

Bachelor of Engineering Subject Code: 3110007

ENVIRONMENTAL SCIENCE 1st Year

Type of course: Mandatory Course

Prerequisite: Interest in natural systems sustaining the life on the earth.

Rationale: To inculcate the environmental values translating into pro-conservation actions. Honorable Supreme Court of India has made it 'mandatory' to introduce a basic course on environment at the undergraduate level.

Teaching and Examination Scheme:

| Tea | aching Sch | neme | Credits | | | Total | | |
|-----|------------|------|---------|--------|---------|-------------|-------|-------|
| L | T | P | С | Theor | y Marks | Practical N | Marks | Marks |
| | | | | ESE(E) | PA (M) | ESE (V) | PA(I) | |
| 2 | 2 | 0 | 0 | 70 | 30 | 0 | 0 | 100 |

Content:

| Sr. No. | Content | Total Hrs | % Weightage |
|---------|---|--------------|-------------|
| 1 | INTRODUCTION TO ENVIRONMENT | 02 | 8 |
| | Definition, principles and scope of Environmental Science. Impacts of | | |
| | technology on Environment, Environmental Degradation, Importance | | |
| | for different engineering disciplines | | |
| 2 | ENVIRONMENTAL POLLUTION | 14 | 44 |
| | a) Water Pollution: Introduction – Water Quality Standards, | | |
| | Sources of Water Pollution, Classification of water | | |
| | pollutants, Effects of water pollutants | | |
| | b) Air Pollution: Composition of air, Structure of atmosphere, | | |
| | Ambient Air Quality Standards, Classification of air | | |
| | pollutants, Sources of common air pollutants like PM, SO ₂ , | | |
| | NO _X , Auto exhaust, Effects of common air pollutants | | |
| | c) Noise Pollution: Introduction, Sound and Noise, Noise | | |
| | measurements, Causes and Effects | | |
| | d) Solid Waste: Generation and management | | |
| | e) Bio-medical Waste: Generation and management | | |
| | f) E-waste: Generation and management | | |
| 3 | GLOBAL ENVIRONMENTAL ISSUES | 06 | 24 |
| | Sustainable Development, Climate Change, Global Warming and | | |
| | Green House Effect, Acid Rain, Depletion of Ozone layer, Carbon | | |
| | Footprint, Cleaner Development Mechanism (CDM), International | | |
| | Steps for Mitigating Global Change | | |



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| 4 | BASIC CONCEPT OF GREEN BUILDING AND SMART CITIES Green Building: Introduction, Objectives, Fundamental Principles, Benefits of Green Building, Examples of Green Building Smart Cities: Concept | 04 | 16 |
|---|---|----|----|
| 5 | CONCEPT OF 4R's Principles, Application of 4R's | 02 | 8 |

Suggested Specification table with Marks (Theory):

| Distribution of Theory Marks | | | | | | |
|------------------------------|---------|---------|---------|---------|---------|--|
| R Level | U Level | A Level | N Level | E Level | C Level | |
| 40 | 40 | 20 | 0 | 0 | 0 | |

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

- 1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha Second edition, 2013 Publisher: Universities Press (India) Private Ltd, Hyderabad.
- 2. Basics of Environmental Studies by Prof Dr N S Varandani ,2013 Publisher: LAP -Lambert Academic Publishing , Germany
- 3. Environmental Studies by Anindita Basak ,2009 Publisher: Drling Kindersley(India)Pvt. Ltd Pearson
- 4. Textbook of Environmental Studies by Deeksha Dave & S S Kateva, Cengage Publishers.
- 5. Environmental Sciences by Daniel B Botkin & Edward A Keller Publisher: John Wiley & Sons
- 6. Environmental Studies by R. Rajagopalan, Oxford University Press
- 7. Environmental Studies by Benny Joseph, TMH publishers
- 8. Environmental Studies by Dr. Suresh K Dhameja, 2007 Published by : S K Kataria & Sons New Delhi
- 9. Basics of Environmental Studies by U K Khare, 2011 Published by Tata McGraw Hill

Course Outcome:

| Sr. | CO statement | Marks % weightage |
|------|---|-------------------|
| No. | | |
| CO-1 | Identify the types of pollution in society along with their sources | 45 |
| CO-2 | Realize the global environmental issues | 25 |
| CO-3 | Conceptualize the principles of Green Buildings and Smart cities | 15 |
| CO-4 | Implement the concept of recycle and reuse in all fields of engineering | 15 |



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List of Tutorials: Based on

- 1. Introduction to Environment
- 2. Water Pollution
- 3. Air Pollution
- 4. Noise Pollution
- 5. Solid Waste
- 6. Bio-medical Waste
- 7. E-waste
- 8. Global Environmental Issues
- 9. Concept of Green Building
- 10. Concept of Smart Cities
- 11. Concept of 4R's

List of Open Source Software/learning website: MOEF, NPTEL



Bachelor of Engineering Subject Code: 3110012

WORKSHOP/ MANUFACTURING PRACTICES

B.E. 1st YEAR

Type of course: Engineering Science **Prerequisite:** Zeal to learn the subject

Rationale: Workshop practice is the backbone of the real industrial environment which helps to develop and enhance relevant technical hand skills required by the technician working in the various engineering industries and workshops. Irrespective of branch, the use of workshop practices in day to day industrial as well domestic life helps to dissolve the problems.

Teaching and Examination Scheme:

| r | Teaching Scheme Credits | | | | Examination Marks | | | | Total Marks |
|---|-------------------------|---|---|---|-------------------|-----|----------------|-----|-------------|
| | L | Т | P | С | Theory Marks | | Practical Mark | KS | |
| | | | | | ESE | PA | ESE | PA | |
| | | | | | (E) | (M) | (V) | (I) | |
| ſ | 0 | 0 | 4 | 2 | 0 | 0 | 80 | 20 | 100 |
| | | | | | | | | | |

Contents:

Introduction to various shops / sections and workshop layouts. Safety norms safety equipment's to be followed in a workshop.

Demonstration of hand tools, power tools, basic measuring instruments, marking and measurement. Overview of Carpentry, Fitting, Smithy shop, Welding, Tin smithy, Electrical and Electronic, Plumbing, Machine shop and machine tools.

Practice:

Students are required to prepare one job each in the following shops: Fitting, Carpentry, Smithy /Tin smithy, Electric Arc welding/ Resistance welding.

Demonstrations of Jobs in following machine shops: Lathe Machine, Drilling Machine, Hacksaw Machine

Course Outcome:

| Sr. No. | CO statement |
|---------|--|
| CO-1 | Understand various manufacturing processes in machine shop and perform basic operations of welding, fitting, smithy and carpentry work a) perform basic operations of welding, fitting, smithy and carpentry work b) Explain various manufacturing processes in machine shop |
| CO-2 | Discuss application of plumbing fitting, masonry items and about plastic molding and glass cutting for various engineering application |
| CO-3 | Measure different electrical quantities and trouble shoot electrical and electronics appliances. |
| CO-4 | Conduct experiments with various kits such as Raspberry and Arduino for embedded system development |
| CO-5 | Use basic commands of computer operating systems |

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Workshop Practice:

- 1) Machine shop
- 2) Fitting shop
- 3) Carpentry
- 4) Welding shop
- 5) Electrical
- 6) Electronics
- 7) Casting
- 8) Smithy
- 9) Plastic moulding & Glass Cutting
- 10) Plumbing and its fitting
- 11) Masonry Work
- 12) IOT
- 13) Software Tools & OS Commands

List of Experiments

Machine shop

- 1. Demonstration of job on Lathe machine
- 2. Demonstration of job on Drilling machine
- **3.** Study of different types of power tools

Fitting Shop

Hands on Practice and job making in Fitting shop

Carpentry

Hands on Practice and job making in Carpentry shop.

Welding shop

- 1. Hands on Practice and job making using Electric arc Welding / Resistance welding process
- 2. Hands on Practice and job making using Soldering process

Casting:

Demonstration of Pattern Making by sand moulding

Smithy

Hands on Practice and job making in Smithy/ Tin smithy shop.

Plumbing and its fitting

- 1) Types of Pipes and Fittings
- 2) Joints (PVC and Metal)
- 3) Plumbers tools and equipment's
- 4) Cutting and bending of different mental pipes

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- 5) Pipe fitting
- 6) Plumbing symbols
- 7) Plumbing services
- 8) Sanitary Pipes and Fittings
- 9) Joints

Plastic moulding & Glass Cutting

Masonry Work

- 1) Different types of Bricks
- 2) Different size and part of Bricks
- 3) Different types of Bonds
- 4) Types of tools used for various masonry works

Electrical

- 1. Measure voltage, current, frequency, phase difference, power, power factor for single and three-phase supply
- 2. Wire fan, tube light, two-way control (staircase wiring).
- 3. Wire MCB, ELCB for a given load circuit
- 4. Preparing the drawing for wiring a newly built room, without any electrical wiring along with a bill of materials with specifications; the room may be a class-room, an office, a shop, a clinic, a small workshop etc.
- 5. Identify and rectify open circuit, and short circuit faults in PCB/System
- 6. Solder and de-solder electronic components on different types of PCB
- 7. Identify various types of ports and connectors

Electronics:

- 1) Introduction to basic electronics components and its testing: Resistors, Inductors, Capacitor, Diode, BJT
- 2) Introduction to testing and Measurement Instruments: Power Supply, Function Generator, Oscilloscope

IOT

Arduino starter kits or raspberry pi

i.e. Arduino Starter kit mostly includes following:, Similarly for Raspberry pi use whatever required

- An Arduino or Raspberry
- Jumper wires
- Resistors
- Breadboard
- LEDs
- Buttons



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Case Studies/Demonstration

- 1. Arduino LED On/Off
- 2. Or Raspberry LED/On

It requires

- LED
- Resistor
- Connecting wires
- 3. Arduino alarm system which detects movement of an intruder with a high pitched alarm sounds and flashing lights.

It requires

- An ultrasonic "ping" sensor –HC-SR04 or PIR
- A piezo buzzer
- LED strip light
- 4. Arduino Trafiic Light Controller
- 5. raspberry pi on screen keyboard app.

It requires

- Red, yellow and green LEDs.
- A breadboard.
- 6 x 220 resistors.
- Connecting wires.
- 1 x pushbutton switch.
- 1 x 10k resistor

Software Tools & OS Commands

Dream weaver Web development Tool

Student Has to build his own Web Site consisting of basic profile about his department, his own personnel profile and basic Institute Details

Student Has to learn any of Two OS (Windows,Linux,Unix,MacOS,Apple,Android)

Student has to learn basic Windows and Linux/Ubuntu shell commands and have to develop simple shell script.

Journal is to be prepared covering the topics of demonstration and report about process / methodology /



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inspection for making jobs.

Major Equipment: Lathe machine, drilling machine, grinding machine, Resistance and Arc Welding machine, Hacksaw machine, Fitting, Carpentry and Plumbing vice, various types of files for fitting shop, hand hacksaw, monkey spanner, die, chisels, jack plane, furnace, anvil, different types of hammers for various shops, tongs, scissors, hand shear machine, sheet cutter, welding goggles, welding gloves, Soldering iron, Moulding box, different wooden/ metal patterns.

List of Open Source Software/learning website: http://nptel.iitm.ac.in/courses.php

Reference Books:

- 1. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
- 2. Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata McGraw Hill House, 2017.
- 3. Workshop Technology Vol. 1 and 2 by Raghuvanshi B.S. Dhanpat Rai & Sons1998
- 4. Workshop Technology by Chapman W.A. J and Arnold E. Viva low priced student edition, 1998
- 5. Workshop Practices, H S Bawa, Tata McGraw-Hill, 2009

P.S: Out of 13 activities, college has to opt for any 8 activities for a specific branch. Each activity will be of 4 hours per semester.

GUJARAT TECHNOLOGICAL UNIVERSITY B. E. FIRST YEAR

Subject Name: Calculus Subject Code: 110014

Course Objectives of Calculus:

Students entering in Calculus should have a firm grasp of algebra and trigonometry. They should be able to graph elementary functions and solve both linear equations and inequalities.

The objective of Calculus is for students to learn the basics of the Calculus. They will study Convergence of series, Curve tracing, Expansion of function and error estimation, an introduction to the Fundamental Theorem of Calculus, Partial differentiation and its applications, Multiple integrals and its applications.

More generally, the students will improve their ability to think critically, to analyze a real problem and solve it using a wide array of mathematical tools. These skills will be invaluable to them in whatever path they choose to follow, be it as a mathematics major or in pursuit of a career in one of the other sciences.

They will also able to apply these ideas to a wide range of problems that include the equations of motion, related rates, curve sketching and optimization. The students should be able to interpret the concepts of Calculus algebraically, graphically and verbally.

After the successful completion of the course, students will be able to

- Determine the convergence of infinite series
- Calculate the derivatives of functions of several variables
- Graphing and optimization of the functions
- Compute the basic multiple integrals

The course is designed in such a way that it can be covered comprehensively in period of semester.

| Sr. No | Course Content | Total Hrs. |
|-----------|---|---------------|
| 1. | Convergence of Sequences and Series, Power Series and radius of convergence. | 04 |
| 2. | Monotonic function, Concavity and Convexity of a curve, Points of inflection, Curve tracing: Cartesian and Polar curves. | 03 |
| 3. | Taylor's series, Maclaurin's series, Convergence of Taylor's series and error estimation, Indeterminate forms, | 05 |
| 4. | Fundamental theorem of calculus, Leibnitz,s Rule, Reduction formulae. | 06 |
| 5. | Improper Integrals and its convergence, Application of definite integrals: volume by slicing, by rotation about an axis and by cylindrical shells. | 06 |
| 6. | Limit, Continuity of functions of several variables, Partial derivatives, Chain rules, Euler's theorem | 04 |
| 7. | Application of partial derivatives: Tangent planes and normal, Linearization and error approximation, extreme values and saddle points, Lagrange multipliers, partial derivatives with constrained variables, Taylor's expansion. | 08 |
| 8. | Double and Triple integrals, Change of order of integration, Change of variables, Jacobian. Applications: Area, Volume. | 06 |

Text Books:

- 1. Maurice D. Weir, Joel Hass, Frank R. Giordano, Thomas' Calculus, Person Education (11th edition) Sections: 11.1-11.7, 4.4, 2.5, 10.5-10.6, 11.8-11.9, 4.6, 5.4, 14.6-14.10
- 2. James Stewart, Calculus (5th Edition), Thomson (2003).Sections: 6.1-6.3, 14.1-14.5, 14.7-14.8, 15.1-15.4, 15.6-15.9

Reference Books:

- 1 Hughes Hallett et al., Calculus Single and Multivarible (3rd Edition), John-Wiley and Sons (2003).
- 2 T. M. Apostol, Calculus, Volumes 1 and 2 (2nd Edition), Wiley Eastern (1980).

GUJARAT TECHNOLOGICAL UNIVERSITY B. E. FIRST YEAR

Subject Name: **Elements of Civil Engineering** Subject Code: **110004**

| Sr. No | Course Content | Total Hrs. |
|-----------|---|---------------|
| 1. | Scope of Civil Engineering | 03 |
| | Introduction: Impact of Infrastructural Development on the Economy of a Country, Role of Civil Engineers, Importance of Planning, Scheduling and Construction Management. | |
| 2. | Surveying | 04 |
| | Introduction: Surveying and levelling, Object and uses, Primary divisions, Fundamental principles, Classification of surveying, Plans and maps, Scales, Units of measure. | |
| | Linear measurements: | 04 |
| | Methods, Instruments used in chaining; Chain surveying, Ranging, Errors in chaining, Conventional symbols. | |
| | Compass surveying: | 09 |
| | Types and uses of compass, Bearings, Whole Circle Bearings and Reduced Bearings, Computation of angles; Meridians & its related examples; declinations and dip of needle; Chain and compass surveying field work. | |
| | Elevation measurements: | 09 |
| | Levelling, object and uses, terms used in levelling, leveling instruments, methods of levelling, recording and methods of reducing, errors in leveling & examples related to levelling, contours; characteristics and applications. | |
| | Areas and volumes; use of a Planimeter | 03 |
| | Modern Tools of Surveying and Mapping: | 03 |
| | Introduction to Global Positioning System, Remote Sensing and Geographic Information System | |

| 3. | Construction Materials: | 09 |
|----|---|----|
| | Requirement, types, uses, properties and importance of Civil Engineering materials like Stone, Bricks, Lime, Cement, Ferrous and Non Ferrous Metals, Ceramic Materials, Timber, Sand, Aggregate, Mortar and Concrete, Paints and Varnishes, Glass, Plastic. | |
| 4. | Elements of Building Construction: | 12 |
| | Planning: Elementary principles and basic requirements of a building planning, layout of residential & industrial buildings. Introduction to Plan, Elevation & Section of Residential Building. | |
| | Construction: Classification of buildings based upon occupancy and structure, Design Loads, Common building components, their functions, and nominal dimensions. Elements of building drawing, Introduction to building byelaws | |
| 5. | Water Resources Development: | 05 |
| | Elementary Hydrology, Sources of water, Watershed Development, water requirements and its conservation, Basic Introduction of Hydraulic Structures of Storage (Only Dams), | |
| 6. | Transportation Engineering: | 05 |
| | Role of Transportation in National development, Transportation Ways, Surface-Transportation and Aviation, BOT & BOOT Projects for Highways, Elements of Traffic Engineering and Traffic Control. | |

Reference Books:

1. Title : Surveying Vol .I & II Author: Dr. B. C. Punamia

Publisher: Laxmi Publication Delhi

2. Title: Surveying Vol. I and II

Author: S. K. Duggal

Publisher: Tata Macgraw hill Publication New Delhi

3. Title: Civil Engg. Drawing Author: S. C. Rangwala

Publisher: Charotar Pub. House Anand

4. Title: Building Construction Author: Dr. B. C. Punamia Publisher: Laxmi Pub. Delhi 5. Title: Engineering Material Author: Dr. S.C. Rangwala Publisher: Charotar Pub. House

6. Title: Highway Engineering Author: Khanna S. K. and Justo C. E.G. Publisher: Nemchand and Brothers

7. Title: Irrigation Engineering and Hydraulic Structures Author: Santoshkumar Garg Publisher: Khanna Publishers Delhi



Bachelor of Engineering Subject Code: 3110013 ENGINEERING GRAPHICS & DESIGN 1st YEAR

Type of course: Engineering Science

Prerequisite: Zeal to learn the subject

Rationale: Engineering Drawing is an effective language of engineers. It is the foundation block which strengthens the engineering & technological structure. Moreover, it is the transmitting link between ideas and realization.

Teaching and Examination Scheme:

| Te | aching Sche | me | Credits | | Examination Marks | | | |
|----|-------------|----|---------|--------|-------------------|----------|----------|-------|
| | | | | Theory | Marks | Practica | al Marks | Total |
| L | T | P | C | ESE | PA | ESE | PA | Marks |
| | | | | (E) | (M) | Viva (V) | (I) | |
| 2 | 0 | 4 | 4 | 70 | 30 | 30 | 20 | 150 |

Content:

| Sr. | Topics | Teaching | Module |
|-----|--|-----------|-----------|
| No. | 10 p. 00 | Hrs. | Weightage |
| 1 | Introduction to Engineering Graphics: Drawing instruments and | 2 (Lab | 20% |
| | accessories, BIS – SP 46. Use of plane scales, Diagonal Scales and | teaching) | |
| | Representative Fraction | | |
| 2 | Loci of Points: Path of the points moving on Simple mechanisms, | 2 | |
| | Slider crank mechanism, Four bar mechanism | | |
| 3 | Engineering Curves: Classification and application of Engineering | 6 (Lab | |
| | Curves, Construction of Conics, Cycloidal Curves, Involutes and | teaching) | |
| | Spirals along with normal and tangent to each curve | | |
| 4 | Projections of Points and Lines: Introduction to principal planes of | 8 | 30% |
| | projections, Projections of the points located in same quadrant and | | |
| | different quadrants, Projections of line with its inclination to one | | |
| | reference plane and with two reference planes. True length and | | |
| | inclination with the reference planes | | |
| 5 | Projections of Planes: Projections of planes (polygons, circle and | 6 | |
| | ellipse) with its inclination to one reference plane and with two | | |
| | reference planes, Concept of auxiliary plane method for projections | | |
| | of the plane | | |
| 6 | Projections of Solids, Section of Solids and Development of | 10 | 15% |
| | Surfaces: Classification of solids. Projections of solids (Cylinder, | | |
| | Cone, Pyramid and Prism) along with frustum with its inclination to | | |
| | one reference plane and with two reference planes, Section of such | | |
| | solids and the true shape of the section, Development of surfaces | | |
| 7 | Orthographic Projections: Fundamental of projection along with | 2 | 25% |
| | classification, Projections from the pictorial view of the object on the | | |



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| | principal planes for view from front, top and sides using first angle projection method and third angle projection method, full sectional | | |
|---|---|-----------|-----|
| | view | | |
| 8 | Isometric Projections and Isometric View or Drawing: Isometric | 2 (Lab | |
| | Scale, Conversion of orthographic views into isometric projection, | teaching) | |
| | isometric view or drawing of simple objects | | |
| 9 | Computer Aided Drawing: | 4 (Lab | 10% |
| | Introduction to AutoCAD, Basic commands for 2D drawing like: | teaching) | |
| | Line, Circle, Polyline, Rectangle, Hatch, Fillet, Chamfer, Trim, | | |
| | Extend, Offset, Dim style, etc | | |

Suggested Specification table with Marks (Theory):

| Distribution of Theory Marks | | | | | | | |
|------------------------------|---------|---------|---------|---------|---------|--|--|
| R Level | U Level | A Level | N Level | E Level | C Level | | |
| 25 | 30 | 30 | 5 | 5 | 5 | | |
| | | | | | | | |

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Reference Books:

- 1. A Text Book of Engineering Graphics by P.J.Shah S.Chand & Company Ltd., New Delhi
- 2. Elementary Engineering Drawing by N.D.Bhatt Charotar Publishing House, Anand
- 3. A text book of Engineering Drawing by R.K.Dhawan, S.Chand & Company Ltd., New Delhi
- 4. A text book of Engineering Drawing by P.S.Gill, S.K.Kataria & sons, Delhi
- 5. Engineering Drawing by B. Agrawal and C M Agrawal, Tata McGraw Hill, New Delhi

Course Outcome:

| Course | Outcome. | |
|--------|---|-------------------|
| Sr. | CO statement | Marks % weightage |
| No. | | |
| CO-1 | Know and understand the conventions and the methods of engineering | 15 |
| | drawing. | |
| CO-2 | Interpret engineering drawings using fundamental technical | 25 |
| | mathematics. | |
| CO-3 | Construct basic and intermediate geometry and comprehend the theory | 25 |
| | of projection. | |
| CO-4 | Improve their visualization skills so that they can apply these skills in | 25 |
| | developing new products. | |
| CO-5 | Improve their technical communication skill in the form of | 05 |
| | communicative drawings. | |
| CO-6 | Use computer software for engineering drawing. | 05 |
| | | |



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List of Practical:

Students must prepare sketch book and drawing sheets on the following topics. **Minimum three** problems must be given for sheet number 3 to 9.

