B.E. / B. Tech. DEGREE PROGRAMMES

FIRST YEAR SYLLABUS

(For the students admitted during 2009-10 and onwards)

COIMBATORE INSTITUTE OF TECHNOLOGY

(Government Aided Autonomous Institution affiliated to Anna University Coimbatore)

COIMBATORE - 641 014

LIST OF ELECTIVE SUBJECTS

GROUP - A

(S-1) BASIC CIVIL ENGINEERING

(S-2) BASIC MECHANICAL ENGINEERING

(S-3) BASIC ELECTRICAL ENGINEERING

(S-4) BASIC COMMUNICATION ENGINEERING

(S-5) BASIC COMPUTER ENGINEERING

(S-6) BASIC C PROGRAMMING

GROUP - B

(S-7) BUILDING MATERIALS

(S-8) ENGINEERING MECHANICS

(S-9) ELECTRIC CIRCUITS

(S-10) NETWORK THEORY

(S-11) C PROGRAMMING - THEORY AND PRACTICE

(S-12) FUNDAMENTALS OF DIGITAL COMPUTERS

(S-13) CHEMISTRY FOR CHEMICAL ENGINEERS

LANGUAGE ELECTIVE

(L-1) ENGLISH - II

(L-2) GERMAN

PHYSICAL EDUCATION IS COMPULSORY

SYLLABI

09FY11 MATHEMATICS – I

L	T	P	C
3	1	0	4

ASSESSMENT : THEORY

OBJECTIVE

To develop the basic Mathematical problem solving skills of Engineering students that are imperative for effective understanding of Engineering subjects. The topics introduced will serve as basic tools for specialized studies in many Engineering fields.

MATRIX AND HYPERBOLIC FUNCTIONS

Eigenvalues and eigenvectors-Cayley Hamilton theorem (without proof)-Application to find the inverse and higher powers of a matrix-Diagonalization-Quadratic forms-Orthogonal reduction to canonical form. Hyperbolic and inverse hyperbolic functions. **(9)**

DIFFERENTIAL CALCULUS

Curvature-Evolutes-Envelopes-Expansions and extreme values Functions of two variables-Lagrange's multiplier method for constrained extrema. **(9)**

INTEGRAL CALCULUS

Beta, Gamma integrals-properties and problems-Double and triple integrals-changing the order of integration-Jacobian of transformation-Application to areas and volumes. **(9)**

ORDINARY DIFFERENTIAL EQUATIONS

Second and higher order linear differential equations with constant coefficients- Euler Cauchy equation-Linear Simultaneous equations-Method of variation of parameters.-Method of reduction of order -Transformation of equation by changing the dependent and independent variables. **(9)**

SOLID GEOMETRY

Planes, straight lines-coplanar lines-skew lines. Spheres-tangent plane to the sphere - orthogonal spheres. **(9)**

Theory : 45

Tutorials : 15

Total : 60

TEXT BOOKS

1. Kandasamy. P. *et al*., "Engineering Mathematics for first year B.E/ B.Tech",(Volume I & II) (8th fully Revised Edition) S Chand & Co – (2008).
2. Veerarajan .T , "Engineering Mathematics" (For first year) , (First Revised Edition) Tata .Mc Graw– Hill Publishing company Ltd., -(2008).
3. Venkataraman.M.K., "Engineering Mathematics", (First year) , The National Publishing Company – (2008).

REFERENCE BOOKS

1. Erwin Kreyszig, "Advanced Engineering Mathematics", (8 th Edition) John Wiley & Sons (Asia) Pvt .Ltd ., - (2008).
2. Grewal, B.S., "Higher Engineering Mathematics", (40th Edition) Khanna Publishers – (2007).

09FY12 ENGLISH – I

L	T	P	C
2	0	2	3

ASSESSMENT : THEORY AND PRACTICAL

OBJECTIVE

To comprehend the fundamental components of English grammar and to perceive the intricacies of listening, speaking, reading, and writing in the chosen medium.

