the features of Java<br>• To learn the advanced concepts in Java. | | | | | | | |
| **Outcome** | • Students will understand the benefits and capabilities of Java. | | | | | | | |

**UNIT – I** **Hours: 12**

Creation of Java, importance of Java to internet, byte code, Java buzzwords, data types, declaring variables, dynamic initialization, scope and life time of variables, arrays, operators, control statements, type conversion and casting, compiling and running of simple Java program. Concepts of classes and objects, class fundamentals Declaring objects, assigning object reference variables, introducing methods, constructors, usage of static with data and methods, usage of final with data, access control, this key word, garbage collection, overloading methods and constructors, parameter passing - call by value, recursion, nested classes and inner classes, exploring the String class.

**UNIT – II** **Hours: 12**

Basic concepts, member access rules, usage of super key word, forms of inheritance, method overriding, abstract classes, dynamic method dispatch, using final with inheritance, the Object class. Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

**UNIT – III** **Hours: 12**

Concepts of Exception handling, types of exceptions, usage of try, catch, throw, throws and finally keywords, Built-in exceptions, creating own exception sub classes, Concepts of Multithreading, differences between process and thread, thread life cycle ,creating multiple threads using Thread class, Runnable interface, Synchronization, thread priorities, inter thread communication, daemon threads, deadlocks, thread groups.

**UNIT – IV** **Hours: 12**

Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

AWT : Concepts of components, container, panel, window, frame, canvas, Font class, Color class and Graphics. Applets - Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

**UNIT – V** **Hours: 12**

RMI- JDBC- Developing Java Program for RMI and JDBC

| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes: -** | **Total Hours: 60** |
|---|---|---|---|

**Text Books**

1. The Complete Reference Java J2SE 5th Edition, Herbert Schildt, TMH Publishing Company Ltd, NewDelhi, 2002.
2. Big Java 2nd Edition, Cay Horstmann, John Wiley and Sons, 2005.

**Reference Books**

1. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI, 2004.
2. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education, 2002.
3. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education, 2004.

**Websites**

1. http://www.ibm.com/developerworks/java/
2. http://docs.oracle.com/javase/tutorial/rmi/

| **Department:** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester :** Five | | **Category :** TA | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT114 | Data Base Management System | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Programming Skills and Data Structures | | | | | | | |
| **Objective** | • To teach the fundamentals of Database Management System to the students<br>• To make them understand the applications of Data Base Management System in real-time. | | | | | | | |
| **Outcome** | • The students can be able to understand the concepts of Database Management System<br>• The students can able to choose and design the database for the specific requirement of the project. | | | | | | | |
| **UNIT – I** | **Introduction:** | | | | | **Hours: 12** | | |
| Introduction to Database Systems: Overview – Data Models – Database System Architecture – History of Database Systems. Entity-Relationship Model: Basic Concepts – Constraints – Keys – Design Issues – Entity Relationship Diagram –Entity Sets – Design of an E-R Database Schema. | | | | | | | | |
| **UNIT – II** | **Relational Model and SQL** | | | | | **Hours: 12** | | |
| Structure of Relational Databases – Relational Algebra –Relational Algebra Operations – Modification of Database – Views –Relational Calculus.<br>SQL Background – Basic Structure – Set Operations – Aggregate Functions – Null Values – Nested Sub-queries – Views –Modification of Database –Joined Relations – Data-Definition Language. | | | | | | | | |
| **UNIT – III** | | | | | | **Hours: 12** | | |
| **Integrity and Security:** Domain Constraints – Referential Integrity – Assertions –Triggers – Security - Authorization.<br>**Relational Database Design**: Normalization -First Normal Form, Second Normal Form- Third Normal Form- Boyce-Codd Normal Form. | | | | | | | | |
| **UNIT – IV** | **Storage and File Structures** | | | | | **Hours: 12** | | |
| Overview of Physical Storage Media – Magnetic Disks – RAID – Tertiary Storage – Storage Access – File Organization: Indexing and Hashing: Basic Concepts –Static Hashing – Dynamic Hashing. | | | | | | | | |
| **UNIT – V** | **Transactions** | | | | | **Hours: 12** | | |
| Concept – Transaction State – Implementation of Atomicity and Durability – Concurrent Executions – Serializability. Concurrency Control: Lock-Based Protocols. Recovery System: Failure Classification – Storage Structure – Recovery and Atomicity – Log-Based Recovery – Shadow Paging. | | | | | | | | |
| **Total Contact Hours:45** | **Total Tutorials: 15** | **Total Practical Classes: -** | | | | **Total Hours: 60** | | |

**Text Books**

1. Silberschatz, Korth, Sudarshan, "*Database System Concepts"*, 6th Edition, McGraw-Hill Higher Education, International Edition, 2011

**Reference Books**

1. Fred R McFadden, Jeffery A Hoffer, M. B. Prescott, "Modern Database Management", 7th Edition, Addison Wesley, 2004.
2. Elmasri and Navathe, "Fundamentals of Database Systems", 6th Edition, Addison Wesley, 2010.
3. Jefrey D.Ulman, Jenifer Widom, "A First Course in Database Systems", 5th Edition, Prentice Hall, 2009.
4. Bipin C Desai, "An Introduction to Database Systems", Galgotia Publications Pvt Limited, 2003.

**Websites**

1. http://www.databases.about.com

| **Department:** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester :** Five | | **Category :** LB | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT115 | Computer Networks Laboratory | - | - | 3 | 2 | 60 | 40 | 100 |
| **Prerequisite** | | | | | | | | |
| **Objective** | • To learn socket programming<br>• To use simulation tools.<br>• To analyze the performance of protocols in different layers in computer networks using simulation tools. | | | | | | | |
| | | | | | | | | |
| | 1. Applications using TCP Sockets like<br>a. Echo client and echo server<br>b. File transfer<br>c. date and time server & client<br>d. Chat<br>2. Applications using UDP Sockets like<br>a. DNS<br>b. SNMP<br>3. Applications using Raw Sockets like<br>a. Ping<br>b. Trace route<br>4. Programs using RPC<br>5. Experiments using simulators like OPNET:<br>a. Performance comparison of MAC protocols<br>b. Performance comparison of Routing protocols like<br>i. Shortest path routing<br>ii. Flooding<br>iii. Link State<br>iv. Hierarchical<br>c. Study of TCP/UDP performance. | | | | | | | **Hours: 45** |
| **Total contact Hours:** | **Total Tutorials:** | **Total Practical Classes: 45** | | | | **Total Hours: 45** | | |

| **Department:** Information Technology | | | | **Programme:** B.Tech. (IT) | | | |
|---|---|---|---|---|---|---|---|
| **Semester :** Five | | | | **Category :** LB | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT116 | Java Programming Laboratory | - | - | 3 | 2 | 60 | 40 | 100 |
| **Prerequisite** | Theoretical Background of JAVA Programming Language | | | | | | | |
| **Objective** | • To understand the basics of java<br>• To write programs in Java covering the object oriented concepts.<br>• To write programs covering advanced concepts in java like thread handling, applets, RMI and JDBC | | | | | | | |
| **Outcome** | On successful completion of this course students will be able to:<br>• Write programs and develop projects in Java. | | | | | | | |

Develop Java programs to cover the following topics:

- Simple Java program with one or more classes
- Exception Handling
- Inheritance
- Packages
- Interfaces
- Event Handling
- File Handling
- Thread Handling
- AWT controls/Java Swings/Struts framework
- Applets
- RMI
- JDBC

| **Total contact Hours:** | **Total Tutorials:** | **Total Practical Classes: 45** | **Total Hours: 45** |
|---|---|---|---|

| **Department:** Information Technology | | | | **Programme:** B.Tech. (IT) | | | |
|---|---|---|---|---|---|---|---|
| **Semester :** Five | | | | **Category :** LB | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT117 | Data Base Management Systems Laboratory | - | - | 3 | 2 | 60 | 40 | 100 |
| **Objective** | • To design databases for real-time applications<br>• To provide students with hands-on experience to understand and to be familiar in Oracle database, SQL, Oracle Reports and Oracle Forms.<br>• To familiarize to students the knowledge of JDBC and ODBC connectivity | | | | | | | |
| **Outcome** | • To analyze database needs and functions<br>• To create data models and Entity-Relationship (E-R) diagrams<br>• To use normalization rules and principles to create normalized databases | | | | | | | |

**Programs to be developed using ORACLE and VB:** **Hours: 45**

1. **Study of Database Concepts**: Relational model – Table – Operations on Tables– View – Schema – Privilege – Role – Transactions.
2. **Study of SQL**: Primitive Data Types – User Defined data Types – Built-in Functions –To create, alter, drop, select, insert, delete, update, commit, rollback, grant and revoke.
3. **SQL Commands:** To implement all DDL , DML and DCL Commands of SQL
4. **Study of Query Types:** Queries involving Union, Intersection, Difference, Cartesian Product and Divide Operations – Sub-Queries – Join Queries-Correlated Queries
5. **Indexing**: To implement Indexing.
6. **Application:** Design and develop any three of the following:
   - Library Information System
   - Logistics Management System
   - Students' Information System
   - Ticket Reservation System
   - Hotel Management System
   - Hospital Management System
   - Inventory Control
   - Retail Shop Management
   - Employee Information System
   - Payroll System

| **Total contact Hours:** | **Total Tutorials:** | **Total Practical Classes: 45** | **Total Hours: 45** |
|---|---|---|---|

| **Department:** Information Technology | | | **Programme:** B.Tech. (IT) | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester :** Six | | | **Category :** TA | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT118 | Software Engineering | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Data structures | | | | | | | |
| **Objective** | • Understand the software life cycle models;<br>• Design and Develop Domain Oriented appropriate software product.;<br>• Understand different types of testing. | | | | | | | |
| **Outcome** | On successful completion of this course, the students will be able to:<br>• Define and develop a software project by gathering requirement with SRS Report<br>• Identify appropriate model for given/selected project.<br>• Implement and test with test case generation. | | | | | | | |

| **UNIT – I** | **Hours: 12** |
|---|---|

**Introduction to Software Engineering:** The Software Engineering Discipline – Evolution and Impact – Software Development projects – Emergence of Software Engineering – Computer System Engineering **Software Life Cycle Models:** classic Waterfall model – Iterative Lifecycle model – prototyping model – Evolutionary model – spiral model –Introduction to Agile.

**Case study:** Identify appropriate **model** for given domain- Importance of agile in real-time system.

| **UNIT – II** | **Hours: 12** |
|---|---|

**Software Project Management:** Responsibilities of a Software Project Manager – Project Planning – Metrics for Project Size Estimation – Empirical Estimation Techniques – COCOMO – Halstead's Software Science – Staffing Level Estimation – Scheduling – Organization and Team structures – Staffing – Risk Management – Software Configuration Management

**Requirements Analysis and Specification:** Requirements Gathering and Analysis – Software Requirements specification – Formal System Specification – Axiomatic Specification - Algebraic Specification – 4GL.

**Case study:** Prepare **SRS report** for given domain

| **UNIT – III** | **Hours: 12** |
|---|---|

**Software Design:** Outcome of a Design Process – Characteristics of a Good Software Design – Coupling and Cohesion – Approaches to Software Design – Object Oriented Vs Function Oriented Software Design approaches

**Function Oriented Software Design:** Structured Analysis – Data Flow Diagrams – Applying DFD to Real time systems – Structured and Detailed Design-ER relation-Use case design

**Case study:** Prepare **SDS report** for given domain with DFD/ER/Use Case

| **UNIT – IV** | **Hours: 12** |
|---|---|

**Coding and Testing:** Coding – Software Documentation – Testing – Unit Testing – Black Box testing – White Box testing –BVA- Structural Testing – Test Coverage Criteria Based On Data Flow Mechanisms – Regression Testing- Debugging – Program Analysis tools – Integration testing – Testing Object Oriented programs – System Testing – Issues.

**Case study:** Apply **Test case** generation for given domain.

| **UNIT – V** | **Hours: 12** |
|---|---|

**Software Reliability and Quality :** - Software Reliability – Software Quality – ISO 9000 – SEI CMM – Six Sigma. Measures And Measurements – Software Metric-ZIPF's Law – Software Cost Estimation – Function Point Models – COCOMO Model – Delphi Method – Scheduling –Software reverse engineering – Risk Management– Software maintenance process

**Case study:** Apply software standards for small real-time projects.

| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes: -** | **Total Hours: 60** |
|---|---|---|---|

**Text Books**

1. Rajib Mall, " Fundamentals of Software Engineering", PHI Learning, Third Edition, 2013.

**Reference Books**

1. Roger S. Pressman, "Software Engineering: A Practitioner's Approach", McGraw-Hill International Edition, Seventh edition, 2009.
2. S. L. Pfleeger and J.M. Atlee, "Software Engineering Theory and Practice", Pearson Education, Third edition, 2008.

3. Pankaj Jalote, “An Integrated Approach to Software Engineering”, Narosa, Third edition, 2008.
4. Ian Sommerville, “Software Engineering”, Pearson Education, Eighth edition, 2008.

**Websites**

1. http://www.nptel.iitm.ac.in/courses/Webcourse-contents/IITKharagpur/SoftEngg/
2. http://www.computer.org/portal/web/swebok

| **Department:** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester :** Six | | **Category :** TA | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT119 | Artificial Intelligence | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Discrete Mathematics | | | | | | | |
| **Objective** | • To search and discover intelligent characteristics of existing AI projects, Intelligent agents map a new problem – as search.<br>• To understand different Knowledge Representation schemes for typical AI problems.<br>• To design and implement a typical AI problem to be solved Using Machine Learning Techniques. | | | | | | | |
| **Outcome** | On successful completion of this course, students will be able to:<br>• Capability to develop intelligent systems<br>• Apply heuristic concepts to design efficient algorithms that help to attain the goals in satisfactory manner<br>• Design applications related to Natural Language Processing and Web applications. | | | | | | | |
| **UNIT – I** | **Introduction** | | | | | | | **Hours: 12** |
| History of AI - - problem spaces and search- Production System-Heuristic Search techniques –Best-first search- Problem reduction-Constraint satisfaction-Means Ends Analysis.<br>Intelligent agents: Agents and environment – structure of agents and its functions- simple reflex agent- goal based agent – utility based agent – learning agents. | | | | | | | | |
| **UNIT – II** | **Knowledge Representation** | | | | | | | **Hours: 12** |
| Approaches and issues in knowledge representation- Propositional Logic –Predicate logic-Forward and backward reasoning - Unification- Resolution- Weak slot-filler structure – Strong slot-filler structure- Knowledge- Based Agent | | | | | | | | |
| **UNIT – III** | **Reasoning under uncertainty** | | | | | | | **Hours: 12** |
| Logics of non-monotonic reasoning-Implementation- Basic probability notation - Bayes rule – Certainty factors and rule based systems-Bayesian networks – Dempster - Shafer Theory - Fuzzy Logic. | | | | | | | | |
| **UNIT – IV** | **Planning and Learning** | | | | | | | **Hours: 12** |
| Planning with state space search-partial order planning-planning graphs-conditional planning-continuous planning-Multi-Agent planning. Forms of learning- Learning from observation - Inductive learning – Decision trees – Explanation based learning – Statistical Learning methods - Reinforcement Learning -Neural Net learning and Genetic learning | | | | | | | | |
| **UNIT – V** | **Advanced Topics** | | | | | | | **Hours: 12** |
| Game Playing: Minmax search procedure-Adding alpha-beta cutoff Expert System: Representation-Expert System shells-Knowledge Acquisition. Robotics: Hardware-Robotic Perception-Planning-Application domains | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes: -** | | | **Total Hours: 60** | | | |

**Text Books**

1. Elaine Rich and Kevin Knight and Shivashankar B.Nair, Artificial Intelligence, 3rd edition, Tata Mc Graw Hill, 2009.
2. Ben Coppin, "Artificial Intelligence Illuminated", Jones and Bartlett Publishers, 1st edition, 2004.
3. Stuart J.Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, Pearson Education Asia, II edition, 2003.
4. N.P.Padhy, Artificial Intelligence and Intelligent Systems, Oxford University Press, 2nd edition, 2005.

**Reference Book**

1. Rajendra Akerkar ,Introduction to Artificial Intelligence, Prentice hall of India, 2005.
2. Patrick Henry Winston, Artificial Intelligence, 3rd edition Pearson Education, Inc., 2001.

