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**FIRST YEAR  
B.TECH PROGRAMME  
2010-2011  
SYLLABUS**

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## II. CURRICULUM FOR ALL B.TECH PROGRAMME

### THEORY:

<b>Subject Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>M</b>
GEA001	<a href="#">Communication in English</a>	3	1	0	100
GEA002	<a href="#">Engineering Mathematics</a>	3	1	0	100
GEA003	<a href="#">Engineering Physics</a>	3	0	0	100
GEA004	<a href="#">Engineering Chemistry</a>	3	0	0	100
GEA005	<a href="#">Basic Electrical &amp; Electronics Engineering</a>	3	0	0	100
GEA006	<a href="#">Basic Mechanical &amp; Civil Engineering</a>	3	0	0	100
GEA007	<a href="#">Engineering Graphics</a>	3	0	0	100
GEA008	<a href="#">Introduction to Computing</a>	3	0	0	100

### PRACTICAL:

<b>Subject Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>M</b>
GEA009	<a href="#">Physics &amp; Chemistry Laboratory</a>	0	0	3	100
GEA010	<a href="#">Basic Engineering Practices</a>	0	0	3	100
GEA011	<a href="#">Computer Practice Laboratory</a>	0	0	3	100

### **III. GEAO01- COMMUNICATION IN ENGLISH**

#### **UNIT I**

##### **GENERAL VOCABULARY**

- Word formation using prefixes and suffixes
- Labeling and identification of words formed
- Nominal compounds

##### **TECHNICAL VOCABULARY**

- Definitions and extended definition
- Listening and reading for interpretation
- Transcoding or transformation of information
- Process description
- Paragraph writing-General and technical

#### **UNIT II**

##### **TENSES**

- Subject/verb agreement
- Gerunds as different parts of speech
- Active and passive voices
- Framing of Wh-questions
- Modal verbs
- Conditional statements
- Cause and effect statements

#### **UNIT III**

##### **COMMUNICATION SKILLS**

- Group discussion
- Presentation
  - Proposed and completed projects
- Interview skills
  - Mock interviews

### **CONVERSATION SKILLS**

- Persuasive speech
- Leading conversation
- Dealing with clients

### **UNIT IV**

#### **WRITTEN SKILLS**

- Letter writing
  - Formal and informal letters
  - E-mail communication
- Note taking
- Instructions
- Preparing minutes of meeting
- Mini project not less than 100 pages
  - Relevant to branch of study
- Agenda or itinerary of Industrial visits
  - Planning an industrial tour, national or international level conferences/seminars

### **UNIT V**

#### **CREATIVE THINKING AND CRITICAL THINKING**

- Discussion of current events and problems
- Offering suggestions/solutions/opinions
- Crisis management and trouble shooting

#### **TEXT BOOKS:**

1. Dr. S. Ganesan, et al, "Communication in English", Himalaya Publishing House, Mumbai, 2009.
2. Dr. S. Ganesan, Dr. Marry T. Persis, Ms. B. Subhashini, "Effective Communication in Technical English", Dhanam Publications, Chennai – 600 042, 2010.

#### **REFERENCE BOOKS:**

1. P.K Dutt, G. Rajeevan and C.L.N Prakash, "A Course in Communication Skills", Cambridge University Press, India 2007.
2. Edgar Rhorpe, Showick Thorpe, "Objective English", Second Edition, Pearson Education, 2007.

## **IV. GEA002 - ENGINEERING MATHEMATICS**

### **UNIT I**

#### **DIFFERENTIAL CALCULUS OF FUNCTIONS OF SEVERAL VARIABLES & VECTOR DIFFERENTIAL CALCULUS**

Functions of several variables - Domains and regions- Functional notation - Level curves and level surfaces - Limits and continuity - Partial derivatives - Total differential- Fundamental lemma- Derivatives and differentials of functions of functions- Implicit functions- Inverse functions- Jacobians and their properties- Maxima and minima of functions with side conditions- Lagrange's method of multipliers.

Vector fields and scalar fields - The gradient field - The directional derivative- Divergence and Curl of a vector field- Solenoidal and Irrotational vector fields- The Laplacian in polar, cylindrical, and spherical coordinates.

### **UNIT II**

#### **INTERGRAL CALCULUS OF FUNCTIONS OF SEVERAL VARIABLES & VECTOR INTEGRAL CALCULUS**

Double integrals- Changing the order of integration- Cartesian and polar coordinates- Evaluation of double integrals in Cartesian coordinates by transforming them from Cartesian to polar coordinates- Triple integrals- Area as a double integral- Volume as a triple integral.

Line integrals in the plane-Line integrals as integrals of vectors- Green's theorem (with out proof) in the plane and its verification- Line integrals in space- Surfaces in space- Normal to the surface- Orientability- Surface integrals- Divergence theorem (with out proof) and Stokes' theorem (with out proof) and their verification involving cubes and rectangular parallelepiped only.