FOCUS ON LANGUAGE: FUNDAMENTALS OF ENGLISH GRAMMAR

Word formation: Prefixes and Suffixes - Synonyms and Antonyms- Noun Phrases -Gerunds and Infinitives - Subject-verb Agreement - Tenses- Impersonal Passive Voice -Conditional Sentences- Adjectives and Degrees of Comparison -Conjunctions and Prepositions. **(6)**

TECHNICAL COMMUNICATION

Process of Communication - Language as a Tool of Communication- Levels of Communication - Flow of Communication - Communication Networks - Importance of Technical Communication - Barriers to Communication. **(4)**

READING

Predicting the Content - Skimming the Text - Understanding the Gist -Topic Sentence and its Role - Scanning - Inferring Meanings: Lexical and Contextual. **(4)**

WRITING

Right Words and Phrases - Sentence Construction - Paragraph Development - Components of a Paragraph - Techniques for Paragraph Development - Kinds of Paragraphs. **(6)**

LISTENING

Types of Listening - Implications of Effective Listening - Filling Gaps - Note Taking - Specific Details. **(4)**

SPEAKING

Presentation Strategies - Organizing Contents - Kinesics - Proxemics - Paralinguistics - Chronemics - Understanding Nuances of Delivery - Visual Aids. **(6)**

Theory : 30 Practicals : 30 Total : 60

TEXT BOOK

1. Meenakshi Raman, Sangeeta Sharma, "Technical Communication -English Skills for Engineers", Oxford University Press, New Delhi,2008.

REFERENCE BOOKS

1. Steven M Gerson & Sharon J Greson, "Technical Writing – Process and Product", third edition, Pearson Education (Singapore) Pte.Ltd., New Delhi, 2008.
2. Aysha Viswamohan, "English for Technical Communication", Tata MacGraw Hill Publishing Company Limited, New Delhi, 2008.
3. Aruna Koneru, "Professional Communication", Tata MacGraw Hill Publishing Company Limited, New Delhi, 2008.
4. Leena Sen, "Communication Skills", Prentice Hall of India Pvt. Ltd., New Delhi, 2007.

ASSESSMENT PROCEDURE

THEORY:

Final Examination : 25%

Internal Assessment : 25%

PRACTICAL : Continuous Assessment : 50

09FY13 PHYSICS – I

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVES **:**

To understand architectural acoustics, role of ultrasonics in NDT, concept of high vacuum technology and its applications, principle of laser and light propagation through optical fiber, importance of Schrödinger's equation and its applications.

ACOUSTICS AND ULTRASONICS

Reverberation - Reverberation time - Sabine's formula - Absorption coefficient and its determination - Factors affecting the acoustics of the buildings and their remedies- Production of ultrasonic waves- Magnetostriction and Piezoelectric methods - Properties -Detection - Thermal and Piezoelectric methods, Determination of velocity of ultrasonic waves in liquids using acoustic grating - applications-SONAR, Non destructive testing. **(10)**

HIGH VACUUM TECHNOLOGY

Introduction - Exhaust pump and their characteristics - Production of high vacuum - Gaede and Cenco hyvac rotary oil pumps - Oil diffusion pump - Measurement of low pressure - Pirani gauge - Penning gauge- Applications of high vacuum. **(8)**

LASERS

Absorption and emission - Spontaneous emission - Stimulated emission - Population inversion - Sources of excitation - Active medium- Resonant cavity - Einstein's theory of stimulated emission - Nd-YAG laser - CO_2 laser - Semiconductor laser - Applications - 3D profiling and material processing. **(9)**

FIBER OPTICS

Optical fiber - Advantages of optical fibers as wave guides and propagation of light in optical fibers - Numerical aperture and acceptance angle - Structure of optical fibers - Fiber optical materials - Types of optical fibers - Single and multimode fibers - Step index and graded index fibers - Applications - Fiber optic communication system, Fiber endoscope. **(9)**