- 1. Practice sheet (which includes dimensioning methods, different types of line, construction of different polygon, divide the line and angle in parts, use of stencil)
- 2. Plane scale and diagonal scale
- 3. Loci of points (only sketch book)
- 4. Engineering curves
- 5. Projection of line
- 6. Projection of plane
- 7. Projection of solid, section of solid and development of surfaces
- 8. Orthographic projection
- 9. Isometric projection
- 10. At least one orthographic drawing (three views) using above mentioned AutoCAD commands.



Bachelor of Engienering Subject Code: 3110005 BASIC ELECTRICAL ENGINEERING 1st Year

Type of course: Engineering Science

Prerequisite: NA

Rationale: Electricity has been the main source of energy for the developing and developed countries. Per capita consumption of electricity of a country can be considered as an indicator of the development of the country. In view of this, it is essential for all engineering graduates to know the basic aspects of electrical engineering. This subject deals with basic circuit solution methods, introduction to electrical machines and basics of domestic electrical installations.

Teaching and Examination Scheme:

| Tea | aching Sch | neme | Credits | | Examination Marks | | | |
|-----|------------|------|---------|--------|------------------------------|---------|-------|-------|
| L | T | P | C | Theor | Theory Marks Practical Marks | | | Marks |
| | | | | ESE(E) | PA (M) | ESE (V) | PA(I) | |
| 3 | 0 | 2 | 4 | 70 | 30 | 30 | 20 | 150 |

Content:

| Sr. No. | Content | Total Hrs | % Weightage |
|---------|--|--------------|-------------|
| 1 | DC Circuits: | 8 | 20 |
| | Electrical circuit elements (R, L and C), voltage and current sources, | | |
| | Kirchoff's current and voltage laws, analysis of simple circuits with dc | | |
| | excitation. | | |
| | Superposition, Thevenin and Norton Theorems. | | |
| | Time-domain analysis of first-order RL and RC circuits. | | |
| 2 | AC Circuits | 10 | 25 |
| | Representation of sinusoidal waveforms, peak and RMS values, Phasor | | |
| | representation of AC quantities, real power, reactive power, apparent | | |
| | power, power factor. | | |
| | Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC | | |
| | combinations (series and parallel), | | |
| | Series and parallel resonance. | | |
| | Three phase balanced circuits, voltage and current relations in star and | | |
| | delta connections, Power measurement in three phase circuits. | | |
| 3 | Transformers | 8 | 15 |
| | Magnetic materials, BH characteristics. | | |
| | Construction and working principle of single phase and three phase | | |
| | transformers. | | |
| | Ideal and practical transformer. | | |
| | Auto-transformer and its applications. | | |
| 4 | Electrical Machines | 8 | 20 |
| | Generation of rotating magnetic fields. | | |



Bachelor of Engienering

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| | Construction and working of following machines: | | |
|---|---|---|----|
| | Three-phase induction motor | | |
| | Single-phase induction motor. | | |
| | Separately excited DC motor. | | |
| | Synchronous generators. | | |
| 5 | Electrical Installations | 8 | 20 |
| | Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, | | |
| | MCCB. | | |
| | Types of Wires and Cables. | | |
| | Earthing – Types of earthing and its importance. | | |
| | Safety precautions for electrical appliances. | | |
| | Types of Batteries, Important Characteristics for Batteries. | | |
| | Elementary calculations for energy consumption. | | |
| | Basics of power factor improvement. | | |

Suggested Specification table with Marks (Theory):

| Distribution of Theory Marks | | | | | | | |
|------------------------------|---------|---------|---------|---------|---------|--|--|
| R Level | U Level | A Level | N Level | E Level | C Level | | |
| 40 | 20 | 20 | 20 | 0 | 0 | | |
| | | | | | | | |

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

- (i) D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
- (ii) Basic Electrical Engineering Nagsarkar and Sukhija, Oxford University Press
- (iii) B. L. Theraja, "Electrical Technology Part I and II", S. Chand and Co. 2012
- (iv) D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
- (v) L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
- (vi) E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
- (vii) V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

Course Outcomes

| Sr. No. | CO statement | Marks % weightage |
|---------|---|-------------------|
| CO-1 | Apply fundamental electrical laws and circuit theorems to electrical circuits. | 20 |
| CO-2 | Analyze single phase and three phase AC circuits. | 25 |
| CO-3 | Describe operating principle and applications of static and rotating electrical machines. | 35 |
| CO-4 | Comprehend electrical installations, their protection and personnel safety. | 20 |



Bachelor of Engienering Subject Code: 3110005

List of Experiments:

- (1) Introduction and use of measuring instruments voltmeter, ammeter, multi-meter, oscilloscope. Resistors, Capacitors and Inductors.
- (2) To verify the DC circuit currents and voltages by calculations and actual measurements.
- (3) To verify the Kirchoff's current and voltage laws.
- (4) To verify the Network theorems.
- (5) To obtain sinusoidal steady state response of R-L and R-C circuits impedance calculation and verification. Observation of phase differences between current and voltage.
- (6) Measuring the steady-state and transient time-response of R-L, R-C, and R-L-C circuits to a step change in voltage (transient may be observed on a Digital Storage Oscilloscope).
- (7) To verify the resonance in R-L-C circuits.
- (8) To measure the power in three phase circuits using two wattmeter method.
- (9) To verify the current and voltage relationships in three phase star and delta connections.
- (10) Demonstration of cut-section models and charts of various machines.
- (11) Demonstration of domestic installations like MCB, ELCB, MCCB etc.
- (12) Understanding of various safety precautions for electrical installations.
- (13) Demonstration of various types of wires and cables.
- (14) Understanding of various electricity bills and calculations for energy consumption.
- (15) To verify the power factor improvement in single phase AC circuit.

Major Equipment:

Ammeters, Voltmeters, Wattmeters, Resistors, Capacitors and Inductors of appropriate rating. Multimeters, Digital storage oscilloscope, Cut section models/charts of various machines, Demo units for MCB, ELCB, MCCB etc, Samples of wires and cables. Charts for earthing and safety precautions.

List of Open Source Software/learning website:

www.vlabs.co.in

GUJARAT TECHNOLOGICAL UNIVERSITY B. E. FIRST YEAR

Subject Name: Computer Programming and Utilization Subject Code: 110003

| Sr. No. | Topic | Total Hrs |
|------------|---|--------------|
| 1 | Introduction to computer and programming | 06 |
| | Introduction, Basic block diagram and functions of various components of computer, Concept of Hardware and Software, Types of software, Compiler and Interpreter, Concepts of Machine level, Assembly level and High level programming, Flow charts and Algorithms. | |
| 2 | Fundamentals of 'C' | 04 |
| | Features of C language, structure of C program, comments, header files, data types, constants and variables, operators, expressions, evaluation of expressions, type conversion, precedence and associativity, I/O functions | |
| 3 | Control Structures in 'C' | 06 |
| | Simple statements, Decision making statements, Looping statements, Nesting of control structures, break and continue statement, goto statement | |
| 4 | Array & String | 04 |
| | Concept of array, One and Two dimensional arrays, declaration and initialization of arrays, String, String storage, Built-in string functions | |
| 5 | Functions | 04 |
| | Concept of user defined functions, prototype, definition of function, parameters, parameter passing, calling a function, recursive function, Macros, Preprocessing | |
| 6 | Pointers | 04 |
| | Basics of pointers, pointer to pointer, pointer and array, pointer to array, array of pointers, function returning a pointer | |
| 7 | Structure and Union | 04 |
| | Basics of structure, structure members, accessing structure members, nested structures, array of structures, structure and functions, structures and pointers, unions, bit-fields | |

8 File Management 04
Introduction to file management, Simple file management functions for text files, Reading from and writing to files.

Guidelines:

- 1. Theory hours are to be utilized to teach the concepts and syntax with the use of simple programs.
- 2. Practical hours are to be utilized for making exhaustive programming practice for real life examples.
- 3. The theory examination should contain approximate 1/3 weightage for programming problems.

Text Books:

- 1. Programming in ANSI C, Forth Edition, E Balagurusamy, TMH
- 2. C: The Complete Reference, Herbert Schildt, McGrawHill

Reference Books:

- 1. Programming in C, Ashok Kamthane, Pearson
- 2. Computer concepts and Programming, Vikas Gupta, dreamTech
- 3. Computer fundamentals and Programming in C, Pradip dey and Manas Ghosh, Oxford

GUJARAT TECHNOLOGICAL UNIVERSITY B. E. FIRST YEAR

Subject Name: **Mechanics of Solids**Subject Code: **110010**

| Sr. No. | Topic | Total Hrs |
|------------|--|--------------|
| 1 | Introduction: | 1 |
| | Scalar and vector quantities, Composition and resolution of vectors, System of units, Definition of space, time, particle, rigid body, force. | |
| 2 | Fundamentals of Statics: | 9 |
| | Force: Types of Forces, Characteristics of a force, System of forces. | |
| | Coplanar concurrent forces: Resultant of coplanar concurrent force system by analytical method only- Law of parallelogram of forces, Law of triangle of forces, Law of polygon of forces, Composition and resolution of forces, Equilibrium conditions for coplanar concurrent forces, Equilibrant, Free body diagrams, Lami's theorem. | |
| | Coplanar non-concurrent forces: Moments & couples, Characteristics of moment and couple, Equivalent couples, Force couple system, Varignon's theorem, Parallel forces, Resultant of non-concurrent forces by analytical method only, Equilibrium conditions of coplanar non-concurrent force system, Equilibrant, Free body diagrams. | |
| 3 | Truss | 4 |
| | Analysis of plane truss, Static determinacy of plane truss, Methods of analysis of truss, Zero force members, Analysis of simple determinate plane trusses using method of joints and method of sections. | |
| 4 | Center of gravity and moment of inertia | 6 |
| | Center of gravity and centroid: Centroid of lines, plane areas and volumes, Pappus – Guldinus first and second theorems. | |
| | Moment of inertia of planar cross-sections: Parallel & perpendicular axes theorems, polar moment of inertia, radius of gyration of areas. | |
| 5 | Friction | 6 |
| | Theory of friction, Types of friction, Static and kinetic friction, Cone of friction, Angle of repose, Coefficient of friction, Laws of friction, Friction on inclined plane, ladder friction, wedge friction, belt and rope friction. | |

| 6 | Simple stresses & strains | 9 |
|---|---|---|
| | Normal/axial stresses: Tensile & compressive, Shear and complementary shear. | |
| | Strains: Linear, shear, lateral, thermal and volumetric. Elastic Constants: Modulus of elasticity, Poisson's ratio, Modulus of rigidity and bulk modulus (Definitions only) | |
| | Analysis of normal stress & strains: Homogeneous and composite bars having uniform & stepped sections axial loads and thermal loads, hoop stresses, analysis of homogeneous prismatic bars under multidirectional stresses. | |
| 7 | Statically determinate beams | 4 |
| | Beams: Types of loads, Types of supports, Types of beams; Determination of support reactions. | |
| | Bending moment and shear force: Relationship between loading, shear force & bending moment, Bending moment and shear force diagrams for beams subjected to only three types of loads :i) concentrated loads ii) uniformly distributed loads iii) couples and their combinations; Point of contraflexure. | |
| 8 | Stresses in homogeneous beams | 4 |
| | Bending stress in beams: Pure bending, Theory of pure bending, Neutral axis, Moment of resistance, Relationship between moment of resistance, Bending stress, moment of inertia, Radius of curvature and modulus of elasticity; Section modulus. | |
| | Shear stress in beams: Horizontal shear stress, Relationship between shear force, shear stress and moment of inertia; Horizontal shear stress distribution diagrams across beam section; average shear stress | |
| 9 | Principal stresses | 5 |
| | Analytical solution for elements under axial and shear stress: Normal, tangential and resultant stress on inclined plane, angle of obliquity of resultant stress, maximum shear stress, principal planes and principal stresses, principal stresses in beams under bending and shear. | |
| L | | |

Laboratory Instructions:

The students shall be studying of following in laboratory hours; the same shall be examined during **practical examinations only**.

(a) **Simple Machines:** Velocity ratio, mechanical advantage, efficiency, reversibility of machines, simple machines such as levers, pulley and pulley blocks, wheel and differential axle, Single purchase/double purchase crab, compound screw jacks.

(b) Physical & Mechanical properties of structural materials: Elastic, homogeneous, isotropic materials; limits of elasticity and proportionality, yield limit, ultimate strength, strain hardening, proof stress, factor of safety, working stress, load factor, Properties related to axial, bending, and torsional & shear loading, Toughness, hardness

Experiments:

Students will have to perform following experiments (Five from each group) in laboratory and shall prepare the laboratory manual.

Group-I

- 1. Equilibrium of coplanar concurrent forces
- 2. Equilibrium of coplanar concurrent forces
- 3. Equilibrium of coplanar parallel forces: Determination of reactions of simply supported beam
- 4. Verification of principle of moment: Bell crank lever
- 5. Determination of member force in a triangular truss
- 6. Determination of coefficient of static friction using inclined plane
- 7. Determination of parameters of machines (Any two)
 - (a) Wheel and differential axles
 - (b) Single purchase crab
 - (c) Double purchase crab
 - (d) System of pulleys

Group-II

- 1. Determination of hardness of metals: Brinell /Vicker/Rockwell hardness test
- 2. Determination of impact of metals: Izod/Charpy impact test
- 3. Determination of compression test on
 - (a) Metals -mild steel and cast iron
 - (b) Timber –along and parallel to the grains
- 4. Determination of tensile strength of metals
- 5. Determination of shear strength of metals
- 6. Determination of transverse strength of beam
- 7. Determination of flexural strength of tiles

BOOKS:

- 1. Engineering Mechanics (Statics) Beer and Johnston
- 2. Applied Mechanics S. B. Junnarkar & H. J. Shah
- 3. Mechanics of Structure Vol. I S. B. Junnarkar & H. J. Shah
- 4. Mechanics of Materials Beer and Johnston

GUJARAT TECHNOLOGICAL UNIVERSITY B. E. FIRST YEAR

Subject Name: Vector Calculus and Linear Algebra

Subject Code: 110015

Course Objectives of Vector Calculus and Linear Algebra:

This course is designed to develop the intuitive understanding and computational skills necessary for the concepts of calculus of functions of several variables by tying together vector calculus and vector algebra. To be successful in this course, student should have adequate knowledge of elementary calculus and set theory.

The course objective is to introduce the student to the concepts of vector-valued functions, vector analysis and vector algebra. Students will learn in detail about Gradient, Curl, Divergence, Line integration, Surface integration. It is leading to learn the Green's theorem, Stoke's theorem and Divergence Theorem. They will also learn all the basics of vector spaces like subspaces, linear span, linear independence of vectors, basis of vector space, solution space of simultaneous linear system of equations, determinants and its properties of higher order, linear transformation of real vector spaces, matrix of linear transformations, change of basis, inner product space and gram-schmidt process, eigen values and eigen vectors and application to quadric forms.

After the successful completion of the course, students will be able to

- Determine the line integration, surface integration
- Understand the vector space and its properties
- Establish the linear transformations and inner product
- Recognize applications to quadratic forms

The course will help students to apply these concepts to the problems related to models in work, circulation and flux Problems, hydrodynamics and fluid dynamics, electrical circuits, networking, linear programming, graph theory, computer graphics, construction of curves and surfaces through specified points etc.

The course is designed in such a way that it can be covered comprehensively in a semester course.

| Sr. No. | Contents | Total Hrs |
|------------|--|--------------|
| 1 | Gradients and Directional derivatives | 01 |
| 2 | Parametrization of curves, Arc length and surface area of parametrized curves and surfaces. | 02 |
| 3 | Line integrals, Work, circulation, flux, path independence, conservative field, surface integrals | 03 |
| 4 | Divergence and curl, Green's theorem, Stoke's theorem and Divergence theorem. | 05 |
| 5 | Vectors in R ⁿ , properties of R ⁿ , dot product, norm and distance properties in R ⁿ , Pyathagorean theorem in R ⁿ , Vector Spaces, Vector Subspaces, Linear independence and dependence, Linear span, Basis of subspaces, Extension to basis. | 07 |
| 6 | Methods to solve system of linear equations: Gauss elimination, Gauss Jordan method, Elementary row operation, Row reduced echelon form, Inverse of matrices, Row space, Column space, Null space, Rank. | 07 |
| 7 | Determinants and its properties, Cramer's rule. | 02 |
| 8 | Linear transformation in R ⁿ and basic properties, Linear transformation as Rotation, reflection, expansion, contraction, shear, projection, Matrix of linear transformations, Change of basis and Similarity, Rank Nullity theorem. | 05 |
| 9 | Inner product space and properties, Angel and orthogonality and normality of basis, Gram Schmidt's process, Least squares approximations (linear system) | 05 |
| 10 | Eigen values and eigen vectors, Caley-Hamilton theorem, Eigen values of orthogonal, symmetric, skew symmetric, hermitian, skew hermitian, unitary and normal matrices, Algebraic and Geometric multiplicity, Diagonalization by similarity transformation, Spectral theorem for real symmetric matrices, Application to quadratic forms. | 05 |

Text Books:

- 1. E. Kreyszig, Advanced Engineering Mathematics (8th Edition), Wiley-India (1999) Sections: 8.9-8.11, 9.1-9.9
- 2. H. Anton, Elementary Linear Algebra with applications (9th Edition), Wiley-India (2008).Chapters 1 to 8 and Articles 9.5-9.7.

Reference Books:

- 1. Hughes Hallett et al., Calculus Single and Multivarible (3rd Edition), John-Wiley and Sons (2003).
- G. Strang, Linear Algebra and its applications (4th Edition), Thomson, (2006).
- 3. S. Kumaresan, Linear Algebra A Geometric Approach, Prentice Hall India (2006).
- 4. Maurice D. Weir, Joel Hass, Frank R. Giordano, Thomas' Calculus, Person Education (11th edition)

COMMUNICATION SKILLS SUBJECT CODE: 2110002 B.E. 1ST YEAR

Type of course: Communication skills

Prerequisite: Zeal to learn the subject

Rationale: The rationale of Technical Communication Skills in English is to help students understand the process of communication in link with Non – verbal Communication. The curriculum also targets the understanding of different barriers that creep into communication process. Moreover Units covered on LSRW skills development will help students acquire competence over linguistic skills. This would be developed through balanced and integrated tasks.

