School of Engineering

Course Structure and Syllabi

I and II Semesters B. Tech.
(Common to all B. Tech. Programmes)

Academic Programme

July, 2013
Faculty of Engineering & Technology
B. Tech. (common to all disciplines) I Year

**Course Structure**

<table>
<thead>
<tr>
<th>Semester – I</th>
<th>Code</th>
<th>Subjects</th>
<th>H-1*</th>
<th>H-2**</th>
<th>Credits</th>
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</table>

$H_1$ and $H_2^{**}$ are Various Combinations of 1st and 2nd Semester branches.
Faculty of Engineering & Technology
B. Tech. (common to all disciplines) I Semester
Contact Hours per week: 3L-1T

E1001 - ENGINEERING MATHEMATICS - I

Matrices: Elementary row and column transformation Rank of matrix, Linear dependence, Consistency of linear system of equations, Characteristic equation, Cayley-Hamilton Theorem, Eigen values and Eigen vectors, Diagonalization, Complex and unitary matrices.

Differential Calculus-I: Leibnitz theorem, Partial differentiation, Euler’s theorem, Curve tracing, Change of variables, Expansion of function of several variables

Differential Calculus-II: Jacobian Approximation of Errors. Extrema of Functions of Several Variables. Lagrange’s Method of Multipliers (Simple applications).

Multiple Integrals: Double and triple integrals; Applications of Multiple Integrals to Area and Volume; Change of order of Integration; Change of variables, Beta and Gamma functions; Dirichlet’s Integral and its Applications.

Vector Calculus: Point functions, Gradient, divergence and curl of a vector and their physical interpretations, Line, Surface and Volume integrals, Green’s, Stokes’s and Gauss divergence theorem.

Suggested Books

5. S.S. Sastr, Engineering Mathematics, PHI.
E100: ENGINEERING PHYSICS- I


Suggested Books

E1003-ENGINEERING CHEMISTRY

WATER AND ITS TREATMENT

FUELS AND ENERGY
POLYMERS AND THEIR APPLICATIONS
Introduction, Types, Classification of polymers, Methods of polymerization, Stereo specific polymers, Ziegler Natta catalysis, Properties of polymer, Conducting Polymer, Engineering applications, Biodegradable polymers, Preparation, Properties, Uses of Poly Styrene, PVC, PTFE, Bakelite’s, Cellulose derivatives, Poly Carbonates.

Plastics: Types, Compounding of plastics, Moulding (Four types) - Fiber reinforced, Glass fiber reinforced plastics, Bullet Proof Plastics, Properties of plastics, Engineering applications.

Rubbers and Elastomers: Introduction, Preparation, Vulcanization, Properties of Rubbers, Engineering applications. Buna-S, Buna-N, Poly Urethane, Engineering applications of Elastomer

CORROSION CHEMISTRY AND ENGINEERING

SUGGESTED BOOKS
DC Networks: Kirchhoff’s Laws, Node Voltage and Mesh Current Analysis; Delta-Star and Star-Delta Transformation, Source Conversion, Superposition Theorem, Thevenin’s Theorem, Norton’s Theorem


Three Phase A.C. Circuits: Generation of Three-Phase AC Voltage, Delta and Star-Connections, Line and Phase Quantities, 3-Phase Balanced Circuits


Electrical Machines: Principles of DC Machines, Types, Different Parts of DC Machines. Principles of single phase and three phase induction motors

Diodes: PN junction diode, V-I characteristics, Rectifier and filter circuits, Introduction to Zener diode, LED, Photo Diode, Varactor Diode.

Transistors: Bipolar Junction Transistors, Transistor Current Components, Characteristics of CE, CB and CC Transistor Amplifiers.

Thyristors: The four layer diode, Uni-junction transistor and its application in Thyristor circuits.

Communication Systems: Introduction to Modulation, Demodulation; Types of Communication Systems

Suggested books
(i) Basic Electrical Engineering by Nagrath & Kothari
(ii) Basic Electrical Engineering by C.L.Wadhawa
(iii) Basic Electrical &Electronics Engineering by J.B.Gupta & S.K.Kataria
Faculty of Engineering & Technology  
B.Tech. (common to all disciplines) I / II Semester  
Contact Hours per week: 3L

**E1005-ENGINEERING MECHANICS**


**Introduction of Moment of Inertia** and its Theorem, Determination of Areas, First Moment of Area, Centroid of Sections, Rectangle, Circle, T section, I Section, Angle Section, Hollow Section, Section and Product Moments of Plane Area, Rectangle, Triangle, Circle, T-Section, I Section, Angle Section, Hollow Section, Parallel Axis Theorem, Perpendicular Axis Theorem, Polar Moment of Inertia.