**Websites**

1. http://aima.cs.berkeley.edu/ai.html
2. www.stanford.edu/class/cs221/

| **Department:** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester :** Six | | **Category :** TA | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT120 | Web Technology | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Object Oriented Programming, HTML, JAVA | | | | | | | |
| **Objective** | • To introduce the basics of Network Model.<br>• To introduce the Web Development Process and Various Web Technologies.<br>• To learn Networking and Security issues of Internet. | | | | | | | |
| **Outcome** | On successful completion of this course, the students will be able to:<br>• Use appropriate web development tools for various web application<br>• Learn various Networking and Security issues of Internet to have a protected internet use. | | | | | | | |
| **UNIT – I** | | | | | | | | **Hours: 12** |
| Internet Principles and Components: History of the Internet and World Wide Web- – HTML - protocols – HTTP, SMTP, POP3, MIME, IMAP. Domain Name Server, Web Browsers and Web Servers, Dynamic HTML | | | | | | | | |
| **UNIT – II** | | | | | | | | **Hours: 12** |
| Client Side and Server Side Programming: Introduction to JAVA Scripts and VB Scripts– Object Based Scripting for the web. Programming Java Script and VB Script - Structures – Functions – Arrays – Objects, Regular Expression in java script. Java Server Pages - Session and Application management - Session tracking and cookies – Access a database from JSP – Developing N-tier web application. | | | | | | | | |
| **UNIT – III** | | | | | | | | **Hours: 12** |
| XML and ActiveX: Anatomy of xml document - XML markup-working with elements and attributes - creating valid documents-xml objects and DOM. ActiveX controls: OLE and ActiveX -ActiveX Documents, Server side Active-X Components, ActiveX DLL and ActiveX Exe. | | | | | | | | |
| **UNIT – IV** | | | | | | | | **Hours: 12** |
| Multimedia and Web Application: Multimedia in web design, Audio and video speech synthesis and recognition - Electronic Commerce – E-Business Model – E-Marketing – Online Payments and Security – N-tier Architecture. Search and Design: Working of search engines -optimization-Search interface. | | | | | | | | |
| **UNIT – V** | | | | | | | | **Hours: 12** |
| Web Services: Introduction to Web Services, UDDI, SOAP, WSDL, Web Service Architecture, Developing and deploying web services. Ajax – Improving web page performance using Ajax, Programming in Ajax. | | | | | | | | |
| **Total Contact Hours:45** | **Total Tutorials: 15** | **Total Practical Classes: -** | | | **Total Hours: 60** | | | |

**Text Books**

1. Deitel and Deitel, Goldberg, "Internet and World Wide Web – How to Program", Pearson Education Asia, 2001. (UNIT I)
2. Rajkamal, "Web Technology", Tata McGraw-Hill, 2001. (UNITs II & IV)
3. John Paul Mueller, "Active X from the Ground Up", Tata McGraw-Hill, 1997. (UNIT III)
4. Eric Newcomer, "Understanding Web Services: XML, WSDL, SOAP, and UDDI", Addison-Wesley, 2002. (UNIT V)

**Reference Books**

1. Phillip Hanna, "JSP 2.0 - The Complete Reference", McGraw-Hill, 2003.
2. Mathew Eernisse, "Build Your Own AJAX Web Applications", SitePoint, 2006.

**Websites**

1. http://www.w3schools.com

| **Department:** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester :** Six | | **Category :** LB | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT121 | Artificial Intelligence and Software Engineering Laboratory | - | - | 3 | 2 | 60 | 40 | 100 |
| **Prerequisite** | Hands on exercises in advanced programming, software development | | | | | | | |
| **Objective** | • To familiarize the students with the concepts in AI and Knowledge representation concepts in Lisp and Prolog<br>• To understand the software engineering methodologies for project development.<br>• To gain knowledge about open source tools for Computer Aided Software Engineering using case tools. | | | | | | | |
| **Outcome** | On successful completion of this course, the students will be able to:<br>• Use appropriate tools for SW development<br>• Develop complex programs in Lisp and Prolog | | | | | | | |

**CYCLE I – AI EXERCISES**

1. To implement the different types of hill climbing techniques
2. To implement A* Algorithms.
3. To implement AO* Algorithms
4. To implement constraint satisfaction technique
5. To design and develop game playing programs in Lisp
   - 8 queens problem
   - Knight's tour problem
   - Crossword puzzle
6. Problems in Prolog
   - Resolution in Predicate Logic

**CYCLE II – SOFTWARE ENGINEERING LAB**

Using Open source Tools: StarUML / UMLGraph / Topcased prepare the following documents for each experiment and develop the software using Software Engineering methodology

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

| **Total contact Hours:** | **Total Tutorials:** | **Total Practical Classes: 45** | **Total Hours: 45** |
|---|---|---|---|

| **Department:** Information Technology | | **Programme :** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester :** Six | | **Category :** LB | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT122 | Web Technology Laboratory | - | - | 3 | 2 | 60 | 40 | 100 |
| **Prerequisite** | Object Oriented Programming, Networks | | | | | | | |
| **Objective** | • To introduce the basics of Network Model.<br>• To introduce the Web Development Process and Various Web Technologies.<br>• To learn Networking and Security issues of Internet. | | | | | | | |
| **Outcome** | On successful completion of this course, the students will be able to:<br>• Use appropriate web development tools for various web application<br>• Learn various Networking and Security issues of Internet to have a protected internet use. | | | | | | | |

**LIST OF EXERCISES**

1. Creation of HTML Files
2. Working with Client Side Scripting
    - 2.1 VBScript
    - 2.2 JavaScript
3. Configuration of web servers
    - 3.1 Apache Web Server
    - 3.2 Internet Information Server (IIS)
4. Working with ActiveX Controls in web documents.
5. Experiments in Java Server Pages
    - 5.1 Implementing MVC Architecture using Servlets
    - 5.2 Data Access Programming (using ADO)
    - 5.3 Session and Application objects
    - 5.4 File System Management
6. Working with other Server Side Scripting
    - 6.1 Active Server Pages
    - 6.2 Java Servlets

    6.3 PHP
7. Experiments in Ajax Programming
8. Developing Web Services
9. Developing any E-commerce application (Mini Project)

| **Total contact Hours:** | **Total Tutorials:** | **Total Practical Classes: 45** | **Total Hours: 45** |
|---|---|---|---|

| **Department:** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester :** Six | | **Category :** LB | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT123 | Software Development Laboratory | - | - | 3 | 2 | 60 | 40 | 100 |
| **Prerequisite** | Knowledge in programming languages<br>Knowledge in Software Engineering Concepts | | | | | | | |
| **Objective** | • To Provide them a knowledge in design and implementation of projects<br>• To make use of the tools such as Python and all suitable software for the design and development purpose | | | | | | | |
| **Outcome** | On successful completion of this course, the students will be able to:<br>• Know the various phases in the design of the project<br>• To be aware of the tools and software to be used in final year project | | | | | | | |

The following documents for the Mini Project are to be prepared. Implementation is to be done by adopting software engineering methodology. For preparing documents and implementation the real time CASE tools are to be used wherever applicable. After implementation documentation report is to be submitted in IEEE format.

1. Project Planning: Thorough study of the problem, Identification project scope , objectives, Infrastructure and cost estimation
2. Software requirement Analysis: Feasibility study - Documentation of all the requirements as specified by customer in convention Software Requirement Specification-
3. Design and Development: Preparation of use case, collaboration or sequence, class, object, package, deployment diagrams and coding of the project.
4. Software Testing: Prepare test plan, perform validation testing, Coverage analysis, memory leaks develop test case hierarchy and Site check and Site monitor.

| **Total contact Hours:** | **Total Tutorials:** | **Total Practical Classes: 45** | **Total Hours: 45** |
|---|---|---|---|

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Department:** Humanities and Social Sciences | | | **Programme:** B. Tech. (IT) | | | | | |
| **Semester :** Six | | | **Category :** PR | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| HS102 | General Proficiency | - | - | 3 | 1 | 100 | - | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objectives** | • To enhance the students' communication and language skills and make them industry-ready.<br>• To encourage brain storming discussions and team work.<br>• To train students to master soft skills through various activities. | | | | | | | |
| **Outcomes** | On successful completion of the module students will be able to:<br>• Communicate in English effectively and confidently.<br>• Imbibe the requisite soft skills.<br>• Improve critical thinking and analytical skills. | | | | | | | |

**Art of communication:** Verbal and Non-verbal Communication – Barriers to Communication – Importance of Body Language (Proxemics, kinesics, haptic, chronemics and paralanguage) – Effective Listening – Feedback – presentation skills.

**Introduction to soft skills:** Self-Confidence – Leadership Qualities – Emotional Quotient – Time Management – Stress Management – Interpersonal Skills.

**Comprehension and Analysis**: British and American English – GRE based comprehension – analytical writing – analyzing contemporary issues – current English usage.

**Adapting to corporate life**: Group discussions – meetings – Public Speaking – Debate – Intercultural communication – etiquettes –interviews-email writing.

**Aptitude**: Vocabulary building - Verbal and Numerical aptitude.

| **Total contact Hours:** | **Total Tutorials:** | **Total Practical Classes: 45** | **Total Hours: 45** |
|---|---|---|---|

**Reference Books:**


1. Nicholls, Anne. Mastering Public Speaking. Jaico Publishing House,2003.
2. Agrawal, R.S. Quantitative Aptitude,S.Chand and Co., 2004.
3. Sherfield M Robert. Developing Soft Skills Pearson Education, 2005.
4. Hair O' Dan, Friedrich W. Gustav and Lynda Dee Dixon. Strategic Communication in Business and the Professions, Pearson Education, 2008.
5. Chaney Lilian and Jeanette Martin. Intercultural Business Communication, Pearson Education, Fourth Edition, 2008.
6. Dignen, B. Fifty ways to improve your presentation skills in English. Orient Blackswan, 2014.


**Websites:**

1. www.cambridgeenglish.org

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Department:** Information Technology | | | **Programme:** B.Tech. (IT) | | | | | |
| **Semester :** Seven | | | **Category :** TA | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT124 | Information Security | 3 | 1 | -- | 4 | 40 | 60 | 100 |
| **Prerequisite** | Computer Networks | | | | | | | |
| **Objective** | • To introduce the basics of Security and logical and physical design of Security<br>• To understand how to do cryptography to secure information<br>• To learn the methods of protection by Biometric Security | | | | | | | |
| **Outcome** | On successful completion of this course, the students will be able to:<br>• Use appropriate methods in security<br>• Learn various methods of implementing security | | | | | | | |
| **UNIT – I** | **Introduction** | | | | | **Hours: 10** | | |
| Security Trends, OSI security architecture, Security attacks, security services, security mechanisms, - Security System Development Life cycle –Legal, Ethical and Professional issues. | | | | | | | | |
| **UNIT – II** | **Security Analysis And Logical Design** | | | | | **Hours: 11** | | |
| Risk Management - Identifying and Assessing Risk - Assessing and Controlling Risk. Blueprint for Security - Information Security Policy - Standards and Practices – ISO 17799/BS 7799 – NIST Models - VISA International Security Model - Design of Security Architecture. | | | | | | | | |
| **UNIT – III** | **Physical Design** | | | | | **Hours: 14** | | |
| Security Technology – Intruders, Malicious software, Firewalls, Scanning and Analysis tools, Content filters**.** | | | | | | | | |
| **UNIT – IV** | **Cryptography** | | | | | **Hours: 11** | | |
| Advanced Encryption standard, Principles of public-key cryptosystem, Key management, Message authentication and Hash functions, Digital signatures. | | | | | | | | |
| **UNIT – V** | **Biometric Security** | | | | | **Hours: 14** | | |
| Biometrics: Definition-Types of Biometrics- Multi biometrics-Fusion methods-applications. | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes: 0** | | | | **Total Hours: 60** | | |
| **Text Books** | | | | | | | | |
| 1. Michael E Whitman and Herbert J Mattord, Principles of Information Security, Vikas Publishing House, New Delhi, 2010.<br>2. William Stallings, Crptography and Network security, Principles and Practices, Fourth Edition, Pearson Education, 2012. | | | | | | | | |
| **Reference books** | | | | | | | | |
| 1. John D.Wood Ward, Jr.Nicholas M.Orlans and Peter T.Higgm, Biometrics, Dream techpress, 2010. | | | | | | | | |

| **Department:** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester :** Seven | | **Category :** TA | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT125 | Web Services and XML | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | HTML, Component Technology and Databases | | | | | | | |
| **Objective** | • To understand the advantages of XML technology family.<br>• To analyze the problems associated with tightly coupled distributed software architecture.<br>• To learn the Web services building block and to implement e-business solutions using XML based web services. | | | | | | | |
| **Outcome** | On successful completion of this course, the students will be able to:<br>• Understand the benefits of XML, web services and SOA.<br>• Develop e-business applications using these technologies. | | | | | | | |
| **UNIT – I** | **Introduction to XML** | | | | | | **Hours: 12** | |
| XML – benefits – Advantages of XML over HTML, EDI, Databases – XML based standards – Structuring with schemas - DTD – XML Schemas – XML processing – DOM –SAX – presentation technologies – XSL – XFORMS – XHTML – Transformation – XSLT – XLINK – XPATH – XQuery. | | | | | | | | |
| **UNIT – II** | **Introduction to SOA** | | | | | | **Hours: 12** | |
| 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 – III** | **Web Services** | | | | | | **Hours: 12** | |
| Business motivations for web services – B2B – B2C – Technical motivations – limitations of Component Technologies – Architecting web services – Implementation view – web services technology stack – logical view – composition of web services – deployment view – from application server to peer to peer – process view – life in the runtime. | | | | | | | | |
| **UNIT – IV** | **Working in Java Platform** | | | | | | **Hours: 12** | |
| 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** | **Advanced Topics:** | | | | | | **Hours: 12** | |
| RESTful Services- Advantages-Overview of RESTful and JAX-RS-Handling Requests and Responses- Dependency Injection-Error Handling- Generic Services- working with databases | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials:** | **Total Practical Classes: 15** | | | | | **Total Hours: 60** | |

**Text Books**

1. AtulKahate," XML and Related technologies", Pearson Education, 2008. (Unit I)
2. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2005. (Unit II,III)
3. Newcomer, Lomow, "Understanding SOA with Web Services", Pearson Education, 2005. (Unit III, IV, V)

**Reference Books**

1. Keith Ballinger, ". NET Web Services Architecture and Implementation", Pearson Education, 2003.
2. David Chappell, "Understanding .NET A Tutorial and Analysis", Addison Wesley, 2002.
3. Kennard Scibner and Mark C.Stiver, "Understanding SOAP", SAMS publishing.
4. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services, An Architect's Guide", Pearson's Edn, 2005.
5. Ron Schmelzer et al. " XML and Web Services", Pearson Education, 2002.

**Websites**

1. http://docs.oracle.com/cd/E17802_01/webservices/webservices/docs/1.6/tutorial/doc/JavaWSTutorial.pdf
2. http://www.w3schools.com/xml/
3. www.soa.com

| **Department:** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester :** Seven | | **Category :** TA | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT126 | Management Concepts and Strategies | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objective** | • To introduce the fundamental of Management concept strategies<br>• To understand the economic, cultural and ethical issues relating to international business<br>• To get acquainted with Software Quality Assurance Standardization | | | | | | | |
| **Outcome** | On successful completion of this course, the students will be able to:<br>• Follow Social responsibility, standards, policies and Ethics<br>• Enable students to apply Management concepts to international business situations, formulate frameworks for complex cross-border decision making. | | | | | | | |
| **UNIT – I** | **Management** | | | | | **Hours: 12** | | |
| Science Theory and Practice - Management and Society: Social responsibility and Ethics. The nature and purpose of planning - objectives – Strategies-Policies and planning premises- factors causing globalization of business-international business environment. | | | | | | | | |
| **UNIT – II** | **Decision making** | | | | | **Hours: 12** | | |
| The Nature and purpose of organizing - Basic departmentation - Line /staff Authority and decentralization - Effective Organizing and organizational culture- Ethical decision making. | | | | | | | | |
| **UNIT – III** | **Human Resource Management** | | | | | **Hours: 12** | | |
| The importance of the human factor – Objectives of human resource management – Inclusive growth and affirmative action -Role of human resource manager – Human resource policies- Performance appraisal and career strategy | | | | | | | | |
| **UNIT – IV** | **Staffing** | | | | | **Hours: 12** | | |
| Process of Recruitment, Selection, Induction Training – Motivation – Leadership styles and qualities – Communication – process and barriers. | | | | | | | | |
| **UNIT – V** | **Controlling and Strategic Managements** | | | | | **Hours: 12** | | |
| Managements control systems –Types and Techniques- Strategic compulsions Standardization- Designing Strategic- control and implement to strategies. | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes:** | | | | **Total Hours: 60** | | |

**Text Books**

1. Herald Knootz and Heinz Weihrich, Essentials of Management, McGraw-Hill Publishing Company, Singapore International Edition, 2006.
2. Decenzo and Robbins, Human Resource Management, Wiley, 11th Edition, 2013.