Teaching and Examination Scheme:

| Teaching Scheme Credits | | | | Examination Marks | | | | Total |
|-------------------------|---|---|---|-------------------|-----|-----------------|-----|-------|
| L | T | P | С | Theory Marks | | Practical Marks | | Marks |
| | | | | ESE | PA | ESE | PA | |
| | | | | (E) | (M) | Pr/Viva (V) | (I) | |
| 2 | 0 | 2 | 4 | 70 | 30* | 30 | 20 | 150 |

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Contents:

| Sr. No. | Topics | Teaching Hrs. | Module Weightage |
|------------|---|---------------|---------------------|
| | Basics of Communication | | |
| | Definition and Process of Communication | | |
| 1 | • Kinesics | 4 | 150/ |
| 1 | Paralinguistics | | 15% |
| | Proxemics | | |
| | • Chronemics | | |
| | Presentation Strategies | | |
| | Defining the Purpose of Presentation | | |
| 2 | How to Make an Effective Presentation: | 2 | 10% |
| | i) Analyzing audience and locale | | |
| | ii) Organizing content and preparing an outline | | |
| | Listening Ability | | |
| | Hearing and Listening | | |
| 3 | Types of Listening | 2 | 10% |
| | Barriers to Effective Listening | | |
| | Traits of a Good Listener | | |
| | Reading Fluency | | |
| 4 | Introduction | 4 | 15% |
| | Reading Strategies | | |

| | Techniques of reading | | |
|---|---|---|-----|
| | Developing Reading Comprehension | | |
| | Writing: Mastering the Final Skill | | |
| | Paragraph writing (Application Que) | | |
| | Business Letters (Application Que) | | |
| | Report Writing (Application Que) | | |
| _ | Completion of a Given Story (Application Que) | _ | |
| 5 | E-mail etiquettes | 6 | 25% |
| | Note: Only Practical/Application Questions of | | |
| | writing skills should be asked in ESE, the | | |
| | theory of the above mentioned topics can be | | |
| | explained in the class. | | |
| | Enriching Language through Literature | | |
| | Poems | | |
| | • The Road Not Taken by Robert Frost | | |
| 6 | • Goodbye Party for Miss Pushpa T S by Nissim Ezekiel | 6 | 25% |
| | Short Stories | | |
| | • The Eyes Are Not Here by Ruskin Bond | | |
| | • The Romance of a Busy Broker by O. Henry | | |

Language Laboratory Activities:

| Sr.No | Activity | Hour | | | |
|-------|---|------|--|--|--|
| 1. | Comprehension Practical | 02 | | | |
| 2. | Picture Description and completion of a story | 02 | | | |
| 3. | Book Review | 04 | | | |
| | List of Books Suggested for the Book Review | | | | |
| | The Secret by Rhonda Byrne | | | | |
| | My Experiments with Truth by M K Gandhi | | | | |
| | Hind Swaraj by M K Gandhi | | | | |
| | Wings of Fire by A P J Abdul Kalam | | | | |
| | History of Everything by Stephen Hawking | | | | |
| | | | | | |
| | Haroun and the sea of stories by Salman Rushdie | | | | |
| | Abhigyan Shakutalam by Kalidasa | | | | |
| | Who Moved My Cheese by Robin Sharma | | | | |
| | You Can Win by Shiv Khera | | | | |
| | Stay Hungry Stay Foolish by Rashmi Bansal | | | | |
| | The Monk Who Sold His Ferrari by Robin Sharma | | | | |
| | I am Ok You are Ok by Thomas Harris | | | | |
| | The Eighth Habit by Stephen Covey | | | | |
| | Bhagvat Gita on Effective Leadership I by Poojan Roka | | | | |
| | The Kalam Effect By Nair | | | | |
| | Tough Times Never Last But Tough People Do by | | | | |
| | Dr.Robert Schuller | | | | |
| | What Employers Want But Business Schools Don't Teach | | | | |
| | by Yasmin D'sousa and Amitabh Singh | | | | |

| | Freedom is not Free by Shiv Khera | |
|-----|---|----|
| | Be an Exraordinary Person in an Extaordinary World by | |
| | Robert Schuller | |
| | Making Miracles by Arnold Fox and Barry Fox | |
| | The Road Less Travelled by M.Scott Peck | |
| | to name a few | |
| 4. | Presentations | 03 |
| 5. | GD Practical | 02 |
| 6. | Telephonic Conversation | 01 |
| 7. | Role Play | 03 |
| 8. | Phonetics –Spoken Practice | 02 |
| 9. | Listening practice and negotiation skills | 03 |
| 10. | Phonetics - Transcription / Dictionary Reading | 02 |

Reference Books:

- 1. Vibrant English. Hyderabad: Orient BlackSwan, 2013
- 2. Lesikar R V, Flatley M E, Rentz K and Pandey Business Communication: Making Connections in a Digital World 2009: New Delhi, Tata Mcgrow Hill
- 3. Kumar S and Lata P Communication Skills 2011: New Delhi Oxford University Press
- 4. Leech, Geoffrey and Jan Svartvik. A Communicative Grammar of English. New Delhi: Pearson, 2009.

Course Outcome:

After learning the course the students should be able to

- 1. To know the process of communication and its components.
- 2. To improve the language skills i.e. Listening Skills, Speaking Skills, Reading Skills and Writing Skills (LSRW).
- 3. Construct basic and intermediate skills in English language.
- 4. To enhance phonetic competence, comprehension skills, presentation skills, group discussion skills etc.
- 5. To create literature sensibility and learn life skills through it.
- 6. To build confidence for communicating in English and create interest for the life-long learning of English language.

*PA (M): 10 marks for Active Learning Assignments, 20 marks for other methods of PA

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus of Communication Skills is covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should be sent to achievements@gtu.edu.in.

ELEMENTS OF MECHANICAL ENGINEERING SUBJECT CODE: 2110006 B.E. 1st YEAR

Type of course: Engineering Science

Prerequisite: Zeal to learn the subject

Rationale: Understanding of basic principles of Mechanical Engineering is required in various field

of engineering.

Teaching and Examination Scheme:

| Tea | ching Sc | heme | Credits | Examination Marks | | | | Total |
|-----|----------|------|---------|--------------------------|-----|-----------|-------|-------|
| L | T | P | C | Theory Marks | | Practical | Marks | Marks |
| | | | | ESE | PA | ESE | PA | |
| | | | | (E) | (M) | Viva (V) | (I) | |
| 4 | 0 | 2 | 6 | 70 | 30* | 30 | 20** | 150 |

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Content:

| Sr# | Торіс | Teaching Hrs. | Module Weightage |
|-----|---|------------------|---------------------|
| 1 | Introduction: Prime movers and its types, Concept of Force, Pressure, Energy, Work, Power, System, Heat, Temperature, Specific heat capacity, Change of state, Path, Process, Cycle, Internal energy, Enthalpy, Statements of Zeroth Law and First law | 4 | |
| 2 | Energy: Introduction and applications of Energy sources like Fossil fuels, Nuclear fuels, Hydel, Solar, wind, and bio-fuels, Environmental issues like Global warming and Ozone depletion | 3 | 25% |
| 3 | Properties of gases:Gas laws, Boyle's law, Charle's law, Combined gas law, Gas constant, Relation between Cp and Cv, Various non flow processes like constant volume process, constant pressure process, Isothermal process, Adiabatic process, Poly-tropic process | 5 | |
| 4 | Properties of Steam: Steam formation, Types of Steam, Enthalpy, Specific volume, Internal energy and dryness fraction of steam, use of Steam tables, steam calorimeters | 6 | |
| 5 | Heat Engines: Heat Engine cycle and Heat Engine, working substances, Classification of heat engines, Description and thermal efficiency of Carnot; Rankine; Otto cycle and Diesel cycles | 5 | 30% |
| 6 | Steam Boilers:Introduction, Classification, Cochran, Lancashire and Babcock and Wilcox boiler, Functioning of different mountings and accessories | - | |
| 7 | Internal Combustion Engines: Introduction, Classification, | 4 | 20% |

| | Engine details, four-stroke/ two-stroke cycle Petrol/Diesel engines, Indicated power, Brake Power, Efficiencies | | |
|----|---|---|-----|
| 8 | Pumps: Types and operation of Reciprocating, Rotary and Centrifugal pumps, Priming | 3 | |
| 9 | Air Compressors: Types and operation of Reciprocating and Rotary air compressors, significance of Multistaging | 3 | |
| 10 | Refrigeration & Air Conditioning: Refrigerant, Vapor compression refrigeration system, vapor absorption refrigeration system, Domestic Refrigerator, Window and split air conditioners | 4 | |
| 11 | Couplings, Clutches and Brakes: Construction and applications of Couplings (Box; Flange; Pin type flexible; Universal and Oldham), Clutches (Disc and Centrifugal), and Brakes (Block; Shoe; Band and Disc) | 3 | 25% |
| 12 | Transmission of Motion and Power: Shaft and axle, Belt drive, Chain drive, Friction drive, Gear drive | 4 | |
| 13 | Engineering Materials: Types and applications of Ferrous & Nonferrous metals, Timber, Abrasive material, silica, ceramics, glass, graphite, diamond, plastic and polymer | 4 | |

Note: Topic No. 6 of the above syllabus to be covered in Practical Hours.

Reference Books:

- 1. Elements of Mechanical Engineering by N M Bhatt and J R Mehta, Mahajan Publishing House
- 2. Basic Mechanical Engineering by Pravin Kumar, Pearson
- 3. Fundamental of Mechanical Engineering by G.S. Sawhney, PHI Publication New Delhi
- 4. Elements of Mechanical Engineering by Sadhu Singh S. Chand Publication
- 5. Introduction to Engineering Materials by B.K. Agrawal Tata Mcgraw Hill Publication, New Delhi

Course Outcome:

After learning the course the students should be able to

- 1. To understand the fundamentals of mechanical systems
- 2. To understand and appreciate significance of mechanical engineering in different fields of engineering

List of Experiments:

- 1. To understand construction and working of various types of boilers.
- 2. To understand construction and working of different boiler mountings and accessories.
- 3. To determine brake thermal efficiency of an I. C. Engine.
- 4. To understand construction and working of different types of air compressors.
- 5. To demonstrate vapor compression refrigeration cycle of domestic refrigerator OR window air conditioner OR split air conditioner.

Open Ended Problems: Apart from above experiments a group of students has to undertake one open ended problem/design problem. Few examples of the same are given below.

- 1. Develop a prototype of gear train/drive for certain velocity ratios.
- 2. Develop a small boiler with different mountings.
- 3. Develop a hot air engine

Major Equipments: Models of Cochran, Lancashire and Babcock and Wilcox boilers, models of various mountings and accessories, Models of various types of IC engines, Single cylinder two stroke /four stroke petrol/ diesel engine, models of pumps, compressors, refrigerator/air conditioner, models of various types of brakes, coupling, clutches, drives

List of Open Source Software/learning website: http://nptel.iitm.ac.in, http://vlab.co.in/

*PA (M): 10 marks for Active Learning Assignments, 20 marks for other methods of PA

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus of Elements of Mechanical Engineering is covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should be sent to achievements@gtu.edu.in.

** PA (I): 10 marks for a case study of Systems, 10 marks for other methods of PA.

The case study of Systems: The case study should be of a working EE system, which shows the working of the concepts, included in the Syllabus.

#ESE Pr (V):10 marks for Open Ended Problems, 20 marks for VIVA.

Note: Passing marks for PA (M) will be 12 out of 30.

Passing marks for ESE Pract(V) will be 15 out of 30.

Passing marks for PA (I) will be 10 out of 20

PHYSICS (Modified on 4th Feb 2014) SUBJECT CODE: 2110011 B.E. 1st YEAR

Type of course: Engineering Science

Prerequisite: Engineering physics majors are expected to have a basic understanding of calculus, physics and chemistry or computer science

Rationale: The Engineering Physics program is to prepare students for careers in engineering where physics principles can be applied to the advancement of technology. This education at the intersection of engineering and physics will enable students to seek employment in engineering upon graduation while, at the same time, provide a firm foundation for the pursuit of graduate studies in engineering.

Teaching and Examination Scheme:

| Teaching Scheme Credits | | | | Examination Marks | | | | Total |
|-------------------------|---|---|---|-------------------|-----|-----------------|-----|-------|
| L | T | P | С | Theory Marks | | Practical Marks | | Marks |
| | | | | ESE | PA | ESE | PA | |
| | | | | (E) | (M) | Viva (V) | (I) | |
| 3 | 0 | 2 | 5 | 70 | 30* | 30# | 20 | 150 |

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Content:

| Sr No | Topic | Teaching Hrs. | Module Weightage |
|-------|--|------------------|---------------------|
| 1 | DIELECTRICS: Definitions : Electric field intensity, Electric flux, Dielectric parameters Types of Dielectric materials : Solid, Liquid and Gaseous Classification of electrical insulating materials Claussius-Mosotti equation Uses of Dielectric Materials; Capacitors: Single and multilayer, Polymeric Film, Electrolytic; Power and Distribution transformers, other applications | 5 | 15% |
| 2 | MAGNETIC MATERIALS: Definitions: Magnetic moment, Magnetic dipole, Magnetic Filed strength, Magnetic flux density, Intensity of magnetization, Magnetic dipole moment, Magnetic Field intensity, Magnetic permeability, magnetic susceptibility, Bohr magnetron Classification of Magnetic Materials on the basis of magnetic moment Soft and Hard Magnetic Materials Anti-ferromagnetic materials Ferrites | 5 | 15% |

| ACOUSTIC AND ULTRASONIC: Introduction, Classification and Characteristics of sound Sabine's formula for reverberation (Without Derivations) Introduction of Absorption co-efficient Sound absorbing materials Factors affecting the acoustics of building and their remedies Sound Insulation Noise Pollutions Noise Control in machines Properties of ultrasound by (1) piezoelectric method and (2) magnetostriction method Methods for Ultrasound Velocity measurement Applications of ultrasound: Industry, Medicine NDT through Ultrasonic SUPERCONDUCTIVITY: Superconductivity General Properties of superconductors Types of Superconductors High Temperature superconductors Applications: Magnets, Josephson effect, SQUID, Maglev, other NON LINEAR OPTICS: LASER Introduction Characteristics of laser radiation Spontaneous and stimulated emission Working of LASER with basic idea about Population Inversion, Pumping mechanism, Optical Resonators Nd: YAG LASER Applications of LASER: Medical, Industrial, Communication and other FIBER OPTICS Introduction of Optical Fiber Advantages of Optical Fiber Advantages of Optical Fiber Modes of Propagation Types of Optical Fiber Total Internal Reflection Numerical Aperture and Acceptance angle Modes of Propagation Types of Optical Fiber | | Magnetic December and Decider Co. C. | | 1 |
|--|---|---|---|-------|
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| NANOPHYSICS: | | | | |
| 6 Nanoscale 5 15% | 6 | Nanoscale | 5 | 15% |
| Surface to volume ratio | | | 5 | 13/0 |
| Surface effects on Nanomaterials | | Surface effects on Nanomaterials | | |

| | Quantum size effects | | |
|---|--|---|-----|
| | Electron confinement | | |
| | Nanomaterials and Nanotechnology | | |
| | Unusal properties of Nanomaterials | | |
| | Disadvantages of Nanomaterials | | |
| | Synthesis of Nanomaterials | | |
| | • Carbon Nanotubes: Introduction, Structure, Synthesis, | | |
| | Properties and applications | | |
| | Applications of Nanomaterials | | |
| | ADVANCED ENGINEERING MATERIALS: | | |
| | SHAPE MEMORY ALLOYS | | |
| | Introduction, Synthesis, Properties and Applications | | |
| | METALLIC GLASSES | | |
| | Introduction, Synthesis, Properties and Applications | | |
| 7 | <u>BIO MATERIALS</u> | 5 | 15% |
| | Introduction, Properties and Applications | | |
| | ENERGY MATERIALS | | |
| | Solar cells | | |
| | • Fuel cells (H ₂ O ₂ , Lithium cell) | | |
| | Ultra capacitors | | |

Reference Books:

- 1. Engineering Physics by V Rajendran, Tata McGraw Hill Education
- 2. Engineering Physics John Wiley Publication
- 3. Engineering Physics by Naidu, Pearson Education India
- 4. Non-Conventional Energy Resources", Mechanical Engineering Series, Khan B. H., Tata McGraw Hill Publishing Company Ltd., New Delhi, 2006
- 5. Engineering Physics by H Aruldhas, PHI India
- 6. Engineering Physics by B K Pandey, S. Chaturvedi, Cengage Learning
- 7. Resnick, Halliday and Krane, Physics part I and II, 5th Edition John Wiely (2002)
- 8. Physics for scientists and engineers with modern physics by Jewett &Serwey, Cengage publications
- 9. The Feynman Lectures on Physics Vol 2, Pearson Education India

Course Outcome:

- 1. The student will demonstrate the ability to think in core concept of their engineering application by studying various topics involved in branch specific applications.
- 2. The student will demonstrate the ability to use appropriate mathematical techniques and concepts to obtain quantitative solutions to problems in physics.
- 3. In courses involving laboratory, the student will demonstrate the ability to collect and analyze data and to prepare coherent reports of his or her findings.
- 4. In a design module project, the student will demonstrate the ability to perform a literature search, to make use of appropriate computational or laboratory skills, and to make an effective written or oral presentation of the results of the project.

List of Experiments:

Important Note

- Total 18 experiments are listed in the design module.
- ** Key goals of these experiments are :
 - (1) To enhance the understanding of student towards the errors present in the real time measurement and the ways to take care of them.
 - (2) To create visualization of various phenomena covered in the syllabus.
 - (3) To induce the skill of student in handling different measuring instruments.
- Subject teacher is advised to setup any 8 experiments from the following list.
- In the session student should perform <u>minimum 4 set of experiments</u> and complete <u>one small project</u> based on engineering applications. This project along with any performed experiment should be **EVALUATED BY EXTERNAL EXAMINER.**
- 1. To understand some basic aspects of error analysis and graph drawing.
- 2. To measure the dielectric constant of a material
- 3. To measure the Hysteresis loss in a Ferromagnetic material.
- 4. To study the Hall-Effect.
- 5. To determine Young's Modulus of Elasticity of the given samples by bending.
- 6. Measurement of the Distance using Ultrasonic Sensors.
- 7. Study of Object Detection using Ultrasonic Sensors.
- 8. Determination of the Velocity of Ultrasonic Waves in a non-electrolytic Liquid by Ultrasonic Interferometer.
- 9. Determination of the Compressibility of a non-electrolytic Liquid by Ultrasonic Interferometer.
- 10. To study the I-V Characteristic of Silicon diode.
- 11. To study the I-V Characteristic of Zener diode.
- 12. To study the I-V Characteristic of LED.
- 13. To determine the efficiency of given solar cell.
- 14. To study basic wind power set up.
- 15. To measure the Resistivity & Band gap of Germanium Crystal (N-type) by Four Probe Method.
- 16. To measure the numerical aperture of optical fiber.
- 17. To Study of propagation & bending loss in optical fiber.
- 18. To determine the frequency of given laser source.

Open ended Projects in Science and technology study:-

Aims:

- 1. To provide experience in laboratory based experimentation, data recording and analysis and drawing of conclusions.
- 2. To develop report writing skills for scientific material
- 3. To develop the ability to undertake investigations where, as part of the exercise, the goals and methods have to be defined by the investigator.
- 4. To develop skills in literature searches and reviews.

In the beginning of the academic term, faculties will have to allot their students at least one (Students are free to select any area of science and technology)

- Open ended design based small project **or**
- Computer based simulation/ web based application/ analysis presentations of applied science field which may help them in their branches especially in their UDP/IDP projects.

- 1. These can be done in a group containing maximum three students in each.
- 2. Open ended design based small project OR UDP based study will be evaluated by external examiner with appropriate marks allotment given by GTU time to time.
- 3. Faculties should cultivate problem based project to enhance the basic mental and technical level of students.
- 4. Evaluation should be done on **approach of the student on his/her efforts** (not on completion) to study the design module of given task.

Open Ended Project fields:-

Students are free to select any area of science and technology may be based on their branches to define projects.

Some suggested projects are listed below:

1. Design: A working electric motor.

Area: Electricity and Magnetism

Using:1 meter of bendable, insulated wire, a size "D" battery, a disk magnet, two paper clips, sandpaper, wire strippers, masking tape.

2. Design: Computer based simulation/ small calculation with help basic programming language based on Physics

Area: Computational physics

3. Design: A Hydraulic Jack works on the principle of Pascal's law that states Area: Fluid Dynamics

Using: poker and scissors, syringes, M-seal, inlet pipes

Major Equipments:

| Sr. No. | Name | Technical Specification |
|------------|---|---|
| 1 | Universal training kit – electronics | |
| 2 | Rectifier Kit (Half wave, full wave, bridge) | Consisting of 0-30 V variable power supply, Diodes (IN 4007), Module of 10k resistors, Included Filter Circuit. |
| 3 | LDR, LED characteristic kit | 0-30 V variable power supply |
| 4 | Diode - Zener Diode Characteristic Kit | 0-30 V regulated tunnable power supply, milliammeter (0-50mA), Microammeter (0-100μA), Digital multimeter, Resistances module 10K, Facility of Silicon Diode (IN4001), Germanium Diode (DR 25) and Zener Diode with reverse bias voltage Max. up to 8-9 V |
| 5 | dB meter, Sound generator, speaker | dB meter with the range of 0-200 dB |
| 6 | Hall effect trainer | Power supply of (220 V, 50Hz), constant current source of (30 mA, DC) variable through port Digital Gauss Meter, |

| Your 8 Your 8 Plant using Ultra 12 X ray 13 Fiber 14 Fiber 16 Intro | niconductor energy gap set up ung's Modulus set up sistivity and Band Gap asurement ar energy trainer | Four Probe experimental Set up (consisting constant current source, Dual range miliVoltmeter, power supply for oven and miliammeter Thermometer (Mercury) Temperature range up to 200-250 °C Stand, weight box (up to 1kg), Samples (iron, Al, Cu etc), DC adapter, Spherometer stand with buzzer, weight holder Fundamental of photovoltaic cell should be studied, |
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| meas solar 10 Plant using Ultra 12 X ray 13 Fiber 14 Intro | asurement | |
| meas solar 10 Plant using Ultra 12 X ray 13 Fiber 14 Intro | asurement | Fundamental of photovoltaic cell should be studied, |
| solar 10 11 Plantusing Ultra 12 X ray 13 Fiber 14 15 Lase 16 Intro | | Fundamental of photovoltaic cell should be studied, |
| 10 Plandusing Ultra 12 X ray 13 Fiber 14 Fiber 15 Lase 16 Intro | ar energy trainer | Fundamental of photovoltaic cell should be studied, |
| 11 Plantusing Ultra 12 | | 1 |
| 11 using Ultra 12 X ray 13 Fiber 14 15 Lase 16 Intro | | application and Characteristics features should be |
| 11 using Ultra 12 X ray 13 Fiber 14 15 Lase 16 Intro | | measured by a kit |
| Ultra 12 X ray 13 Fiber 14 15 Lase 16 Intro | nk's constant determination with | Plank's constant apparatus, |
| 12 X ray 13 Fiber 14 Fiber 15 Lase 16 Intro | ng LED | oven, LED Red, LED Yellow |
| 13 X ray 13 Fiber 14 Fiber 15 Lase 16 Intro | rasonic measurement kit | Quartz Crystal (Frequency: 2 MHz), |
| 13 Fiber 14 Fiber 15 Lase 16 Intro | | Ultrasonic Transducer approx 25 cm to 1.2 m, |
| 13 Fiber 14 Fiber 15 Lase 16 Intro | | Clock Generator 40 kHz, |
| 13 Fiber 14 Fiber 15 Lase 16 Intro | ovy movydou mottoma lvit | Amplifier 40 dB - 70dB |
| Fiber 14 Fiber 15 Lase 16 Intro | ay powder pattern kit | Powder patterns slides, travelling microscope 10x, |
| 1415 Lase16 Intro | | X ray diffraction pattern |
| 1415 Lase16 Intro | er Optic Kit | LED source 950 nm/660 nm compatible APV or |
| 15 Lase 16 Intro | er Optic Kit | Photo diode Detector with Numerical Aperture |
| 16 Intro | | Measurement Facility |
| 16 Intro | er Source | He- Ne Laser and 1350 nm I-R Laser |
| | oductory Nano Kit | 2 11 2000 0000 0000 0000 0000 00000 |
| 1 1 1 1 1 1 1 1 1 | steresis loop set up | Voltage Sensor range ± 0.5 V to ± 1 V, |
| 11 | гг | current Sensor ± 0.5 A to ± 1 A, |
| 17 | | coil 250 to400 turns (pair), |
| | | Resistance Module 10 ohm ,10 watt |
| 18 Rube | | |
| 19 Opti | pen's Tube (Sound) | |
| 20 CRC | pen's Tube (Sound) tical Power meter | (-50 dB to 0dB) measurement range |
| chan | tical Power meter | |
| 19 Optio | | |

| 21 | Digital Multimeters | |
|----|--------------------------------|---|
| 22 | Analog Voltmeters (mV, V) | |
| 23 | Analog Ammeter (micro, mA, A) | |
| 24 | Wires | |
| 25 | Tool Kit with tester | |
| 26 | Bread Board | |
| 27 | Screw Dirver Kit | |
| 28 | Regulated Power Supply (0-50V) | |
| 29 | Capacitors, Resistors | |
| 30 | Diodes | |
| 31 | LEDs, LDRs | |
| 32 | Rheostat | |
| 33 | Soldering kit with wire | |
| 34 | Function Generator (5MHz) | Generation of sine, Square, Saw tooth waves required, +/- pulses frequency range up to 20 MHz, Peak to peak voltage around 20 V |
| 35 | Multiple power supply | Variable of 0-30 volt , 30V/2A, 5V/2A , 15V/1A |

List of Open Source Software/learning website:

- ➤ The Flying Circus of Physics 2nd edition by Jearl Walker, Wiley India
- > Six Ideas that shaped physics by Thomas A Moore, McGraw Hill education
- > http://www.howstuffworks.com/ -- Tech stuff
- ➤ How things works by Louis A Bloomfeild, Wiley Publications
- > Physics of Everyday Phenomena by W. Thomas Griffith, Juliet Brosing, McGraw Hill Education
- ➤ Latest journals like BBC Knowledge, How things work-everyday technology explained by National Geographics.
- http://www.sciencefairadventure.com/

*PA (M): 10 marks for Active Learning Assignments, 20 marks for other methods of PA

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus of Physics is covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should be sent to achievements@gtu.edu.in.