**Introduction to laws of friction**, Cone of Friction, Equilibrium of bodies on inclined plane, application of problems involving wedges, ladders, screw friction, Rolling Resistance, Belt Friction


**Suggested Books**

Faculty of Engineering & Technology

B.Tech. (common to all disciplines)-I/II Semester
Contact Hours per week : 2 hrs

E1006-Electrical & Electronics Engineering Lab

List of Experiments

A. ELECTRICAL LAB

1. To study Graphical Symbols used to indicate electrical equipment and components. Single line diagram of an Electrical power distribution system.

2(i) To study the functions of components used in house wiring. Connections of house wiring including earthing with 1-phase energy meter, MCB, ceiling fan, tube light, three pin socket and a lamp operated from two different positions.
(ii) To study the construction, working of the different types of lamps.

3(i) To study the construction and working of ceiling fan, single phase induction motor and three phase squirrel cage induction motor.
(ii) To connect ceiling fan along with regulator. To also connect a single phase induction motor through an auto-transformer and to run it at varying speeds.

4(i) To study moving coil & moving iron ammeters and voltmeters, wattmeters and energy meters.
(ii) To run a 3-phase squirrel cage induction motor on no load and measure its voltage, current, power and power factor. Reverse the direction of rotation.

5(i) To study the construction and connect single phase transformer and auto-transformer. Measure input and output voltage and find turn ratio of transformer.
(ii) To study the construction of a core type three phase transformer. Connect star and delta connection of a 3-phase transformer and find relation between line and phase voltage.

ELECTRONICS LAB

6(i) Identification, testing of resistors, inductors, capacitors, PN-diode, Zener diode, LED, LCD, BJT, FET, UJT, SCR, Photo diode and Photo transistor.
(ii) Introduction to Printed Circuit Boards (PCBs) and mount components on PCB.

7. To study the functions of CRO, analog & digital multi-meters and function / signal generator.

8. To observe output waveform of half wave and full wave rectifier (centre tap and bridge).

9. To measure voltage gain of BJT in CE configuration and plot gain vs. frequency response. Find band width.
E1007-MECHANICAL WORKSHOP

List of Exercises

Machine Shop
Study of lathe machine, drilling machine and shaper, their parts and demonstration of operations performed on them.
1. Prepare a job on lathe machine by performing turning, facing and chamfering as per given drawing.
2. Prepare a job on shaper as per given drawing.

Fitting Shop
Study of fitting tools, their uses and demonstration of operations by using different tools.
3. Prepare a job including finishing of all four sides by filing and make a square notch.
4. Prepare a job by finishing its two sides and perform drilling and taping on it.

Carpentry Shop
Study of wood and wood working, tools used in carpentry shop and their applications.
5. Prepare a T-lap/Cross lap joint.
6. Prepare a bridle joint.

Welding Shop
Definition of welding and brazing process and their applications. Study of tools used in arc and gas welding shop.
7. Prepare a lap/butt joint in arc welding shop.
8. Demonstration of different types of flames in gas welding shop.
9. Study of common welding defects.

Foundry Shop
Study of moulding and casting process, moulding sand, foundry tools and patterns used for moulding.
10 Prepare a mould by using a given pattern.
11 Making and baking of dry sand cores for placing in horizontal, vertical and hanging positions in the mould cavity.

Tin Smithy Shop
Study of sheet metal working, tools used in smithy shop and soldering process.
12 Prepare a mechanical joint and perform soldering on it.
13 Prepare a funnel as per given drawing.