### UNIT III INFINITE SERIES, IMPROPER INTEGRALS & LAPLACE TRANSFORMS

Infinite series: Infinite sequences- Limit of a sequence- Infinite series- Convergence- Tests for convergence and divergence- Sequences and series of functions- Uniform convergence- Weierstrass M-test for uniform convergence- power series- Taylor and Maclaurin series- Taylor's formula for functions of two variables.

Improper Integrals: Meaning of improper integrals- Definitions of beta integral and gamma integral- Formulas

$$\Gamma(n+1) = n\Gamma(n), \beta(m, n) = \frac{\Gamma(m)\Gamma(n)}{\Gamma(m+n)} - \text{Evaluation of}$$

$$\int_0^{\pi/2} \sin^m \theta \cos^n \theta d\theta \text{ using beta and gamma functions.}$$

Laplace Transform: Definition of Laplace transform- Condition for its existence- Laplace transforms of elementary functions- Basic properties of Laplace transform- Transforms of derivatives and integrals- Shift theorems- Transforms of unit step Functions and impulse functions- Transform of periodic functions- meaning of the inverse Laplace transform- Statement of the Convolution theorem- Tauberian theorems- Initial and final value theorem

### UNIT IV FUNCTIONS OF A COMPLEX VARIABLE

**Analytic Functions:** Definition of analytic function- Statement of Cauchy- Riemann's necessary conditions- Statement of sufficient conditions- Harmonic and orthogonal properties of  $u(x, y)$  and  $v(x, y)$  where  $f(z) = u(x, y) + iv(x, y)$  is analytic- Finding the analytic

function when the real part or the imaginary parts or the sum of the real and imaginary parts or the difference of the real and imaginary parts is given- Concept of conformal mapping defined by  $w = f(z)$ , where  $f(z)$  is an analytic function- Discussion of the mappings  $w = z + c, w = cz, w = 1/z$ - Definition of bilinear transformation- Cross-Ratio and its invariance property- Finding the bilinear transformation using the invariance property of cross-ratio.

**Complex Integration:** meaning of complex integration- Statement and applications of Cauchy's Integral theorem and of Cauchy's Integral Formula- Taylor's and Laurent's expansions- Singular points and their types- Definitions of residue at a singular point- Statement of the Residue theorem and its application in the evaluation of real improper integrals (Problems involving unit circle and semi-circular contours excluding poles on the boundaries)- Statement of the theorem involving the Inverse Laplace transform as a contour integral.

## UNIT V

### MATRICES & ORDINARY DIFFERENTIAL EQUATIONS

**Matrices:** Rank of matrices- Consistency of linear equations- Characteristic equation, Characteristic values and characteristic vectors of a square matrix of rational numbers- Diagonal, Symmetric and Orthogonal matrices and their properties- Statement of Cayley- Hamilton theorem and its verification for 2<sup>nd</sup> and 3<sup>rd</sup> order matrices only- uses of Cayley- Hamilton theorem in finding the inverse of a non-singular matrix and the power of a square matrix- Representation of matrices in diagonal forms.

**Ordinary Differential Equations:** Methods and solutions of Higher order linear differential equation with constant coefficients- Method of variation of parameters- Method of undetermined coefficients- Cauchy's and Legendre's linear equations- Simultaneous first-order linear equations with constant coefficients- Finding the solution of a system of

first-order linear equations with constant coefficients by reducing it to a single differential equation of higher order- Finding the solution of a system of first- order linear equations with constant coefficients by matrix method- Solution of ordinary second order linear differential equations and simultaneous first-order linear equations with constant coefficients using Laplace transform.

**TEXT-BOOKS:**

1. G.B. Thomas and R.L. Finney, Calculus and Analytical Geometry, 9<sup>th</sup> edition, Addison-Wesley Publishing House, 1995.
2. E. Kreyszig, Advanced Engineering Mathematics, 9<sup>th</sup> edition, Wiley, 2005.
3. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, 3<sup>rd</sup> edition, Narosa Publishing House, 2009.

**REFERENCE BOOKS:**

1. P. Duraipandian, S. Udayabaskaran and T. Karthikeyan, Engineering Mathematics (I Year), Muhil Publishers, 2010.
2. W.E. Boyce and R.C. DiPrima, Elements of Differential Equations and Boundary Value Problems, 9<sup>th</sup> edition, Wiley, 2008.
3. J.W. Brown and R.V. Churchill, Complex Variables and Applications, 8<sup>th</sup> edition, McGraw Hill, 2008.
4. M.R. Spiegel, Laplace Transforms, McGraw Hill, 1965.
5. Piskunov, Differential and Integral Calculus (Vol. I & II), CBS Publishers, 1995 & 1999.