ESE Pr (V):10 marks for Open Ended Problems, 20 marks for VIVA.

Note: Passing marks for PA (M) will be 12 out of 30. Passing marks for ESE Pract(V) will be 15 out of 30.

B.E Semester: 3 **Computer Engineering**

Subject Code 130703 Subject Name DATABASE MANAGEMENT SYSTEM

| Sr.No | Course content |
|-------|---|
| 1. | Introductory concepts of DBMS: Introduction and applications of DBMS, Purpose of data base, Data Independence, Database System architecture- levels, Mappings, Database users and DBA |
| 2. | Relational Model: Structure of relational databases, Domains, Relations, Relational algebra – fundamental operators and syntax, relational algebra queries |
| 3. | Entity-Relationship model: Basic concepts, Design process, constraints, Keys, Design issues, E-R diagrams, weak entity sets, extended E-R features – generalization, specialization, aggregation, reduction to E-R database schema |
| 4. | Relational Database design: Functional Dependency – definition, trivial and non-trivial FD, closure of FD set, closure of attributes, irreducible set of FD, Normalization – 1Nf, 2NF, 3NF, Decomposition using FD- dependency preservation, BCNF, Multivalued dependency, 4NF, Join dependency and 5NF |
| 5. | Query Processing & Query Optimization: Overview, measures of query cost, selection operation, sorting, join, evaluation of expressions, transformation of relational expressions, estimating statistics of expression results, evaluation plans, materialized views |
| 6. | Transaction Management: Transaction concepts, properties of transactions, serializability of transactions, testing for serializability, System recovery, Two- Phase Commit protocol, Recovery and Atomicity, Log-based recovery, concurrent executions of transactions and related problems, Locking mechanism, solution to concurrency related problems, deadlock, , two-phase locking protocol, Isolation, Intent locking |
| 7. | Security: Introduction, Discretionary access control, Mandatory Access Control, Data Encryption |

| 8. | SQL Concepts: Basics of SQL, DDL,DML,DCL, structure – creation, alteration, defining constraints – Primary key, foreign key, unique, not null, check, IN operator, aggregate functions, Built-in functions –numeric, date, string functions, set operations, sub-queries, correlated sub-queries, join, Exist, Any, All, view and its types., transaction control commands. |
|----|---|
| 9. | PL/SQL Concepts: Cursors, Stored Procedures, Stored Function, Database Triggers |

- 1. An introduction to Database Systems, C J Date, Addition-Wesley.
- 2. Database System Concepts, Abraham Silberschatz, Henry F. Korth & S. Sudarshan, McGraw Hill.
- 3. Understanding SQL by Martin Gruber, BPB
- 4. SQL- PL/SQL by Ivan bayross
- 5. Oracle The complete reference TMH /oracle press

B.E Semester: 3
Computer Engineering

Subject Code: 130701

Subject Name: DIGITAL LOGIC DESIGN

Sr.No Course content Binary System: 1. Digital computer and digital systems, Binary Number, Number base conversion Octal and Hexadecimal Number, complements, Binary Codes, Binary Storage and register, Binary Logic, Integrated Circuit 2. Boolean Algebra and Logic Gates: Basic Definition, Axiomatic Definition of Boolean Algebra, Basic Theorem and Properties of Boolean Algebra, Minterms And Maxterms, Logic Operations, Digital Logic Gates, IC digital Logic Families 3. Simplification of Boolean Functions: Different types Map method, Product of sum Simplification, NAND or NOR implementation, Don't Care condition, Tabulation method 4. Combinational Logic: Introduction, Design Procedure, adder, subtractor, Code Conversion, Universal Gate Combinational Logic With MSI AND LSI: 5. Introduction, Binary Parallel Adder, Decimal Adder, Magnitude Comparator, Decoder, Multiplexer, ROM, Programmable Logic Array. 6. Sequential Logic: Introduction, Flip-Flops, Triggering of Flip-Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Flip-Flop Excitation Tables, Design Procedure, Design of Counters, Design with State **Equations** 7. Registers Transfer Logic & Micro-Operation: Introduction, Inter-register Transfer, Arithmetic, logic and shift Micro-Operations, Conditional Control Statements, Fixed-Point Binary Data, overflow, Arithmetic Shifts, Decimal Data, Floating-Point Data, Instruction Codes, Design of Simple Computer 8. Registers, Counters and the Memory unit: Introduction, Registers, Shift Registers, Ripple Counters, Synchronous Counters, Timing Sequences, Memory Unit

| 9. | Processor Logic Design: Introduction, Processor Organization, Arithmetic Logic Unit, Design of Arithmetic and logic circuit, Design of ALU. Status Register, Design of shifter, Processor Unit, Design of Accumulator. |
|-----|--|
| 10. | Control Logic Design: Introduction, Control Organization, Hard-Wired Control, Micro-Program Control. |

- Digital Logic and Computer Design By M Morris Mano
 Principle of digital Electronics By Malvino & Leach
- 3. Modern Digital Electronics By R.P.Jain

B.E Semester: 3

Subject Code 130001 Subject Name Mathematics - 3

| Sr.No | Course content |
|-------|---|
| 1. | First order ODE: Methods for solving them, homogeneous equations, exactness, methods for finding integrating factors, Linear and Bernoulli's equation. |
| 2. | Higher order ODE: Linear ODEs (generalities) complimentary function as and particular integrals, linear dependence and independence of functions, Wronskians, Abel-Liouville formula, use of a known solution (for reduction of order) method of variation of parameter. |
| 3. | Linear ODEs with constant coefficient and the Cauchy Euler equation. the characteristic polynomial and indicial polynomial, discussion of the case of complex roots and repeated roots, extracting the real form of the solution via Euler's formula $e^{i\theta} = cos\theta + isin\theta$, method of undetermined coefficient for finding the particular integral for special right hand sides. (forcing functions) both for constant coefficient ODEs as well as Cauchy Euler ODEs. |
| 4. | Beta Gamma functions and their basic properties, statement of Euler's reflection formula, duplication formula via beta gamma. |
| 5. | Laplace transforms: Definition of functions of exponential type with examples. Definition of the Laplace transform and its basic properties as well as examples of Laplace transforms of exponential function, polynomials and trigonometric functions. Statement of the Riemann Lebesgue lemma. Finding the inverse transform. Laplace transform of $\frac{d^n y}{dt^n}$ and $t^n y(t)$ Heaviside unit step function and shifting |
| | theorems. Convolution and the convolutions theorem. Beta gamma identity. Use of Laplace transform for solving IVP for ODEs and systems of ODEs. Computing certain important integrals via Laplace transforms. |
| 6. | Series solution of ODEs, Illustrative examples as the equations of Legendre, Tchebychev etc., Legendre polynomials, their Orthogonality and completeness. |

- 7. Ordinary differential equations with regular singular points and the method of Frobenious. Detailed discussion of Bessel's equations and Bessels' functions of first kind only. Basic properties of $J_p(x)$, the recurrence relation between $J_{p-1}(x)$, $J_p(x)$ and $J_{p+1}(x)$. Integral representation of $J_n(x)$ (where n is a non negative integer).
- 8. Fourier series and Fourier transforms Basic formulae in Fourier series. Statement of the theorem on pointwise convergence of Fourier series. Parsevals formula (statement only) and Bessel's inequality with examples. Mean convergence of Fourier series. Fourier transforms and its basic properties. Fourier transform of the Gaussian and the Fourier inversion theorem (statement only). Riemann Lebesgue lemma for Fourier series and Fourier transforms (statement only).
- 9. Basic partial differential equations of mathematical physics and their origins (vibrating strings, vibrating membrances heat conduction in solids etc.,). Solving PDEs via the method of separation of variables. The Laplace operator in cylindrical and spherical polar coordinates. Brief discussion of Fourier Bessel series. Solution via Fourier series/Fourier-Bessel series for rectangular and circular domains in \mathbb{R}^2 and spherical and cylindrical domains in \mathbb{R}^3 .

- 1. E.Kreyszig, Advanced engineering mathematics (8th Edition), John Wiley (1999).
- 2. W. E. Boyce and R. DiPrima, Elementary Differential Equations (8th Edition), John Wiley (2005).
- 3. R. V. Churchill and J. W. Brown, Fourier series and boundary value problems (7th Edition), McGraw-Hill (2006).
- 4. T.M.Apostol, Calculus , Volume-2 (2nd Edition), Wiley Eastern , 1980

B.E Semester: 3 Computer Engineering

Subject Code 131101 Subject Name Basic Electronics

| Sr.No | Course Content |
|-------|--|
| 1 | Energy Bands in Solids: Charged Particles, Field Intensity, Potential Energy, The eV Unit of Energy, The Nature of the Atom, Atomic Energy Levels, Electronic Structure of The Elements, The Energy Band Theory of Crystals, Insulators, Semiconductors and Metals |
| 2 | Transport Phenomena in Semiconductors: Mobility and Conductivity, Electrons and Holes in an Intrinsic Semiconductor, Donor and Acceptor Impurities, Charge Densities in a Semiconductor, Electrical Properties of Ge and Si, The Hall Effect, Conductivity Modulation, Generation and Recombination of Charges, Diffusion, The Continuity Equation, Injected Minority –Carrier Charge, The Potential Variation within a Graded Semiconductor |
| 3 | Junction –Diode Characteristics: Open –Circuited p-n Junction, p-n Junction as a Rectifier, Current Components in a p-n Diode, Volt-Ampere Characteristic, Temperature Dependence of the V/I Characteristic, Diode Resistance, Space Charge, Transition Capacitance, Charge-Control Description of a Diode, Diffusion Capacitance, Junction Diode Switching Times, Breakdown Diodes, Tunnel Diode, Semiconductor Photodiode, Photovoltaic Effect, Light –Emitting Diodes |
| 4 | Diode Circuits: Diode as a Circuit Element, Load-Line Concept, Piecewise Linear Diode Model, Clipping Circuits, Clipping at Two Independent Levels, Comparators, Sampling Gate, Rectifiers, Other Full-Wave Circuits, Capacitor Filters, Additional Diode Circuits |
| 5 | Transistor Characteristics: Junction Transistor, Transistor Current Components, Transistor as an Amplifier, Transistor Construction, CB Configuration, CE Configuration, CE Cutoff region, CE Saturation Region, Typical Transistor, CE Current Gain, CC Configuration, Analytical Expressions for Transistor Characteristics Maximum Voltage Rating, Phototransistor |

| 6 | Transistor at Low Frequencies: Graphical Analysis of the CE configuration, Two-Port Devices and the Hybrid Model, Transistor Hybrid Model, h-Parameters, Conversion Formulas for the Parameters of Three Transistor Configurations, Analysis of a Transistor Amplifier Circuit Using h Parameters, Thevenin's and Norton's Theorems and Corollaries, Emitter Follower, Comparison of Transistor Amplifier Configurations, Linear Analysis of a Transistor Circuit, Miller's Theorem and its Dual, Cascading Transistor Amplifiers, Simplified CE Hybrid Model, Simplified Calculations for the CC Configuration, CE Amplifier with an Emitter Resistance, High Input Resistance Transistor Circuits |
|---|---|
| 7 | Transistor Biasing and Thermal Stabilization: Operating Point, Bias Stability, Self-Bias , Stabilization against Variations in $I_{\text{CO}},\ V_{\text{BE}}$ and $\beta,$ General Remarks on Collector-Current Stability, Bias Compensation, Thermistor and Sensistor Compensation, Thermal Runaway, Thermal Stability |
| 8 | Field Effect Transistors: Junction FET, Pinch-Off Voltage, JFET Volt-Ampere Characteristics, FET Small-Signal Model, MOSFET, Digital MOSFET Circuits, Low Frequency CS and CD Amplifiers, Biasing the FET, The FET as a Voltage Variable Resistor, CS Amplifier at High Frequencies, CD Amplifier at High Frequencies |
| 9 | Power Circuits and Systems: Class A large Signal Amplifiers, Second Harmonic Distortion, Higher –Order Harmonic Generation, Transformer Coupled Audio Power Amplifier, Efficiency, Push-Pull Amplifiers, Class B Amplifiers, Class AB Operation, Regulated Power Supplies, Series Voltage Regulator |

- 1. Integrated Electronics By Jacob Millman and Christos C. Halkias, Tata McGraw Hill Publication
- 2. Electronics Devices by Floyd, Pearson Publication [Seventh edition]
- 3. Electronic Devices and Circuit Theory by Robert Boylestad and Louis Nashelsky [Ninth Edition]

B.E Semester: 3 Computer Engineering

Subject Code 130704

Subject Name COMPUTER ORGANIZATION AND ARCHITECTURE

| Sr.No | Course content |
|-------|---|
| 1. | OVERVIEW OF REGISTER TRANSFER AND MCROOPERATIONS: Register Transfer Language, Register transfer, Bus and Memory transfer, Arithmetic Micro-operations, Logic Micro-operations, Shift Microoperations, Arithmatic Logic Shift Unit. |
| 2. | BASIC COMPUTER ORGANIZATIONAND DESIGN: Instruction codes, Computer registers, computer instructions, Timing and Control, Instruction cycle, Memory-Reference Instructions, Input-output and interrupt, Complete computer description, Design of Basic computer, design of Accumulator Unit. |
| 3. | PROGRAMMING THE BASIC COMPUTER: Introduction, Machine Language, Assembly Language, the Assembler, Program loops, Programming Arithmetic and logic operations, subroutines, I-O Programming. |
| 4. | MICROPROGRAMMED CONTROL: Control Memory, Address sequencing, Microprogram Example, design of control Unit |
| 5. | CENTRAL PROCESSING UNIT: Introduction, General Register Organization, Stack Organization, Instruction format, Addressing Modes, data transfer and manipulation, Program Control, Reduced Instruction Set Computer (RISC) |
| 6. | PIPELINE AND VECTOR PROCESSING: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction, Pipeline, RISC Pipeline, Vector Processing, Array Processors |
| 7. | COMPUTER ARITHMETIC: Introduction, Addition and subtraction, Multiplication and Division Algorithms, Floating Point Arithmetic, Decimal Arithmetic Unit and Operations |

- 1. Computer System Architecture : By M. Morris Mano.
- 2. Structured Computer Organization : By Tanenbaum
- 3. Computer Organization : By Stallings.
- 4. Computer Architecture and Organization : By Hayes.

B.E Semester: 3 **Computer Engineering**

Subject Code 130702 Subject Name DATA AND FILE STRUCTURES

| | T |
|-------|---|
| Sr.No | Course content |
| 1. | INTRODUCTION TO DATA STRUCTURE: Data Management concepts, Data types — primitive and nonprimitive, Performance Analysis and Measurement (Time and space analysis of algorithms-Average, best and worst case analysis), Types of Data Structures- Linear & Non Linear Data Structures. |
| 2. | LINEAR DATA STRUCTURE Array: Representation of arrays, Applications of arrays, sparse matrix and its representation., Stack: Stack-Definitions & Concepts, Operations On Stacks, Applications of Stacks, Polish Expression, Reverse Polish Expression And Their Compilation, Recursion, Tower of Hanoi, Queue: Representation Of Queue, Operations On Queue, Circular Queue, Priority Queue, Array representation of Priority Queue, Double Ended Queue, Applications of Queue, Linked List: Singly Linked List, Doubly Linked list, Circular linked list ,Linked implementation of Stack, Linked implementation of Queue, Applications of linked list. |
| 3. | NONLINEAR DATA STRUCTURE: Tree-Definitions and Concepts, Representation of binary tree, Binary tree traversal (Inorder, postorder, preorder), Threaded binary tree, Binary search trees, Conversion of General Trees To Binary Trees, Applications Of Trees-Some balanced tree mechanism, eg. AVL trees, 2-3 trees, Height Balanced, Weight Balance, Graph-Matrix Representation Of Graphs, Elementary Graph operations, (Breadth First Search, Depth First Search, Spanning Trees, Shortest path, Minimal spanning tree) |
| 4. | HASHING AND FILE STRUCTURES: Hashing: The symbol table, Hashing Functions, Collision-Resolution Techniques, File Structure: Concepts of fields, records and files, Sequential, Indexed and Relative/Random File Organization, Indexing structure for index files, hashing for direct files, Multi-Key file organization and access methods. |
| 5. | PRACTICAL DETAILS: At least 10 practical should be performed by students using programming language. |

- 1. An Introduction to Data Structures with Applications. by Jean-Paul Tremblay & Paul G. Sorenson Publisher-Tata McGraw Hill.
- 2. Data Structures using C & C++ -By Ten Baum Publisher Prenctice-Hall International.
- 3. Fundamentals of Computer Algorithms by Horowitz, Sahni, Galgotia Pub. 2001 ed.
- 4. Fundamentals of Data Structures in C++-By Sartaj Sahani.
- 5. Data Structures: A Pseudo-code approach with C -By Gilberg & Forouzan Publisher-Thomson Learning.

B.E Semester: 4 Computer Engineering

Subject Code 140701

Subject Name MICROPROCESSOR AND INTERFACING

| Sr.No | Course content |
|-------|---|
| 1. | Introduction to Microprocessor, Microprocessor systems with bus organization, Microprocessor Architecture & Operations, Memory, I/O Device, Memory and I/O Operations |
| 2. | 8085 Microprocessor Architecture, Address, Data And Control Buses, Pin Functions, Demultiplexing Of Buses, Generation Of Control Signals, Instruction Cycle, Machine Cycles, T-States, Memory Interfacing. |
| 3. | Assembly Language Programming Basics, Classification of Instructions, Addressing Modes, 8085 Instruction Set, Instruction And Data Formats, Writing, Assembling & Executing A Program, Debugging The Programs, Decision Making, Looping, Stack & Subroutines, Developing Counters And Time Delay Routines, Code Conversion, BCD Arithmetic And 16-Bit Data Operations. |
| 4. | Interfacing Concepts, Ports, Interfacing Of I/O Devices, Interrupts In 8085, Interfacing of Data Converters (D-To-A And A-To-D), Programmable Interfacing Devices Like 8279 Keyboard/Display Interface, 8255A PPI, 8253/8254 Timer, 8259A PIT, 8237 DMA Controller, Serial I/O Concepts, SID And SOD, 8251A USART. Interfacing of above chips With 8085, Programming them In Deferent Modes, Practical Applications |

- 1. Microprocessor Architecture, Programming, and Applications with the 8085 Ramesh S. Gaonkar Pub: Penram International.
- 2. Microcomputers and Microprocessors: The 8080,8085 and Z-80 Programming, Interfacing and Troubleshooting by John E. Uffenbeck.
- 3. Microprocessor and Microcontroller fundamentals. The 8085 and 8051 Hardware and Software by William Kleitz.