Suggested books:

Faculty of Engineering & Technology  
B. Tech. (common to all disciplines) I Semester  
Contact Hours per week: 2 hrs

E1008-Practical Geometry

List of Exercises

1. **Lettering:** Capital letters, Lowercase letters

2. **Engineering Curves:** Ellipse, Parabola, Hyperbola, Cycloid

3. **Projection of Points and Lines:** Projection of points (all quadrants), Projection of lines (parallel to both H.P. and V.P., parallel to one and perpendicular to other, parallel to one and inclined with other)

4. **Projection of Planes:** Horizontal, Vertical and Inclined planes (circular and polygons)

5. **Projection of Solids:** Cone, Cylinder, Pyramid, Prism

6. **Development of Surfaces of Solids:** Cone, Cylinder, Pyramid, Prism

7. **Introduction to AUTOCAD:** Simple systems, commands and drawing of simple 2D drawings

Suggested Books

1. Bhatt N.D., Engineering Drawing
2. Laxminarayanan, Engineering Drawing
Faculty of Engineering & Technology
B. Tech. (common to all disciplines)-I Semester
Contact Hours per week: 2 hrs

E1009-Engineering Physics Lab- I

List of Experiments

Students are required to perform any ten experiments out of the following fourteen experiments.

1. To determine characteristics of Solar Cell. (Complete Kit)
2. To study the variation in resistance of a Semiconductor with temperature and to determine its energy Band-Gap.
3. To study LCR circuit characteristics.
4. To study Diode/Zener Diode characteristics.
5. To convert a Galvanometer into an Ammeter of given range and calibrate it.
6. To convert a Galvanometer into a Voltmeter of given range and calibrate it.
7. To determine the height of an unknown object using Sextant.
8. To determine Young’s Modulus by bending of beam method.
9. To determine the elasticity coefficients of given rods by Searl’s apparatus.
10. To determine Resolving power of Telescope.
11. To determine transmission coefficient of a semi-transparent glass plate using LB Photometer.
12. To determine the wavelength of prominent lines of Mercury by using plane Diffraction Grating and Spectrometer.
14. To study Logic Gates and verify their truth tables.
Faculty of Engineering & Technology  
B. Tech. (common to all disciplines)- 1 Semester  
Contact Hours per week : 2 hrs

E1010: Engineering Chemistry Lab

List of Experiments

1. To determine the hardness of Water by complexometric method.
2. To determine the hardness of Water by HCl method.
3. To determine the amount of free chlorine in given water sample.
4. Determination of Total residual Chlorine in water sample.
5. Determination of Viscosity of a given lubricant by Redwood Viscometer No.1.
7. Determination of Cloud and Pour Points of a given lubricant.
8. To determine moisture, volatile and ash content in a given coal sample by proximate analysis.
9. To determine the calorific value of Solid Fuel by Bomb’s Calorimeter.
10. Find out the amount of Na and K in a given sample by Flame Photometer.
11. To estimate the barium sulphate content in given barium salt solution and then calculate the barium content.
12. To determine the strength of unknown solution of FAS by titrating it with Potassium dichromate of N/40 strength using potassium ferricyanide as an external indicator.
13. To determine the strength of unknown solution of FAS by titrating it with Potassium dichromate of N/40 strength using N-phenyl anthranilic acid as an internal indicator.
14. To determine the strength of a given copper sulphate solution with N/20 sodium thiosulphate (hypo) solution.

Suggested books

G1002: Presentation, Publication and Graphing Techniques

B. Tech. 1st Semester

Contact Hours per week: 3

Credits: 3

Presentation Techniques


Documentation and Publication Techniques


Graphing Techniques


Suggested Books

1. MATLAB (An Introduction with Application): Amos Gilat, Wiley India.
2. Getting Started with MATLAB: Rudra Pratap, Oxford University Press.
G1003: Computer Lab – I

B. Tech. - I Semester
Contact Hours per week: 2 hrs
Credit(s): 1

List of Exercises

PowerPoint:
Introduction to the IDE of Power Point, Introduction to various toolbars like – Quick access, Placeholders, Creating title slides, slide shows, Introduction to layouts, themes, Clipboard, font paragraph, Drawing & Editing, Animations, Transitions, Spell Check, Outline, Tab, slides tabs, Sorter view and Printing

MS Word:
Introduction to IDE of Microsoft Word, Functionality of various tool bars – Quick Access, Title, Ribbon, Ruler, and Status Bars. Understanding document Views, Formatting, Editing and Understanding non printing characters, Using AutoText, Using Indentation & Alignment, and Style set Page breaks, Page numbers and Setting Page Layouts and Printing Documents