## **V. GEA003 – ENGINEERING PHYSICS**

### **UNIT I ULTRASONICS**

Introduction – Production – magnetostriction effect – magnetostriction generator – piezoelectric effect – Piezoelectric generator- Detection of ultrasonic waves properties – Cavitations – Velocity measurement – Acoustic grating – Industrial applications – Drilling, welding, soldering and cleaning – SONAR. – Non Destructive Testing – Liquid penetrant method - Pulse echo system – A, B and C – scan displays – Radiography methods – Medical applications – Sonograms.

### **CRYSTALLOGRAPHY**

Lattice – unit cell – Bravais lattice – lattice planes – Miller indices –d spacing in cubic lattice – Calculation of number of atoms per unit cell – Atomic radius – Coordination number – Packing factor for SC, BCC, FCC and HCP structures – Polymorphism and allotropy – Crystal defects – Point, line and surface defects – Burger vector.

### **UNIT II QUANTUM PHYSICS AND APPLICATIONS**

Black body radiation – Planck’s quantum theory - Development of quantum theory – Planck’s radiation formula - Stephen-Boltzmann law, Wien’s displacement law, Rayleigh – Jean’s law – Photo electric effect – Law of photoelectric emission – Explanation of photoelectric emission laws using Einstein’s photoelectric equation – Types of photoelectric cells – Application of photoelectric effect. Compton effect – Schrödinger wave equation – Time dependent and time independent wave equations - Applications of Schrödinger wave equation – Particle in one dimensional box.

## **BAND THEORY OF SOLIDS**

Bloch theorem – Kronig-Penney model (qualitative treatment) – energy band formation in solids – classification of materials into conductors, semiconductors and insulators – concept of effective mass of an electron.

## **UNIT III**

### **LASER AND FIBRE OPTICS**

Introduction – Spontaneous and stimulation emission of radiation – Einstein's coefficient – Amplification of light – Population inversion – Pumping mechanisms – Optical resonators – Laser characteristics – Laser types – Ruby laser, He –Ne laser, CO<sub>2</sub> laser, Semiconductor laser ( Homo junction and Hetro junction) – Applications of laser – Industrial applications - Medical applications – Principle of Compact Disc- Construction and reconstruction of a hologram.

Principle and propagation of light in optical fibers – Numerical Aperture and Acceptance angle – Types of Optical Fibers ( material, refractive index, mode), Application – Dispersion – losses in fibres – manufacturing of fibres - Fiber Optic Communication system – Fiber Optic Sensors ( displacement sensor and pressure sensor) – Medical Endoscope.

## **UNIT IV**

### **MATERIAL SCIENCE**

#### **CONDUCTING MATERIALS**

Conductors - Classical free electron theory – Electrical and Thermal Conductivity- Wiedemann-Franz law- Drawback of classical theory- quantum free electron theory – Fermi-Dirac distribution (analytical) and its temperature dependence – Fermi energy – electron scattering and resistance – Matthiessen's rule.

## **SEMICONDUCTORS**

Intrinsic semiconductors – carrier concentration – expression for conductivity – extrinsic semiconductors – carrier concentration – drift and diffusion – Hall effect – direct and indirect band gap semiconductors

## **SUPERCONDUCTORS**

General properties – Meissner effect – penetration depth – type I and type II superconductors – flux quantization – DC and AC Josephson effect – BCS theory – applications of superconductors

## **UNIT V**

### **MAGNETIC MATERIALS**

Permeability – magnetization – origin of magnetic moment – classification of magnetic materials – Dia, para and ferro magnetism – hysteresis curve – soft and hard magnetic materials

### **DIELECTRIC MATERIALS**

Dielectric constant – electronic, ionic and orientational polarizations – Internal fields in solids – Clausius-Mossotti equation – dielectrics in alternating fields – frequency dependence of the polarizability – Ferro and Piezo electricity

### **NEW ENGINEERING MATERIALS**

Metallic glasses – Production methods – Properties and application – Shape memory alloy – Characteristics and applications – Nano phase materials – Synthesis – Plasma arcing – Chemical vapour deposition – Sol gel method – Electro deposition – Ball milling – Properties and application – Carbon nano tubes – Types, fabrication methods – Arc method – Pulsed laser deposition – Structure, properties and application.