B.E Semester: 4 Computer Engineering

Subject Code 140703

Subject Name OBJECT ORIENTED ANALYSIS DESIGN AND UML

| Sr.No | Course content |
|-------|---|
| 1. | Introduction: About Object Orientated Technology, Development and OO Modeling History. |
| 2. | Modeling Concepts: Modeling design Technique, Three models, Class Model, State model and Interaction model. |
| 3. | Class Modeling: Object and class concepts, link and association, Generalization and Inheritance, Advanced class modeling- aggregation, Abstract class metadata, constraints. |
| 4. | State Modeling: Event, state, Transition and conditions, state diagram, state diagram behavior, concurrency, Relation of Class and State models. |
| 5. | Interaction Modeling: Use case Models, sequence models, activity models |
| 6. | Analysis and Design: Development Life cycle, Development stages, Domain Analysis-Domain class model, domain state model, domain interaction model, Iterating and analysis. Application Interaction model, Application class model, Application state Model, Adding operation. |
| 7. | System Design: Estimating Performance, Making a reuse plan, breaking system into subsystems ,identifying concurrency, allocation of subsystems, management of data storage, Handling Global resources, choosing a software control strategy, Handling boundary condition, common Architectural style. |
| 8. | Class design: Overview of class design ,designing algorithms recursing downward, refactoring, design optimization, Adjustment of Inheritance, Reification of Behavior. |

Reference Books:

1. Oriented Modeling and Design wih UML second edition by michael Blaha and James Rambaugh

B.E. Semester: IV Computer Engineering

Subject Code: 140705

Subject Name: Object Oriented Programming with C++

| Sr.No | Course content | Hours |
|-------|---|-------|
| 1 | Concepts of OOP : Introduction OOP, Procedural Vs. Object Oriented | 4 |
| | Programming, Principles of OOP, Benefits and applications of OOP | |
| 2 | C++ Basics: Overview, Program structure, namespace, identifiers, | 6 |
| | variables, constants, enum, operators, typecasting, control structures | |
| 3 | C++ Functions : Simple functions, Call and Return by reference, | 6 |
| | Inline functions, Macro Vs. Inline functions, Overloading of functions, | |
| | default arguments, friend functions, virtual functions | |
| 4 | Objects and classes : Basics of object and class in C++, Private and | 8 |
| | public members, static data and function members, constructors and | |
| | their types, destructors, operator overloading, type conversion | |
| 5 | Inheritance : Concept of Inheritance, types of inheritance: single, | 8 |
| | multiple, multilevel, hierarchical, hybrid, protected members, | |
| | overriding, virtual base class, | |
| 6 | Polymorphism : Pointers in C++, Pointes and Objects, this pointer, | 6 |
| | virtual and pure virtual functions, Implementing polymorphism | |
| 7 | I/O and File management : Concept of streams, cin and cout objects, | 8 |
| | C++ stream classes, Unformatted and formatted I/O, manipulators, File | |
| | stream, C++ File stream classes, File management functions, File | |
| | modes, Binary and random Files | |
| 8 | Templates, Exceptions and STL: What is template? function | 8 |
| | templates and class templates, Introduction to exception, try-catch- | |
| | throw, multiple catch, catch all, rethrowing exception, implementing | |
| | user defined exceptions, Overview and use of Standard Template | |
| | Library | |

Books:

- 1. Object Oriented Programming With C++, E Balagurusamy, TMH
- 2. C++ Programming, Black Book, Steven Holzner, dreamtech
- 3. Object Oriented Programming in Turbo C++, Robert Lafore, Galgotia
- 4. Object Oriented Programming with ANSI and Turbo C++, Ashok Kamthane, Pearson
- 5. The Compete Reference C++, Herbert Schlitz, TMH

B.E Semester: 4 **Computer Engineering**

Subject Code 140702 Subject Name OPERATING SYSTEM

| Sr.No | Course content | | | | | | | |
|-------|--|--|--|--|--|--|--|--|
| 1. | Introduction: What is an OS?, Evolution Of OS, OS Services, Types Of OS, Concepts of OS, Different Views Of OS, Concepts of OS | | | | | | | |
| 2. | Process Management: Process, Process Control Block, Process States, Threads, Types of Threads, Multithreading. | | | | | | | |
| 3. | Interprocess Communication: Race Conditions, Critical Section, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem etc., Scheduling, Scheduling Algorithms. | | | | | | | |
| 4. | Deadlock: Deadlock Problem, Deadlock Characterization, Deadlock Detection, Deadlock recovery, Deadlock avoidance: Banker's algorithm for single & multiple resources, Deadlock Prevention. | | | | | | | |
| 5. | Memory Management: Paging: Principle Of Operation, Page Allocation, H/W Support For Paging, Multiprogramming With Fixed partitions, Segmentation, Swapping, Virtual Memory: Concept, Performance Of Demand Paging, Page Replacement Algorithms, Thrashing, Locality. | | | | | | | |
| 6. | Input Output Management Principles Of Input/Output H/W: I/O Devices, Device Controllers, Direct Memory Access, Principles Of Input/Output S/W: Goals Of The I/O S/W, Interrupt Handler, Device Driver, Device Independent I/O Software Disks: RAID levels, Disks Arm Scheduling Algorithm, Error Handling | | | | | | | |
| 7. | File Systems Files: File Naming, File Structure, File Types, File Access, File Attributes, File Operations, Memory Mapped Files, Directories: Hierarchical Directory System, Pathnames, Directory Operations, File System Implementation, | | | | | | | |

| 8. | Implementing Files: Contiguous Allocation, Linked List Allocation, Linked List Using Index, Inodes, Implementing Directories In C, MS-DOS, UNIX. Shared Files, Disk Space Mgmt, File System Reliability, File System Performance | | | | | | | |
|-----|--|--|--|--|--|--|--|--|
| 9. | Security: Security Environment, Design Principles Of Security, User Authentication, Protection Mechanism: Protection Domain, Access Control List | | | | | | | |
| 10. | Case Study: Unix, Linux, Windows 2000. | | | | | | | |
| 11. | Unix/Linux Operating System: Development Of Unix/Linux, Role Of Kernel & Function Of Kernel, System Calls, Elementary Shell Programming, Directory Structure, System Administration | | | | | | | |
| 12. | Introduction To Multiprocessor And Distributed Operating System | | | | | | | |

- 1. Modern Operating Systems -By Andrew S. Tanenbaum (PHI)
- 2. Operating System Internals & Design Principles -By William Stallings (PHI)
- 3. Operating Systems By D.M.Dhamdhare (TMH)
- 4. Unix System Concepts & Applications By Sumitabha Das (TMH)
- 5. Unix Shell Programming By Yashwant Kanitkar

GUJARAT TECHNOLOGICAL UNIVERSITY **B.E Semester**: 4

Subject Name: Management – I

| Sr. No | Course content | | | | | | | |
|-----------|--|--|--|--|--|--|--|--|
| 1. | Introduction to Management and Organizations | | | | | | | |
| | Innovative management for Turbulent times Functions of management Planning, Organizing, Controlling and Leading Types of Managers Managerial Roles | | | | | | | |
| 2. | Management history | | | | | | | |
| | Schools of Management Scientific management The Behavioral Approach The Systems approach The contingency approach | | | | | | | |
| 3. | Organizational Structure and Design | | | | | | | |
| | Types of structures Work specialization Departmentalization Chain of Command Span of Control Centralization and Decentralization Formalization | | | | | | | |
| 4. | Organizational Culture and Environment | | | | | | | |
| | Concept of culture and its importance Attributes of culture How does culture affect managers and employees | | | | | | | |
| 5. | Social responsibility and Managerial ethics | | | | | | | |
| | Concept of corporate social responsibility and ethics Stakeholders and its management Ethical issues in management | | | | | | | |
| | | | | | | | | |

- 1 'Management' Stephen P. Robbins, Mary Coulter, Neharika Vohra Pearson Prentice Hall of India, New Delhi, Tenth edition
- 2 'Essentials of Management', Koontz and Weihrich, Tata McGraw Hill, 2004, 6th Edition
- 3 Essentials of management Adrew J. Durbrin, India edition, 7^{th} Edition, Thomson South Western
- 4 Principles of Management, Charles WL Hill and Steven L McSane, The McGraw Hill Companies, 2008
- 5 Principles of Management, Richard L. Daft, Cengage Learning, 2009

B.E Semester: 4

Subject Name Mathematics-IV

| Sr.No | Course content | | | | | | |
|-------|---|--|--|--|--|--|--|
| 1. | Complex numbers and functions: Limits of Functions, Continuity, Differentiability, Analytic functions Cauchy-Riemann Equations, Necessary and Sufficient condition for analyticity, Properties of Analytic Functions, Laplace Equation, Harmoni Functions, Finding Harmonic Conjugate functions Exponential, Trigonometric, Hyperbolic functions and its properties Multiple valued function and its branches: Logarithmic function an Complex Exponent function. | | | | | | |
| 2. | Complex Integration: Curves, Line Integrals (contour integral) and its properties. Line integrals of single valued functions, Line integrals of multiple valued functions (by choosing suitable branches). Cauchy-Goursat Theorem, Cauchy Integral Formula, Liouville Theorem, Fundamental Theorem of Algebra, Maximum Modulus Theorems. | | | | | | |
| 3. | Power Series: Convergence (Ordinary, Uniform, Absolute) of power series, Taylor and Laurent Theorems, Laurent series expansions. Zeros of analytic functions. Singularities of analytic functions and their classification Residues: Residue Theorem, Rouche's Theorem, Argument Principle. | | | | | | |
| 4. | Applications of Contour Integration: Evaluating various type of definite real integrals using contour integration method. | | | | | | |
| 5. | Conformal Mapping and its applications: Mappings by elementary functions, Mobius transformations, Schwarz-Christoffel transformation. | | | | | | |
| 6. | Interpolation: Interpolation by polynomials, divided differences, error of the interpolating polynomial. | | | | | | |
| 7. | Numerical integration: Composite rules, error formulae, Gaussian integration. | | | | | | |
| 8. | Linear algebraic equation: Solution of a system of linear equations: implementation of Gaussian elimination and Gauss-Seidel methods, partial pivoting. | | | | | | |

| 9. | Roots of equation: Solution of a nonlinear equation: Bisection and Secant methods, Newton's method, rate of convergence, Power method for computation of Eigen values. |
|-----|--|
| 10. | Ordinary differential equations: Numerical solution of ordinary differential equations, Euler and Runge-Kutta methods. |

- 1) R. V. Churchill and J. W. Brown, Complex variables and applicati (7th Edition), McGraw-Hill (2003).
- 2) J. M. Howie, Complex analysis, Springer-Verlag (2004).
- 3) M. J. Ablowitz and A. S. Fokas, Complex Variables- Introduction and Applications, Cambridge University Press, 1998 (Indian Edition).
- 4) E. Kreyszig, Advanced engineering mathematics (8th Edition), John Wiley (1999).
- 5) S. D. Conte and Carl de Boor, Elementary Numerical Analysis- An Algorithmic Approach (3rd Edition), McGraw-Hill, 1980.
- 6) C. E. Froberg, Introduction to Numerical Analysis (2nd Edition), Addison-Wesley, 1981.

DEGREE IN COMPUTER ENGINEERING

PROPOSED TEACHING SCHEME

Semester - V

| SR NO | SUBJECT | TEACH | CREDITS | | |
|-------|--|---------------|----------|-----------|---------|
| SKNO | SUBJECT | THEORY | TUTORIAL | PRACTICAL | CKEDIIS |
| 1 | Management - II | 2 | 0 | 0 | 2 |
| 2 | Advance Processors | 3 | 0 | 2 | 5 |
| 3 | Computer Network | 4 | 0 | 2 | 6 |
| 4 | Design and Analysis of Algorithms | 4 | 0 | 2 | 6 |
| 5 | Object Oriented Programming With Java | 2 | 0 | 2 | 4 |
| 6 | Visual Basic Application & Programming (Institute Elective - II) | 4 | 0 | 2 | 6 |
| 7 | Seminar | 0 | 0 | 1 | 1 |
| | TOTAL | 19 | 0 | 11 | 30 |

B. E. SEMESTER: V

Computer Engg./Information Technology/Computer Science & Engg.

Subject Name: Computer Network

Subject Code: 150702

| Teaching Scheme | | | | Evaluation Scheme | | |
|-----------------|----------|-----------|-------|----------------------------|----|-------------------------------|
| Theory | Tutorial | Practical | Total | (Theory) Exam (Theory) (M) | | Internal Assessment (I) |
| 4 | 0 | 2 | 6 | 70 | 30 | 50 |

| Sr. No. | Course Content |
|------------|---|
| 1. | Introduction: Uses of computer network, Network hardware, Network software, OSI model, TCP/IP model, Comparison of OSI and TCP/IP model, Example network: The internet, X.25, Frame Relay, ATM, Ethernet, Wireless LANs: 802.11. |
| 2. | The Physical layer: Bandwidth, Maximum data rate of a signal, Guided and unguided transmission media. |
| 3. | The Data Link Layer: Design Issues: Framing, Error control, Flow control, Error detection and correction, Elementary data link protocols: Simplex, stop and wait, Sliding window protocol, HDLC. |
| 4. | The Medium Access Control Sublayer: The channel allocation problem, Multiple Access protocols: ALOHA, CSMA, Collision Free Protocols, Limited Contention Protocols, Wavelength Division Multiple Access Protocols, Wireless LAN protocols, Ethernet: Traditional Ethernet, Switched Ethernet, Fast Ethernet, Gigabit Ethernet, IEEE 802.2: LLC Data link layer switching: Bridges, Local Internetworking, Spanning tree bridges, Remote Bridge, Repeaters, Hub, Switches, Routers, Gateway, Virtual LANs. |
| 5. | The network Layer: Design Issues: Store and forward packet switching, Service provided to transport layer, Implementation of connection oriented and connection less service, Comparison of virtual circuit and datagram subnets. Bouting algorithms. The Optimality principle. Shortest path |

Design Issues: Store and forward packet switching, Service provided to transport layer, Implementation of connection oriented and connection less service, Comparison of virtual circuit and datagram subnets, Routing algorithms, The Optimality principle, Shortest path routing, Flooding, Distance vector routing, Link state routing, Hierarchical routing, Broadcast routing, Multicast routing, Routing for mobile host, Routing in ad hoc network, Congestion control algorithms principles, Prevention policies, Congestion control in virtual circuit subnets, Congestion control in datagram subnets, Load shedding, Jitter control quality of service requirements, Techniques for achieving good quality of service, Internetworking: How network can be connected, Concatenated virtual circuit, Connectionless internetworking, Tunneling, Internetwork routing and fragmentation, The network layer in the internet: The IP protocol, IP addresses, Internet control protocol,

| | OSPF, BGP, Internet multicasting, Mobile IP, IPv6. |
|----|--|
| 6. | The Transport Layer: The transport service: Services provided to the upper layers, Transport service primitives, Socket elements of transport protocols addressing, Connection establishment, Connection release, Flow control, Multiplexing, Crash recovery the transport protocol: UDP, TCP. |
| 7. | The Application layer: DNS: The DNS name space, Resource records, Name servers, Electronic mail: Architecture and services, The user agent, Message formats, Message transfer, Final delivery, World Wide Web: Architectural overview, HTTP. |

- 1. Computer network, Andrew S. Tanenbaum, Pearson.
- 2. Introduction to data communication and networking, Behrouz Forouzan, TMH.
- 3. Computer Network, Natalia Olifer, Victor Olifer, Wiley-India edition.
- 4. Data and computer communication, William Stallings, Pearson

B. E. SEMESTER: V

Computer Engineering/Computer Science & Engineering

Subject Name: Design and Analysis of Algorithms

Subject Code: 150703

| Teaching Scheme | | | | Evaluation Scheme | | |
|-----------------|----------|-----------|-------|---|----|-------------------------------|
| Theory | Tutorial | Practical | Total | University Exam (Theory) (E) (M) Mid Sem Exam (Theory) (M) | | Internal Assessment (I) |
| 4 | 0 | 2 | 6 | 70 | 30 | 50 |

| Sr. No. | Course Content |
|------------|--|
| 1. | Basics of Algorithms and Mathematics: What is an algorithm?, Mathematics for Algorithmic Sets, Functions and Relations, Vectors and Matrices, Linear Inequalities and Linear Equations. |
| 2. | Analysis of Algorithm: The efficient algorithm, Average and worst case analysis, Elementary operation, Asymptotic Notation, Analyzing control statement, Amortized analysis, Sorting Algorithm, Binary Tree Search. |
| 3. | Divide and Conquer Algorithm: Introduction, Multiplying large Integers Problem, Problem Solving using divide and conquer algorithm - Binary Search, Sorting (Merge Sort, Quick Sort), Matrix Multiplication, Exponential. |
| 4. | Greedy Algorithm General Characteristics of greedy algorithms, Problem solving using Greedy Algorithm - Activity selection problem, Elements of Greedy Strategy, Minimum Spanning trees (Kruskal's algorithm, Prim's algorithm), Graphs: Shortest paths, The Knapsack Problem, Job Scheduling Problem. |
| 5. | Dynamic Programming: Introduction, The Principle of Optimality, Problem Solving using Dynamic Programming – Calculating the Binomial Coefficient, Making Change Problem, Assembly Line- Scheduling, Knapsack problem, Shortest path, Matrix chain multiplication, Longest Common Subsequence. |

| 6. | Exploring Graphs: An introduction using graphs and games, Traversing Trees – Preconditioning, Depth First Search - Undirected Graph, Directed Graph, Breath First Search, Backtracking – The Knapsack Problem, The Eight queens problem, General Template. |
|----|---|
| 7. | String Matching: Introduction, The naive string matching algorithm, The Rabin-Karp algorithm, String Matching with finite automata. |
| 8. | Introduction to NP-Completeness: The class P and NP, Polynomial reduction, NP- Completeness Problem, NP-Hard Problems. |

- Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, PHI.
- Design and Analysis of Algorithms, Dave and Dave, Pearson.
- 3.
- Fundamental of Algorithms by Gills Brassard, Paul Bratley, PHI. Introduction to Design and Analysis of Algorithms, Anany Levitin, Pearson.

Conventional Power Engineering (Inst. Elec.-II) (151906)

Home Syllabus

Books Question Papers

Result

SYLLABUS

| Sr. | Topics | Teaching Hours | Module Weightage |
|-----|--|----------------|------------------|
| 1 | Thermal Power Plant Simple Rankine cycle, General layout of modern thermal power plant, Site selection, Present status of power generation in India. | | |
| 2 | Steam Turbine Principle of operation, Classification, Compounding of steam turbines, Impulse turbine- velocity diagram, Condition for maximum efficiency, Reaction turbine- velocity diagram, Degree of reaction, Parson turbine, Condition for maximum efficiency, Governing of steam turbines. | | |
| 3 | Gas turbine Classification, Open and closed cycle, Actual Brayton cycle, Methods of improving efficiency and specific output – open cycle with regeneration, Reheating and inter cooling, Combined steam and gas turbine plant. | | |
| 4 | Diesel Power plant Outline of diesel power plant, Systems of diesel power plant like air intake system, Fuel system, Cooling system, Exhaust system, lubrication system, Engine starting and stopping system. | | |
| 5 | Hydro-Electric Power plant Elements of hydro electric power plant, Classification of hydraulic turbines, Construction and working of Pelton wheel, Francis and Kaplan turbine, Draft tube, Cavitation, Governing of hydraulic turbines, Hydraulic electric power plants in India. | | |
| 6 | Nuclear Power Plant Nuclear fusion and fission, Chain reaction, Nuclear fuels, Components of nuclear reactor, Classification of reactors, Pressurized water reactor, Boiling water reactor, Gas cooled reactor, CANDU reactor, Fast breeder reactor, Nuclear aste and its disposal, Nuclear power plants in India. | | |
| 7 | Economics of power generation Load curves, load duration curves, Connected load, maximum load, Peak load, base load and peak load power plants, load factor, Plant capacity factor, Plant use factor, Demand factor, diversity factor, Cost of power plant, Performance and operating characteristics of power plant, Tariff for electric energy. | | |

SEMESTER: V

Subject Name: Management - II

Course Objective:

The objective of the course is to provide an understanding and an introduction to the basic functional areas of management such as Marketing, Finance, Human Resources and Production. The emphasis of the course is to give basic introduction to the concepts. At the same time an attempt is made to incorporate relevant basic topics of strategic management.

(1) Introduction to Marketing Management

| Sr. No. | Course Content |
|------------|--|
| 1. | Marketing Function: The four P's in Marketing, Different concepts in marketing, Production, Product, Selling, Marketing, Societal and holistic. |
| 2. | Marketing Demand: Method of demand forecasting- survey of buyers' intentions, sales force opinion method, expert opinion method, market test method, time series analysis, statistical demand analysis(concepts only no examples). |
| 3. | Market Segmentation: Meaning, Importance and different bases of market segmentation with reference to consumer product and industrial product. |

(2) Introduction to Financial Management

| Sr. No. | Course Content |
|------------|--|
| 1. | Meaning of finance and scope of financial management |
| 2. | Finance functions. |
| 3. | Financial management and role of financial manager. |
| 4. | Objectives of financial management. |

(3) Introduction to Production Management

| Sr. No. | Course Content |
|------------|--|
| 1. | Meaning, characteristics, plant location, factors affecting location |
| 2. | Plant layout: Product and process layout – meaning, merits and demerits. |
| 3. | Break-even analysis (sums). |

(4) Introduction to Human Resource Management

| Sr. No. | Course Content |
|------------|---|
| 1. | Importance |
| 2. | Manpower planning : concept and features and objectives |
| 3. | Manpower planning process |
| 4. | Recruitment : sources |
| 5. | Selection : process |
| 6. | Selection tests : types of tests |

(5) Introduction to Strategic Management

| Sr. No. | Course Content |
|------------|---|
| 1. | Management by objectives. |
| 2. | How strategic and operational plans differ. |
| 3. | The evolution of the concept of strategy. |
| 4. | Levels of strategy : Some key distinctions. |
| 5. | The contents of a corporate strategy. |

Text Books:

1. Principles and Practices of Management by L. M. Prasad.

- 1. Principles of Management by Tripathy and Reddy.
- 2. Business Organization and Management by C. B. Gupta.
- 3. Management by James Stoner and Edward Freemen.
- 4. Management by Herold Knootz and Heinz Wechnch.
- 5. Principles of Management, Charles WL.

B. E. SEMESTER: V

Computer Engg./Information Technology/Computer Science & Engg.