**Reference Books**

1. Charles W.L.Hill & Gareth R.Jones, Strategic Management Theory, An Integrated approach, Biztantra, Wiley India,6 th edition, 2007.
2. Azhar Kazmi, Strategic Management & Business Policy, Tata McGraw Hill, Third Edition, 2008.
3. Bateman Snell, Management: Competing in the new era, McGraw-Hill 5 th Edition,2009
4. Watt S.Hamphery, Managing the Software Process, Pearson Education Inc, New Delhi, 2011.
5. Ties AF, Stoner and R.Edward Freeman, Management, Prentice Hall of India Pvt., Ltd., New Delhi, 2003.
6. Joseph, Massie, Essentials of Management, Prentice Hall of India Pvt., Ltd., New Delhi, 2002

**Websites**

1. http://www.hrfolks.com/articles/strategic%20hrm/essentials%20of%20strategic%20management.pdf
2. http://smallbusiness.chron.com/key-concepts-strategic-management-organizational-goals-10234.html

| **Department:** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester :** Seven | | **Category :** LB | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT127 | Web Services and XML Laboratory | - | - | 3 | 2 | 60 | 40 | 100 |
| **Prerequisite** | Databases, hyper text markup languages, computer networks, Component Technology | | | | | | | |
| **Objective** | • To design and develop business applications using the popular platform independent middleware technologies practiced in the industry. | | | | | | | |
| **Outcome** | On successful completion of this course, the students will be able to:<br>• Develop distributed applications in popular platform independent technologies for any business domain. | | | | | | | |

The students have to develop distributed applications for a given domain using the following technologies:

- XML with presentation technologies like XSLT, CSS and storage0 technologies like SAX, DOM with SOAP protocol using C#.net
- XML with presentation technologies like XSLT, CSS and storage technologies like SAX, DOM with SOAP protocol using Java
- Web Service creation using JAX-WS
- Web Service creation using JAX-RS
- Web Services with SOA client using C#.net
- An interoperable application involving either language/network protocol heterogeneity or involving any two of the above technologies.

| **Total Contact Hours:** | **Total Tutorials:** | **Total Practical Classes: 45** | **Total Hours: 45** |
|---|---|---|---|

**Text Books**


1. AtulKahate," XML and Related technologies", Pearson Education,2008.
2. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2005.
3. Newcomer, Lomow, "Understanding SOA with Web Services", Pearson Education, 2005.
4. Ron Schmelzer et al. " XML and Web Services", Pearson Education, 2002.


**Reference Books**


1. Keith Ballinger, ". NET Web Services Architecture and Implementation", Pearson Education, 2003.
2. David Chappell, "Understanding .NET A Tutorial and Analysis", Addison Wesley, 2002.
3. KennardScibner and Mark C.Stiver, "Understanding SOAP", SAMS publishing.
4. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services, An Architect's Guide", Pearson's Edn, 2005.


**Websites**

1. http://docs.oracle.com/cd/E17802_01/webservices/webservices/docs/1.6/tutorial/doc/JavaWSTutorial.pdf
2. http://www.w3schools.com/xml/
3. www.soa.com

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|---|---|---|---|---|---|---|---|---|
| **Department:** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
| **Semester :** Seven | | **Category :** PR | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| 1T128 | Project Work (Phase-I) | - | - | 9 | 2 | 100 | - | 100 |
| **Prerequisite** | Fundamentals of Software Engineering, Problem-solving skills and Application Development Knowledge. | | | | | | | |
| **Objective** | The objective of the project is to enable, the students to work in convenient groups of three to four members in a group on a project of latest topic / research area / industrial applications. Each project group shall have a guide who is a faculty member. This first phase of project work focuses on the following activities:<br>• Literature Survey on project topic<br>• Problem Definition<br>• Project Design | | | | | | | |
| **Outcome** | On successful completion of the First Project Phase, the students will be able to:<br>• State Problem definition clearly<br>• Prepare SRS for projects<br>• Prepare SDS for projects<br>• Develop the Presentation skills<br>• Develop the ability to work in a Group | | | | | | | |
| The project group is required to do the following<br>• Literature Survey,<br>• Problem formulation<br>• Forming a methodology of arriving at the solution of the problem.<br>• Documentation of each step | | | | | | | | |
| **Total Contact Hours:** | **Total Tutorials:** | **Total Practical Classes: 45** | | | | **Total Hours: 45** | | |
| **Text Books** | | | | | | | | |
| 1. Books related to the Project Title<br>2. Papers published in Reputed Journals and Conferences related to the Project | | | | | | | | |

| **Department:** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester :** Seven | | **Category :** PR | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT129 | Professional Ethics and Practice | - | - | 3 | 1 | 100 | - | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objective** | • To assist the students to realize their strength and weakness both in physical and mental aspects.<br>• To highlight the roles and responsibilities in their professionalism | | | | | | | |
| **Outcome** | • The students will have a clear vision about the relationship among self, society and nature.<br>• The students will realize their importance in the society (in particular in their professional) | | | | | | | |

The course should cover the following topics by way of Seminars, Expert Lectures and Assignments:

- Human Values and Attitudes, Ethical Living and Duty Consciousness
- Life, Body and Mind, Philosophy of Life, Analysis of Thought and Neutralization of Anger
- Ethical Theories, Profession and Professionalism, Engineering Ethics – Moral issues, Ethical theories and their uses
- Engineering as Experimentation – Code of Ethics, Engineer's responsibility for safety and Responsibilities and rights
- Global issues of engineering ethics and World Peace.

| **Total Contact Hours:** | **Total Tutorials:** | **Total Practical Classes: 45** | **Total Hours: 45** |
|---|---|---|---|

**Text Books**


1. Charles D.Fleddermann, Engineering Ethics, Prentice Hall, New Mexico, 1999.
2. R. Subramanian, Professional Ethics, Oxford University Press, 2013.
3. Vethathiri, Journey of Consciousness, The World Community Service Centre, 1995.

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|---|---|---|---|---|---|---|---|---|
| **Department:** Information Technology | | | | **Programme:** B.Tech. (IT) | | | | |
| **Semester :** Eight | | | | **Category :** PR | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT130 | Comprehensive Test and Viva-Voce | - | - | 3 | 1 | 60 | 40 | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objective** | • To refresh all the IT related subjects studied<br>• To face the placement tests conducted for the campus recruitment | | | | | | | |
| **Outcome** | Upon completion of the course, the students will be in a position to<br>• Take up competitive exams and placement interviews in the IT domain | | | | | | | |
| **The students are provided with tutorial sessions to update their knowledge in all the IT related subjects they have studied from the 3rd to 8th semester.** A comprehensive test, preferably with objective type questions, will be conducted. A comprehensive viva voce examination (external) will be conducted. | | | | | | | | |
| **Total Contact Hours:** | **Total Tutorials:** | **Total Practical Classes: 45** | | | | **Total Hours: 45** | | |
| **Text Books** | | | | | | | | |
| Books related to all the IT related subjects studied from III to VIII semester**.** | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|
| **Department:** Information Technology | | | **Programme:** B.Tech. (IT) | | | | | |
| **Semester :** Eight | | | **Category :** PR | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| IT131 | Project Work (Phase-II) | - | - | 9 | 6 | 60 | 40 | 100 |

| | |
|---|---|
| **Prerequisite** | • Fundamentals of Software Engineering, Problem-solving skills and Application Development Knowledge<br>• Project Work Phase I |
| **Objective** | The students are expected to complete the project (Phase - II) and to submit a full-fledged report comprising of the complete system developed along with the implementation and the test results. This phase of project work focuses on the following activities:<br>• Project Implementation<br>• Testing<br>• Project Documentation |
| **Outcome:** | On successful completion of this Project Phase, the students will be able to:<br>• Master a programming language or software tool used for implementation<br>• Test the project and compare it with benchmark standards<br>• Prepare the Project Report<br>• Develop the presentation skills<br>• Develop the ability to work in a Group |

The project group is required to do the following

- Master a programming language or software tool used for implementation
- Test the project and compare it with benchmark standards
- Prepare Project Report
- Develop Presentation skills
- Develop ability to work in a Group
- Publish a paper in a reputed Conference.

| | | | |
|---|---|---|---|
| **Total Contact Hours:** | **Total Tutorials:** | **Total Practical Classes: 45** | **Total Hours: 45** |

**Text Books**

1. Books related to the Project Title
2. Papers published in Reputed Journals and Conferences related to the Project

# SYLLABUS (Elective Subjects)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Department:** Information Technology | | | | | **Programme:** B.Tech. (IT) | | | |
| **Semester : -** | | | | | **Category :** TA | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITP01 | System Software | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Knowledge in C Programming, Assembly languages, Discrete mathematics and data structures. | | | | | | | |
| **Objective** | • Understand the design and implementation of Assemblers, loaders, linkers and compilers.<br>• Understand how source language programs are implemented at the machine level. | | | | | | | |
| **Outcome** | On successful completion of this course, the students will be able to:<br>• To use of formal attributed grammars for specifying the syntax and semantics of programming languages.<br>• Have in depth Working knowledge of the major phases of Loading linking and compiling. | | | | | | | |
| **UNIT – I** | **Introduction** | | | | | **Hours: 12** | | |
| Introduction to System Software and Machine architecture – Simplified Instructional Computer (SIC)- Traditional machines-VAX Architecture-Pentium Pro Architecture- RISC machines. | | | | | | | | |
| **UNIT – II** | **Translators** | | | | | **Hours: 12** | | |
| Assemblers: Basic assembler functions- machine – dependent and machine independent assembler features - Assembler design – Two-pass assembler with overlay structure- one – pass assembler and multi - pass assembler. Interpreters: Virtual Machine concept- Java Byte Codes- Microsoft Intermediate Language | | | | | | | | |
| **UNIT – III** | **Loaders and Linkers** | | | | | **Hours: 10** | | |
| Basic loader functions, machine – dependent and machine – independent loader features. Loader design – Linkage editors, dynamic linking and bootstrap loaders. | | | | | | | | |
| **UNIT – IV** | **Macro Processors** | | | | | **Hours: 10** | | |
| Functions – Machine independent macro processor features – macro processor design option- Implementation examples. | | | | | | | | |
| **UNIT – V** | **Text Editors and Compilers** | | | | | **Hours: 14** | | |
| 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 **-** Introduction to Compilers -Analysis of the source program – Phases of Compiler. | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes:** | | | | **Total Hours: 60** | | |
| **Text Books** | | | | | | | | |
| 1. Leland L Beck and D. Manjula, "System Software", III Edition, Pearson Education, First Impression, 2007.<br>2. John J Donovan, Systems Programming, Tata McGraw Hill Company, New Delhi, 2004. | | | | | | | | |
| **Reference Books** | | | | | | | | |
| 1. Dhamdhere D M, Systems Programming and Operating Systems, Tata McGraw Hill Company, New Delhi, 2002.<br>2. David Galles, Modern Compiler Design, Addison Wesley, 2004. | | | | | | | | |
| **Websites** | | | | | | | | |
| 1. http://www.edunotes.in/system-software-notes<br>2. http://www.uotechnology.edu.iq/sweit/Lectures/Dr-Shaima-Sys-Prog/lec1-2-3-4.pdf | | | | | | | | |

| **Department:** Information Technology | | **Programme:** B.Tech (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester : -** | | **Category :** TA | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITP02 | Information Coding Techniques | 4 | - | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Mathematics, Design and Analysis of Algorithms | | | | | | | |
| **Objective** | • To understand the basics of information, coding methods.<br>• To understand the source coding methods of Text, Image, audio and video data.<br>• To understand various channel coding methods | | | | | | | |
| **Outcome** | On successful completion of this course, the students will be able to:<br>• Design and develop algorithms for various multimedia data for storage and communication applications. | | | | | | | |
| **UNIT – I** | **Information Entropy Fundamentals** | | | | | | | **Hours: 12** |
| Information – entropy - properties of information and entropy-relation between information and probability-mutual and self information-coding theory-code efficiency and redundancy-Shannon's theorem – construction of basic codes-Shannon and Fano coding, Huffman coding–arithmetic coding. | | | | | | | | |
| **UNIT – II** | **Data and Voice Coding** | | | | | | | **Hours: 12** |
| Lossless Predictive - Run-length Encoding - Ziv-Lempel Coding - Voice Coding - Modulation – Linear Predictive Coding - Silence Coding and Sub-band Coding – Audio Coding. | | | | | | | | |
| **UNIT – III** | **Image and video compression** | | | | | | | **Hours: 12** |
| Quantization-JPEG standards-motion compensation-MPEG-1- MPEG-2-MPEG-4, H.26x, AVC, HEVC standards. | | | | | | | | |
| **UNIT – IV** | **Error Control Coding** | | | | | | | **Hours: 12** |
| Linear Block Codes for Error Correction - Cyclic Codes - Bose-Choudhuri Hocquenghem codes | | | | | | | | |
| **UNIT – V** | | | | | | | | **Hours: 12** |
| Coding for Secure Communications: Convolution Codes - Trellis Coded Modulation - Cryptography | | | | | | | | |
| **Total Contact Hours: 60** | **Total Tutorials:** | **Total Practical Classes:** | | | **Total Hours: 60** | | | |

**Text Books**

1. Ranjan Bose, Information theory, coding and cryptography, Tata McGraw Hill, 2008.
2. J. S. Chitode, Information Coding Techniques, Technical Publications, 2008.

**Reference Books**

1. Ze-Nian Li and Mark S. Drew, Fundamentals of Multimedia, Pearson Education, 2004.
2. Viterbi, Information theory and coding, McGraw Hill, 1982.
3. John G. Proakis, Digital Communications, 2ndEdition, McGraw Hill, 1989.
4. K. Sayood, Introduction to Data Compression, Morgan Kaufmann Publishers, 2000.

**Websites**

1. http://www.itswtech.org/Lec/Manal%28system%20programming%29/ch2_introduction_to_coding techniques.pdf
2. http://www.webopedia.com/coding.html
3. http://www.cmlab.csle.ntu.edu.twu/~itct.html

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|---|---|---|---|---|---|---|---|---|
| **Department:** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
| **Semester : -** | | **Category :** TCP | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITP03 | C# and .Net Programming | 3 | - | 2 | 4 | 50 | 50 | 100 |
| **Prerequisite** | C++, Object oriented concepts and computer networks | | | | | | | |
| **Objective** | • Understand the foundations of CLR execution and to learn the technologies of the .NET framework.<br>• Know the object oriented aspects of C#.<br>• Learn web based applications on .NET (ASP.NET). | | | | | | | |
| **Outcome** | After completing this course, the student will be able to*:*<br>• Debug, compile, and run a simple C # and .Net applications.<br>• Develop programs using C# on .NET<br>• Design and develop Web based applications on .NET Discuss CLR. | | | | | | | |
| **UNIT – I** | **Introduction to C#** | | | | | **Hours: 15** | | |
| Introducing C#, Understanding .NET, overview of C#, Literals, Variables, Data Types, Operators, checked and unchecked operators, Expressions, Branching, Looping, Methods, implicit and explicit casting, Constant, Arrays, Array Class, Array List, String, String Builder, Structure, Enumerations, boxing and unboxing. | | | | | | | | |
| **UNIT – II** | **Object Oriented Concepts of C#** | | | | | **Hours: 15** | | |
| Class, Objects, Constructors and its types, inheritance, properties, indexers, index overloading, polymorphism, sealed class and methods, interface, abstract class, abstract and interface, operator overloading, delegates, events, errors and exception, Threading. | | | | | | | | |
| **UNIT – III** | **Application Development on .Net** | | | | | **Hours: 15** | | |
| Building windows application, Creating our own window forms with events and controls, menu creation, inheriting window forms, SDI and MDI application, Dialog Box(Modal and Modeless), accessing data with ADO.NET, DataSet, typed dataset, Data Adapter, updating database using stored procedures, SQL Server with ADO.NET, handling exceptions, validating controls, windows application configuration. | | | | | | | | |
| **UNIT – IV** | **Web Based Application Development on .Net** | | | | | **Hours: 15** | | |
| Programming web application with web forms, ASP.NET introduction, working with XML and .NET, Creating Virtual Directory and Web Application, session management techniques, web config, web services, passing datasets, returning datasets from web services, handling transaction, handling exceptions, returning exceptions from SQL Server. | | | | | | | | |
| **UNIT – V** | **CLR and .Net Framework** | | | | | **Hours: 15** | | |
| Assemblies, Versioning, Attributes, reflection, viewing meta data, type discovery, reflection on type, marshalling, remoting, security in .NET | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials:** | **Total Practical Classes: 30** | | | | **Total Hours: 75** | | |
| **Text Books** | | | | | | | | |
| 1. Herbert Schildt, "The Complete Reference: C# 4.0", Tata Mc Graw Hill, 2012.<br>2. Christian Nagel et al. "Professional C# 2012 with .NET 4.5", Wiley India, 2012. | | | | | | | | |
| **Reference Books** | | | | | | | | |
| 1. Andrew Troelsen , "Pro C# 2010 and the .NET 4 Platform, Fifth edition, A Press, 2010.<br>2. Ian Griffiths, Matthew Adams, Jesse Liberty, "Programming C# 4.0", Sixth Edition, O'Reilly, 2010. | | | | | | | | |
| **Websites** | | | | | | | | |
| 1. csharp.net-tutorials.com/<br>2. www.dotnet-tricks.com/Tutorial/netframeworklist | | | | | | | | |