**TEXT BOOKS:**

1. P.K.Palanisamy, "Modern Engineering Materials", SCITECH Publications, 2009
2. Dr.P.Mani, "Engineering Physics", Dhanam Publications, 2010

**REFERENCES:**

1. S.L.Kakani and Shubhra Kakani, "Engineering Physics", 2<sup>nd</sup> ed., CBS publications and Distributors, 2008
2. Arthus Beiser, "Concepts of Modern Physics", Tata Mc Graw Hill Publications (2007)
3. S.O. Pillai, "Solid State Physics", New age Intl Publications (5<sup>th</sup> Edition - 2002)
4. Murugesan and Kiruthiga Sivaprakash, "Modern Physics", 13<sup>th</sup> Edition, S. Chand Publications (2007)
5. Ali Omer, "Elementary Solid State physics", Person Publications 5<sup>th</sup> Edition (2004)
6. A.S. Vasudeva, "Modern Engineering Physics", S. Chand and Company Ltd, 3<sup>rd</sup> Revised Edition.

## **VI. GEA004 - ENGINEERING CHEMISTRY**

### **UNIT I**

#### **THERMODYNAMICS**

Introduction – thermodynamic equilibrium-work and heat-heat capacity of a system- relation between  $C_p$  and  $C_v$  – Zeroth, First and Second law of thermodynamic- Gibb's-helmholtz equation- Van't Hoff isotherm-maxwell relation.

#### **FUELS AND COMBUSTION**

Proximate and ultimate analysis of coal-significances, characteristic of metallurgical coke – manufacture by Otto-Hoffmann method- synthetic petrol Bergius process – Fischer Tropsch's process-Knocking –Octane number- improvement of anti knocking characteristics-cetane number- Gaseous fuel- water gas- producer gas & CNG, group and net calorific values (Dulong's formula) – simple problem – calculation of minimum air requirements-simple problems- flue gas analysis – Orsat apparatus.

### **UNIT II**

#### **SURFACE CHEMISTRY**

Introduction-types of adsorption-adsorption of gases on solids, solute from solution-adsorption isotherm- Freundlich and Langmuir adsorption isotherm Role of adsorbent in catalysis- ion exchange reaction- chromatography – pharmaceutical industries – role of activated carbon in pollution abatement of air and waste water- Industrial applications of adsorption.

#### **PHASE RULE**

Statement and explanation of the terms involved- one component water system- condensed phase rule-construction of phase diagram by thermal analysis-simple eutectic systems- Pb-Ag and Fe- C system – Alloys-importance – ferrous alloys – Nichrome-Alnico and stainless steel – non-ferrous alloys- solder, brass and bronze- heat treatment of alloys.

### **UNIT III**

#### **ELECTROCHEMISTRY**

Electrochemical cells- reversible & irreversible cell- EMF-measurement of EMF- single electrode potential- Nernst equation-problems-reference electrode- SHE-Calomel electrode-ISE-Glass electrode-measurement of PH-electrochemical series- significance- potentiometric titration -precipitation titration -conductometric titration.

### **UNIT IV**

#### **SPECTROSCOPY**

Introduction- Electromagnetic radiation- absorption of electromagnetic radiation- interaction of electromagnetic radiation with matter- Beer- Lambert's law- principle & instrumentation of UV- Visible spectroscopy, AAS, IR spectroscopy- estimation of iron by colorimetry- flame photometry- instrumentation (block diagram)- estimation of sodium by flame photometry- Microwave spectroscopy and its applications.

### **POLYMERS**

Introduction- classification of polymers- types of polymerization- Conducting polymers- Bio degradable polymers- Engineering plastics- PVC- Teflon- PC- Perlon-U, Thermocole, PMMA & Epoxy resins- Rubber-types- vulcanization of rubber- Polymer blend & alloys- composites- FRP, MMC & CMC - Industrial applications of polymers.

### **UNIT V**

#### **WATER TECHNOLOGY**

Introduction- Boiler feed water- requirements- disadvantages of using hard water in boilers- internal conditioning (phosphate.calgon and carbonate conditioning methods)- external conditioning- demineralization process-desalination- reverse osmosis- Electrodialysis- Domestic water treatment.

## **NEW ENGINEERING MATERIALS**

Semi conductors- Superconductors- Organic electronic materials- Solid oxide materials- Memory metals- Nano materials- CNT –Nano composites- Stone tools to designer drugs-Optical fibres- Buckminster fullerenes  
Engineering materials- Abrasives, Refractories and Lubricants- Classification and properties.

## **TEXT BOOKS:**

1. Dr. A. Ravikrishnan – Engineering Chemistry, Sri Krishna Publication, Chennai – 600 037
2. R. Gopalan, D. Venkappayya; Sulochana nagarajan – “ A Text Book of Engineering Chemistry”, Vikas Publishing House Pvt Ltd, New Delhi – 110 014.
3. Shelley Oberoi. Monika Malik – “Engineering Chemistry”, Cengage Learning India Pvt Ltd, Delhi – 110 092.
4. Dr. J. Nandagopal, Dr. S. Sivanesan, Dr. S.K. Chitralekha Devi – “A Text Book of Engineering Chemistry” V.K. Publication, Chennai – 600 042.