Subject Name: Object Oriented Programming with Java

Subject Code: 150704

| Teaching Scheme | | | | Evaluation Scheme | | |
|-----------------|----------|-----------|-------|------------------------------|------------------------------------|-------------------------------|
| Theory | Tutorial | Practical | Total | University Exam (Theory) (E) | Mid Sem Exam (Theory) (M) | Internal Assessment (I) |
| 2 | 0 | 2 | 4 | 70 | 30 | 50 |

| Sr. No. | Course content |
|------------|---|
| 1. | Introduction to Java: Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, Overloading, Math class, Arrays in java. |
| 2. | Objects and Classes: Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like String, Character, StringBuffer, File, this reference. |
| 3. | Inheritance and Polymorphism: Inheritance in java, Super and sub class, Overriding, Object class, Polymorphism, Dynamic binding, Generic programming, Casting objects, Instance of operator, Abstract class, Interface in java, Package in java, UTIL package. |
| 4. | Event and GUI programming: Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, Text Fields, Text Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Windows, Menus, Dialog Box, Applet and its life cycle, Introduction to swing. |
| 5. | I/O programming: Text and Binary I/O, Binary I/O classes, Object I/O, Random Access Files. |
| 6. | Multithreading in java, Thread life cycle and methods, Runnable interface, Thread synchronization, Exception handling with try-catch-finally, Collections in java, Introduction to JavaBeans and Network Programming. |

- 1. Introduction to Java Programming (Comprehensive Version), Daniel Liang, Seventh Edition, Pearson.
- 2. Programming in Java, Sachin Malhotra & Saurabh Chaudhary, Oxford University Press.
- 3. Murach's Beginning Java 2, Doug Lowe, Joel Murach and Andrea Steelman, SPD.
- 4. Core Java Volume-I Fundamentals, Eight Edition, Horstmann & Cornell, Pearson Education.
- 5. The Complete Reference, Java 2 (Fourth Edition), Herbert Schild, TMH.
- 6. Java Programming, D. S. Malik, Cengage Learning.
- 7. Big Java, 3rd Edition, Horstmann, Wiley-India.
- 8. Head First Java, Katy Sierra & Bert Bates, SPD (O'Reilly).

B. E. SEMESTER: V

Computer Engg./Information Technology/Computer Science & Engg.

Subject Name: Visual Basic Applications and Programming

(Institute Elective-II)

Subject Code: 150706

| Teaching Scheme | | | | Evaluation Scheme | | |
|-----------------|----------|-----------|-------|------------------------------|------------------------------------|-------------------------------|
| Theory | Tutorial | Practical | Total | University Exam (Theory) (E) | Mid Sem Exam (Theory) (M) | Internal Assessment (I) |
| 4 | 0 | 2 | 6 | 70 | 30 | 50 |

| 1. Advantages of VBA: • An easy-to-use and versatile language • Integrated with off-the-shelf products • Minimizes development time and costs 2. Macros: The First Step: • Recording and executing macros • Limitations • Enhancing with VBA code 3. The Code Design and Debugging Tools: • Project Explorer • Help system • Code Window • IntelliSense • Properties Window • Object Browser • Block commenting and uncomment • Code stepping • Immediate Window • Breakpoints 4. Event-Driven Programming: • The role of events in Windows • How events are triggered | Sr. No. | Course content | | | | | | |
|---|------------|---|--|--|--|--|--|--|
| Integrated with off-the-shelf products Minimizes development time and costs 2. Macros: The First Step: Recording and executing macros Limitations Enhancing with VBA code 3. The Code Design and Debugging Tools: Project Explorer Help system Code Window IntelliSense Properties Window Object Browser Block commenting and uncomment Code stepping Immediate Window Breakpoints 4. Event-Driven Programming: The role of events in Windows | 1. | Advantages of VBA: | | | | | | |
| Macros: The First Step: Recording and executing macros Limitations Enhancing with VBA code The Code Design and Debugging Tools: Project Explorer Help system Code Window IntelliSense Properties Window Object Browser Block commenting and uncomment Code stepping Immediate Window Breakpoints Event-Driven Programming: The role of events in Windows | | | | | | | | |
| 2. Macros: The First Step: | | | | | | | | |
| Recording and executing macros Limitations Enhancing with VBA code 3. The Code Design and Debugging Tools: Project Explorer Help system Code Window IntelliSense Properties Window Object Browser Block commenting and uncomment Code stepping Immediate Window Breakpoints 4. Event-Driven Programming: The role of events in Windows | | Minimizes development time and costs | | | | | | |
| Limitations Enhancing with VBA code The Code Design and Debugging Tools: Project Explorer Help system Code Window IntelliSense Properties Window Object Browser Block commenting and uncomment Code stepping Immediate Window Breakpoints Event-Driven Programming: The role of events in Windows | 2. | | | | | | | |
| Enhancing with VBA code The Code Design and Debugging Tools: Project Explorer Help system Code Window IntelliSense Properties Window Object Browser Block commenting and uncomment Code stepping Immediate Window Breakpoints Event-Driven Programming: The role of events in Windows | | | | | | | | |
| 3. The Code Design and Debugging Tools: • Project Explorer • Help system • Code Window • IntelliSense • Properties Window • Object Browser • Block commenting and uncomment • Code stepping • Immediate Window • Breakpoints 4. Event-Driven Programming: • The role of events in Windows | | | | | | | | |
| Project Explorer Help system Code Window IntelliSense Properties Window Object Browser Block commenting and uncomment Code stepping Immediate Window Breakpoints 4. Event-Driven Programming: The role of events in Windows | | Enhancing with VBA code | | | | | | |
| Help system Code Window IntelliSense Properties Window Object Browser Block commenting and uncomment Code stepping Immediate Window Breakpoints 4. Event-Driven Programming: The role of events in Windows | 3. | | | | | | | |
| Code Window IntelliSense Properties Window Object Browser Block commenting and uncomment Code stepping Immediate Window Breakpoints 4. Event-Driven Programming: The role of events in Windows | | | | | | | | |
| IntelliSense Properties Window Object Browser Block commenting and uncomment Code stepping Immediate Window Breakpoints 4. Event-Driven Programming: The role of events in Windows | | | | | | | | |
| Properties Window Object Browser Block commenting and uncomment Code stepping Immediate Window Breakpoints 4. Event-Driven Programming: The role of events in Windows | | | | | | | | |
| Object Browser Block commenting and uncomment Code stepping Immediate Window Breakpoints 4. Event-Driven Programming: The role of events in Windows | | | | | | | | |
| Block commenting and uncomment Code stepping Immediate Window Breakpoints 4. Event-Driven Programming: The role of events in Windows | | | | | | | | |
| Code stepping Immediate Window Breakpoints 4. Event-Driven Programming: The role of events in Windows | | | | | | | | |
| Immediate Window Breakpoints 4. Event-Driven Programming: The role of events in Windows | | | | | | | | |
| Breakpoints 4. Event-Driven Programming: The role of events in Windows | | | | | | | | |
| 4. Event-Driven Programming: • The role of events in Windows | | | | | | | | |
| The role of events in Windows | | Breakpoints | | | | | | |
| | 4. | | | | | | | |
| How events are triggered | | | | | | | | |
| | | | | | | | | |
| Responding to events through event procedures | | Responding to events through event procedures | | | | | | |

| 5. | Putting Objects to Work: |
|-----|--|
| | Properties |
| | Methods |
| | Events |
| | Collections |
| | Using WithEnd With |
| | |
| 6. | Storing Data In Variables: |
| | How and when to declare variables |
| | Selecting data types |
| | Fixed and dynamic arrays |
| | Constants |
| | The scope and lifetime of variables |
| | The ecope and meanine of variables |
| 7. | Conditional Branching: |
| | IfThenElse |
| | SelectCase |
| | |
| 8. | Looping Through Code: |
| | DoLoop, While and Until |
| | ForNext and For EachNext |
| | |
| 9. | Building Procedures: |
| | Creating Sub and Function procedures |
| | Calling procedures |
| | Passing arguments to procedures |
| | a lassing digunients to procedures |
| 10. | Understanding Object Model Structures: |
| | Exploring the hierarchy using the Object Browser and Help system |
| | Referencing specific objects |
| | Treferencing appearing abjects |
| 11. | Writing Application-Specific Procedures: |
| | Key objects within Excel, Word and Outlook |
| | Creating templates and add-ins |
| | orealing templates and add ins |
| 12. | Exploiting who Dower of Automation |
| 12. | Exploiting the Power of Automation: |
| | Controlling one Office application while working in another application Associated data in detachases using Astive V. Data Objects. |
| | Accessing data in databases using ActiveX Data Objects |
| 10 | Haine Intrincia Dialoga. |
| 13. | Using Intrinsic Dialogs: |
| | Communicating with the user through the message box |
| | Gathering user information with the input box |
| | Utilizing the File Dialog object and Dialogs collections |
| 14. | Creating Customized Dialogs with User Form Objects: |
| 14. | Creating Customized Dialogs with User Form Objects: • Command buttons |
| | List and Combo boxes |
| | |
| | Option buttonsCheck boxes |
| | |
| | Labels Tout haves |
| | Text boxes |
| | • Frames |
| | Adding more functionality with advanced ActiveX controls |

15. Modifying menus and toolbars Simplifying user interaction with the CommandBar object Adding and removing CommandBarControl objects 16. Handling Runtime Errors: The On Error GoTo structure Classifying errors with the Err object Continuing execution with Resume, Resume Next or Resume label 17. Implementing Security: The dangers of macro viruses Macro security levels in Office Applying digital signatures to macros Password protecting your VBA code

- 1. VBA Developer's Handbook, 2nd Edition, 2001, Authors: Ken Getz Ken Getz, Mike Gilbert, Publication: Wiley Publication, Sybex.
- 2. Excel VBA Macro Programming, 2004, Author: Richard Shepherd, Publication: Mc Graw Hill.
- 3. Mastering VBA, 2nd Edition, 2005, Author: Guy Hart-Davis, Publication: Wiley Publication, Sybex.
- 4. Access VBA Programming, Authors: Charles Brown, Ron Petrusha Publication: Mc Graw Hill.
- 5. Mastering VBA for Microsoft Office 2007, 2nd Edition, Author: Richard Mansfield, Publication: Wiley Publication, Sybex.

B. E. SEMESTER: V

Computer Engineering/Computer Science & Engineering

Subject Name: Advance Processors

Subject Code: 150701

| , | Teaching S | Scheme | | Eval | uation Schem | e |
|--------|------------|-----------|-------|------------------------------|------------------------------------|-------------------------------|
| Theory | Tutorial | Practical | Total | University Exam (Theory) (E) | Mid Sem Exam (Theory) (M) | Internal Assessment (I) |
| 3 | 0 | 2 | 5 | 70 | 30 | 50 |

| Sr. No. | Course content |
|------------|---|
| 1. | Introduction to 16-bit microprocessors, 8086 architecture, Segments, Flags, Instruction set assembly language programming on 8086 using assembler, Interrupts, Writing interrupt services routines, Debugging programs, 8086 pin functions, Minimum and maximum mode operations, Memory banks. |
| 2. | 80286/386/486 register set, Data types, Overview of instruction set, Memory segmentation with descriptor tables including LDT and GDT, Privilege levels, Changing privilege levels, Paging including address translation, Page level protection, MMU cache, Virtual memory, Paging and segmentation, Multitasking with TSS, Context switching, Task scheduling, Extension and I/O permission, Managing interrupts with IDT, Gates and exception handlers. |
| 3. | Technical overview (only features) of the Pentium architecture including Pentium-Pro, MMX, Hyper Threading, Core-2-duo, Concepts of RISC, RISC vs. CISC architecture of SUN SPARC. |

- 1. Microprocessor & Interfacing Douglas Hall, TMH.
- 2. Advanced 80386 Programming Techniques: James Turley, TMH.
- 3. Advance Microprocessor Deniel Tabak, TMH.
- 4. The Intel Microprocessors (Eight Editions): Barry B. Brey, Pub: Pearson (Prentice Hall).
- 5. The 8086 Microprocessor, Kenneth Ayala, Cengage Learning.
- 6. The 8088 and 8086 Microprocessors, Triebel & Singh, Pearson Education.
- 7. IBM PC Assembly Langauge & Programming, Peter Abel, PHI.

DEGREE IN COMPUTER ENGINEERING

PROPOSED TEACHING SCHEME

Semester - VI

| SR NO | SUBJECT | TEACHING SCHEME(HOURS) | | | HOURS |
|-------|-----------------------------|------------------------|----------|-----------|-------|
| Sh NO | SOBJECT | THEORY | TUTORIAL | PRACTICAL | HOUNS |
| 1 | Software Enginerring | 4 | 0 | 2 | 6 |
| 2 | Information Security | 4 | 0 | 2 | 6 |
| 3 | Computer Graphics | 4 | 0 | 2 | 6 |
| 4 | Theory Of Computation | 3 | 0 | 0 | 3 |
| 5 | Web Application Development | 3 | 0 | 2 | 5 |
| 6 | System Programming | 2 | 0 | 2 | 4 |
| | TOTAL | 20 | 0 | 10 | 30 |

B. E. SEMESTER: VI

Computer Engineering/Information Technology/Computer Science & Engineering

Subject Name: Computer Graphics

| Teaching Scheme | | | | Eval | luation Scheme | |
|-----------------|----------|-----------|-------|------------------------------------|---------------------------------|------------------|
| Theory | Tutorial | Practical | Total | University Exam (Theory) (E) | Mid Sem Exam (Theory) (M) | Practical (I) |
| 4 | 0 | 2 | 6 | 70 | 30 | 50 |

| Sr. No | Course Content | Total Hrs. |
|-----------|--|---------------|
| 1. | Basic of Computer Graphics, Applications of computer graphics, Display devices, Random and Raster scan systems, Graphics input devices, Graphics software and standards | 04 |
| 2. | Graphics Primitives: Points, lines, circles and ellipses as primitives, scan conversion algorithms for primitives, Fill area primitives including scan-line polygon filling, inside-outside test, boundary and flood-fill, character generation, line attributes, area-fill attributes, character attributers, antialiasing methods | 14 |
| 3. | 2D transformation and viewing: Transformations (translation, rotation, scaling(, matrix representation, homogeneous coordinates, composite transformations, reflection and shearing, viewing pipeline and coordinates system, window-to-viewport transformation, clipping including point clipping, line clipping (cohensutherland, liang bersky, NLN), polygon clipping | 12 |
| 4. | 3D concepts and object representation: 3D display methods, polygon surfaces, tables, equations, meshes, curved lies and surfaces, quadric surfaces, spline representation, cubic spline interpolation methods, Bazier curves and surfaces, B-spline curves and surfaces | 14 |
| 5. | 3D transformation and viewing: 3D scaling, rotation and translation, composite transformation, viewing pipeline and coordinates, parallel and perspective transformation, view volume and general (parallel and perspective) projection transformations | 10 |

| 6. | Advance topics: visible surface detection concepts, back-face detection, depth buffer method, illumination, light sources, illumination methods (ambient, diffuse reflection, specular reflection), Color models: properties of light, XYZ, RGB, YIQ and CMY color models | 10 |
|----|---|----|
| | TIQ and Civit color models | |

1. Computer Graphics C Version, D.Hearn And P.Baker, Pearson Eduction

- 1. Procedural Methods for computer graphics, Rogers, TMH
- 2. Computer Graphics, Foley and van Dam, Person Education
- 3. Computer Graphics with virtual reality systems, R. K. Maurya, Wiley-India
- 4. Computer Graphics with OpenGL, Hearn and Baker, Pearson
- 5. Computer Graphics, Sinha & Udai, TMH
- 6. Computer Graphics, Peter Shirley, Steve Marschner, Cengage Learning

B. E. SEMESTER: VI

Computer Engineering/Information Technology/Computer Science & Engineering

Subject Name: Information Security

| Teaching Scheme | | | | Evaluation Scheme | | | |
|-----------------|----------|-----------|-------|------------------------------------|---------------------------------|------------------|--|
| Theory | Tutorial | Practical | Total | University Exam (Theory) (E) | Mid Sem Exam (Theory) (M) | Practical (I) | |
| 4 | 0 | 2 | 6 | 70 | 30 | 50 | |

| Sr. No | Course Content | Total Hrs. |
|-----------|--|---------------|
| 1. | Conventional Encryption: Conventional Encryption Model, Steganography, Classical Encryption Techniques | 04 |
| 2. | Conventional Encryption Techniques: Simplified Des, Block Cipher Principles, Data Encryption Standards, Differential And Linear Cryptography Principles, Block Cipher Design Principles, Modes Of Operations, Algorithms Like Triple Des, International Data Encryption Algorithm, Blowfish, Rc5, Cast-128, Rc2, Characteristics Of Advanced Symmetrical Block Cipher, Issues Of Conventional Encryption Like Traffic Distribution, Random Number Generation, Key Distribution | 14 |
| 3. | Public Key Cryptography: Principles Of Public-Key Cryptography, RSA Algorithm, Key Management, Elliptic Curve Cryptography, Diffie-Hellman Key Exchange | 08 |
| 4. | Number Theory: Prime And Relative Prime Numbers, Modular Arithmetic, Euler's Theorem, Euclid's Algorithm, Discrete Logarithm Tics | 04 |
| 5. | Message Authentication And Hash Functions: Authentication Requirement, Functions, Message Authentication Code, Hash Functions, Security Of Hash Functions And Macs, MD5 Message Digest Algorithm, Secure Hash Algorithm, Ripemd-160, Hmac | 06 |
| 6. | Introduction To E-Commerce: Introduction To E-Commerce, Transactions On E-Commerce, Requirement Of Security On E-Commerce | 04 |

| 7. | Network Security: Digital Signatures, Authentication Protocols, Digital Signature Standards, Application Authentication Techniques Like Kerberos, X.509 Directory Authentication Services, Active Directory Service Of Windows NT/Windows 2000 | 10 |
|----|--|----|
| 8. | IP Security E-Mail Security: IP Security Overview, Architecture, Authentication Header, Encapsulation Security Payload, Combining Security Association, Key Management, Pretty Good Privacy, S/Mime And Types | 08 |
| 9. | Web Security: Web Security Requirement, SSL And Transport Layer Security, Secure Electronic Transactions, Firewall Design Principles, Trusted Systems | 06 |

1. Cryptography And Network Principles And Practice Fourth Edition, William Stallings, Pearson

- Cryptography & Network Security, Forouzan, Mukhopadhyay, McGrawHill
 Cryptography and Network Security (2nd Ed.), Atul Kahate, TMH
- 3 Information Systems Security, Godbole, Wiley-India
- 4 Information Security Principles and Practice, Deven Shah, Wiley-India

B. E. SEMESTER: VI

Computer Engineering/Information Technology/Computer Science & Engineering

Subject Name: Software Engineering

| Teaching Scheme | | | | Eval | luation Scheme | |
|-----------------|----------|-----------|-------|------------------------------------|---------------------------------|------------------|
| Theory | Tutorial | Practical | Total | University Exam (Theory) (E) | Mid Sem Exam (Theory) (M) | Practical (I) |
| 4 | 0 | 2 | 6 | 70 | 30 | 50 |

| Sr. No | Course Content | Total Hrs. |
|-----------|---|---------------|
| 1. | Introduction to Software Engineering: Study of Different Models, Software Characteristics, Components, Applications, Layered Technologies, Processes, Methods And Tools, Generic View Of Software Engineering, Process Models- Waterfall model, Incremental, Evolutionary process models- Prototype, Spiral And Concurrent Development Model. | 08 |
| 2. | Requirements Engineering: Problem Recognition, Requirement Engineering tasks, Processes, Requirements Specification, Use cases and Functional specification, Requirements validation, Requirements Analysis, Modeling – different types | 08 |
| 3. | Structured System Design: Design Concepts, Design Model, Software Architecture, Data Design, Architectural Styles and Patterns, Architectural Design, Alternative architectural designs, Modeling Component level design and its modeling, Procedural Design, Object Oriented Design. | 08 |
| 4. | Data Oriented Analysis & Design: Difference between Data and Information, E-R Diagram, Dataflow Model, Control Flow Model, Control and Process Specification, Data Dictionary | 06 |
| 5. | User Interface Design: Concepts of UI, Interface Design Model, Internal and External Design, Evaluation, Interaction and Information Display Software | 05 |
| 6. | Planning a Software Project: Scope and Feasibility, Effort Estimation, Schedule and staffing, Quality Planning, Risk management- identification, assessment, control, project monitoring plan, Detailed Scheduling | 06 |

| 7. | Quality Assurance: Quality Control, Assurance, Cost, Reviews, Software Quality Assurance, Approaches to SQA, Reliability, Quality Standards- ISO9000 And 9001 | 05 |
|-----|--|----|
| 8. | Coding and Unit Testing: Programming principles and guidelines, Programming practices, Coding standards, Incremental development of code, Management of code evaluation, Unit testing- procedural units, classes, Code Inspection, Metrics – size measure, complexity metrics, Cyclomatic Complexity, Halstead measure, Knot Count, Comparison Of Different Metrics. | 06 |
| 9. | Testing: Concepts, Psychology of testing, Levels of testing, Testing Process- test plan, test case design, Execution, Black-Box testing – Boundary value analysis – Pairwise testing- state based testing, White-Box testing – criteria and test case generation and tool support, Metrics – Coverage analysis- reliability | 05 |
| 10. | Software Project Management: Management Spectrum, People –Product – Process- Project, W ⁵ HH Principle, Importance of Team Management | 04 |
| 11. | Case Tools And Study: Introduction To CASE, Building Blocks Of CASE, Integrated CASE Environment | 03 |

1. Pressman R.S., Software Engineering: A Practitioner's Approach, TMH

- 1. Software Engineering, Eighth Edition, Sommerville, Pearson
- 2. Software Engineering, Rajiv Mall, PHI
- 3. Software Engineering, Pankaj Jalote, A Precise Approach, Wiley India
- 4. Software Engineering, An Engineering Approach, Peters & Pedrycz, Wile-India
- 5. Software Engineering, Principles and Practice, JAwadekar, TMH