| **Department:** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester : -** | | **Category :** TCP | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITP04 | Computer Hardware and Troubleshooting | 3 | - | 2 | 4 | 50 | 50 | 100 |
| **Prerequisite** | Digital System and Computer Architecture, Microprocessors and Applications | | | | | | | |
| **Objective** | • To provide insight to the various parts and types of computer.<br>• To familiarize the hardware types and the evolution in each of them.<br>• To give the basics of troubleshooting. | | | | | | | |
| **Outcome** | On successful completion of this course:<br>• The students will have theoretical exposure as well as hands on exposure to know about the hardware aspects of computer. | | | | | | | |
| **UNIT – I** | **PC Hardware Overview** | | | | | **Hours: 12** | | |
| Introduction – Basic Parts of PC – Functional block diagram – system board – Microprocessor – Interrupts – DMA – SMPS – BIOS – POST sequence - System configuration ion – Memory – Mass storage – I/O interface standards | | | | | | | | |
| **UNIT – II** | **Bus Standards and Networking** | | | | | **Hours: 12** | | |
| ISA – PCI – SCSI – IDE – USB – comparative study and characteristics – Network Interface Cards – Cables and connectors - MODEM – AT command set | | | | | | | | |
| **UNIT – III** | **Peripheral Devices & Display Adapters** | | | | | **Hours: 12** | | |
| Functional descriptions of keyboard – mouse – printers – joystick – scanners – CGA – SVGA. | | | | | | | | |
| **UNIT – IV** | **Mass Storage Devices** | | | | | **Hours: 12** | | |
| Floppy disk and drive – Hard disk and drive – MFM and RLL recording standards – CD technology – DVD technology – pen drives – tape drives | | | | | | | | |
| **UNIT – V** | **Troubleshooting tools** | | | | | **Hours: 12** | | |
| In-Circuit Emulators – Logic State/Timing Analyzers – Digital Multimeters – CROs – Signature Analyzers – Troubleshooting problems of system boards, add on cards and peripherals. | | | | | | | | |
| **Total Contact Hours:45** | **Total Tutorials:** | **Total Practical Classes: 30** | | | | **Total Hours: 75** | | |
| **Text Books** | | | | | | | | |
| 1. Hans Peter Messmer, Indispensable PC Hardware Book , Pearson Education, 4th edition,2003.<br>2. Govindarajulu, IBM PC and Clones , Tata McGraw Hill, 4th edition, 2002. | | | | | | | | |
| **Reference Books** | | | | | | | | |
| 1. Barry Brey, The Intel Microprocessors 8086/88, 80186/188, 80286, 80386,80486, PENTIUM and PENTIUM PRO architecture, Programming and Interfacing, 6th edition, PHI, 2002.<br>2. Ed Tittel, David Johnson, Networking Essentials: Study Guide, Comdex Computer Publishing, 1998.<br>3. Scott Muller, Upgrading and Repairing PCs, 15th edition, 2002. | | | | | | | | |

| **Department:** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester : -** | | **Category :** TA | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITP05 | Real-Time Systems | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Knowledge in Operating Systems and Computer Networks | | | | | | | |
| **Objective** | • To explain the concept of a real-time system<br>• To describe a design process for real-time systems and to explain the role of a real-time operating system<br>• To understand the real-time communication in networks | | | | | | | |
| **Outcome** | On successful completion of this course students will be able to:<br>• Understand the differences between general purpose and real-time systems.<br>• Understand basic multi-task scheduling algorithms for periodic, aperiodic, and sporadic tasks<br>• Understand task and thread scheduling in real-time operating systems. | | | | | | | |
| **UNIT – I** | **Introduction** | | | | | **Hours: 12** | | |
| Introduction to Real-Time system – Characteristics – Types of Real-Time tasks – Timing constraints –Real-Time Scheduling:- Basic concepts and classification of Algorithms – Clock- Driven Scheduling – Event-Driven Scheduling – Hybrid schedulers – EDF Scheduling – RM Scheduling and its Issues. | | | | | | | | |
| **UNIT – II** | **Real-time Scheduling** | | | | | **Hours: 12** | | |
| Resource Sharing and Dependencies among Real-Time tasks: Resource sharing in Real Time tasks, Priority Inversion, Priority Inheritance Protocol, Highest Locker Protocol, Priority Ceiling Protocol, Handling Task dependencies – Scheduling Real-Time Tasks in Multiprocessor and Distributed Systems – Resource Reclaiming in Multiprocessor Real-Time Systems – Fault- Tolerant Task Scheduling in Multiprocessor Real-Time Systems. | | | | | | | | |
| **UNIT – III** | **Real-Time Operating System (RTOS) and Database** | | | | | **Hours: 12** | | |
| Features of RTOS, Commercial Real-Time Operating Systems, Real-time Databases: Applications, Design issues, Characteristics of Temporal Data, Concurrency control, Commercial Real-Time Databases. | | | | | | | | |
| **UNIT – IV** | **Real-Time Communication–I** | | | | | **Hours: 12** | | |
| Real-Time Communication in Wide Area Networks:- Introduction, Service and Traffic Models and Performance Requirements, Resource Management, Switching Subsystem, Route Selection in Real-Time Wide Area Networks:- Basic Routing Algorithms, Routing during Real-Time Channel Establishment, Route Selection Approaches, Dependable Real-Time Channels. | | | | | | | | |
| **UNIT – V** | **Real-Time Communication–II** | | | | | **Hours: 12** | | |
| Real-Time Communication in a LAN – Soft Real-Time Communication in a LAN – Hard Real- Time Communication in a LAN – Bounded Access Protocols for LANs – Real-Time Communications over Packet Switched Networks – QoS requirements – Routing and Multicasting. | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes:** | | | | **Total Hours: 60** | | |

**Text Books**

1. Rajib Mall, Real-Time Systems Theory and Practice, Pearson Education, India, 2012.
2. C. Siva Ram Murthy and G. Manimaran, Resource Management in Real-Time Systems and Networks, Prentice-Hall of India, 2005.

**Reference Books**

1. Jane W.S. Liu, Real-Time Systems, Pearson Education, 2006.
2. Stuart Bennelt, Real time computer control – and introduction, Pearson Education, 2003.
3. C. M. Krishna and Kang G Shin, Real time systems, McGraw-Hill, 1997.

**Websites**

1. http://www.real-time-sys.com/
2. http://www.slideshare.net/sanjivmalik/rtos-concepts

| **Department:** Information Technology | | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Semester : -** | | | **Category :** TB | | | | | | |
| **Subject Code** | **Subject** | | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITP06 | Theory of Computation | | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Knowledge in mathematics, including a course in Discrete mathematics, and in programming. | | | | | | | | |
| **Objective** | • To learn about automata, grammar, language, and their relationships.<br>• To understand the power of Turing machine, and the decidable nature of a problem.. | | | | | | | | |
| **Outcome** | Upon completion of the course, you should be able to:<br>• Explain the basic concepts of deterministic and non-deterministic finite automata, regular language, context-free language, Turing machines, computability and complexity.<br>• Describe the formal relationships among machines, languages and grammars.<br>• Solve the problems using formal language. | | | | | | | | |
| **UNIT – I** | **Introduction** | | | | | | | **Hours: 12** | |
| Finite Automata and Regular Expressions: Deterministic and Non-Deterministic Finite Automata, Finite Automata with ε-moves, regular expressions – equivalence of NFA and DFA, two-way finite automata, Moore and Mealy machines, minimization of finite automata- applications of finite automata. | | | | | | | | | |
| **UNIT – II** | **Regular Expressions and Context Free Grammars** | | | | | | | **Hours: 12** | |
| Regular expression formalism- equivalence with finite automata-regular sets and closure properties- pumping lemma for regular languages- decision algorithms for regular sets- applications.<br>Context-Free Grammars – derivation trees, Chomsky Normal Forms and Greibach Normal Forms, ambiguous and unambiguous grammars- equivalence of regular grammar and finite automata- pumping lemma for Context free languages – applications. | | | | | | | | | |
| **UNIT – III** | **Turing machines** | | | | | | | **Hours: 12** | |
| Elements of Turing machines(TM) – tuning machine construction – complexity of TM-Universal, multi-tape, multi-track, multi-stack Turing machines –recursive and recursive enumerable languages- functions –Church's Turing hypothesis. | | | | | | | | | |
| **UNIT – IV** | **Pushdown Automata(PDA) and Parsing Algorithms** | | | | | | | **Hours: 12** | |
| Pushdown Automata and context-free languages; Deterministic PDA-Nondeterministic PDA- Equivalence of PDA and CFG-closure properties of CFL. | | | | | | | | | |
| **UNIT – V** | **Parsing Techniques** | | | | | | | **Hours: 12** | |
| Top down parsing- bottom up parsing- Automatic construction of bottom up parsers – LR(0) grammar – SLR parser – LR(1) grammar – Canonical-LR parser- LALR parser. | | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes:** | | | | | | **Total Hours: 60** | |
| **Text Books** | | | | | | | | | |
| 1. Vivek Kulkarni, "Theory of Computation", Oxford University press, 2013.<br>2. K.L.P. Mishra and NM.Chandrasekaran, "Theory of Computer Science-Automata Languages and Computation", third edition, PHI Learning Private Ltd, 2009. | | | | | | | | | |
| **Reference Books** | | | | | | | | | |
| 1. John E. Hopcroft and Jeffrey D. Ullman, Introduction to Automata Theory, Languages and Computation, Narosa Publishers, 2002.<br>2. Michael Sipser, Introduction to the Theory of Computations, Brooks/Cole Thomson Learning, 1997.<br>3. John c. Martin, Introduction to Languages and the Theory of Computation, Tata McGraw-Hill, 2003. | | | | | | | | | |
| **Websites** | | | | | | | | | |
| 1. www.infolab.stanford.edu/ullman/ialc.html<br>2. www.nptel.iitm.ac.in/courses/106106049/ | | | | | | | | | |

| **Department:** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester : -** | | **Category :** TA | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITP07 | Embedded Systems | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Microprocessors and Microcontroller | | | | | | | |
| **Objective** | • To understand the architecture of embedded processors, microcontrollers and peripheral devices<br>• To program microcontrollers in assembly for embedded systems<br>• To understand the challenges in developing operating systems for embedded systems<br>• To learn programming the embedded systems in high level language such as C | | | | | | | |
| **Outcome** | On successful completion of this course students will be able to:<br>• Understand the concepts of embedded processors with microcontrollers.<br>• Learn the programming details of microcontrollers. | | | | | | | |
| **UNIT – I** | **Introduction to embedded systems** | | | | | | | **Hours: 12** |
| Definition – Applications involving embedded systems – Product development life cycle – Successive Refinement – Quality design – Debugging – Switch and LED interfaces – ARM CortexTM Processor: Architecture, Instruction sets and Programming | | | | | | | | |
| **UNIT – II** | **Memory and Input/Output Management** | | | | | | | **Hours: 12** |
| Programming input and Output – Memory system Mechanisms – Memory and IO devices interfacing – Interrupt handling | | | | | | | | |
| **UNIT – III** | **Processes and operating systems** | | | | | | | **Hours: 12** |
| Multiple tasks and Processes – Context switching – Scheduling Policies – Interprocess communication mechanisms – Performance issues | | | | | | | | |
| **UNIT – IV** | **Embedded C Programming** | | | | | | | **Hours: 12** |
| Programming embedded systems in C – C-looping structures – Register allocation – Function calls – Pointer aliasing – Structure arrangement – Bit fields – Unaligned data and endianness – Inline function and inline assembly – Portability issues | | | | | | | | |
| **UNIT – V** | **Embedded System Development:** | | | | | | | **Hours: 12** |
| Meeting real-time constraints – Multi state systems and function sequences – Embedded software development tools – Emulators and debuggers – Design issues – Design Methodologies – Case studies | | | | | | | | |
| **Total Contact Hours:45** | **Total Tutorials: 15** | **Total Practical Classes:** | | | | **Total Hours: 60** | | |

**Text Books**

1. Jonathan W Valvano, "Embedded Systems: Introduction to Arm Cortex™ -M Microcontrollers", Fourth Edition, 2013
2. Andrew N. Sloss, D. Symes, C. Wright, "ARM system developers Guide", Morgan Kauffman/ Elsevier, 2006

**Reference Books**

1. Wayne Wolf, "Computer as Components: Principles of Embedded Computer System Design", Elsevier, 2006
2. Michael J. Pont, "Embedded C", Pearson Education, 2007
3. Steve Heath, "Embedded System Design", Elsevier, 2005

**Websites**

1. http:// www.slideshare.net/murugan_m1/embedded-system-basics
2. http:// www.embeddedindia.com/

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|---|---|---|---|---|---|---|---|---|
| **Department:** Information Technology | | | | **Programme:** B.Tech. (IT) | | | | |
| **Semester : -** | | | | **Category :** TA | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITP08 | Business Intelligence | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Understanding of Business Process and its management. | | | | | | | |
| **Objective** | The students are to<br>• Get Exposed with the basic rudiments of Business Intelligence system<br>• Understand the modeling aspects behind Business Intelligence life cycle and the techniques used in it<br>• Get exposed with different data analysis tools and techniques | | | | | | | |
| **Outcome** | At the end of the course the students will be able to:<br>• Link data mining with Business Intelligence.<br>• Apply various modeling techniques and business Intelligence methods to various situations.<br>• Decide on appropriate technique to be used in different contexts. | | | | | | | |
| **UNIT – I** | **Business Intelligence** | | | | | **Hours: 12** | | |
| Effective and Timely Decisions – Data, Information and Knowledge – Role of Mathematical Models – Business Intelligence Architectures: Cycle of Business Intelligence Analysis – Enabling Factors in Business Intelligence Projects – Development of a Business Intelligence System – Ethics and Business Intelligence. | | | | | | | | |
| **UNIT – II** | **Knowledge Delivery** | | | | | **Hours: 12** | | |
| The Business Intelligence User Types, Standard Reports, Interactive Analysis and Ad Hoc Querying, Parameterized Reports and Self-Service Reporting, Dimensional Analysis, Alerts/Notifications, Visualization: Charts, Graphs, Widgets, Scorecards and Dashboards, Geographic Visualization, Integrated Analytics, Considerations: Optimizing the Presentation for the Right Message. | | | | | | | | |
| **UNIT – III** | **Efficiency** | | | | | **Hours: 12** | | |
| Efficiency Measures – The CCR Model: Definition of Target Objectives- Peer Groups – Identification of Good Operating Practices; Cross Efficiency Analysis – Virtual Inputs and Outputs – Other Models. Pattern Matching – Cluster Analysis, Outlier Analysis | | | | | | | | |
| **UNIT – IV** | **Business Intelligence Applications** | | | | | **Hours: 12** | | |
| Marketing Models – Logistic and Production Models – Real-time Case Studies in Different Domains. | | | | | | | | |
| **UNIT – V** | **Future Of Business Intelligence** | | | | | **Hours: 12** | | |
| Future of business intelligence – Emerging Technologies, Machine Learning, Predicting the Future, BI Search & Text Analytics – Advanced Visualization – Rich Report, Future Beyond Technology. | | | | | | | | |
| **Total Contact Hours:45** | **Total Tutorials: 15** | **Total Practical Classes:** | | | | **Total Hours: 60** | | |

**Text Books**

1. Efraim Turban, Ramesh Sharda, Dursun Delen, “Decision Support and Business Intelligence Systems”, 9th Edition, Pearson 2013.

**Reference Books**

1. Larissa T. Moss, S. Atre, “Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making”, Addison Wesley, 2003.
2. Carlo Vercellis, “Business Intelligence: Data Mining and Optimization for Decision Making”, Wiley Publications, 2009.
3. David Loshin Morgan, Kaufman, “Business Intelligence: The Savvy Manager"s Guide”, Second Edition, 2012.
4. Cindi Howson, “Successful Business Intelligence: Secrets to Making BI a Killer App”, McGraw-Hill, 2007.
5. Ralph Kimball , Margy Ross , Warren Thornthwaite, Joy Mundy, Bob Becker, “The Data Warehouse Lifecycle Toolkit”, Wiley Publication Inc.,2007.