## **REFERENCES:**

1. P.C.Jain and Monica Jain - “Engineering Chemistry” Dhanpat Rai Pub, Co., New Delhi (2002)
2. S.S.Dara- “A Text book of Engineering Chemistry” S.Chand & Co.Ltd., New Delhi (2006)
3. Puri B.R, Sharma L.R. & S.Pathania - “Principles of physical Chemistry,Shoban Lal nagin Chand & Co., Jalandhar (2000)
4. B.Sivasankar - “Engineering Chemistry” Tata McGraw-Hill Pub.Co.Ltd. New Delhi (2008)
5. B.K.Sharma - “Engineering Chemistry” , Krishna Prakasan Media (P) Ltd., Meerut (2001)
6. Bhal B.S., Tuli G D, and Arun Bhal, - “Essentials of Physical Chemistry, S.Chand & Company Ltd., New Delhi, 2004

**VII. GEA005 - BASIC ELECTRICAL AND ELECTRONICS**  
**ENGINEERING**

**UNIT I**

**ELECTRICAL MACHINES AND MEASURING INSTRUMENTS**

D.C. Generator – D.C. motor – Determination of the efficiency of a D.C.motor – Transformer – Voltmeter and ammeters – dynamometer type wattmeter – induction type energy meter – Multimeter - Megger (Basic construction and principles of operation only)

**UNIT II**

**ELECTRONIC COMPONENTS AND TRANSDUCERS**

Electronic components - Passive circuit component – Resistors – Film and wire wound resistors and their tolerances – Potentiometers – single turn and multiturn potentiometers – capacitors – Electrolytic, ceramic, polystyrene, mica and paper capacitors –dissipation factor – uses of various types of capacitors in circuits.Transducers – Displacement, velocity, force, strain, pressure, temperature, flow and light transducers (Examples and applications)

**UNIT III**

**SEMICONDUCTOR DEVICES**

Basic concepts of PN junction – diodes –Zener diodes – bipolar junction transistor – Junction field – effect transistor – Mosfet – Thyristor- Photoelectric devises ( Basic principles and applications)

**UNIT IV**

**DIGITAL ELECTRONICS**

Binary Number System – Logic Gates – Boolean Algebra – Half and Full Adders – Flip-Flops – Registers and Counters – A/D and D/A Conversion

## **UNIT V**

### **INTRODUCTION TO COMMUNICATION SYSTEMS**

Analogue and digital signals – telecommunication service – Transmission processes – Basic principles of modulation – AM,FM,Pulse and digital (Qualitative treatment only) - data transmission – modem – communication systems – radio, TV, Microwave, satellite, ISDN, Internet.(Block diagrams only)

#### **TEXT BOOKS:**

1. Thyagarajan, T., K.P.S.Chelvi, & Rengasamy, T.R. - “Engineering Basics”, , New age international, 1997.
2. Muraledharan, K.A., Muthusubramanian, R. & Salivahanan,S., Basic Electrical and Electronics Engineering” Tata McGraw Hill, 1997.
3. B.L.Theraja, - “Fundamentals of Electrical and Electronics Engineering, “S.Chand and company, New Delhi, 1988.

#### **REFERENCES**

1. B.L.Theraja & A.K.Theraja, - “A text book of Electrical Technology”, Niraja Construction & Development Company, New Delhi, 1994.
2. V.K.Mehtha, - “Principles of Electronics” S.Chand and Company, NewDelhi, 1995.
3. E.Hughes 4th Edn., - “Electrical Technology” Longman group London, 1972.
4. A.Singh, - “Principles of Communication Engineering” S.Chand & Company, 1994.
5. V.K.Jain, - “Switching theory and digital Electronics”, Khanna Publishers, New Delhi, 1977
6. Salivahanan & Suresh Kumar, “Electronic Devices & Circuits”, Publishers Tata Mccraw.

7. Gupta, "Electronics & Instrumentation", Publisher PHI.
8. T.Mahadeva, "Electronic Devices & Circuits", Publishers Aassacn Learning Services.

## **VIII. GEA006 - BASIC MECHANICAL AND CIVIL ENGINEERING**

### **PART A – MECHANICAL ENGINEERING**

#### **UNIT I MANUFACTURING PROCESSES**

##### **(a) Metal cutting**

Introduction to Manufacturing & Machining - The Metal cutting process - Orthogonal and oblique metal cutting, Types of Machining Operations & Terminology – The Cutting Tool – Descriptive study of constructional features & operations of a typical Centre lathe

##### **(b) Metal forming**

Introduction to metal forming – Terminology - Bulk deformation & Sheet metal working – Basic operations - Hot forming and cold forming – Detailed study of constructional features & operations of a typical forming machine.

##### **(c) Metal Joining**

Introduction to Metal Joining Processes - Terminology - Welding processes - Arc & Gas welding - AC & DC welding equipments - Brazing and soldering – Descriptive study of constructional features & operations of a typical welding machine.