B. E. SEMESTER: VI Computer Engineering

Subject Name: System Programming

| Teaching Scheme | | | | Evaluation Scheme | | | |
|-----------------|--------------------------|---|-------|------------------------------------|-------------------------------|----|--|
| Theory | Tutorial Practical Total | | Total | University Exam (Theory) (E) | Mid Sem Exam (Theory) (I) (I) | | |
| 2 | 0 | 2 | 4 | 70 | 30 | 50 | |

| Sr. No | Course Content | Total Hrs. |
|-----------|--|---------------|
| 1. | Language Processors: Language Processing Activities, Fundamental of Language Processing (phases and passes of compiler and role of each analyzer), Fundamental of Language Specification | 04 |
| 2. | Scanning and Parsing: Regular Grammars and Regular Expression, Finite state automata, Building DFAs, The Scanning Process, An Elementary Scanner Design and Its Implementation, The role of a parser, Top down parsing-naïve approach, Recursive descent parser, LL (1) parser, Bottom up parsing- naïve approach, simple precedence grammars, Operator Precedence Parsing | 06 |
| 3. | Assemblers: Elements of Assembly Language Programming, Assembly Scheme, single pass Assembler, Detailed Design of two pass assembler, Comparison of single pass and two pass compiler ,Output interface of assembler | 06 |
| 4. | Macro Processors: Macro Definition and Call, Macro Expansion, Nested Macro Calls, Advanced Macro Facilities, Design Of Macro Preprocessor, Design of macro assembler | 08 |
| 5. | Loader & Linkers: Relocation of Linking Concept, Design of Linker, Linker for MS DOS, Linking for overlays, Design of absolute loaders, Design of direct linking loaders | 05 |
| 6. | Introduction To Compilers: Aspects of Compilation, Memory Allocation, Compilation of Expression and Control Structure, Code Optimization, Interpreters | 03 |

1. System Programming & Operating System, Dhamdhere, TMH

- System Programming, John J. Donovan, TMH
 System Software, 3rd Ed., Beck & Manjula, Pearson Education
 System Programming and Compiler Construction, R.K. Maurya, Wiley-dreamtech

B. E. SEMESTER: VI

Computer Engineering /Computer Science & Engineering

Subject Name: Theory of Computation

| Teaching Scheme | | | | Evaluation Scheme | | | |
|-----------------|----------|---------------------|---|---------------------------------------|----|------------------|--|
| Theory | Tutorial | ial Practical Total | | University Exam (Theory) (Theory) (M) | | Practical (I) | |
| 3 | 0 | 0 | 3 | 70 | 30 | 50 | |

| Sr. No | Course Content | Total Hrs. |
|-----------|---|---------------|
| 1. | Review Of Mathematical Terms And Theory: Basic Mathematical Notations And Set Theory, Logic Functions And Relations, Language Definitions, Mathematical Inductions And Recursive Definitions | 04 |
| 2. | Finite Automata: Deterministic And Non Deterministic Finite Automata, ∧-Transitions, Conversion From NFA To DFA, Kleene's Theorem, Regular And Non Regular Languages | 12 |
| 3. | CFG (Context Free Grammar): Introduction To CFG, CFG And Known Languages, Unions Concatenations And *'S Notations And CFL, Derivations Of Trees And Ambiguity, Unambiguous CFG And Algebric Expressions, Normal Forms And Siplified Forms | 09 |
| 4. | Pushdown Automata, CFL and NFL: Introduction To PDA, Definition, DPDA, PDA Corresponding To CFG, CFG Corresponding To PDA, Introduction To CFL, Intersections And Complements Of CFL, Decisions Problems And CFL | 09 |
| 5. | Turing Machines, Recursive Language: Model Of Computation And Church Turning Thesis, Definition Of Turing Machine, Tm And Language Acceptors, Variations Of Tm, Non Deterministic Tm, Universal Tm, Enumerable And Language, Recursive And Non Recursive Enumerable | 05 |
| 6. | Computation Functions, Measuring, Classifications And Complexity: Primitive Recursive Functions, Halting Problem, Recursive Predicates And Some Bounded Operations, Unbounded Minimizations And μ -Recursive Functions, Godel Numbering, Computable Functions And μ -Recursive, Numerical Functions | 05 |

| 7. | Tractable And Intractable Problems: | |
|----|---|----|
| | Growth Rate And Functions, Time And Speed Complexity, Complexity | 04 |
| | Classes, Tractable And Possibly Intractable Problems, P And Np | 04 |
| | Completeness, Reduction Of Time, Cook's Theorem, Np-Complete Problems | |

1. Introduction To Languages And Theory Of Computation By John C. Martin, Third Edition, TMH.

- 1. Automata Theory, Languages and Computation, Hopcroft, Motwani, Ullman, Pearson Education
- 2. Theory of automata, Langusges and computation, Kumar, McGraHill
- 3. The Theory of Computation, Moret, Pearson Education
- 4. Introduction to Computer Theory, Cohen, Wiley-India

B. E. SEMESTER: VI

Computer Engineering /Computer Science & Engineering

Subject Name: Web Application Development

| Teaching Scheme | | | | Evaluation Scheme | | | |
|-----------------|----------|--------------------------|---|------------------------------------|---------------------------------|------------------|--|
| Theory | Tutorial | Tutorial Practical Total | | University Exam (Theory) (E) | Mid Sem Exam (Theory) (M) | Practical (I) | |
| 3 | 0 | 2 | 5 | 70 | 30 | 50 | |

| Sr. No | Course Content | Total Hrs. |
|-----------|---|---------------|
| 1. | Introduction to WWW: Protocols and programs, secure connections, application and development tools, the web browser, Web Design: Web site desin principles, planning the site and navigation | 05 |
| 2. | Introduction to HTML: The development process, basic HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, simple HTML forms, web site structure Introduction to XHTML: XML, Move to XHTML, Meta tags, Character entities, frames and frame sets, inside browser. | 07 |
| 3. | Style sheets : Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2 | 05 |
| 4. | Javascript: Client side scripting, What is Javascript, How to develop Javascript, simple Javascript, variables, functions, conditions, loops and repetition Javascript: Advance script, Javascript and objects, Javascript own objects, the DOM and web browser environments, forms and validations DHTML: Combining HTML, CSS and Javascript, events and buttons, controlling your browser, | 07 |
| 5. | XML: Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Well formed, using XML with application.XML, XSL and XSLT. Introduction to XSL, XML transformed simple example, XSL elements, transforming with XSLT | 06 |

| 6. | Web services, Feeds and and Blogs: Need for web services, SOAP, SOAP XML and HTTP, Web feeds, Blogs, The server side: What is server, choices, setting up UNIX and Linux web servers, Logging users, dynamic IP | 08 |
|----|--|----|
| 7. | PHP: Starting to script on server side, Arrays, function and forms, advance PHP | |
| | Databases : Basic command with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables, PHP myadmin and database bugs. | 10 |

- 1. Developing Web Application, Ralph Moseley, Wiley India
- 2. Web Design, Joel Sklar, Cengage Learning

- 1. Web Design, Joel Sklar, Cengage Learning
- 2. Web Technologies, Black Book, dreamtech Press
- 3. Web Applications: Concepts and Real World Design, Knuckles, Wiley-India
- 4. Developing Web Applications in PHP and AJAX, Harwani, McGrawHill
- 5. Internet and World Wide Web How to program, P.J. Deitel & H.M. Deitel. Pearson publication

GUJARAT TECHNOLOGICAL UNIVERSITY **COMPUTER ENGINEERING**

B. E. SEMESTER: VII

[Valid from August 2011 to May 2012]

Subject Name: Mobile Computing Subject Code: 170702

| Teaching Scheme | | | | Evaluation Scheme | | | |
|-----------------|----------|-----------|-------|--------------------------|-----------|-----------------|----------------------|
| Theory | Tutorial | Practical | Total | University Exam (E) | | Mid Sem Exam | Practical (Internal) |
| | | | | Theory | Practical | (Theory) (M) | |
| 3 | 0 | 2 | 5 | 70 | 30 | 30 | 20 |

| Sr. No. | Course Contents | Total Hrs |
|------------|---|--------------|
| 1. | Mobile Computing Introduction | 11 |
| | History of Wireless Communications, Types, propagation modes Wireless network architecture, Applications, Security, Concerns and Standards, Benefits, Future. Evolution of mobile computing, What mobile users need, SOC and AOC client, Mobile computing OS, Architecture for mobile computing, Three tier architecture, design considerations for mobile computing, mobile computing through internet, making existing applications Mobile-Enabled. | |
| 2. | Mobile Technologies | 15 |
| | Bluetooth, Radio frequency identification(Rfid), Wireless Broadband, Mobile IP: Introduction, Advertisement, Registration, TCP connections, two level addressing, abstract mobility management model, performance issue, routing in mobile host, Adhoc networks, Mobile transport layer: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, transaction oriented TCP., IPv6 | |
| | Global system for mobile communication, Global system for mobile communication, GSM architecture, GSM entities, call routing in GSM,PLMN interface, GSM addresses and identifiers, network aspects in GSM,GSM frequency allocation, authentication and security, Short message services, Mobile computing over SMS,SMS, value added services through SMS, accessing the SMS bearer | |
| 3. | General packet radio service(GPRS) | 10 |
| | GPRS and packet data network, GPRS network architecture, GPRS network operation, data services in GPRS, Applications of GPRS, Billing and charging in | |

| | GPRS | |
|----|--|----|
| 4. | Wireless Application Protocol(WAP) WAP,MMS,GPRS application CDMA and 3G | 18 |
| | Spread-spectrum Technology, CDMA versus GSM, Wireless data, third generation networks, applications in 3G Wireless LAN, Wireless LAN advantages,IEEE802.11 standards ,Wireless LAN architecture, Mobility in Wireless LAN, Deploying Wireless LAN, Deploying Wireless LAN, Mobile ad hoc networks and sensor networks, wireless LAN security, WiFi v/s 3G Voice over Internet protocol and convergence, Voice over IP,H.323 framework for voice over IP,SIP, comparison between H.323 ad SIP, Real time protocols, convergence technologies, call routing, call routing, voice over IP applications, IMS, Mobile VoIP, Security issues in mobile Information security, security techniques and algorithms, security framework for mobile environment | |

- 1. Mobile Computing, Asoke K Telukder, Roopa R Yavagal, TMH
- 2. The complete reference J2ME, TMH
- 3. Programming for Mobile and Remote Computers, G. T. Thampi, dreamtech
- 4. Handbook of Wireless Networks and Mobile Computing, Ivan Stojmenovic , Wiley

- 1. Principles of Mobile Computing, Hansmann, Merk, Nicklous and Stober, Springer
- 2. Mobile Communications, Jochen Schiller, Pearson
- 3. Mobile Computing, Raj Kamal, Oxford
- 4. Mobile Computing, Wandra & Wandra, Akshat Pub.
- 5. Android Wireless Application Development, Shane Conder, Lauren Darcey, Pearson
- 6. Professional Android 2 Application development, Reto Meier, Wrox, Wiley India

COMPUTER ENGINEERING / INFORMATION TECHNOLOGY / COMPUTER SCIENCE & ENGINEERING B. E. SEMESTER: VII

Subject Name: **Project** Subject Code: **170001**

| Teaching Scheme | | | | Evaluation Scheme | | | |
|-----------------|----------|-----------|-------|------------------------|-----------|-----------------|----------------------|
| Theory | Tutorial | Practical | Total | University Exam (E) | | Mid Sem Exam | Practical (Internal) |
| | | | | Theory | Practical | (Theory) (M) | |
| 0 | 0 | 4 | 4 | 0 | 100 | 0 | 50 |

General Guidelines for the Project – I & II

Following are the General guidelines:

- 1. Semester 7th, teaching scheme is 0-0-4, with 4 credits worth of 150 marks
- 2. Semester 8th, teaching scheme is 0-0-8 or 0-0-12 in some cases worth of 300 to 450 marks.

Note:

In the 7th Semester 50 marks are to be given for Problem Definition which is to be given in a specified format. The format may be specified by dept. /college. The common form for the problem definition can be downloaded from GTU website.

Procedure:

- a) Each defined project needs to be from Industry/Research organization/Govt.organization/socio-technical issues.
- b) Project identification should be based on "Shodh- Yatra" carried out by the students after completion of B.E Semester 6th Examination but before starting of the 7th Semester.
- c) Problem definition for the project needs to be submitted by every student in the first week of the 7th Semester to his/her college.
- d) Each definition will be evaluated based on merit in the beginning of the 7th semester itself by the College.
- e) Every College should send the list of students along with the Problem Definition in the specified format to GTU before 15th August, 2011.

Facilitation:

You may contact your Udisha club co-ordinator/Faculty /Department/Principal or Chairman of your Sankul for arranging "Shodh-Yatra" to the industries.

Guidelines for the Students:

- 1. The students are required to identify their problem during the summer of 2011 and they are required to follow all the rules and instructions issued by department, for safety and other requirements.
- 2. Each student or student group would work under the guidance of the Faculty from the College. In case any problem/other issue arises for the smooth progress of IDP discovery/Practical Training, it should be immediately brought to the notice of the Udisha club co-ordinator/Faculty /Department/Principal or Chairman of your Sankul.
- 3. The students are required to submit the Problem Definition (in the specified format) to their Head of the Department in their College during the first week of the 7th semester.
- 4. Problem is to be located from industry floor and then it has to be developed in 7th and 8th semester in college with possible periodic inputs from concerned industries. Both the project parts are single major project. Student has complete work in College premise only under supervision of College teacher along with Other Subjects/Course as per Teaching Scheme
- 5. Any student can pick an industry in any Sankul as per his/her feasibility. He/she is allowed to choose any particular industry and interdisciplinary projects are allowed inside same college. Student has complete work in College premise only under supervision of College teacher along with Other Subjects/Course as per Teaching Scheme
- 6. The project is mandatory for each branch. Sankuls are not boundary for choosing an IDP. Any students can be linked to anywhere.
- 7. The project work will be in-house industry project, where student need to implement project related to any domain of industry like education, legal, manufacturing, design, pharmaceutical, Ecommerce, etc.
- 8. Students are required to get approval of project definition from the department.
- 9. After approval of project definition students are required to report their project work weekly to respective internal guide.
- 10. Maximum 4 students can allow working in particular project group.
- 11. Students have to submit project with following listed documents after the approval of their project definition. Format for same will be provided by department.
 - a. Project Synopsis
 - b. Software Requirement Specification
 - c. SPMP
 - d. Final Project Report
 - e. Company certificate
 - f. Project Setup file with Source code
 - g. Project Presentation (PPT)

GUJARAT TECHNOLOGICAL UNIVERSITY COMPUTER ENGINEERING

B. E. SEMESTER: VII

[w.e.f. June 2012]

Subject Name: Wireless Communication and Mobile Programming

Subject Code: 170702N

| Teaching Scheme | | | | | Evalua | tion Scheme | |
|-----------------|----------|-----------|-------|-----------|----------------|-----------------|----------------------|
| Theory | Tutorial | Practical | Total | Univers (| ity Exam E) | Mid Sem Exam | Practical (Internal) |
| | | | | Theory | Practical | (Theory) (M) | |
| 3 | 0 | 2 | 5 | 70 | 30 | 30 | 20 |

| Sr. No. | Course Contents | Total Hrs |
|------------|---|--------------|
| 1. | Mobile Computing Introduction | 11 |
| | History of Wireless Communications, Types, propagation modes Wireless network architecture, Applications, Security, Concerns and Standards, Benefits, Future. Evolution of mobile computing, What mobile users need, SOC and AOC client, Mobile computing OS, Architecture for mobile computing, Three tier architecture, design considerations for mobile computing, mobile computing through internet, making existing applications Mobile-Enabled. | |
| 2. | Mobile Technologies | 15 |
| | Bluetooth, Radio frequency identification(Rfid), Wireless Broadband, Mobile IP: Introduction, Advertisement, Registration, TCP connections, two level addressing, abstract mobility management model, performance issue, routing in mobile host, Adhoc networks, Mobile transport layer: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, transaction oriented TCP., IPv6 | |
| | Global system for mobile communication, Global system for mobile communication, GSM architecture, GSM entities, call routing in GSM,PLMN interface, GSM addresses and identifiers, network aspects in GSM,GSM frequency allocation, authentication and security, Short message services, Mobile computing over SMS,SMS, value added services through SMS, accessing the SMS bearer | |
| 3. | General packet radio service(GPRS) | 10 |
| | GPRS and packet data network, GPRS network architecture, GPRS network operation, data services in GPRS, Applications of GPRS, Billing and charging in | |

| | GPRS | |
|----|--|----|
| 4. | Wireless Application Protocol(WAP) WAP,MMS,GPRS application CDMA and 3G | 18 |
| | Spread-spectrum Technology, CDMA versus GSM, Wireless data, third generation networks, applications in 3G Wireless LAN, Wireless LAN advantages,IEEE802.11 standards ,Wireless LAN architecture, Mobility in Wireless LAN, Deploying Wireless LAN, Deploying Wireless LAN, Mobile ad hoc networks and sensor networks, wireless LAN security, WiFi v/s 3G Voice over Internet protocol and convergence, Voice over IP,H.323 framework for voice over IP,SIP, comparison between H.323 ad SIP, Real time protocols, convergence technologies, call routing, call routing, voice over IP applications, IMS, Mobile VoIP, Security issues in mobile Information security, security techniques and algorithms, security framework for mobile environment | |

- 1. Mobile Computing, Asoke K Telukder, Roopa R Yavagal, TMH
- 2. The complete reference J2ME, TMH
- 3. Programming for Mobile and Remote Computers, G. T. Thampi, dreamtech
- 4. Handbook of Wireless Networks and Mobile Computing, Ivan Stojmenovic , Wiley

- 1. Principles of Mobile Computing, Hansmann, Merk, Nicklous and Stober, Springer
- 2. Mobile Communications, Jochen Schiller, Pearson
- 3. Mobile Computing, Raj Kamal, Oxford
- 4. Mobile Computing, Wandra & Wandra, Akshat Pub.
- 5. Android Wireless Application Development, Shane Conder, Lauren Darcey, Pearson
- 6. Professional Android 2 Application development, Reto Meier, Wrox, Wiley India

GUJARAT TECHNOLOGICAL UNIVERSITY COMPUTER ENGINEERING

B. E. SEMESTER: VII

Subject Name: Advance .Net Technology (Department Elective -I)

| Teaching Scheme | | | | | Evalua | tion Scheme | |
|-----------------|----------|-----------|-------|--------------|-----------------|-----------------|----------------------|
| Theory | Tutorial | Practical | Total | Univers (| sity Exam E) | Mid Sem Exam | Practical (Internal) |
| | | | | Theory | Practical | (Theory) (M) | |
| 4 | 0 | 2 | 6 | 70 | 30 | 30 | 20 |

| Sr. No. | Course Contents | Total Hrs |
|------------|--|--------------|
| 1. | Introduction to .NET | 03 |
| | .NET framework, MSIL, CLR, CLS, Name spaces, Assemblies, the Common Language Implementation , Assemblies , Metadata and Intermediate Language , Garbage Collection , Versioning and Side-by-Side Execution , The End to DLL Hell , Managed Execution , COM InterOp | |
| 2. | Data Types and Base Class Libraries Understanding .NET Data Types , Exploring Assemblies and Namespaces , String Manipulation , Files and I/O , Collections , The Microsoft.VisualBasic Namespace | 02 |
| 3. | VB .NET | 02 |
| | Language Features Creating .NET Projects , Namespaces , Data Structure and Language Highlights , Classes and Inheritance , Structured Error Handling , Exploring the Base Class Library , Compatibility with VB6 , The .NET Type System , Threads | |
| 4. | Object Oriented Programming with VB.NET Creating Classes in VB.NET, Overloading, Constructors, Inheritance, Controlling scope and visibility, Dispose and Finalization, Debugging and Error Handling | 03 |
| 5. | Introduction to Windows Forms Benefits of Windows Forms , .NET Events , The Windows Forms Model ,Creating Windows Forms ,Windows Forms Properties and Events , Dialogs , ToolTips | 03 |

| _ | | 0.5 |
|-----|---|-----|
| 6. | Windows Forms and Controls in detail Windows Form Controls ,Resizing , Menus, Visual Inheritance , Apply Inheritance techniques to Forms , Creating Base Forms , Programming Derived Forms , MDI Form, Custom control creation, Using ActiveX Controls, Printing , Handling Multiple Events , GDI+ | 05 |
| 7. | Introduction to ADO.NET Benefits of ADO.NET, ADO.NET compared to classic ADO, ADO.NET Objects Working with DataSets, Managed Providers, Data Binding, DataSets and XML, Typed DataSets, Working with Data Reader | 05 |
| 8. | Console Applications When to use Console Applications , Generating Console Output , Processing Console Input | 03 |
| 9. | C# .NET Introduction to C#,Namespaces,Constructors and Destructors, Function Overloading and Inheritance,Modifiers,Properties and Indexers, Attributes, Reflection API ,Unsafe Code, Events and Delegates | 04 |
| 10. | ASP.Net Introduction to ASP.NET, Difference between ASP and ASP .Net, Working with Controls, Using Rich Server Controls, Configuration Overview, Using the Web Site Administration Tool, Programming Configuration Files, Encrypting Configuration Sections, Accessing Data using ADO .Net, Connecting to Data, Executing Commands, Working with Data | 04 |
| 11. | Managing State Preserving State in Web Applications, Page-Level State, Using Cookies to Preserve State, ASP.NET Session State, Storing Objects in Session State, Configuring Session State, Setting Up an Out-of-Process State Server, Storing Session State in SQL Server, Using Cookieless Session IDs, Application State | 04 |
| 12. | Themes and Master Pages Creating a Consistent Web Site, ASP.NET Themes: Working with CSS and Scene files, Master Pages: working with Content place holder and Nested Master page. | 05 |
| 13. | Using the Data Bound controls and Repeater Controls Overview of List-Bound Controls, Creating a Repeater Control, Creating a DataList Control, | 02 |
| 14. | Creating and Consuming Web Services The Motivation for XML Web Services, Creating an XML Web Service with Visual Studio, Designing XML Web Services, Creating Web Service Consumers, Discovering Web Services Using UDDI | 05 |

| 15. | Advance .Net Concepts: | 04 |
|-----|---|----|
| | Introduction Windows Presentation Foundation (WPF), Introduction to Windows | |
| | Communication Foundation (WCF), Introduction to Windows Work Flow (WF), | |
| | Silver light, Introduction to Ajax Controls. | |
| | | |