MS Excel:
Introduction to Electronic Spreadsheet, Worksheet, Cells, Quick Access Toolbar, Formula Bar, Status Bar, Clipboard, Font, Alignment, Number, Cells, Styles, Editing, Perform Mathematical Calculations, Working with Headers & Footers, Perform Automatic Calculations, Perform Advanced Mathematical Calculations, Work with Long Text, format Numbers, Excel Functions, Using Reference Operators and Printing
Charts: Creating and applying chart layout, Adding Labels, Switching Data, Changing the Chart Style, Size and Position, Chart Type
**G1004: Communication Skills (English for Professionals)**

**Stepping Stones (Vocabulary Building):** Vocabulary development, Use of different words in different contexts, Technical Vocabulary, Scientific Vocabulary and Terms in daily use. Foreign words in use, Abbreviations. Introduction of Synonyms through the use of dictionary, vocabulary related to description. Phrasal verbs and its usage in sentence. Affixation- Prefix and Suffix. Conversion of one word to other- Noun to Verb, Verb to Noun, Adjective to Noun, Verb to Adverb, Adjective to Adverb, Common Noun to Abstract Noun. Synonyms, Antonyms. Words often confused.


**Activities:** Role Plays, Dialogue Speaking, Skit, Pictures Description.

**Speak Well (Speech Mechanism):** Phonetics


**Activities:** Self- Introduction, Practicing through video and audio clippings, Reading and comprehending through various channels like newspaper and magazines.

**Composition:** Business Letter Writing- Structure, Format, Parts of Letter, Various Styles of Letter Writing, Floating Enquiry, Quotations, Quarry for Product specification, Price and other details, Placing the orders and their Execution, Handling Complaints, Sales Letters, Job Applications and their Cover Letters, Letters to Editors. Technical Proposal Writing.

**Drama:** Indian Drama- Kanyadaan by Vijay Tendulkar.

**Suggested Books**

4. Effective Technical Communication, M Ashraf Rizvi, Tata McGraw Hill (New Delhi)


**Faculty of Engineering & Technology**  
**B. Tech. (common to all disciplines) II Semester**  
**Contact Hours per week: 3L-1T**

**E2001-ENGINEERING MATHEMATICS - II**

**Differential Equations:** Ordinary differential equations of first order, Exact differential equations, Linear differential equations of first order, Linear differential equations of nth order with constant coefficients, Complementary functions and particular integrals,

Simultaneous linear differential equations, Solutions of second order differential equations by changing dependent and independent variables, Method of variation of parameters, Applications to engineering problems (without derivation).

**Series Solutions and Special Functions:** Series solutions of ODE of 2nd order with variable coefficients with special emphasis to differential equations of Legendre and Bessel; Legendre’s polynomials, Bessel’s functions and their properties.

**Laplace Transforms:** Laplace transform, Existence theorem, Laplace transform of derivatives and integrals, Inverse Laplace transform, Unit step function, Dirac- delta function, Laplace transform of periodic functions; Convolution theorem; Application to solve Simple linear and simultaneous differential equations.

**Fourier Series and Partial Differential Equations:** Periodic functions, Trigonometric series, Fourier series of period 2\(\pi\) , Euler’s formulae, Functions having arbitrary period, Change of interval, Even and odd functions, Half range sine and cosine series.

Introduction of partial differential equations, Linear partial differential equations with constant coefficients of 2nd order and their classifications - parabolic, elliptic and hyperbolic with illustrative examples.

**Applications of Partial Differential Equations:** Method of separation of variables for solving partial differential equations, Wave equation up to two-dimensions, Laplace equation in two-dimensions, Heat conduction equations up to two-dimensions, Equations of transmission Lines.

**Suggested Books**

5. S.S. Sastrri, Engineering Mathematics, PHI.  


Quantum Optics: Coherence: Spatial and temporal coherence, Coherence length, Coherence time. Q-factor for LASER. Visibility as a Measure of Coherence. Spatial Coherence and Size of the Source. Temporal Coherence and Spectral Purity.

Applications of Quantum Optics: LASER, Holography and Optical Communications


An Overview of Upcoming Technologies:
- Photonics * Spintronics * Quantum Computers * Nanotechnology

Suggested Books
E2003-ENVIRONMENTAL CHEMISTRY

ENVIRONMENTAL SCIENCE: AN INTRODUCTION

Multidisciplinary nature of environmental studies: Definition, scope and importance, Need for public awareness. Natural Resources: Forest resources, Water resources, Mineral resources, Food resources, Energy resources, Land resources, Role of an individual in conservation of natural resources.