#### **UNIT II COMBUSTION ENGINES & POWER PLANTS**

##### **(a) Combustion Engines**

Principle of Internal and external combustion engines – Petrol engine, diesel engine, working principle and comparison - Two stroke and four stroke engines, working principle and comparison - Alternative fuels – Descriptive

study of constructional features & principle of operation of a typical Internal Combustion Engine.

**(b) Power Plants**

Introduction to Pumps – Reciprocating & Centrifugal – Turbines – Pelton wheel & Francis – Power Plant Engineering - Classification of Power Plants – Working principle of Steam, Hydro-electric and Nuclear Power plants – Merits and Demerits Descriptive study of constructional features & principle of operation of a typical hydraulic turbine.

**UNIT III REFRIGERATION & AIR-CONDITIONING SYSTEM**

**(a) Refrigeration System**

Introduction to Refrigeration - Terminology – Non cyclic & Cyclic Refrigeration - Principle of vapour compression and vapour absorption refrigeration system - Applications. Descriptive study of constructional features & principle of operation of a typical Refrigeration system.

**(b) Air Conditioning System**

Air-Conditioning – Terminology - Layout of typical domestic refrigerator – Window and Split type room Air conditioner – Applications Descriptive study of constructional features & principle of operation of a typical Air Conditioning System.

**B – CIVIL ENGINEERING**

**UNIT IV INTRODUCTION TO CIVIL ENGINEERING AND CONSTRUCTION MATERIALS**

**Introduction to Civil Engineering:** Civil engineering -- Importance of civil engineering -- Branches of civil engineering.

**Construction Materials:** Soil – Stones – Bricks – Timber -- Cement -- Aggregate – Concrete -- Steel and Bitumen.

**UNIT V FUNDAMENTALS OF CIVIL ENGINEERING**

**Mechanics:** Forces -- Mechanical properties of materials -- Simple Stress and Strain.

**Structures:** Classification of Structures -- Types of Structures -- Structural elements

**Foundations:** Bearing capacity of soil -- Requirements of foundations -- Types of foundations.

**TEXT BOOKS:**

1. Shantha Kumar S R J., “Basic Mechanical Engineering”, Hi-tech Publications, Mayiladuthurai, (2000).
2. Venugopal K and Prahua Raja V, “Basic Mechanical Engineering”, Anuradha Publishers, Kumbakonam, (2000).
3. Ramamrutham. S, “Basic Civil Engineering”, Dhanpat Rai Publishing Co. (P) Ltd. (1999).
4. Rangwala, S.C., “Engineering Materials ”, Charotar Publishing House, Anand, 1997.
5. Shanmugam G and Palanichamy M S, “Basic Civil and Mechanical Engineering”,Tata McGraw Hill Publishing Co., New Delhi, (1996).

**REFERENCES:**

1. Rao P.N., “Manufacturing Technology”, 2nd Edition, Tata McGraw Hill Inc., New Delhi.
2. Surendra Singh, “Building Materials ”, Vikas Publishing Company, New Delhi, 1996.
3. Neil Jackson and Ravindrakumar Dhir, “Civil Engineering Materials ”.
4. National Building Code of India, “Building

- Materials ", Part V, 1983.
5. Khurmi R.S. & Gupta J.K., " A Text Book of Thermal Engineering (Mechanical Technology) ", S.Chand &Co., New Delhi, 1999.
  6. Campbell J.S., "Principles of Manufacturing Materials and Processes", 14th Edition, Tata McGraw Hill.Inc., New Delhi, 1995.

## **IX. GEA007 - ENGINEERING GRAPHICS**

**First angle projection method is to be followed.  
(4 Hours/Week)**

### **INTRODUCTION (Not to be included for examination)**

Drawing instruments and their use – Bureau of Indian Standards (BIS) conventions – free-hand lettering – dimensioning – simple geometric constructions.

### **UNIT I**

Construction of ellipse (concentric circle and eccentricity methods), construction of parabola (rectangle and eccentricity methods), construction of hyperbola (eccentricity method) – construction of cycloid – construction of involutes of circle and square – drawing of tangents and normal at any point to the above curves.

Orthographic projections of points, orthographic projections of straight lines located in the first quadrant only – determination of true lengths and true inclinations – orthographic projections of polygonal surface and circular lamina inclined to both reference planes.

### **UNIT II**

Projections of simple solids (prisms, pyramids, cylinder and cone) when the axis is inclined to one reference plane by change of position and change of reference line methods.

Sections of solids (prisms, pyramids, cylinder and cone) in simple vertical position by using cutting plane inclined to one reference plane and perpendicular to the other – obtaining true shape of section.

### **UNIT III**

Free-hand sketching of orthographic views of pictorial views of solids – free-hand sketching of pictorial views of solids given the orthographic views.