QUANTUM PHYSICS

Planck's quantum theory - Compton effect - Concept of matter waves - Physical significance of wave function - Schrödinger's wave equation - Time independent and time dependent equation - Eigen values and eigen function - Particle in a box (one dimensional)- Scanning electron microscope (SEM)- Transmission electron microscope (TEM). **(9)**

Total : 45

TEXT BOOKS

1. Rajendran. V, "Engineering Physics", Tata McGraw Hill Publishing Company, New Delhi, 2009.
2. Gaur R K and Gupta S L, "Engineering Physics", 8th edition Dhanpat Rai Publications Pvt.Ltd, New Delhi, 2002.

REFERENCE BOOKS

1. Avadhanulu M.N. and Kshirsagar P.G, "Engineering Physics", Sixth revised edition, 2003, S.Chand & Company Ltd.
2. Jayakumar, S. "Engineering Physics", RK Publishers, Coimbatore, 2003.
3. Ganesan, S. Iyandurai, N. "Applied Physics", KKS Publishers, Chennai, 2007s

09FY14 ENGINEERING CHEMISTRY

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To introduce a few topics involving the application aspects of chemistry

WATER TREATMENT

Hardness of water-units of hardness, Estimation of hardness-EDTA method. Boiler troubles-sludge and scale formations, boiler corrosion, caustic embrittlement, priming and foaming. Softening methods-Zeolite process, Ion exchange process. Drinking water treatment-removal of impurities, disinfection, Break-point chlorination. Desalination by electrodialysis and reverse osmosis methods. **(9)**

FUELS AND COMBUSTION

Classification of fuels-calorific value, units of heat, Gross and Net calorific values. Determination of calorific value by Bomb calorimeter-Dulong's formula- theoretical calculation of calorific value. Coal-types of coal-Analysis of coal-Proximate analysis and ultimate analysis-Metallurgical coke- carbonization, Manufacture-Otto Hoffmann's by-product oven method .Petroleum-Refining of crude oil, Knocking-Octane number and Cetane number. **(9)**

CORROSION AND ITS CONTROL

Introduction - mechanism of corrosion - chemical corrosion, electrochemical corrosion - Differential aeration corrosion - Pilling Bedworth rule - factors influencing corrosion. Corrosion control-cathodic protection - sacrificial anodic protection method - Impressed current cathodic protection - use of inhibitors. Protective coatings - Metallic coatings - anodic and cathodic coatings - Methods of application of metal coatings. Organic coatings - paints, varnishes, emulsion paints - special paints Luminescent paint, Heat - resistant paint, Fire - retardant paint, Water repellent paint, Antifouling paint. **(9)**

POLYMER CHEMISTRY

Polymerisation - Introduction - Degree of polymerization, functionality - Effect of polymer structure on properties. Mechanical properties of polymers - plastics - thermoplastics and thermosets - Silicone polymers - types and uses - polyurethanes - vulcanization of rubber - synthetic rubbers - styrene rubber, nitrile rubber and reclaimed rubber - reinforced plastics - polymers in medicine and surgery. **(9)**

ELECTROCHEMISTRY AND BATTERIES

Metal finishing - Importance of metal finishing - factors involved in metal finishing - Decomposition potential, over potential, polarization. Electroplating - mechanism of Electrodeposition. Electroplating of copper, nickel and chromium. Electroless plating. **(6)**

Batteries and cells : Battery characteristics - Amperes, Ampere hours, capacity, cycle, shelf life - Primary batteries - Lechlanche cell, Alkaline battery, Lithium battery. Secondary batteries - Lead - acid accumulator, Nickel - Cadmium battery. Fuel cells - Hydrogen - Oxygen fuel cells, Methanol - Oxygen fuel cell. **(3) Total : 45**

TEXT BOOKS

1. Jain, P. C. and Monikka Jain, "Engineering Chemistry" - Dhanpat Rai & Co. (2004).
2. Dara, S. S., "A Text book of Engineering Chemistry"- S Chand & Company Ltd (2006).