- 1. Professional VB. NET, Wrox publication
- 2. ASP .NET complete reference, TMH
- 3. C# The Basic by Vijay Mukhi

- 1. ASP.NET Developer's Guide Greg Buczek, McGrawHill
- 2. Programming VB.Net 2005, Julia Case Bradley, Anita Millspaugh, McGrawHill
- 3. ASP.NET 2.0, Black Book, dreamtech
- 4. ASP.NET 4, Unleashed Stephen Walther, Kevin Hoffman, Nate Dudek, Pearson
- 5. Professional C# .Net, Wrox publication

GUJARAT TECHNOLOGICAL UNIVERSITY COMPUTER ENGINEERING

B. E. SEMESTER: VII

Subject Name: Advance Computing Technology

| Teaching Scheme | | | | | Evalua | tion Scheme | |
|-----------------|----------|-----------|-------|---------|------------|-------------|------------|
| Theory | Tutorial | Practical | Total | Univers | ity Exam | Mid Sem | Practical |
| | | | | (| E) | Exam | (Internal) |
| | | | | Theory | Practical | (Theory) | |
| | | | | | | (M) | |
| 3 | 0 | 2 | 5 | 70 | 30 | 30 | 20 |
| | | | | | | | |

| Sr. No. | Course Contents | Total Hrs |
|------------|--|--------------|
| 1. | Cluster Computing at Glance : | 08 |
| | Ease of Computing, Scalable Parallel Computer Architecture, Towards Low Cost Parallel Computing & Motivation, Windows opportunity, A Cluster Computer And Its Architecture, Cluster Classification, Commodity Components fir Clusters, Network Services/Communication SW, Cluster Middleware and Single Systems Image, Resource management & Scheduling (RMS), Programming environment Tools, Cluster Applications, Representative Cluster Systems, Clusters of SMPS | |
| 2. | Cluster Setup and Administration : | 06 |
| | Setting up the cluster, Security, System Monitoring, System Tuning, | |
| 3. | Constructing Scalable Services : | 06 |
| | Environment, Resource sharing, Resource sharing enhanced locality, prototype implementation and extension | |
| 4. | Introduction to Grid and its Evolution : | 05 |
| | Beginning of the grid, building blocks of the grid, grid applications and application middleware, future of the grid, Evolution of the Grid: first, second and third generation | |
| 5. | Implementing Production Grids : | 05 |
| | Grid context, Grid support for collaboration, Building an initial multisite, computational and data grid, cross site trust management, Transition to a prototype production grid | |

| 6. | Anatomy of Grid : | 07 |
|----|---|----|
| | Virtual organizations, Nature of grid architecture, Grid architecture description and practice, intergrid protocols, relation to other technologies, other perspective on grids | |
| 7. | Introduction to Cloud Computing : | 04 |
| | Defining Clouds. Cloud Providers, Consuming Cloud Services, Cloud Models – Iaas, Paas, SaaS, Inside the cloud, Administering cloud services, technical interface, cloud resources | |
| 8. | Nature of cloud : | 08 |
| | Tradition data center, cost of cloud data center, Scaling computer systems, economics, cloud work load, managing data on clouds, public, private and hybrid clouds | |
| 9. | Cloud elements : | 05 |
| | Infrastructure as a service, Platform as a Service, Software as a Service | |

- 1. High Performance Cluster Computing, Volume 1, Architecture and Systems, Rajkumar Buyya, Pearson Education
- 2. Grid Computing Making the Global Infrastructure A Reality, Edited by Berman, Fox and Hey, Wiley India
- 3. Cloud Computing for Dummies, Hurwitz, Bllor, Kaufman, Halper, Wiley India.

- 1. Cloud Computing, A Practical Approach, Anthony Velte, Toby Velte, Robert Elsenpeter, McGrawHill
- 2. Clouding Computing with Windows Azure Plaform, Roger Jennings, Wiley India
- 3. Virtualization for Dummies Bernand Golden, Wiley India
- 4. Cloud Computing Bible, Berrie Sonsisky, Wiley (India)
- 5. Cloud Security Ronald Krutz, Wiley (India)

GUJARAT TECHNOLOGICAL UNIVERSITY COMPUTER ENGINEERING

B. E. SEMESTER: VII

Subject Name: Advance Java Technology

| Teaching Scheme | | | | | Evalua | tion Scheme | |
|-----------------|----------|-----------|-------|-----------------|-----------|-----------------|----------------------|
| Theory | Tutorial | Practical | Total | University Exam | | Mid Sem Exam | Practical (Internal) |
| | | | | Theory | Practical | (Theory) (M) | (Internal) |
| 3 | 0 | 2 | 5 | 70 | 30 | 30 | 20 |

| Sr. No. | Course Contents | Total Hrs |
|------------|---|--------------|
| 1. | Introduction To Swing, MVC Architecture, Applets, Applications and Pluggable Look and Feel, Basic swing components: Text Fields, Buttons, Toggle Buttons, Checkboxes, and Radio Buttons | 06 |
| 2. | Java database Programming, java.sql Package, JDBC driver types, java beans | 06 |
| 3. | Network Programming With java.net Package, Client Programs And Server Programs, Content And Protocol Handlers | 06 |
| 4. | RMI architecture, RMI registry, Writing distributed application with RMI, Naming services, Naming And Directory Services, Overview of JNDI, Object serialization and Internationalization | 10 |
| 5. | J2EE architecture, Enterprise application concepts, n-tier application concepts, J2EE platform, HTTP protocol, web application, Web containers and Application servers | 04 |
| 6. | Server side programming with Java Servlet, HTTP and Servlet, Servlet API, life cycle, configuration and context, Request and Response objects, Session handling and event handling, Introduction to filters with writing simple filter application | 08 |
| 7. | JSP architecture, JSP page life cycle, JSP elements, Expression Language, Tag Extensions, Tag Extension API, Tag handlers, JSP Fragments, Tag Files, JSTL, Core Tag library, overview of XML Tag library, SQL Tag library and Functions Tag library | 10 |
| 8. | Introduction to Hibernate, Hibernate Architecture, O/R Mapping in Hibernate | 04 |

- 1. Java 6 Programming, Black Book, dreamtech
- 2. Java Server Programming, Java EE6 (J2EE 1.6), Black Book, dreamtech
- 3. Java Programming Advance Topics, Joe Wigglesworth and Paula McMillan, Cengage Learning

- 1. Professional Java Server Programming, a! Apress
- 2. Core Java, Volume II Advanced Features, Eight Edition, Pearson
- 3. Unleashed Java 2 Platform, Sams Techmedia
- 4. The Complete Reference J2EE, Keogh, McGrawHill
- 5. Java EE 5 for beginners, Bayross and Shah, SPD
- 6. JDBC 3 Java Database Connectivity, Bernand Van Haecke, Wiley-dreamtech
- 7. Java Server Pages for Beginners, Bayross and Shah, SPD
- 8. Java Servlet Programming, Jason Hunter, SPD (O'Reilly)

GUJARAT TECHNOLOGICAL UNIVERSITY COMPUTER ENGINEERING

B. E. SEMESTER: VII

Subject Name: Compiler Design

| Teaching Scheme | | | | Evaluation Scheme | | | |
|-----------------|----------|-----------|-------|-------------------|------------|-----------------|------------|
| Theory | Tutorial | Practical | Total | University Exam | | Mid Sem Exam | Practical |
| | | | | (| (E) | | (Internal) |
| | | | | Theory | Practical | (Theory) | |
| | | | | | | (M) | |
| 3 | 0 | 2 | 5 | 70 | 30 | 30 | 20 |
| | | | | | | | |

| Sr. No. | Course Contents | Total Hrs |
|------------|---|--------------|
| 1. | Overview of the Translation Process, A Simple Compiler, Difference between interpreter, assembler and compiler. Overview and use of linker and loader, types of Compiler, Analysis of the Source Program, The Phases of a Compiler, Cousins of the Compiler, The Grouping of Phases, Lexical Analysis, Hard Coding and Automatic Generation Lexical Analyzers, Front-end and Back-end of compiler, pass structure | 06 |
| 2. | Lexical Analyzer Introduction to Lexical Analyzer, Input Buffering, Specification of Tokens, Recognition of Tokens, A Language for Specifying Lexical Analyzers, Finite Automata From a Regular Expression, Design of a Lexical Analyzer Generator, Optimization of DFA | 08 |
| 3. | Parsing Theory Top Down and Bottom up Parsing Algorithms, Top-Down Parsing, Bottom-Up Parsing, Operator-Precedence Parsing, LR Parsers, Using Ambiguous Grammars, Parser Generators, Automatic Generation of Parsers. Syntax-Directed Definitions, Construction of Syntax Trees, Bottom-Up Evaluation of S-Attributed Definitions, L-Attributed Definitions, syntax directed definitions and translation schemes | 10 |
| 4. | Error Recovery Error Detection & Recovery, Ad-Hoc and Systematic Methods | 06 |

| 5. | Intermediate Code Generation Different Intermediate Forms, Syntax Directed Translation Mechanisms And Attributed Mechanisms And Attributed Definition. | 06 |
|----|---|----|
| 6. | Run Time Memory Management Source Language Issues, Storage Organization, Storage-Allocation Strategies, and Access to Non local Names, Parameter Passing, Symbol Tables, and Language Facilities for Dynamic Storage Allocation, Dynamic Storage Allocation Techniques. | 06 |
| 7. | Code Optimization Global Data Flow Analysis, A Few Selected Optimizations like Command Sub Expression Removal, Loop Invariant Code Motion, Strength Reduction Etc. | 06 |
| 8. | Code Generation Issues in the Design of a Code Generator, The Target Machine, Run-Time Storage Management, Basic Blocks and Flow Graphs, Next-Use Information, A Simple Code Generator, Register Allocation and Assignment, The DAG Representation of Basic Blocks, Peephole Optimization, Generating Code from DAGs, Dynamic Programming Code-Generation Algorithm, Code-Generator Generators. | 06 |

- 1. Compiler Tools Techniques A.V.Aho, Ravi Sethi, J.D.Ullman, Addison Wesley
- 2. The Theory And Practice Of Compiler Writing Trembley J.P. And Sorenson P.G. Mcgraw-Hill

- 1. Modern Compiler Design Dick Grune, Henri E. Bal, Jacob, Langendoen, WILEY India
- 2. Compiler Construction Waite W.N. And Goos G., Springer Verlag
- 3. Compiler Construction-Principles And Practices D.M.Dhamdhere, Mcmillian
- 4. Principles of Compiler Design, V. Raghavan, McGrawHill

DEGREE IN COMPUTER ENGINEERING

PROPOSED TEACHING SCHEME

Semester - VII

(w.e.f. 27th June 2011)

| SUBJECT | SUBJECT | TEACHING SCHEME(HOURS) | | | |
|---------|--|------------------------|----------|-----------|---------|
| CODE | SUBJECT | THEORY | TUTORIAL | PRACTICAL | CREDITS |
| 170701 | Compiler Design | 3 | 0 | 2 | 5 |
| 170702 | Mobile Computing [Valid from August 2011 to May 2012] | 3 | 0 | 2 | 5 |
| 170702N | Wireless Communication and Mobile Programming [w.e.f June 2012] | 3 | 0 | 2 | 5 |
| 170703 | Advance Java Technology | 3 | 0 | 2 | 5 |
| 170704 | Advance Computing Technology | 3 | 0 | 2 | 5 |
| | Department Elective-I | 4 | 0 | 2 | 6 |
| 170001 | Project -I | 0 | 0 | 4 | 4 |
| | TOTAL | 16 | 0 | 14 | 30 |

DEPARTMENT ELECTIVE -I

| SUBJECT CODE | DEPARTMENT ELECTIVE -I |
|-----------------|----------------------------|
| 170705 | Embedded Technology |
| 170706 | Computer Signal Processing |
| 170707 | Advance .Net Technology |
| 170708 | Web Data Management |

B.E. SEMESTER: VIII COMPUTER ENGINEERING

Subject Name: **DISTRIBUTED SYSTEMS**

| Sr. No. | Course Contents | Total Hrs |
|------------|--|--------------|
| 1. | Concepts of Distributed Systems : | 02 |
| | Introduction, Distributed computing models, Software concepts, Design issues in distributed systems, Client-server model, WWW 1.0 and 2.0 | |
| 2. | Network Communication: LAN and WAN technologies, OSI Model and Internet protocols, ATM, Protocols for Distributed systems | 04 |
| 3. | Interprocess Communication: Message Passing and its features, IPC message format, IPC synchronization, Buffering, multi datagram messaging, process addressing techniques, failure handling, Formal Models for message passing systems, Broadcast and converge cast on a spanning tree, Flooding and building a spanning tree, Constructing a DFS spanning tree with and without a specified root | 10 |
| 4. | Remote Communication: Introduction, RPC basics, RPC implementation, RPC Communication and Other issues, Sun RPC, RMI basics, RMI Implementation, Java RMI | 08 |
| 5. | Synchronization: Clock synchronization, Logical clocks, Global state, Mutual exclusion, Election algorithms: Bully algorithm, Ring algorithm, Leader election in rings, anonymous rings, Asynchronous rings, synchronous rings, election in wireless networks, Deadlocks in Distributed systems, Deadlocks in Message communication | 10 |
| 6. | Formal Model for Simulation: Problem specification, Communication systems, asynchronous point to point message passing, asynchronous broadcast, Processes, Admissibility, Simulations | 04 |
| 7. | Distributed System Management: Resource management, Task management approach, Load balancing approach, Load sharing approach, Process Management, Process migration, threads, fault tolerance | 10 |
| 8. | Distributed Shared Memory: Concepts, Hardware DSM, Design issues in DSM systems, Implementation issues, Heterogeneous and other DSM systems, Case studies: Munin, Linda | 06 |
| 9. | Naming: Overview, Features, Basic concepts, System oriented names, Object locating mechanisms, Issues in designing human oriented names, Name caches, Naming and security, DNS | 06 |

Text Books:

- Distributed Computing, Sunita Mahajan and Seema Shah, Oxford University Press
 Distributed Computing, Fundamentals, Simulations and Advanced topics, 2nd Edition, Hagit Attiya and Jennifer Welch, Wiley India

- 1. Distributed Systems: Principles and Paradigms, Taunenbaum
- 2. Distributed Systems: Concepts and Design, G. Coulouris, J. Dollimore, and T. Kindberg, Pearson Education

B.E. SEMESTER : VIII COMPUTER ENGINEERING

Subject Name: PARALLEL PROCESSING

| Sr. No. | Course Contents | Total Hrs | | |
|------------|---|--------------|--|--|
| 1. | Parallel Programming Platforms | | | |
| | Implicit Parallelism: Trends in Microprocessor Architectures | 04 | | |
| | Limitations of Memory System Performance | | | |
| | Dichotomy of Parallel Computing Platforms | | | |
| | Physical Organization of Parallel Platforms | | | |
| | Communication Costs in Parallel Machines | | | |
| | Routing Mechanisms for Interconnection Networks | | | |
| | Impact of Process-Processor Mapping and Mapping Techniques | | | |
| 2. | Principles of Parallel Algorithm Design algorithms | 06 | | |
| | • Preliminaries | | | |
| | Decomposition Techniques | | | |
| | Characteristics of Tasks and Interactions | | | |
| | Mapping Techniques for Load Balancing | | | |
| | Methods for Containing Interaction Overheads | | | |
| | Parallel Algorithm Models | | | |
| 3. | Basic Communication Operations, algorithms | 08 | | |
| | One-to-All Broadcast and All-to-One Reduction | | | |
| | All-to-All Broadcast and Reduction | | | |
| | All-Reduce and Prefix-Sum Operations | | | |
| | Scatter and Gather | | | |
| | All-to-All Personalized Communication | | | |
| | Circular Shift | | | |
| | Improving the Speed of Some Communication Operations | | | |
| 4. | . Analytical Modeling of Parallel Programs | 06 | | |
| | Sources of Overhead in Parallel Programs | | | |
| | Performance Metrics for Parallel Systems | | | |
| | Effect of Granularity and Data Mapping on Performance | | | |
| | Scalability of Parallel Systems | | | |
| | Minimum Execution Time and Minimum Cost-Optimal Execution Time | | | |
| | Asymptotic Analysis of Parallel Programs | | | |
| | Other Scalability Metrics | | | |
| 5. | Programming Using the Message Passing Paradigm | 08 | | |
| | Principles of Message-Passing Programming | | | |
| | The Building Blocks: Send and Receive Operations | | | |
| | MPI: The Message Passing Interface | | | |
| | Topologies and Embedding | | | |
| | Overlapping Communication with Computation | | | |
| | Collective Communication and Computation Operations | | | |
| | Groups and Communicators | | | |
| 6. | Programming Shared Address Space Platforms Thread Basics | 08 | | |
| | • Why Threads? | | | |
| | The POSIX Thread Application Programmer Interface | | | |
| | Synchronization Primitives in POSIX | | | |
| | Controlling Thread and Synchronization Attributes | | | |
| | Controlling Thread and Synchronization Attributes Thread Cancellation | | | |
| İ | | | | |
| | Composite Synchronization Constructs | | | |

| 7. | . Dense Matrix Algorithms | 06 |
|----|--|----|
| | Matrix-Vector Multiplication | |
| | Matrix-Matrix Multiplication | |
| 8. | Sorting | 06 |
| | Issues in Sorting on Parallel Computers | |
| | Sorting Networks | |
| | Bubble Sort and its Variants | |
| | Quick sort | |
| 9. | Graph Algorithms | 08 |
| | Definitions and Representation | |
| | Minimum Spanning Tree: Prim's Algorithm | |
| | Single-Source Shortest Paths: Dijkstra's Algorithm | |
| | All-Pairs Shortest Paths | |

- 1. Introduction to Parallel Computing, Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, By Pearson Publication
- 2. Introduction to Parallel Processing, M. SasiKumar, Dinesh Shikhare, P.Raviprakash By PHI Publication

- 1 Introduction To Parallel Programming By Steven Brawer
- 2 Introduction To Parallel Processing By M.Sasikumar, Dinesh Shikhare And P. Ravi Prakash
- 3 Parallel Computers Architecture And Programming By V. Rajaraman And C. Siva Ram Murthy

B.E. SEMESTER : VIII COMPUTER ENGINEERING

Subject Name: ADVANCE COMPUTER NETWORKS

| Sr. No. | Course Contents | Total Hrs |
|------------|--|---------------------|
| 1. | Optical Networking | 02 |
| 1. | Introduction to Optical Networking | \ \frac{\sigma^2}{} |
| | SONET / SDH Standard | |
| | • DWDM | |
| 2. | ATM: The WAN Protocol | 06 |
| | Introducing ATM Technology | |
| | Introducing Faces of ATM | |
| | Explaining the basic concepts of ATM Networking | |
| | Exploring the B-ISDN reference model | |
| | Explaining the Physical Layer | |
| | Explaining the ATM Layer | |
| | Explaining the ATM Adaptation Layer | |
| | Exploring ATM Physical interface | |
| | Choosing an Appropriate ATM Public Service | |
| 3. | Packet Switching Protocols | 04 |
| | Introduction to Packet Switching | |
| | Introduction to Virtual Circuit Packet Switching | |
| | • Introduction to X.25 | |
| | Introducing switched multimegabit data service | |
| 4. | Protocols and Interfaces in Upper Layers of TCP/IP | 04 |
| | Introducing TCP/IP suite | |
| | Explaining Network Layer Protocols | |
| | Explaining Transport Layer Protocol | |
| | Explaining Application Layer Protocol | |
| 5. | Routing in the Internet | 06 |
| | Introduction to Intra-domain and inter-domain routings | |
| | Unicast Routing Protocols | |
| | Multicast Routing Protocols | |
| 6. | Other Routing Techniques | 06 |
| | Introduction to traffic Engineering | |
| | • IP over ATM | |
| | Multiprotocol Label Switching | |
| _ | Storage Area Network | 0.4 |
| 7. | Network Management and Services | 04 |
| | Introduction to Network Management | |
| 0 | Standard Network Management Protocol The Control of the | 07 |
| 8. | Traffic Engineering Basics | 07 |
| | Introduction to traffic Engineering Proving and Definition for Traffic Engineering | |
| | Requirement Definition for Traffic Engineering Traffic Sizing | |
| | Traffic SizingTraffic Characteristics | |
| | D | |
| | | |
| | Time and Delay Consideration Connectivity | |
| | Connectivity | |

| | . A 21.130 D 11.130 | |
|-----|---|----|
| | Availability, Reliability, and Maintainability | |
| | Throughput Calculation | |
| 9. | Multimedia over Internet | 05 |
| | Introduction to Multimedia Services | |
| | Explaining Transmission of Multimedia over the Internet | |
| | Explaining IP Multicasting | |
| | Explaining VOIP | |
| 10. | Introduction to the Cisco IOS. | 04 |
| | The Cisco Router User Interface | |
| | Command Line Interface (CLI) | |
| | Router and Switch Administrative Functions | |
| | Router Interfaces | |
| | Viewing, Saving, and Erasing Configurations | |
| 11. | IP Routing. | 04 |
| | Routing Basics | |
| | The IP Routing Process | |
| | Configuration IP Routing in Our Network | |
| 12. | Dynamic Routing Protocols. | 04 |
| | Routing Protocol Basics | |
| | Routing Information Protocol (RIP) | |
| | Interior Gateway Routing Protocol (IGRP) | |
| | Verifying Your Configurations | |
| 13. | Layer 2 Switching. | 04 |
| | Before Layer 2 Switching | |
| | Switching Services | |
| | • Spanning Tree Protocol (STP) | |
| | LAN Switch-Types | |

- 1. Advance Computer Network, By Dayanand Ambawade, Dr. Deven shah, Prof. Mahendra Mehra, Wiley India
- 2. CCNA Intro Study Guide Todd Lammle, Sybex

Reference Books:

1. High-Speed Networks and Internets, Performance and Quality of Service, Second Edition, William Stallings, Pearson