**Websites**

1. www.businessintelligence.com

| **Department:** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester : -** | | **Category :** TA | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITP09 | Compiler Design | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Basic syntax and semantics of programming languages, object-oriented programming | | | | | | | |
| **Objective** | • To introduce the major concept areas of language translation and compiler design<br>• To develop an awareness of the function and complexity of modern compilers.<br>• To provide practical, hands on experience in compiler design | | | | | | | |
| **Outcome** | On successful completion of this course the students should be able to<br>• Master using lexical analyzer and parser generator tools.<br>• Master building symbol tables and generating intermediate code.<br>• Master generating assembly code for a RISC machine.<br>• Be familiar with compiler architecture and compiler optimization. | | | | | | | |
| **UNIT – I** | **Introduction to Compilers** | | | | | **Hours: 12** | | |
| Translators-Compilation and Interpretation – The phases of Compiler-Errors encountered in different phases-The grouping of phases – cousins of the compiler-Compiler construction tools – A simple one-pass compiler– Context Free Grammars-Derivation– Reduction and Ambiguity. | | | | | | | | |
| **UNIT – II** | **Lexical Analysis** | | | | | **Hours: 12** | | |
| Need and role of lexical analyzer – Lexical errors-Expressing tokens by Regular Expression – Converting regular expression to DFA – Minimization of DFA – Language for specifying lexical analyzers – LEX-Design of lexical analyzer for a sample language. | | | | | | | | |
| **UNIT – III** | **Syntax Analysis** | | | | | **Hours: 12** | | |
| Need and role of the parser – Context Free Grammars – Top Down parsing –General strategies – Recursive Descent Parser – Predictive Parser – LL(1) Parser – Shift Reduce Parser – LR Parser – LR (0) item – Construction of SLR Parsing table – Introduction to LALR Parser – Error handling and recovery in syntax analyzer – YACC – Design of a syntax analyzer for a sample language. | | | | | | | | |
| **UNIT – IV** | **Syntax Directed Translation and Type Checking** | | | | | **Hours: 12** | | |
| Definitions – Construction of syntax trees –Bottom-up evaluation of S-attributed and L-attributed definitions – Top down translation –Bottom up evaluation – Forms of intermediate code – Translation of Assignment, Boolean Expression and Control statements – Backpatching type systems – Specification of a simple type checker – equivalence of type expressions – Type conversions. | | | | | | | | |
| **UNIT – V** | **Code Optimization and Code Generation** | | | | | **Hours: 12** | | |
| Principal sources of Optimization – DAG –Optimization of basic blocks – Global data flow analysis – Efficient data flow algorithms –Source language issues – Storage organization – Symbol tables – Dynamic storage allocation – Issues in design of a code generator – A simple code generator algorithm. | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes:** | | | | **Total Hours: 60** | | |
| **Text Books:** | | | | | | | | |
| 1. Alfred V. Aho, Ravi Sethi Jeffrey D. Ullman, "Compilers- Principles, Techniques, and Tools", Pearson Education Asia, 2007. | | | | | | | | |
| **Reference Books:** | | | | | | | | |
| 1. David Galles, "Modern Compiler Design", Pearson Education Asia, 2007<br>2. Steven S. Muchnick, "Advanced Compiler Design & Implementation", Morgan Kaufmann Pulishers, 2000<br>3. C. N. Fisher and R. J. LeBlanc "Crafting a Compiler with C", Pearson Education, 2000. | | | | | | | | |
| **Websites:** | | | | | | | | |
| 1. http://iitmweb.iitm.ac.in/phase2/downloads/106108113/<br>2. http://csenote.weebly.com/principles-of-compiler-design.html | | | | | | | | |

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| **Department:** Information Technology | | | | **Programme:** B.Tech. (IT) | | | | |
| **Semester : -** | | | | **Category :** TCP | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITP10 | Component Technology | 3 | - | 2 | 4 | 50 | 50 | 100 |
| **Prerequisite** | Computer Networks, Object Oriented Programming, Databases | | | | | | | |
| **Objective** | • This course provides a sound knowledge in various component middleware technologies for distributed applications.<br>• It provides the basics on components.<br>• It introduces popular component technologies and their standards. | | | | | | | |
| **Outcome** | On successful completion of this course, the students will be able to:<br>• Students know about the popular component middleware technologies.<br>• Students learn the architecture, programming of popular component middleware technologies practiced in the industries. | | | | | | | |
| **UNIT – I** | **Introduction** | | | | | **Hours: 12** | | |
| Software Components – objects – fundamental properties of Component technology – modules – interfaces – callbacks – directory services – component architecture – components and middle ware. | | | | | | | | |
| **UNIT – II** | **JAVA COMPONENT TECHNOLOGIES** | | | | | **Hours: 12** | | |
| 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 TECHNOLOGIES** | | | | | **Hours: 12** | | |
| 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** | **COM AND .NET TECHNOLOGIES** | | | | | **Hours: 12** | | |
| 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** | | | | | **Hours: 12** | | |
| 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 Contact Hours: 45** | **Total Tutorials:** | **Total Practical Classes: 30** | | | | **Total Hours: 75** | | |

**Text Books**

1. Clements Szyperski, “Component Software: Beyond Object-Oriented Programming”, Pearson Education publishers, 2003.
2. Ed Roman, “Enterprise Java Beans”, Third Edition, Wiley , 2004.

**Reference Books**

1. Kuth Short, "Component Based Development and Object Modeling ", Sterling Software, 1997.
2. David Chappell, Understanding .NET, Pearson Education Inc, 2002.
3. Bill Burke, Richard Monson-Haefel, Enterprise JavaBeans, Fifth Edition, O’Reilly, 2001.
4. Dan Harkey, Robert Orfali, Client/Server programming with JAVA and CORBA, second edition, Wiley & sons Inc, 1999.

**Websites:**

1. 192.9.162.55/docs/books/j2eetutorial/index.html
2. www.dotnet-tricks.com/Home/Archive

| **Department:** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester : -** | | **Category :** TA | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITP11 | Mobile Communication Networks | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | **Computer Networks** | | | | | | | |
| **Objective** | • To teach the basics of mobile computing ideas and wireless network standards.<br>• To introduce the various models and data management concepts of mobile computing.<br>• To learn the routing and secure protocols of mobile networking | | | | | | | |
| **Outcome** | On successful completion of the module, the students will be able to:<br>• Gain basic knowledge in mobile computing.<br>• Should have a broader knowledge on 3G.<br>• Gain the knowledge on emerging wireless network standards. | | | | | | | |
| **UNIT – I** | **Introduction** | | | | | | **Hours: 12** | |
| Wireless and Mobile Computing Architecture – Limitations of wireless and mobile communication – Wireless Telecommunication Networks: Digital cellular Systems, TDMA - CDMA – Wireless Networking Techniques – Mobility Bandwidth Tradeoffs – Portable Information Appliances. | | | | | | | | |
| **UNIT – II** | **Emerging Wireless Network Standards** | | | | | | **Hours: 12** | |
| 3 G Wireless Networks – State of Industry – Mobility support Software – End User Client Application – Mobility Middleware –Middleware for Application Development - Adaptation and Agents - Service Discovery Middleware – Finding Needed Services - Interoperability and Standardization. | | | | | | | | |
| **UNIT – III** | **Mobile Networking** | | | | | | **Hours: 12** | |
| Virtual IP Protocols - Loose Source Routing Protocols - Mobile IP – CDPD – GPRS – UMTS Security and Authentication – Quality of Service – Mobile Access to the World Wide Web. | | | | | | | | |
| **UNIT – VI** | **Mobile Data Management** | | | | | | **Hours: 12** | |
| Mobile Transactions - Reporting and Co Transactions –Kangaroo Transaction Model – Clustering Model –Isolation only transaction – 2 Tier Transaction Model – Semantic based nomadic transaction processing. | | | | | | | | |
| **UNIT – V** | **Mobile Computing Models** | | | | | | **Hours: 12** | |
| Client Server model – Client/Proxy/Server Model – Disconnected Operation Model – Mobile Agent Model – Thin Client Model – Tools: Java, Brew, Windows CE, WAP, Sybian, and EPOC. | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes:** | | | | | **Total Hours: 60** | |

**Text Books**

1. Reza B Fat and Roy.T. Fielding, “Mobile Computing Principles”, Cambridge University Press, 2005.
2. Abdelsalam A Helal, Richard Brice, Bert Haskel, Marek Rusinkiewicz, Jeffery L Caster and Darell Woelk, “Anytime, Anywhere Computing, Mobile Computing Concepts and Technology”, Springer International Series in Engineering and Computer Science, 2000.

**Reference Books**

1. Golden Richard, Frank Adelstein, Sandeep KS Gupta, Golden Richard and Loren Schwiebert, “Fundamentals of Mobile and Pervasive Computing”, McGraw-Hill Professional Publishing”, 2005.
2. UweHansmann, LotharMerk, Martin S. Nicklons and Thomas Stober, “Principles of Mobile Computing”, Springer, 2003.

**Website**

1. http://www.faadooengineers.com/threads/394-MOBILE-COMPUTING-E-book presentation-and-lecture-notes-covering-full-semester-syllabus
2. http://www.dsc.ufcg.edu.br/~sampaio/cursos/2005.1/BancoDeDados/Artigos/BDMoveis/MobileTransactions/an-overview-of-transaction.pdf

| **Department:** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester : -** | | **Category :** TA | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITP12 | Image Processing | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Mathematics – III | | | | | | | |
| **Objective** | • Relevance of Computer based drawings and processing of digital images in day to day applications.<br>• Adopting the Computer based drawings and animations in relevant situations and circumstances.<br>• Understanding the nature of drawings, images and video in support of the evolving concept of engineering and computer applications. | | | | | | | |
| **Outcome** | On successful completion of the module, the students will be able to:<br>• Engineering graduates with a strong thinking and ability to draw and process real life like images or pictures. | | | | | | | |
| **UNIT – I** | | | | | | **Hours: 12** | | |
| **Digital Image Fundamentals**: Digital image representation –fundamental steps involved in digital image processing – components of image processing system – image sensing and acquisition – image sampling and quantization – basic relationships between pixels –examples of fields that use digital image processing.<br>**Color Image Processing:** fundamentals – color models – pseudo color image processing – color transformations – color image smoothing and sharpening – color segmentation – noise in color images. | | | | | | | | |
| **UNIT – II** | | | | | | **Hours: 12** | | |
| **Intensity Transformations and Spatial Filtering:** Background – Some Basic Intensity Transformation Functions - Histogram processing – Fundamentals of spatial filtering – Smoothing spatial filters – Sharpening spatial filters – **Filtering in the Frequency Domain:** Basics of Filtering in the Frequency Domain – Image Smoothing using Frequency Domain Filters – Image Sharpening using Frequency Domain Filters – Selective Filtering. | | | | | | | | |
| **UNIT – III** | | | | | | **Hours: 12** | | |
| **Image Restoration:** model of the image degradation/restoration process – noise models – restoration in the presence of noise only-spatial filtering – periodic noise reduction by frequency domain filtering – linear, position-invariant degradations – estimating the degradation function – inverse, wiener, constrained least square and geometric mean filtering – geometric transformations.<br>**Wavelets and Multi-resolution processing:** background – Multi-resolution expansions – wavelet transforms in one dimension and two dimensions – fast wavelet transform – wavelet packets. | | | | | | | | |
| **UNIT – IV** | | | | | | **Hours: 12** | | |
| **Image Compression:** fundamentals – image compression models – elements of information theory– error-free compression – lossy compression – image compression standards.<br>**Morphological Image Processing:** preliminaries – dilation and erosion – opening and closing – hit-or-miss transform – some basic morphological algorithms. | | | | | | | | |
| **UNIT – V** | | | | | | **Hours: 12** | | |
| **Image Segmentation:** detection of discontinuities – edge linking and boundary detection – thresholding – region based segmentation.<br>**Representation and Description:** representation – boundary descriptors – regional descriptors – relational descriptors. | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes: -** | | | | **Total Hours: 60** | | |

**Text Books**


1. Rafael C. Gonzalez and Richard E. Woods, Digital Image Processing, 3rd Edition, Pearson Education Pvt. Ltd, 2014.
2. Anil K. Jain, Fundamentals of Digital Image Processing, Prentice Hall of India, 2011.


**Reference Books**


1. Rafael C. Gonzalez, Richard E. Woods and Steven L. Eddins, Digital Image Processing Using MATLAB, Pearson Education Pvt. Ltd., 2004.
2. S. Sridhar, Digital Image Processing, Oxford Press, 2011.
3. S. Jayaraman, S. Esakkirajan and T. Veerakumar, Digital Image Processing, Tata McGraw Hill Education Pvt. Ltd., 2009.

**Websites**

1. http://www.prenhall.com/gonzalezwoods
2. http://www.mhhe.com/jayaraman/dip

| **Department:** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester : -** | | **Category :** TA | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITP13 | Object Oriented Analysis and Design | 4 | - | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Knowledge in Object Oriented Programming | | | | | | | |
| **Objective** | • To familiarize the students to carry out object oriented analysis and design for developing object oriented software projects | | | | | | | |
| **Outcome** | • Students acquire the skills to apply Industry recommended Unified Modeling Language Practices for OOAD and document them effectively | | | | | | | |
| **UNIT – I** | **OOAD BASICS** | | | | | **Hours: 14** | | |
| Introduction – Overview of object oriented system development – Object basics-The Unified Process – Modeling concepts – Modeling as a design technique – Analysis and modeling – UML diagrams – Use case Modeling – Class modeling – State modeling – Interaction Modeling | | | | | | | | |
| **UNIT – II** | **REQUIREMENTS & MORE MODELING** | | | | | **Hours: 10** | | |
| Object Constraint Language - Inception – Evolutionary Requirements– Domain Models – System Sequence Diagrams – Operation Contracts | | | | | | | | |
| **UNIT – III** | **DESIGN AND PRINCIPLES OF DESIGN** | | | | | **Hours: 13** | | |
| Requirements to Design –Design Patterns – Logical Architecture – Package diagram – Design patterns – Model, View, Control pattern – Detailed design – Object design with GRASP pattern – Detailed class diagram with Visibility. | | | | | | | | |
| **UNIT – IV** | **MAPPING TO CODE** | | | | | **Hours: 10** | | |
| Mapping designs to code – Test Driven development and refactoring – UML Tools and UML as blueprint | | | | | | | | |
| **UNIT – V** | **MORE PATTERNS** | | | | | **Hours: 13** | | |
| More Patterns – Analysis update – Objects with responsibilities – Applying design patterns – Architectural Analysis – Logical Architecture Refinement – Package Design –Persistence framework with patterns | | | | | | | | |
| **Total Contact Hours: 60** | **Total Tutorials:** | **Total Practical Classes:** | | | | **Total Hours: 60** | | |

**Text Books**

1. Michael Blaha and James Rumbaugh, “Object-oriented modelling and design with UML”, Prentice-Hall of India, 2005.
2. Craig Larman. “Applying UML and Patterns – An introduction to Object-Oriented Analysis and Design and Iterative Development”, 3rd ed, Pearson Education, 2005.

**Reference Books**

1. Ali Bahrami, “Object Oriented Systems Development”, McGraw-Hill, 1999.
2. Booch, Grady. Object Oriented Analysis and Design. 2nd ed. Pearson Education 2000.
3. Fowler, Martin. UML Distilled. 3rd ed. Pearson Education. 2004.
4. Lunn, Ken. Software development with UML. Palgrave Macmillan. 2003.
5. O"Docherty, Mike. Object-Oriented Analysis & Design. Wiley. 2005.

**Websites**

1. www.omg.org
2. http://www.ibm.com/developerworks/rational/products/rose/
3. http://www.smartdraw.com/resources/tutorials/jacobson-oose-diagrams/

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|---|---|---|---|---|---|---|---|---|
| **Department:** Information Technology | | | | **Programme:** B.Tech. (IT) | | | | |
| **Semester : -** | | | | **Category :** TA | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITP14 | Software Project Management | 4 | - | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Knowledge in Software Engineering | | | | | | | |
| **Objective** | • To apply professional attitudes and techniques to managing a project<br>• To Demonstrate the steps needed to build and maintain effective development teams<br>• To Explain the procedures needed to monitor, control and report upon an IT development project and the ways in which appropriate quality attributes of the products of an IT development project can be assessed and assured | | | | | | | |
| **Outcome** | On successful completion of this course, the students will be able to:<br>• Appropriate steps, principles, techniques and procedures during software project development and management | | | | | | | |
| **UNIT – I** | **Software Process** | | | | | **Hours: 10** | | |
| Process Maturity – Capability Maturity Model (CMM) – KPA Project Management, Variations in CMM - Productivity improvement process. | | | | | | | | |
| **UNIT – II** | | | | | | **Hours: 13** | | |
| **People Management:**<br>Organization structure – Difficulties in people management - Effective team building – Role of Project manager - Team structures – Comparison of different team structures.<br>**Software Metrics:**<br>Role Of Metrics In Software Development - Project Metrics – Process Metrics – Data Gathering - Analysis Of Data For Measuring Correctness, Integrity, Reliability And Maintainability Of Software Products. | | | | | | | | |
| **UNIT – III** | **Project Management And Planning** | | | | | **Hours: 12** | | |
| Project initiation – standard process, Process Tailoring - Feasibility study - Planning – Estimation - Resource allocation The project Plan – Software Development Process – Defects – Finding Defects – Code Review Checklist – Projecting Defects Inspection And Review: Need- Process of Inspection- SRS- Design Document Inspection. | | | | | | | | |
| **UNIT – VI** | **Project Scheduling And Tracking** | | | | | **Hours: 12** | | |
| Scheduling - Critical path – Tracking - Timeline chart – Earned value chart. Software Configuration Management: Baselines - Software configuration items -The SCM process - Version control - Change control - Configuration audit - SCM standards. | | | | | | | | |
| **UNIT – V** | **Working Capital Policy** | | | | | **Hours: 13** | | |
| Importance of Working Capital Management – Risk- Risk analysis and management – Types of Risk involved - RMM plan- Return Trade-off for Current Asset Investments – Financing Current Assets – The Costs and Risks of Alternative Debt Maturities. Quality Planning: Quality process - Quality control –Defect preventive process- Total Quality Management. | | | | | | | | |
| **Total Contact Hours: 60** | **Total Tutorials:** | **Total Practical Classes:** | | | | **Total Hours: 60** | | |

**Text Books**

1. Panka jJalote, Software Project Management in Practice, Pearson Education, New Delhi, 2010.
2. Krish Rangarajan and Anil Misra, Working Capital Management, Excel Book, New Delhi, 2009.