REFERENCE BOOKS

1. Chawla. S., "A Text book of Engineering Chemistry"- Dhanpat Rai & Co. (2005).
2. Vijayasarathy, R. "Engineering Chemistry" - Prentice-Hall of India Private Ltd (2008).

09FY21 MATHEMATICS – II

L	T	P	C
3	1	0	4

ASSESSMENT : THEORY

OBJECTIVE

To develop the basic Mathematical problem solving skills of Engineering students that are imperative for effective understanding of Engineering subjects. The topics introduced will serve as basic tools for specialized studies in many Engineering fields.

THEORY OF EQUATIONS

Relation between the roots and the coefficients-Symmetric functions of the roots - Transformation of equations-Reciprocal equations-Solution of algebraic and transcendental equations by Newton-Raphson method- polynomial equations by Graeffe's root squaring method. **(9)**

DIFFERENCE CALCULUS

Finite differences-operators and their interrelations-Interpolations-Newton's and Lagrange's method - Numerical differentiation based on Newton's formula - Numerical integration-Trapezoidal and Simpson's 1/3 rule. Solutions of finite difference equations with constant coefficients. **(9)**

VECTOR CALCULUS

Vector differentiation-gradient-divergence-curl-physical interpretation and identities. Vector integration-line-surface and volume integrals. Gauss, Stoke's and Green's theorems (without proof)**(9)**

LAPLACE TRANSFORMS

Transform of standard functions-Transform of unit step, dirac delta, error and periodic functions-Initial and final value theorems-Inverse transforms and their properties-Convolution theorem-Applications to ordinary differential equations and integral equations. **(9)**

FOURIER SERIES

Dirichlet's conditions-Full range series-Half range series-Complex form of series- Parseval's identity-Harmonic analysis. **(9)**

Theory : 45

Tutorial : 15

Total : 60

TEXT BOOKS

1. Kandasamy. P. *et al*., “Engineering Mathematics for first year B.E/ B.Tech”, (Volume I & II) (8th fully Revised Edition) S.Chand & Co – (2008).
2. Kandasamy . P., *et al*., “Numerical methods.“, S.Chand & Co - (2008).
3. Veerarajan .T ., “Engineering Mathematics” (III Semester) (Third Edition) Tata.McGraw – Hill Publishing Company Ltd– (2008).

REFERENCE BOOKS

1. Erwin Kreyszig., “Advanced Engineering Mathematics”, (8 th Edition) John Wiley & Sons (Asia) Pvt .Ltd., - (2007).
2. Grewal . B.S., “Higher Engineering Mathematics”, (40th Edition) Khanna Publishers – (2007).

09FY22 ENGLISH – II

L	T	P	C
2	0	2	3

ASSESSMENT : THEORY & PRACTICAL

OBJECTIVE

To enable the students to disseminate technical and formal information effectively and to master the entire gamut of skills required for a successful professional.

FOCUS ON LANGUAGE: ADVANCED ENGLISH GRAMMAR

Voice and Tense - Reported Speech - Relative Clauses - Adverbial Clauses of Time, Place, and Manner - Cause-and-Effect Expressions - Indicators of Purpose and Function. **(6)**

READING

Note-Making - Transfer of Information - Understanding Discourse Coherence - Sequencing of Sentences. **(5)**

WRITING

Formal Letters : Inquiry - Orders - Sales - Claim - Adjustment - Job Application - Memos - E-mails - Reports - Types of Reports - Structure of Reports - Advanced Writing - Writing Instructions - Making Recommendations - Preparation of Checklists. **(7)**

LISTENING

Global Comprehension - Specific Information - Short and long Conversation. **(5)**

SPEAKING

Interviews - Face to face Interviews - Telephonic Interviews - Forms of Group Communication - Group Discussion - Organizational Group Discussions - Meetings (Purposes - Preparation - Procedure) - Conferences (Planning - Preparation - Procedure) **(7)**

Theory : 30
Practicals : 30
Total : 60

TEXT BOOK

1. Meenakshi Raman, Sangeeta Sharma, "Technical Communication- English Skills for Engineers", Oxford University Press, New Delhi, 2008.