Ecosystems: Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids. Biodiversity and its conservation: Introduction, genetic, species and ecosystem diversity, Biogeographically classification of India, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values, Biodiversity at global, National and local levels, India as a mega-diversity nation, Hot-sports of biodiversity, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India, Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

ENVIRONMENTAL POLLUTION

Environmental Pollution: Definition, Cause, effects and control measures of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid waste Management: Causes, effects and control measures of urban and industrial wastes, Role of an individual in prevention of pollution, Pollution case studies, Disaster management: floods, earthquake, cyclone and landslides.

GREEN CHEMISTRY AND ENVIRONMENTAL SUSTAINABILITY


From Unsustainable to Sustainable development, urban problems related to energy, Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people; its problems and concerns. Case Studies, Environmental ethics: Issues and possible solutions, Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies, Wasteland reclamation, Consumerism and waste products, Environment Protection Act, Air (Prevention and Control of Pollution) Act., Water (Prevention


**ENVIRONMENTAL TOXICITY AND DISPOSAL OF DANGEROUS WASTE**

**Inorganic Metals in the Environment:** Bioaccumulation of heavy metals, toxic metals, atomic spectroscopy, presence of Lead, Mercury, Cadmium and Arsenic. **Organic Chemicals in the Environment:** Polychloride Hydrocarbons, toxic organic pollutants, Analysis of Persistent Organic Pollutants. Insecticides, herbicides and insect control: Organophosphates, carbamets, Analysis in water, biological control, sterilization.

Solid waste, disposal of municipal waste, sources of hazardous waste, policy, waste minimization, recycling and reuse, conversion of hazardous waste to less hazardous waste, Radioactive waste, Regulations.

**Suggested Books**
5. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
8. Down to Earth, Centre for Science and Environment (R)
**E1004--ELECTRICAL & ELECTRONICS ENGINEERING**

**DC Networks:** Kirchhoff’s Laws, Node Voltage and Mesh Current Analysis; Delta-Star and Star-Delta Transformation, Source Conversion, Superposition Theorem, Thevenin’s Theorem, Norton’s Theorem

**Single Phase AC Circuits:** Generation of Single Phase AC Voltage, EMF Equation, Average, RMS and Effective Values. RLC Series, Parallel and Series-Parallel Circuits, Complex Representation of Impedances. Phasor Diagram, Power and Power Factor.

**Three Phase A.C. Circuits:** Generation of Three-Phase AC Voltage, Delta and Star-Connections, Line and Phase Quantities, 3-Phase Balanced Circuits

**Measurements:** Principles & Construction of AC/DC voltmeters, ammeters, Wattmeters, Energy meters

**Transformers:** Faraday’s Law of Electromagnetic Induction, Construction and Operation of a Single Phase Transformer, EMF Equation, Voltage & Current Relationships and Phasor Diagram of an Ideal Transformer; Voltage Regulation; Equivalent circuit of a transformer.

**Electrical Machines:** Principles of DC Machines, Types, Different Parts of DC Machines. Principles of single phase and three phase induction motors

**Diodes:** PN junction diode, V-I characteristics, Rectifier and filter circuits, Introduction to Zener diode, LED, Photo Diode, Varactor Diode.

**Transistors:** Bipolar Junction Transistors, Transistor Current Components, Characteristics of CE, CB and CC Transistor Amplifiers.

**Thyristors:** The four layer diode, Uni-junction transistor and its application in Thyristor circuits.

**Communication Systems:** Introduction to Modulation, Demodulation; Types of Communication Systems

**Suggested books**
(i) *Basic Electrical Engineering* by Nagrath & Kothari
(ii) *Basic Electrical Engineering* by C.L. Wadhwa
(iii) *Basic Electrical & Electronics Engineering* by J.B. Gupta & S.K. Kataria
Faculty of Engineering & Technology  
B.Tech. (common to all disciplines) I / II Semester  
Contact Hours per week: 3L  

E1005-ENGINEERING MECHANICS  


Introduction of Moment of Inertia and its Theorem, Determination of Areas, First Moment of Area, Centroid of Sections, Rectangle, Circle, T section, I Section, Angle Section, Hollow Section, Section and Product Moments of Plane Area, Rectangle, Triangle, Circle, T-Section, I Section, Angle Section, Hollow Section, Parallel Axis Theorem, Perpendicular Axis Theorem, Polar Moment of Inertia.  