Development of lateral surfaces of simple and truncated solids – prisms, pyramids, cylinder and cone – development of lateral surfaces of solids with cylindrical cutouts perpendicular to the axis.

### **UNIT IV**

Principles of isometric projection - isometric scale – isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones – isometric view of combination of two simple solids.

Perspective projection of prisms, pyramids and cylinder by visual ray method and vanishing points method.

### **UNIT V**

Top view, front view and sectional view of simple single storeyed masonry building with RCC roof (residential and small office building) with not more than two rooms.

### **TEXT BOOKS:**

1. K.V.Natarajan, A text Book of Engineering Graphics, Dhanalakshmi Publisher, Chennai – 42, 2009
2. Venugopal K., “Engineering Graphics”, New Age International (P) Limited, 2002.

## **REFERENCES:**

1. Warren J. Luzadder and Jon. M.Duff, “Fundamentals of Engineering Drawing”, Prentice Hall of India Pvt., Ltd., Eleventh Edition, 2001.
2. BIS code: SP 46:2003 Engineering Drawing practice for Schools & Colleges

## **X. GEAO08 -- INTRODUCTION TO COMPUTING**

### **UNIT I INTRODUCTION TO COMPUTING**

Computer basics-Data representation-Input/Output units – computer memory – Binary arithmetic – computer languages – computer generations and classification –computer networks

### **UNIT II INTRODUCTION TO C**

Introduction to Programming Language – C Fundamentals – Operators and Expressions – Data Input and Output – Control statement -- Functions – Arrays and Strings.

### **UNIT III FUNCTIONS AND RECURSION**

Concepts of functions with various types of parameters. Various types of parameter passing mechanisms. Recursive functions and implementation of these concepts in ‘C’. Introduction to structures, union and its implementation-concepts of pointers and simple program using pointers – preprocessor

### **UNIT IV INTRODUCTION TO C++ LANGUAGE**

OOPS concepts and its advantages -- Principles of object oriented programming --Comparison with procedural languages -- Tokens, expressions and control structures – Functions -- Classes and Objects: Declaring classes, defining member functions, Making an outside function inline, nesting of member functions, private member functions -- Arrays with in a class, Memory allocation of objects, static data members, static member functions, arrays of objects, objects as function arguments, friend function, returning of objects, constant member function.

### **UNIT V            POINTERS,            VIRTUAL            FUNCTION, POLYMORPHISM**

Constructors-Destructors-operator overloading – type conversion--Inheritance-pointers-virtual functions-polymorphism

#### **TEXT BOOKS:**

1. Rajaraman - “Fundamentals of computers”  
Prentice Hall of India
2. Balagurusamy E - “Programming in ANSI C”  
Tata McGraw-Hill Publishing Company limited
3. Balagurusamy E - “Object oriented programming with C++,”  
Tata McGraw-Hill Publishing Company limited

#### **REFERENCES:**

1. Kanetkar - “Let us C”, 4<sup>TH</sup> edition, Yashavant  
Publisher:BPB
2. Balagurusamy E - “Programming in ANSI C”, 2nd  
edition, Tata McGraw-Hill Publishing Company Ltd

## **XI. GEA009 - PHYSICS LABORATORY**

### **(Any 10 Experiments)**

1. Wave length of laser and particle size – Determination using grating and Numerical Aperture and Acceptance angle of an optical fiber.
2. Rigidity modulus and moment of inertia using Torsional Pendulum
3. Young's modulus by uniform bending
4. Coefficient of viscosity of a given liquid by Poiseuille's flow using burette.
5. Newton's rings – Focal length of convex lens.
6. Dispersive power of prism by spectrometer.
7. Velocity of ultrasonic waves in a liquid by ultrasonic interferometer.
8. Thermal conductivity of a bad conductor by lee's Disc method.
9. Thermo-EMF of thermocouple by potentiometer.
10. Band gap of semiconductor – Post Office Box.
11. Wavelength of Mercury source using grating by spectrometer.
12. Kundt's tube- Determination of velocity of sound waves and hence find the Young's Modules of the material of the metal rod.