**Reference Books**

1. Watts Humphrey, Managing the Software Process, Pearson Education, New Delhi, 2005.
2. Roger S Pressman, Software Engineering – A Practitioner's Approach, McGraw Hill International Edition, Singapore, Sixth Edition, 2007.
3. Hughes, Software Project Management, Tata McGraw-Hill, 2004.
4. Bob Hughes, Mike Cotterell, "Software Project Management", Fifth edition, Tata McGraw Hill, 2009.
5. Walker Royce "Software Project Management A Unified Framework", Pearson Education, 2004.

**Websites**

1. http://www.spmassets.com/index.php/spm-projects.html

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|---|---|---|---|---|---|---|---|---|
| **Department:** Information Technology | | | **Programme:** B.Tech. (IT) | | | | | |
| **Semester : -** | | | **Category :** TA | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITP15 | Data mining and Warehousing | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Data Base Management System | | | | | | | |
| **Objective** | • 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.<br>• To introduce the concept of data warehousing with special emphasis on architecture and design | | | | | | | |
| **Outcome** | On successful completion of this course, the students will be able to<br>• deals with evolving multidimensional intelligent model from a typical system,<br>• discovering the knowledge imbibed in the high dimensional system, and find the hidden interesting patterns in data, and<br>• evaluate various mining techniques on complex data objects. | | | | | | | |
| **UNIT – I** | **Introduction** | | | | | **Hours: 12** | | |
| Definition of data mining - data mining vs query tools – machine learning – taxonomy of data mining tasks – steps in data mining process – overview of data mining techniques. | | | | | | | | |
| **UNIT – II** | **Data Warehousing** | | | | | **Hours: 12** | | |
| Definition – Multidimensional Data Model – Data Cube – Dimension Modelling– OLAP Operations – Warehouse Schema – Data Warehouse Architecture – Data Mart – Meta Data – Types of Meta Data – Data Warehouse Backend Process – Development Life Cycle. | | | | | | | | |
| **UNIT – III** | **Data Pre-Processing And Characterization** | | | | | **Hours: 12** | | |
| Data Cleaning – Data Integration and Transformation – Data Reduction –Discretization and Concept Hierarchy Generation – Primitives – Data Mining Query Language – Generalization – Summarization – Analytical Characterization and Comparison - Association Rule – Mining Multi Dimensional data from Transactional Database and Relational Database.<br>**Case studies** in Real-time Cleaning and Pre-processing Tools | | | | | | | | |
| **UNIT – IV** | **Classification** | | | | | **Hours: 12** | | |
| Classification – Decision Tree Induction – Bayesian Classification – Prediction – Back Propagation – Cluster Analysis – Hierarchical Method – Density Based Method – Grid Based Method – Outlier Analysis.<br>**Case studies** in classification tools and applications | | | | | | | | |
| **UNIT – V** | **Cluster analysis** | | | | | **Hours: 12** | | |
| Types of data – Clustering Methods – Partitioning methods – Model based clustering methods – outlier analysis. Advanced topics: Web Mining – Web Content Mining – Structure and Usage Mining – Spatial Mining – Time Series and Sequence Mining – Graph Mining<br>**Case studies** in cluster applications | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes:** | | | | **Total Hours: 60** | | |
| **Text Books** | | | | | | | | |
| 1. PaulrajPonnaiah, Data Warehousing Fundamentals, Wiley Publishers, Reprint 2011.<br>2. Jiawei Han, MichelineKamber, Data Mining: Concepts and Techniques, Morgan Kaufman Publishers, 2009. | | | | | | | | |
| **Reference Books** | | | | | | | | |
| 1. Ralph Kimball, Margy Ross, The Data Warehouse Toolkit, John Wiley and Sons Inc., 2002.<br>2. Alex Berson, Stephen Smith, Kurt Thearling, Building Data Mining Applications for CRM, Tata McGraw Hill, 2000.<br>3. Daniel T. Larose John Wiley & Sons, Hoboken, Discovering Knowledge in Data: An Introduction to Data Mining, New Jersey, 2004.<br>4. Hand, Mannila and Smyth, Principles of Data Mining, Prentice Hall of India, New Delhi, 2004. | | | | | | | | |
| **Websites** | | | | | | | | |
| 1. http://dssresources.com/papers/features/langseth/langseth02082004.html<br>2. http://www-01.ibm.com/software/data/infosphere/data-warehousing/ | | | | | | | | |

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| **Department:** Information Technology | | | **Programme:** B.Tech. (IT) | | | | | |
| **Semester : -** | | | **Category :** TA | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITP16 | Distributed Computing | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Computer Networks, Operating System | | | | | | | |
| **Objective** | Course Objectives:<br>• To understand the importance of communication in distributed environment.<br>• To study the actual implementation of various communication mechanisms.<br>• To learn the distributed resource management mechanisms. | | | | | | | |
| **Outcome** | On successful completion of this course, the students will be able to:<br>• Learn the distributed computing concepts.<br>• Learn the resource management techniques.<br>• Learn the file management in distributed environment | | | | | | | |
| **UNIT – I** | | | | | | **Hours: 12** | | |
| **Introduction**:- Characteristics, Examples, Applications, Challenges – System models:- Architectural models and Fundamental models – Network principles and Internet protocols– **Interprocess communication**: API, Marshalling, Client-server communication, Group communication, | | | | | | | | |
| **UNIT – II** | | | | | | **Hours: 12** | | |
| **Distributed objects and Remote Invocation**:- Introduction, Communication between distributed objects, Remote Procedure Call, Events and Notification – **Operating System Support**:- Introduction, OS Layer, Protection, Processes and Threads, Communication and invocation, Operating system architecture | | | | | | | | |
| **UNIT – III** | **Distributed File System** | | | | | **Hours: 12** | | |
| File service architecture, Sun network and Andrew File system, Recent advances – Name Services:- Domain Name System, Directory and discovery services, Case study for Global name service and Directory service – Time and Global States:- Clocks, events and processes, Clock synchronization, Logical clocks, Global states, Distributed debugging – Coordination and Agreement | | | | | | | | |
| **UNIT – IV** | **Transaction and Concurrency Control** | | | | | **Hours: 12** | | |
| Transactions and nested transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of concurrency control – Distributed Transactions – Replication - Distributed Shared Memory: Design and implementation issues, Consistency models | | | | | | | | |
| **UNIT – V** | **Distributed Multimedia Systems** | | | | | **Hours: 12** | | |
| Characteristics, Quality of service management, Resource management, Stream adaptation – Web Services:- Introduction, Service descriptions and IDL, Directory service, XML Security, Coordination of web services -Case Study:- CORBA | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes:** | | | | **Total Hours: 60** | | |
| **Text Books:** | | | | | | | | |
| 1. George Coulouris, Jean Dollimore, Tim Kindberg, *Distributed Systems Concepts and Design,* Fourth Edition, Pearson Education India, 2005 | | | | | | | | |
| **Reference Books:** | | | | | | | | |
| 1. Andrew S. Tanenbaum, Maarten Van Steen, *Distributed System: Principles and Paradigms*, Second Edition, Prentice-Hall, 2003 | | | | | | | | |
| **Websites:** | | | | | | | | |
| 1. https://www.youtube.com/playlist?list=PL700757A5D4B3F368 | | | | | | | | |

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| **Department:** Information Technology | | | | **Programme:** B.Tech. (IT) | | | | |
| **Semester : -** | | | | **Category :** TA | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITP17 | High Speed Networks | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Computer Networks | | | | | | | |
| **Objective** | • To provide an in-depth understanding of various existing and emerging high-speed networking technologies.<br>• To understand the network architecture of ISDN, frame relay, ATM, WDM, and optical networking. | | | | | | | |
| **Outcome** | • Develop an in-depth understanding, in terms of architecture, protocols and applications of major high-speed networking technologies<br>• Evaluate various technologies and identify the most suitable one to meet a given set of requirements for a hypothetical corporate network<br>• Develop necessary background to be able to manage projects involving any of the high-speed networking technologies | | | | | | | |
| **UNIT – I** | **Packet Switched Networks** | | | | | **Hours: 12** | | |
| OSI and IP models, Ethernet (IEEE 802.3), Token ring (IEEE 802.5), Wireless LAN (IEEE 802.11) FDDI, DQDB, SMDS: Internetworking with SMDS. | | | | | | | | |
| **UNIT – II** | **ISDN and Broadband ISDN** | | | | | **Hours: 12** | | |
| ISDN - Overview, interfaces and functions, Layers and services - Signaling System 7 – Broadband ISDN architecture and Protocols. | | | | | | | | |
| **UNIT – III** | **ATM and Frame Relay** | | | | | **Hours: 12** | | |
| ATM Main features-addressing, signaling and routing, ATM header structure-adaptation layer, management and control, ATM switching and transmission. Frame Relay: Protocols and services, Congestion control, Internetworking with ATM, Internet and ATM, Frame relay via ATM. | | | | | | | | |
| **UNIT – IV** | **Advanced Network Architecture** | | | | | **Hours: 12** | | |
| IP forwarding architectures overlay model, Multi-protocol Label Switching (MPLS), integrated services in the Internet, Resource Reservation Protocol (RSVP), Differentiated services. | | | | | | | | |
| **UNIT – V** | **Optical Networks and Switching** | | | | | **Hours: 12** | | |
| Optical links- WDM systems, cross-connects, optical LAN's, optical paths and networks; TDS and SDS: modular switch designs-Packet switching, distributed, shared, input and output buffers. | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes:** | | | | **Total Hours: 60** | | |

**Text Books**

1. Jean Walrand and Pravinvaraiya ,"High Performance Communication networks",2nd Edition, Harcourt and Morgan Kauffman,London,2000.
2. SumitKasera, PankajSethi, "ATM Networks ", Tata McGraw-Hill, New Delhi, 2000.
3. Jennifer Bray and Charles F.Sturman,"Blue Tooth" 2nd edition, Pearson Education Asia 2001.

**Reference Books**

1. William Stallings, "ISDN and Broadband ISDN with Frame Relay and ATM", 4th Edition, Pearson Education asia, 2002.
2. Leon Gracia, Widjaja, "Communication networks ", 2nd edition, Tata McGraw-Hill, New Delhi, 2003.
3. Rainer Handel, Manfred N.Huber, Stefan Schroder, "ATM Networks",3rd Edition, Pearson education asia,2002.
4. William Stallings,"High-speed Networks and Internets", 2nd Edition, Pearson education Asia, 2003.

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|---|---|---|---|---|---|---|---|---|
| **Department:** Information Technology | | | | **Programme:** B.Tech. (IT) | | | | |
| **Semester : -** | | | | **Category :** TA | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITP18 | Wireless Sensor Networks | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Computer Networks | | | | | | | |
| **Objective** | • The objectives of this course are to introduce students to the state of the art in wireless sensor actuator networks and to provide hands on training in programming these networks. | | | | | | | |
| **Outcome** | On successful completion of this course, you will be able to:<br>• Apply knowledge of wireless sensor networks to various application areas.<br>• Design, implement and maintain wireless sensor networks.<br>• Formulate and solve problems creatively. | | | | | | | |
| **UNIT – I** | **Overview Of Wireless Sensor Networks** | | | | | **Hours: 12** | | |
| Challenges for Wireless Sensor Networks-Characteristics requirements-required mechanisms, Difference between mobile ad-hoc and sensor networks, Applications of sensor networks- Enabling Technologies for Wireless Sensor Networks. | | | | | | | | |
| **UNIT – II** | **Architectures** | | | | | **Hours: 12** | | |
| Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes , Operating Systems and Execution Environments, Network Architecture - Sensor Network Scenarios, Optimization Goals and Figures of Merit, Gateway Concepts. | | | | | | | | |
| **UNIT – III** | **Networking of Sensors** | | | | | **Hours: 12** | | |
| Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts - S-MAC, The Mediation Device Protocol, Wakeup Radio Concepts, Address and Name Management, Assignment of MAC Addresses, Routing Protocols- Energy-Efficient Routing, Geographic Routing. | | | | | | | | |
| **UNIT – IV** | **Infrastructure Establishment** | | | | | **Hours: 12** | | |
| Topology Control, Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control. | | | | | | | | |
| **UNIT – V** | **Sensor Network Platforms and Tools** | | | | | **Hours: 12** | | |
| Operating Systems for Wireless Sensor Networks, Sensor Node Hardware-Berkeley Motes, Programming Challenges, Node-level software platforms, Node-level Simulators, State-centric programming. | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes:** | | | | **Total Hours: 60** | | |
| **Text Books** | | | | | | | | |
| 1. Holger Karl & Andreas Willig, " Protocols And Architectures for Wireless Sensor Networks" , John Wiley, 2005. | | | | | | | | |
| **Reference Books** | | | | | | | | |
| 1. Feng Zhao & Leonidas J. Guibas, "Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007.<br>2. Kazem Sohraby, Daniel ivlinoli, & Taieb Znati, "Wireless Sensor Networks-Technology, Protocols, And Applications", John Wiley, 2007.<br>3. Anna Hac, "Wireless Sensor Network Designs", John Wiley, 2003.<br>4. Bhaskar Krishnamachari, "Networking Wireless Sensors", Cambridge Press, 2005. | | | | | | | | |

| Department : IT | | Programme: B.Tech. | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Semester: Elective | | Category: TA | | | | | | |
| Course Code | Course Name | Hours / Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | SE | TM |
| ITP19 | Big data and Hadoop Programming | 3 | 1 | - | 4 | 40 | 60 | 100 |
| Prerequisite | Knowledge in Unix/Linux, Core Java and Data base Concepts. | | | | | | | |
| Objective | 1. To understand and Develop the Map Reduce Programs<br>2. To handle Bulk data sets with PIG,HIVE,SQOOP and FLUME<br>3. To integrate external data sources with HDFS. | | | | | | | |
| Outcome | On successful completion of this course ,students will be able to:<br>1. Understand and describe the Analysis of data with Hadoop Frame work<br>2. Understand Loading and Processing of various formats of the data | | | | | | | |
| UNIT – I | 1.1.1 **Hadoop Introduction** | | | | | Hours: 12 | | |
| Introduction to Data and System, Types of Data, Traditional way of dealing large data and its problems, Types of Systems & Scaling, What is Big Data, Challenges in Big Data, Challenges in Traditional Application, New Requirements, Future of Big Data, What is Hadoop? Why Hadoop? Brief history of Hadoop, Features of Hadoop, Hadoop and RDBMS, Hadoop Ecosystem's overview, Hadoop installation in pseudo mode. | | | | | | | | |
| UNIT – II | **1.1.2 Hadoop Distribute File System (HDFS)** | | | | | Hours: 12 | | |
| HDFS Design and Architecture, HDFS Concepts, Interacting HDFS using command line, Dataflow, Introduction about Blocks, Data Replication, Admin Commands Hadoop archives, File System Concepts, Blocks, Replication Factor, Version File Safe mode, Namespace IDs, Purpose of Name Node, Purpose of Data Node, Purpose of Secondary Name Node, Purpose of Job Tracker, Purpose of Task Tracker, HDFS Shell Commands – copy, delete, create directories etc., Reading and Writing in HDFS Difference of Unix Commands and HDFS commands, Hadoop Admin Commands. | | | | | | | | |
| UNIT – III | **Technology and Tool** | | | | | Hours: 12 | | |
| Developing Map Reduce Application ,Phases in Map Reduce Framework, Map Reduce Input and Output Formats, Advanced Concepts, Combiner, HAR ,Partitioner, sorting, shuffling , Hadoop 1.0 Limitations, MapReduce Limitations, History of Hadoop 2.0, HDFS 2: Architecture, HDFS 2: Quorum based storage, HDFS 2: High availability, HDFS 2: Federation. | | | | | | | | |
| UNIT – IV | **Hadoop Programming Languages** | | | | | Hours: 12 | | |
| 1.1.3 **Hive:**Hive concepts, Hive architecture, Install and configure hive, Meta Store – Purpose & Type of Configurations, Different type of tables in Hive, BucketsPartitions, Joins in hive, Hive Query Language, , and Hive Limitations. **PIG** Introduction, Installation and Configuration, Different data types in PIG, Interacting HDFS using PIG , Map Reduce Programs through PIG ,PIG Commands Execution mechanisms (grunt, script...) , **NOSQL Databases Concepts:** Hbase, MongoDb. | | | | | | | | |
| UNIT – V | **Case Studies** | | | | | Hours: 12 | | |
| Different phases of MapReduce programs, Different unstructured data processing examples , Analyzing the Results, Log files, Counters, Skipping Bad and unwanted Records, Execute MapReduce Job – Insights, Exercise's on MapReduce, Data Loading into Hive Tables Hive Query Execution, Hive UDF, Loading, Filtering, Grouping, joins, Sample programs in PIG with Real time. **PDI:** Establishing Connection between PDI to RDMS database, creating data in Hadoop 5. Establishing Connection between PDI to Hadoop data ,Moving data from Hadoop to RDBMS and vice versa Connect to relational database using sqoop and downloading lakhs of records to Hadoop, Twitter analytics with flume. | | | | | | | | |
| **Text Books:** | | | | | | | | |
| 1. Michael Minelli, Michelle Chambers, and Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 2013.<br>2. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilley, 2012.<br>3. E. Capriolo, D. Wampler, and J. Rutherglen, "Programming Hive", O'Reilley, 2012.<br>4. Lars George, "HBase: The Definitive Guide", O'Reilley, 2011.<br>5. Alan Gates, "Programming Pig", O'Reilley, 2011. | | | | | | | | |
| **Reference Books:** | | | | | | | | |

1 P. J. Sadalage and M. Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence", Addison-Wesley Professional, 2012.
2. Eric Sammer, "Hadoop Operations", O'Reilley, 2012.
3. Eben Hewitt, "Cassandra: The Definitive Guide", O'Reilley, 2010.