Introduction to laws of friction, Cone of Friction, Equilibrium of bodies on inclined plane, application of problems involving wedges, ladders, screw friction, Rolling Resistance, Belt Friction  

Rectilinear motion of Particles, Newton’s Law, Equation of motion constant and variable acceleration, curvilinear motion of particles, Equation of motion in Polar Coordinates, Motion of Projectile.  


Suggested Books  

Faculty of Engineering & Technology
B.Tech. (common to all disciplines)-I/II Semester
Contact Hours per week: 2 hrs

E1006-Electrical & Electronics Engineering Lab

List of Experiments

A. ELECTRICAL LAB

1. To study Graphical Symbols used to indicate electrical equipment and components. Single line diagram of an Electrical power distribution system.

2(i) To study the functions of components used in house wiring. Connections of house wiring including earthing with 1-phase energy meter, MCB, ceiling fan, tube light, three pin socket and a lamp operated from two different positions.
   (ii) To study the construction, working of the different types of lamps.

3(i) To study the construction and working of ceiling fan, single phase induction motor and three phase squirrel cage induction motor.
   (ii) To connect ceiling fan along with regulator. To also connect a single phase induction motor through an auto-transformer and to run it at varying speeds.

4(i) To study moving coil & moving iron ammeters and voltmeters, wattmeters and energy meters.
   (ii) To run a 3-phase squirrel cage induction motor on no load and measure its voltage, current, power and power factor. Reverse the direction of rotation.

5(i) To study the construction and connect single phase transformer and auto-transformer. Measure input and output voltage and find turn ratio of transformer.
   (ii) To study the construction of a core type three phase transformer. Connect star and delta connection of a 3-phase transformer and find relation between line and phase voltage.

ELECTRONICS LAB

6(i) Identification, testing of resistors, inductors, capacitors, PN-diode, Zener diode, LED, LCD, BJT, FET, UJT, SCR, Photo diode and Photo transistor.
   (ii) Introduction to Printed Circuit Boards (PCBs) and mount components on PCB.

7. To study the functions of CRO, analog & digital multi-meters and function / signal generator.

8. To observe output waveform of half wave and full wave rectifier (centre tap and bridge).

9. To measure voltage gain of BJT in CE configuration and plot gain vs. frequency response. Find band width.
10. To study the construction and working of SCR and plot V-I Characteristics of SCR.

**Faculty of Engineering & Technology**  
**B. Tech. (common to all disciplines) I/II Semester**  
**Contact Hours per week: 2 hrs**

**E1007-MECHANICAL WORKSHOP**

**List of Exercises**

**Machine Shop**  
Study of lathe machine, drilling machine and shaper, their parts and demonstration of operations performed on them.
1. Prepare a job on lathe machine by performing turning, facing and chamfering as per given drawing.
2. Prepare a job on shaper as per given drawing.

**Fitting Shop**  
Study of fitting tools, their uses and demonstration of operations by using different tools.
3. Prepare a job including finishing of all four sides by filing and make a square notch.
4. Prepare a job by finishing its two sides and perform drilling and taping on it.

**Carpentry Shop**  
Study of wood and wood working, tools used in carpentry shop and their applications.
5. Prepare a T-lap/Cross lap joint.
6. Prepare a bridle joint.

**Welding Shop**  
Definition of welding and brazing process and their applications. Study of tools used in arc and gas welding shop.
7. Prepare a lap/butt joint in arc welding shop.
8. Demonstration of different types of flames in gas welding shop.
9. Study of common welding defects.

**Foundry Shop**  
Study of moulding and casting process, moulding sand, foundry tools and patterns used for moulding.
10 Prepare a mould by using a given pattern.
11 Making and baking of dry sand cores for placing in horizontal, vertical and hanging positions in the mould cavity.

**Tin Smithy Shop**  
Study of sheet metal working, tools used in smithy shop and soldering process.
12 Prepare a mechanical joint and perform soldering on it.
13 Prepare a funnel as per given drawing.
E2008-MACHINE DRAWING

List of Exercises

1. Lecture on free hand sketches, Dimensioning, locations and placing

2. Orthographic Projections: 3 Problems

3. Sectional Views: 3 Problems

4. Riveted Joints: lap joints, butt joints, chain riveting, zig-zag riveting

5. Screw fasteners and Screw Threads: Screw threads, Nuts & bolts, foundation bolts

6. Bearing: Plumber block

Suggested Books

2. Pohit Gautam and Ghosh Gautam, Machine Drawing with AutoCAD, Pearson Education
Students are required to perform any ten experiments out of the following fourteen experiments.