## **XII. GEA009 - CHEMISTRY LABORATORY**

### **LIST OF EXPERIMENTS**

#### **I. WATER ANALYSIS**

1. Estimation of hardness of Water by EDTA
2. Determination of DO in water (Winkler's Method)
3. Estimation of Chloride in Water sample (Argentometric)
4. Estimation of alkalinity of Water sample
5. Determination of Chemical Oxygen Demand of the sample of water/sewage

#### **II. COMPOSITION OF ALLOY**

6. Estimation of Copper in brass by EDTA

#### **III. VISCOMETRY**

7. Determination of molecular weight and degree of polymerization using

#### **IV. CONDUCTOMETRY**

8. Conduct metric titration (Simple acid base)
9. Conduct metric titration (Mixture of weak and strong acids)
10. Conduct metric precipitation titration using  $\text{BaCl}_2$  Vs  $\text{Na}_2\text{SO}_4$
11. Determination of specific and equivalent conductance at infinite dilution of a given electrolyte

#### **V. POTENTIOMETRY**

12. Potentiometric Titration ( $\text{Fe}^{2+}/\text{KMnO}_4$  or  $\text{K}_2\text{Cr}_2\text{O}_7$ )

#### **VI. PH**

13. PH titration (acid & base)

#### **VII. SPECTROPHOTOMETRY**

14. Estimation of Ferric iron

#### **VIII. FLAME PHOTOMETRY**

15. Estimation of Na & K

### **XIII. GEA010 – BASIC ENGINEERING PRACTICES**

#### **GROUP A (MECHANICAL & CIVIL)** **MECHANICAL ENGINEERING PRACTICE**

##### **Bench work and fitting shop:**

- (a) Fitting tools, fitting operations, measurements and checking
- (b) Exercises –
  1. Square fitting
  2. Vee fitting

##### **Welding shop:**

- (a) Arc welding – tools and equipments – welding symbols – different types of joints
- (b) Demonstration of gas welding & gas cutting
- (c) Exercises-
  1. butt joint
  2. Lap joint
  3. Tee joint

##### **Machine shop:**

- (a) Introduction to machining and common machining operations, machine tools, cutting tools, drilling – operation, types.
- (b) Exercises-
  1. Simple turning, Facing, Chamfering and parting
  2. Drilling of holes in a M. S. Flat

##### **Sheet Metal Work shop:**

- (a) Sheet metal – definition, working tools, operations, different types of joints, forming & bending.

- (b) Exercises-
  1. Making of funnel
  2. Making of tray.

**Machine assembly practice:**

- (a) Study of Centrifugal pump
- (b) Study of air conditioner

**CIVIL ENGINEERING PRACTICE**

**Plumbing shop:**

- (a) Basic plumbing tools – house hold plumbing fittings
- (b) Preparation of plumbing's line sketches for water supply and sewage works.
- (c) Exercises-
  1. Basic pipe connections
  2. Mixed pipe material connection
  3. Pipe connections with different joining components.

**Carpentry shop: (Using power tools only)**

- (a) Timber – definition, engineering applications, seasoning and preservation.
- (b) Plywood and Ply boards
- (c) Carpentry process – Carpentry tools, different types of joints, study of the joints in roofs, doors, windows and furniture.
- (d) Exercises-
  1. lap joint
  2. Half – lap corner joint
  3. Tee joint
  4. Dove tail joint
  5. Mortise and Tennon joint

## **GROUP B (ELECTRICAL & ELECTRONICS)**

### **ELECTRICAL ENGINEERING PRACTICE**

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lamp wiring.
3. Stair case wiring
4. Measurement of electrical quantities – voltage, current, power & power factor in RLC circuit.
5. Measurement of energy using single phase energy meter.
6. Measurement of resistance to earth of an electrical equipment.

### **ELECTRONICS ENGINEERING PRACTICE**

1. Study of Electronic Components and Equipments
2. Characteristics of PN Junction diode
3. Characteristics of Zener diode
4. Characteristics of BJT(Any One)
5. Characteristics of JFET
6. Characteristics of Photo diode
7. Verification of Logic Gates
8. Design and Implementation of Adders.

#### **XIV. GEA011-COMPUTER PRACTICE LABORATORY**

Programs could be written and implement the concepts of C and C++ Language

##### **C Programming**

1. Write a C Program to find whether a given number is Odd or Even
2. Write a C Program to test whether a string is a Palindrome
3. Write a C Program to find whether a given number is prime
4. Write a C Program to perform Cast(Conversion) operation
5. Write a C Program to design an arithmetic calculator using Switch-Case
6. Write a C Program to find largest and smallest elements in an array
7. Write a C Program to demonstrate Looping and Control structures
8. Write a C Program to calculate length of a String
9. Write a C Program to demonstrate String functions
10. Write a C Program to find a Factorial of a number using functions
11. Write a C Program to demonstrate memory addressing Using Pointers
12. Write a C Program to demonstrate passing pointer Parameters to functions
13. Write a C Program to perform pointer arithmetic Operations
14. Write a C Program to demonstrate use of Structures and Unions
15. Write a C Program using Enumeration

##### **C++ Programming**

16. Write a C++ Program with a Simple Class
17. Write a C++ Program for Object Comparison

18. Write a C++ Program to Implement Polymorphism
19. Write a C++ Program for processing Student Mark Sheet using Inheritance
20. Write a C++ Program for array with different objects
21. Write a C++ Program using Operator Overloading