**Web sites:**

1.blog.cloudera.com/

2. https://www.mapr.com/blog

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|---|---|---|---|---|---|---|---|---|
| **Department:** Information Technology | | | | **Programme:** B.Tech. (IT) | | | | |
| **Semester : -** | | | | **Category :** TA | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITP20 | Cloud Computing | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Computer Architecture, Operating systems, Computer Networks, Client-Server Architecture | | | | | | | |
| **Objective** | • To impart the principles and paradigm of Cloud Computing and understand the Service Model with reference to Cloud Computing<br>• To comprehend the Cloud Computing architecture and implementation<br>• To realize the role of Virtualization Technologies and have knowledge on Cloud Computing management and security | | | | | | | |
| **Outcome** | On successful completion of this course students will be able to:<br>• Describe the concept, evolution, architecture, pros and cons of Cloud Computing.<br>• Have knowledge of how hypervisors are used in Virtual Machines.<br>• To secure and perform identity management in the Cloud and to access and use the services in the Cloud. | | | | | | | |
| **UNIT – I** | **Introduction to Cloud Computing** | | | | | **Hours: 12** | | |
| Overview, Roots of Cloud Computing, Layers and Types of Cloud, Desired Features of a Cloud, Benefits and Disadvantages of Cloud Computing, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers, Challenges and Risks, Assessing the role of Open Standards. | | | | | | | | |
| **UNIT – II** | **Cloud Architecture, Services and Applications** | | | | | **Hours: 12** | | |
| Exploring the Cloud Computing Stack, Connecting to the Cloud, Infrastructure as a Service, Platform as a Service, Saas Vs. Paas, Using PaaS Application Frameworks, Software as a Service, Identity as a Service, Compliance as a Service. | | | | | | | | |
| **UNIT – III** | **Abstraction and Virtualization** | | | | | **Hours: 12** | | |
| Introduction to Virtualization Technologies, Load Balancing and Virtualization, Understanding Hyper visors, Understanding Machine Imaging, Porting Applications, Virtual Machines Provisioning and Manageability Virtual Machine Migration Services, Virtual Machine Provisioning and Migration in Action, Provisioning in the Cloud Context. | | | | | | | | |
| **UNIT – IV** | **Managing & Securing the Cloud** | | | | | **Hours: 12** | | |
| Administrating the Clouds, Cloud Management Products, Emerging Cloud Management Standards, Securing the Cloud, Securing Data, Establishing Identity and Presence. | | | | | | | | |
| **UNIT – V** | **Case-Studies** | | | | | **Hours: 12** | | |
| Using Google Web Services, Using Amazon Web Services, Using Microsoft Cloud Services. | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes:** | | | | **Total Hours: 60** | | |
| **Text Books** | | | | | | | | |
| 1. Buyya R., Broberg J., Goscinski A., "Cloud Computing : Principles and Paradigm", First Edition, John Wiley & Sons, 2011.<br>2. Sosinsky B., "Cloud Computing Bible", First Edition, Wiley Edition, 2011. | | | | | | | | |
| **Reference Books** | | | | | | | | |
| 1. Miller Michael, "Cloud Computing: Web Based Applications that Change the Way You Work and Collaborate Online", Pearson Education India<br>2. Smooth S., Tan N., "Private Cloud Computing", Morgan Kauffman , First Edition, 2011.<br>3. Linthicium D., "Cloud Computing and SOA Convergence in Enterprise", Pearson Education India. | | | | | | | | |
| **Websites** | | | | | | | | |
| 1. www.ibm.com/cloud-computing/ <br>2. www.microsoft.com/enterprise/it-trends/cloud-computing/ | | | | | | | | |

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| **Department:** Information Technology | | | | **Programme:** B.Tech. (IT) | | | | |
| **Semester : -** | | | | **Category :** TA | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITP21 | Internet of Things | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Computer Architecture, Operating systems, Computer Networks, Client-Server Architecture | | | | | | | |
| **Objective** | • To understand the basics of Internet of Things and get an idea of some of the application areas where Internet of Things can be applied<br>• To understand the middleware for IoT with concepts of Web of Things<br>• To understand the concepts of Cloud of Things with emphasis on Mobile cloud computing and IOT protocols | | | | | | | |
| **Outcome** | On successful completion of this course students will be able to:<br>• Identify and design the new models for latest strategic interaction<br>• Design business intelligence and information security for WoB<br>• Design a middleware for IoT and analyze various protocols for IoT to design different models for network dynamics | | | | | | | |
| **UNIT – I** | **Introduction** | | | | | | **Hours: 12** | |
| Definitions and Functional Requirements –Motivation – Architecture - Web 3.0 View of IoT– Ubiquitous IoT Applications – Four Pillars of IoT – DNA of IoT - The Toolkit Approach for End-user Participation in the Internet of Things. Middleware for IoT: Overview – Communication middleware for IoT –IoT Information Security. | | | | | | | | |
| **UNIT – II** | IOT protocols | | | | | | **Hours: 12** | |
| Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Issues with IoT Standardization – Unified Data Standards – Protocols – IEEE 802.15.4 – BACNet Protocol – Modbus – KNX – Zigbee Architecture – Network layer – APS layer – Security | | | | | | | | |
| **UNIT – III** | Web of things | | | | | | **Hours: 12** | |
| Web of Things versus Internet of Things – Two Pillars of the Web – Architecture Standardization for WoT– Platform Middleware for WoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence. Cloud of Things: Grid/SOA and Cloud Computing – Cloud Middleware – Cloud Standards – Cloud Providers and Systems – Mobile Cloud Computing – The Cloud of Things Architecture | | | | | | | | |
| **UNIT – IV** | Integrated | | | | | | **Hours: 12** | |
| Integrated Billing Solutions in the Internet of Things Business Models for the Internet of Things - Network Dynamics: Population Models – Information Cascades - Network Effects - Network Dynamics: Structural Models - Cascading Behavior in Networks - The Small-World Phenomenon | | | | | | | | |
| **UNIT – V** | Applications | | | | | | **Hours: 12** | |
| The Role of the Internet of Things for Increased Autonomy and Agility in Collaborative Production Environments - Resource Management in the Internet of Things: Clustering, Synchronisation and Software Agents. Applications - Smart Grid – Electrical Vehicle Charging | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes:** | | | | | **Total Hours: 60** | |
| **Text Books** | | | | | | | | |
| 1. Honbo Zhou, "The Internet of Things in the Cloud: A Middleware Perspective", CRC Press 2012<br>2. Dieter Uckelmann, Mark Harrison, " Architecting the Internet of Things", Florian Michahelles- (Eds.) – Springer – 2011<br>3. David Easley and Jon Kleinberg,,"Networks, Crowds, and Markets: Reasoning About a Highly Connected World", Cambridge University Press - 2010 | | | | | | | | |
| **Reference Books** | | | | | | | | |
| 1. Olivier Hersent, Omar Elloumi and David Boswarthick , "The Internet of Things: Applications to the Smart Grid and Building Automation", Wiley -2012<br>2. Olivier Hersent, David Boswarthick, Omar Elloumi , "The Internet of Things – Key applications and Protocols", Wiley, 2012. | | | | | | | | |
| **Websites** | | | | | | | | |
| www.isaca.org | | | | | | | | |

| **Department:** Information Technology | | **Programme:** B.Tech. (IT) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester : -** | | **Category :** TA | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITP22 | Virtualization Techniques | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Computer Architecture, Operating systems, Computer Networks, Client-Server Architecture | | | | | | | |
| **Objective** | • To understand the need of virtualization with its types<br>• To understand the concepts of virtualization and virtual machines<br>• To understand the practical virtualization solutions and enterprise solutions | | | | | | | |
| **Outcome** | On successful completion of this course students will be able to:<br>• Deploy legacy OSs on virtual machines<br>• Understand the intricacies of server, storage, network, desktop and application virtualizations<br>• Design new models for virtualization | | | | | | | |
| **UNIT – I** | **Overview Of Virtualization** | | | | | **Hours: 12** | | |
| Basics of Virtualization – Types of Virtualization Techniques – Merits and demerits of Virtualization – Full Vs Para-virtualization – Virtual Machine Monitor/Hypervisor - Virtual Machine Basics – Taxonomy of Virtual machines – Process Vs System Virtual Machines – Emulation: Interpretation and Binary Translation - HLL Virtual Machines. | | | | | | | | |
| **UNIT – II** | **Server And Network Virtualization** | | | | | **Hours: 12** | | |
| Server Virtualization: Virtual Hardware Overview - Server Consolidation – Partitioning Techniques - Uses of Virtual server Consolidation – Server Virtualization Platforms, Network Virtualization: Design of Scalable Enterprise Networks – Layer2 Virtualization – VLAN - VFI - Layer 3 Virtualization – VRF - Virtual Firewall Contexts - Network Device Virtualization - Data- Path Virtualization - Routing Protocols | | | | | | | | |
| **UNIT – III** | **Storage And Desktop** | | | | | **Hours: 12** | | |
| Storage Virtualization: Hardware Devices – SAN backup and recovery techniques – RAID – Classical Storage Model – SNIA Shared Storage Model – Virtual Storage: File System Level and Block Level, Desktop Virtualization: Concepts - Desktop Management Issues - Potential Desktop Virtualization Scenarios - Desktop Virtualization Infrastructures, | | | | | | | | |
| **UNIT – IV** | **Applying Virtualization** | | | | | **Hours: 12** | | |
| Practical Virtualization Solutions: Comparison of Virtualization Technologies: Guest OS/ Host OS – Hypervisor – Emulation – Kernel Level – Shared Kernel, Enterprise Solutions: VMWare Server – VMWare ESXi – Citrix Xen Server – Microsoft Virtual PC – Microsoft Hyper-V – Virtual Box, Server Virtualization: Configuring Servers with Virtualization – Adjusting and Tuning Virtual servers – VM Backup – VM Migration, Desktop Virtualization: Terminal services – Hosted Desktop – Web-based Solutions – Localized Virtual Desktops, Network and Storage Virtualization: Virtual Private Networks – Virtual LAN – SAN and VSAN – NAS | | | | | | | | |
| **UNIT – V** | **Virtual Machines Products And Application Virtualization** | | | | | **Hours: 12** | | |
| Xen Virtual machine monitors- Xen API – VMware – VMware products – Vmware Features – Microsoft Virtual Server – Features of Microsoft Virtual Server Application Virtualization: Concepts - Application Management Issues - Redesign Application Management – Application Migration | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials: 15** | **Total Practical Classes:** | | | | **Total Hours: 60** | | |

**Text Books**


1. James E. Smith, Ravi Nair, - Virtual Machines: Versatile Platforms for Systems and Processes, Elsevier/Morgan Kaufmann, 2005.
2. David Marshall, Wade A. Reynolds, - Advanced Server Virtualization: VMware and Microsoft Platform in the Virtual Data Center, Auerbach Publications, 2006.
3. Kumar Reddy, Victor Moreno, - Network virtualization, Cisco Press, July, 2006


**Reference Books**


1. Chris Wolf, Erick M. Halter, - Virtualization: From the Desktop to the Enterprise, APress 2005.
2. Danielle Ruest, Nelson Ruest - Virtualization: A Beginner's Guide, TMH, 2009
3. Kenneth Hess , Amy Newman: Practical Virtualization Solutions: Virtualization from the Trenches Prentice Hall 2010
4. Dave Shackleford - Virtualization security- Protecting Virtualized Environments, Sybex Publishers, First Edition, 2012
5. William von Hagen, Professional Xen Virtualization, Wrox Publications January, 2008.

**Websites:** http://www.vmware.com/files/pdf/VMware_paravirtualization.pdf

| Department : IT | | Programme: B.Tech. | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Semester: Elective | | Category: TA | | | | | | |
| Course Code | Course Name | Hours / Week | | | Credit | Maximum Marks | | |
| | | L | T | P | C | CA | SE | TM |
| ITP23 | Augmented Reality | 3 | 1 | - | 4 | 40 | 60 | 100 |
| Prerequisite | Knowledge in 2D,3D imaging, android basics. | | | | | | | |
| Objective | Detailed understanding of the concepts of augmented Reality and its application<br>To Know the importance and real time implementation of Augmented Reality. | | | | | | | |
| Outcome | On successful completion of this course ,students will be able to:<br>Understand and describe the Augmentation Reality benefits and use cases<br>Understand Various dimensions,tools and implementation methods of augmentation Reality. | | | | | | | |
| UNIT – I | Augmented Reality Basics: | | | | | Hours: 12 | | |
| What Is Augmented Reality? The Components of Augmented Reality, Augmented Reality Platforms Augmented Reality Today, Entertainment and Games Translation the Differences between Augmented Reality and Virtual Reality, What is Virtual Reality? Motion Tracking Hardware, Input Devices and Computing platforms, The Difference between AR and QR Codes Challenges with AR Technical Challenges of Augmented Reality Social Challenges of Augmented Reality, the Opportunities for Augmented Reality. AR Functions, the Augmented Perception of Reality. The Creation of an Artificial Environment the Basic | | | | | | | | |
| UNIT – II | The Augmented Reality Interface and Dimension: | | | | | Hours: 12 | | |
| AR Display Technology, Mobile Handheld Displays, Video Spatial Displays and Spatial Augmented Reality Wearable Displays, Interaction in AR Applications Tangible User Interface Collaborative AR Interface, Hybrid AR Interface Multimodal AR Interfaces, Examples of Spatial AR Display, The Next User Interface, the Command Line Interface: The First Dimension, the Graphical User Interface: The Second Dimension, Augmented Reality: The Third Dimension, Advancing Computer Interfaces, Process of Augmenting Reality Augmented Reality Methods: Pattern, Outline, Location, Surface. | | | | | | | | |
| UNIT – III | The Value of Augmented Reality | | | | | Hours: 12 | | |
| AR and Virtual Worlds, AR and Social Networking, Education, Augmented Reality Books, Collaborative Learning Maintenance and Repair, Augmented Manuals, Public Safety, The Military, and The Law, AR and Law Enforcement, Drone Technology and AR, Collaborative Crime Scene Investigation, AR for Fire fighters, AR and The Military, Information Dominance, AR Satellite Finder, AR Flight Tracker, AR Ship Finder, Companies Specializing in AR. Generating Optical Overlay. | | | | | | | | |
| UNIT – IV | Visions of the Future | | | | | Hours: 12 | | |
| 1.1.4 Introduction, The Fifth K-Wave, The Big Trends Generation: The Connected Generation, The Evolving University, Video Games: A Learning Tool, Technical Trends, The Internet of Things, The Expanding Video Game Market, Augmented Reality Enhancers, Future Concepts for Augmented Reality, AR Contact Lenses, Biomimicry and Bionic Eyes. | | | | | | | | |
| UNIT – V | Case Studies | | | | | Hours: 12 | | |
| Going Mobile: Developing for Gear VR, The Gear VR User Interface and Oculus Home, Setting Up the Android SDK, Generating an Oculus Signature File, Setting Up Your Device for USB Debugging, Developing for Gear VR Using Unity3D, Setting Up Your Unity3D Environment, A Simple Unity3D Sample, Handling Touchpad Events, Deploying Applications for Gear VR,: Google Cardboard for Low-Cost Mobile Virtual Reality, Cardboard Basics, Developing with the Cardboard SDK for Android, Developing with the Cardboard SDK for Unity | | | | | | | | |
| Text Books: | | | | | | | | |
| 1. Gregory Kipper Joseph Rampolla , "Augmented Reality An Emerging Technologies Guide to AR",First Edition,2012.<br>2. Tony Parisi, "Learning Virtual Reality DEVELOPING IMMERSIVE EXPERIENCES AND APPLICATIONS FOR DESKTOP, WEB, AND MOBILE", O'Reilly Media Publisher, 2015 .<br>3.William R. Sherman, Alan B. Craig, "Understanding Virtual Reality: Interface, Application, and Design",Morgan Kaufmann, 1st Edition,2002.<br>4. Oliver Bimber, Ramesh Raskar, "Spatial Augmented Reality Merging Real and Virtual Worlds", 2005 | | | | | | | | |
| Reference Books: | | | | | | | | |