1. To measure **Numerical Aperture of an Optical Fiber**.
2. To determine the Coherent Length and Coherent Time of **LASER** using Semiconductor **LASER** source.
3. To perform experiments of interference, diffraction and polarization using **Ruby LASER** Kit.
4. To determine the profile of **He-Ne LASER** beam.
5. To study characteristics of GM detector and determine the slope of the GM characteristic curve.
6. To study Transistor characteristics.
7. To determine an unknown resistance using de-Sauty Bridge.
8. To determine an unknown resistance using Anderson Bridge.
9. To study the variation of Thermo-EMF of Iron-Copper thermocouple with temperature.
10. To determine specific Resistance of a wire by Carrey-Foster’s Bridge.
11. To determine radius of a current carrying coil using Tangent Galvanometer.
12. To determine thermal conductivity of a given material by Lee’s apparatus.
13. To determine specific heat of the given material.
14. To determine the Specific Rotation of Glucose/Sugar Solution by Polarimeter.
Faculty of Engineering & Technology
B. Tech. (common to all disciplines) -II Semester
Contact Hours per week : 2 hrs

E2010-ENVIRONMENTAL CHEMISTRY LAB

List of Experiments

1. Determination of Dissolved oxygen present in given water sample (Winkler’s Method).
2. Determination of free CO$_2$ in a given water sample.
3. Determination of Nitrate content in a given water sample.
4. Determination of Fluoride in a given water sample.
5. Determination of pH of various water samples and their classification.
6. To determine the equivalence conductance of a strong electrolyte hence verify the Onsager’s equation.
7. To determine the equivalent conductivity and dissociation constant of acetic acid (a weak electrolyte).
8. How to Calculate Water Footprints?
9. How to Calculation of Carbon Footprints of an industry?
10. Project Work [Any one under the Guidance of the Teacher]:
    1. Physico-chemical Characterization of Water quality of an area.
    2. Carbon Footprint Calculations of an industry.
    3. Water Footprint Calculation of an industry or crop.
    5. Air Pollution Analysis of an area.

Suggested books

G2002: Introduction to Computer Programming (Programming with C)
B. Tech.: 2nd Semester
Credits: 3 (Contact Hours Per Week: 3)

Introduction

Stored Program Architecture of Computers, Evolution of Processors (In terms of word length & Speed only), Storage Device- Primary Memory and Secondary Storage, Working Principle of Primary Storage devices- RAM, ROM, PROM, EPROM, EEPROM, Random, Direct, Sequential access methods.

Number System

Data Representation, Concept of radix and representation of numbers in radix r with special cases of r=2, 8, 10 and 16 with conversion from radix r1 to radix r2. r’s and (r-1)’s complement. Representation of Integer in sign-magnitude, signed 1’s and 2’s complement. Floating point representation. Concept of bias and normalization. Representation of alphabets.


Programming in C


Suggested Books

1. Let Us C: Bala Guruswami, TATA McGraw Hill.
G2003: COMPUTER LAB - II

B. Tech.: II Semester
Contact Hours per week: 2 hrs
Credit(s): 1

List of Exercises

The lab is to be conducted on Linux platform. vi editor is to be used.

1. Simple OS Commands, vi editor, compiling program, compiler options, linking libraries.
2. Simple input output program integer, real character and string. (Formatted & Unformatted)
3. Conditional statement programs (if, if-else-if, switch-case)
4. Looping Program. (for, while, do-while)
5. Program based on array (one, two and three dimensions)
6. Program using Structure and Union.
7. Program using Function (with and without recursion)
8. Simple programs using pointers.
Faculty of Engineering & Technology
B. Tech. (common to all disciplines) II Semester
Contact Hours per week: 3L

G2004-Communication Skills

1. Phonetics Symbols and Correct Pronunciation.
2. One word for many.
3. Synonyms and Antonyms.
4. Word-Formation.
5. Seminar Presentation.
6. Group Discussion.
8. Technical Proposal Writing.

Suggested Books

(i) Communication Skills’ O.U.P.; Sanjay Kumar, Pushp Lata.
(ii) Effective Technical Communication; Mc Graw Hill- M Asraf Rizvi.