1 Stephen Cawood , Mark Fiala, ‘‘Augmented Reality: A Practical Guide’’, 1st Edition ‘‘, 2008
2. Alan B. Craig ,’’Understanding Augmented Reality: Concepts and Applications’’, 1st Edition,2013
3. Tony Mullen,’’Prototyping Augmented Reality’’, 1st Edition,2011

**Web sites:**

1. augmentedstories.com/
2. www.augmented.org/

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|---|---|---|---|---|---|---|---|---|
| **Department:** Information Technology | | | | **Programme:** B.Tech. | | | | |
| **Semester : -** | | | | **Category :** TA | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITG01 | Bioinformatics | 3 | 1 | - | 3 | 40 | 60 | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objective** | • To learn about central dogma and various biological databases<br>• To learn various tools and their uses.<br>• To learn about sequence algorithms | | | | | | | |
| **Outcome** | On successful completion of this course, the students will be able to:<br>• learn about tools used in Bio informatics & how to use them.<br>• This will facilitate the students to undertake projects in the modern biology. | | | | | | | |
| **UNIT – I** | **Introduction** | | | | | **Hours: 12** | | |
| The Central Dogma – The Killer Application – Parallel Universes – Watson's Definition – Top Down Versus Bottom up – Information Flow – Convergence – Databases – Data Management – Data Life Cycle – Database Technology – Interfaces – Implementation – Networks – Geographical Scope – Communication Models – Transmissions Technology – Protocols – Bandwidth – Topology – Hardware – Contents – Security – Ownership – Implementation – Management. | | | | | | | | |
| **UNIT – II** | **Databases, Tools and their Uses** | | | | | **Hours: 12** | | |
| Importance of databases - nucleic acid sequence databases - protein sequence data bases - structure databases - bibliographic databases and virtual library - specialized analysis packages | | | | | | | | |
| **UNIT – III** | **Sequence Alignment Methods** | | | | | **Hours: 12** | | |
| Pair wise sequence alignment – Local versus global alignment – Multiple sequence alignment – Computational methods – Dot Matrix analysis – Substitution matrices – Dynamic Programming – Word methods – Bayesian methods – Multiple sequence alignment – Dynamic Programming – Progressive strategies – Iterative strategies – Tools – Nucleotide Pattern Matching – Polypeptide pattern matching – Utilities – Sequence Databases. | | | | | | | | |
| **UNIT – IV** | **Predictive Methods Using DNA And Protein Sequences** | | | | | **Hours: 12** | | |
| Gene predictions strategies - protein prediction strategies - molecular visualization-Homology - phylogeny and evolutionary trees - Homology and similarity - phylogeny and relationships. | | | | | | | | |
| **UNIT – V** | **Advanced Topics** | | | | | **Hours: 12** | | |
| Game Playing: Minmax search procedure-Adding alpha-beta cutoff Expert System: Representation-Expert System shells-Knowledge Acquisition. Robotics: Hardware-Robotic Perception-Planning-Application domains | | | | | | | | |
| **Total Contact Hours: 45** | **Total Tutorials: 14** | **Total Practical Classes:** | | | | **Total Hours: 60** | | |
| **Text Books** | | | | | | | | |
| 1. T K Attwood, D J parry-Smith, Introduction to Bioinformatics, Pearson Education, 1st Edition, 11th Reprint 2005.<br>2. C S V Murthy, Bioinformatics, Himalaya Publishing House, 1st Edition 2003. | | | | | | | | |
| **Reference Books** | | | | | | | | |
| 1. Stephen A. Krawetz, David D. Womble, Introduction To Bioinformatics A Theoretical and Practical Approach, Humana Press, 2003.<br>2. Hooman H. Rashidi, Lukas K. Buehler, Bioinformatics Basics-Applications in Biological Science and Medicine, CRC press, 2005.<br>3. Bryan Bergeron, "Bio Informatics Computing", Second Edition, Pearson Education, 2003. | | | | | | | | |
| **Websites** | | | | | | | | |
| 1. bioinformaticsonline.com/<br>2. www.bioinformaticsonline.org/ | | | | | | | | |

| **Department:** Information Technology | | | **Programme:** B.Tech. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Semester : -** | | | **Category :** TA | | | | | | |
| **Subject Code** | **Subject** | | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITG02 | Principles of Programming Languages | | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | - | | | | | | | | |
| **Objective** | • To introduce several paradigms of Programming,<br>• To get used to these paradigms by example Programming Languages,<br>• To understand the concepts of syntax, translation, abstraction, and implementation of Programming Languages. | | | | | | | | |
| **Outcome** | On successful completion of this course, the students will be able to:<br>• Understand the trade-offs between important language design goal<br>• Differentiate between major languages' paradigms: imperative, functional, object oriented and logic. | | | | | | | | |
| **UNIT – I** | **Introduction** | | | | | | **Hours: 12** | | |
| Characteristics of Programming Languages - Factors influencing the evolution of Programming Language - Development of programming methodologies - Desirable features and design issues. | | | | | | | | | |
| **UNIT – II** | **Elementary and Structured Data Type** | | | | | | **Hours: 12** | | |
| Data object variables – constants - data types - elementary data types - declaration - assignments and initialization – enumeration - characters string. Structured data type and objects: Specifications of data structured types - vectors and arrays - variable size data structure - pointers and programmer constructed data structure. | | | | | | | | | |
| **UNIT – III** | **Object Oriented Languages** | | | | | | **Hours: 12** | | |
| the class notion- Information hiding and data abstraction using Classes - Derived Classes and inheritance- Polymorphism - Parameterized types. | | | | | | | | | |
| **UNIT – IV** | **Functional Language** | | | | | | **Hours: 12** | | |
| Functional programming concepts – Referential transparency – Types - Type systems – Name – bindings - environment and scope - Recursive functions - Polymorphic functions - Type variables. | | | | | | | | | |
| **UNIT – V** | **Logic Languages** | | | | | | **Hours: 12** | | |
| Review of Predicate Logic, Clause Form, Logic, Logic as a Programming Language - Unification Algorithm - Abstract Interpreter for Logic Programs - Theory Of Logic Programs. | | | | | | | | | |
| **Total Contact Hours:45** | **Total Tutorials: 15** | **Total Practical Classes: -** | **Total Hours: 60** | | | | | | |

**Text Books**

1. Terrence W. Pratt, Marvin V. Zelkowitz, Programming Languages: Design and Implementation, Prentice Hall, 2000.
2. Daniel P. Friedman, Mitchell Wand, Christopher Thomas Haynes, Essentials of Programming Languages, The MIT Press 2001.

**Reference Books**

1. Allen B. Tucker, Robert Noonan, Programming Languages: Principles and Paradigms, TMH, 2006.
2. John C. Mitchell: Concepts in Programming Languages, Cambridge University Press 2002.
3. Benjamin C. Pierce: Types and Programming Languages, The MIT Press 2002.
4. Michael L. Scott: Programming Language Pragmatics, Morgan Kaufmann Publishers 2005.
5. E Horowitz, Fundamental of Programming Languages, Galgotia, 1984.
6. M. Hennessey, The Semantics of Programming Languages, John Wiley, 1990.
7. Ravi Sethi: Programming Languages: Concepts and Constructs, 2nd edition, Addison-Wesley 1996.

**Websites:**

1. http://forum.jntuworld.com/showthread.php?19715-Principles-Of-Programming-Language-(PPL)-Study-Materials-Notes.

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|---|---|---|---|---|---|---|---|---|
| **Department:** Information Technology | | | | **Programme:** B.Tech. | | | | |
| **Semester : -** | | | | **Category :** TA | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITG03 | Introduction to Operating Systems | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | - | | | | | | | |
| **Objective** | • To grasp a fundamental understanding of operating systems | | | | | | | |
| **Outcome** | On successful completion of this course, the students will be able to:<br>• Understand fundamental operating system abstractions such as processes, threads, files, semaphores, IPC abstractions, shared memory regions, etc.,<br>• Understand basic resource management techniques (scheduling or time management, space management, file management and device management) | | | | | | | |
| **UNIT – I** | **Processes and Threads** | | | | | | **Hours: 12** | |
| Introduction to operating systems – review of computer organization – operating system structures – system calls – system programs – system structure – virtual machines. Processes: Process concept – Process scheduling – Operations on processes –Cooperating processes – Interprocess communication – Communication in client-server systems. Concept of threads | | | | | | | | |
| **UNIT – II** | **Process Scheduling and Synchronization** | | | | | | **Hours: 12** | |
| CPU Scheduling: Scheduling criteria – Scheduling algorithms Process Synchronization: The critical-section problem – Synchronization hardware – Semaphores – Classic problems of synchronization Deadlock: System model – Deadlock characterization – Methods for handling deadlocks – Deadlock prevention – Deadlock avoidance – Deadlock detection – Recovery from deadlock. | | | | | | | | |
| **UNIT – III** | **Storage Management** | | | | | | **Hours: 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 – IV** | **File Systems** | | | | | | **Hours: 12** | |
| File-System Interface: File concept – Access methods – Directory structure – File system mounting – Protection. File-System Implementation: Directory implementation – Allocation methods – Free-space management – Efficiency and performance –Recovery – Log-structured file systems. | | | | | | | | |
| **UNIT – V** | **I/O Systems** | | | | | | **Hours: 12** | |
| I/O Systems – I/O Hardware – Application I/O interface – kernel I/O subsystem – streams – performance. Mass-Storage Structure: Disk scheduling – Disk management –Swap-space management – RAID – Disk attachment – Stable storage – Tertiary storage. | | | | | | | | |
| **Total Contact Hours:45** | **Total Tutorials: 15** | **Total Practical Classes:** | | | | | **Total Hours: 60** | |
| **Text Books** | | | | | | | | |
| 1. Silberschatz, Galvin, and Gagne, “Operating System Concepts”, Eigth Edition, Wiley India Pvt Ltd, 2008. | | | | | | | | |
| **Reference Books** | | | | | | | | |
| 1. D. M. Dhamdhere, “Operating Systems: A concepts based approach”, Second Edition, Tata McGraw-Hill Publishing Company Ltd., 2006.<br>2. Harvey M. Deital, “Operating Systems”, Third Edition, Pearson Education, 2004. | | | | | | | | |

| **Department:** Information Technology | | **Programme:** B.Tech. | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Semester : -** | | **Category :** TA | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** |
| ITG04 | Introduction to Database and Oracle | 3 | 1 | - | 4 | 40 | 60 | 100 |
| **Prerequisite** | Computer Fundamentals | | | | | | | |
| **Objective** | • To teach the fundamentals of Database Management System to the students<br>• To make them understand the applications of Database Management System in Practical aspects. | | | | | | | |
| **Outcome** | On successful completion of this course, the students will be able to<br>• know the concepts of Database Management System.<br>• Design ER model for given project.<br>• Use Oracle and Query any given constraint. | | | | | | | |
| **UNIT – I** | **Introduction** | | | | | **Hours: 12** | | |
| Introduction to Database Systems: Overview – Data Models – Database System Architecture –Storage Management- Transaction Management- History of Database Systems. Introduction to Relational Model-Attribute Types | | | | | | | | |
| **UNIT – II** | **Entity-Relationship Model** | | | | | **Hours: 12** | | |
| Basic Concepts – Constraints – Keys – Design Issues – Entity Relationship Diagram –Entity Sets – Design of an E-R Database Schema. Case study: ER modelling | | | | | | | | |
| **UNIT – III** | **SQL** | | | | | **Hours: 12** | | |
| Introduction to SQL - SQL Data-Definition language – Basic Query Structure-Create Table Command – Integrity Constraints- Set Operations . | | | | | | | | |
| **UNIT – IV** | | | | | | **Hours: 12** | | |
| Aggregate Functions – Null Values – Nested Sub-Queries – Views –Modification of Database –Joined Relations – Data-Definition Language. | | | | | | | | |
| **UNIT – V** | | | | | | **Hours: 12** | | |
| Join Expressions- Inner Joint-Outer Joint-Views -Transactions -Integrity Constraints - SQL Data Types and Schemas - Authorization | | | | | | | | |
| **Total Contact Hours:45** | **Total Tutorials: 15** | **Total Practical Classes:** | | | | **Total Hours: 60** | | |
| **Text Books** | | | | | | | | |
| 1. Silberschatz, Korth, Sudarshan, "*Database System Concepts"*, 6th Edition, McGraw-Hill Higher Education, International Edition, 2011. | | | | | | | | |
| **Reference Books** | | | | | | | | |
| 1. Fred R McFadden, Jeffery A Hoffer, M. B. Prescott, "Modern Database Management", 7th Edition, Addison Wesley, 2004.<br>2. Elmasri and Navathe, "Fundamentals of Database Systems", 6th Edition, Addison Wesley, 2010.<br>3. Jefrey D.Ulman, Jenifer Widom, "A First Course in Database Systems", 5th Edition, Prentice Hall, 2009. | | | | | | | | |
| **Websites** | | | | | | | | |
| http://www.databases.about.com | | | | | | | | |

| **Department:** Information Technology | | | **Programme:** B.Tech. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Semester : -** | | | **Category :** TA | | | | | | |
| **Subject Code** | **Subject** | **Hours / Week** | | | **Credit** | **Maximum Marks** | | | |
| | | **L** | **T** | **P** | **C** | **CA** | **SE** | **TM** | |
| ITG05 | Business Process | 3 | 1 | - | 4 | 40 | 60 | 100 | |
| **Prerequisite** | Computer Programming | | | | | | | | |
| **Objective** | • To introduce the fundamental concepts of Business Process to the students.<br>• To make them understand the usage of the Business Process in the current industry scenario. | | | | | | | | |
| **Outcome** | • The student is able to understand the concepts of Business Process.<br>• The student is able to differentiate between the various Business Processes<br>• The student is able to model the Business Process using the standard notation. | | | | | | | | |
| **UNIT – I** | | | | | | | | **Hours: 12** | |
| Introduction – Definition of Business Process- Need and Importance of Business Process – Examples of Business Process - Business Process Excellence. | | | | | | | | | |
| **UNIT – II** | | | | | | | | **Hours: 12** | |
| Business Process Platforms – Specification and Modeling of Business Process – Integration of Business and Production Process – Integration of Business Process and Business Intelligence. | | | | | | | | | |
| **UNIT – III** | | | | | | | | **Hours: 12** | |
| Global View of Business Process – Local View of Business Process – Business Process Modelling – Events in Business Process Modeling – Semantics of Events. | | | | | | | | | |
| **UNIT – IV** | | | | | | | | **Hours: 12** | |
| Decomposing Business Process – Motivation – Seamless Business Process – Business Process Specification – Tools for Process Specifications. | | | | | | | | | |
| **UNIT – V** | | | | | | | | **Hours: 12** | |
| Life cycle of Business Process –– Classification of Business Process - Workflow Management – Business Process Management –Definition – Application- Life Cycle of Business Process Management –Tools of Business Process Management. | | | | | | | | | |
| **Total Contact Hours:45** | **Total Tutorials: 15** | **Total Practical Classes:** | | | | | | **Total Hours: 60** | |
| **Text Books** | | | | | | | | | |
| 1. M.Weske, “Business Process Management: Concepts, Languages, Architectures, ” Springer, 2012<br>2. Dirk Draheim, “Business Process Technology: A Unified View on Business Processes, Workflows and Enterprise Solutions, Springer, 2010. | | | | | | | | | |
| **Reference Books** | | | | | | | | | |
| 1. Martyn A Ould, “Business Process Management: A Rigorous Approach”, British Computer Society, 2004. | | | | | | | | | |
| **Websites** | | | | | | | | | |
| 1. www.bpmn.org<br>2. www.bpmi.org | | | | | | | | | |