REFERENCE BOOKS

1. Steven M Gerson & Sharon J Greson, "Technical Writing - Process and Product", third edition, Pearson Education (Singapore) Pte. Ltd., New Delhi, 2008.

2. Aysha Viswamohan, "English for Technical Communication", Tata MacGraw Hill Publishing Company Limited, New Delhi, 2008.

3. Aruna Koneru, "Professional Communication", Tata MacGraw Hill Publishing Company Limited, New Delhi, 2008.

4. Leena Sen, "Communication Skills", Prentice Hall of India Pvt.Ltd., New Delhi, 2007.

ASSESSMENT PROCEDURE

Final Theory Examination : 50%

Internal Assessment for Theory and Practical : 50%

GERMAN LANGUAGE

DEUTSCH – EIN GRUNDKURS GERMAN – A BASIC COURSE

1. **EINFÜHRUNG**

   Begrüßung - Name – Vorname – Familienname – Anrede

2. **THEMA**

   Hallo! Wie geht's?

   Begegnungen

   Guten Tag, ich suche,

   Im Supermarkt

   Arbeit und Freizeit

   Familie und Haushalt

3. **GRAMMATIK**

   Position des Verbs: Aussage, W-Frage und

   Ja/Nein – Frage; Artikel ***die der das.***

   W-Frage; Konjugation in Präsens;

   Nominativ: bestimmter unbestimmter und negativer Artikel

   Akkusativ: unbestimmter und negativer Artikel

   Adjektive: Akkusativ-Ergänzung

   Artikel als Pronomen

   Dativ-Ergänzung: Personalpronomen und Ortsangaben; Imperativ

   Modalverben; Ortsangaben; Richtungsangaben;

   Zeitangaben; Ordinalzahlen

   Possessiv-Artikel; trennbare und nicht trennbare Verben;

   Wechselpräpositionen

   Unterricht 50 + Teste 10 = 60 Stunden

LEHRBUCH

Tangaram aktuell 1: Kursbuch + Arbeitsbuch

(Deutsch als Fremdsprache)

Max Hueber Verlag

GERMAN A BASIC COURSE

This course with Tangaram is very fast and the learners will be in a position to apply the new language actively and creatively. This text book aims for a communicative competence and the basic skills required to learn this language. In view of the limited number of hours and restricted lessons, the testing of learners is based on grammar topics covered in this syllabus.

09FY 23 PHYSICS-II

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To study conducting and dielectric materials, conductivity mechanism in semiconductors, superconductors and their applications, to study different types of magnetic materials, the method of preparation and properties of nano-materials and the properties of new engineering materials.

CONDUCTING AND DIELECTRIC MATERIALS

Conductors - classical free electron theory of metals - Electrical and thermal conductivity- Wiedemann - Franz law - Lorentz number - Draw- backs of classical theory. Electrical susceptibility- dielectric constant-electronic, ionic, orientational and space charge polarization-frequency and temperature dependence of polarization- internal field-Claussius- Mosotti relation (derivation) **(10)**

SEMICONDUCTING MATERIALS

Intrinsic and extrinsic semiconductors - Direct band gap and indirect band gap semiconductors - Fermi level - Variation of Fermi level with temperature in intrinsic semiconductor and variation of Fermi level with temperature and impurity concentration in extrinsic semiconductors (qualitative only) - Expression for conductivity - Variation of electrical conductivity with temperature - Determination of band gap energy. **(9)**

SUPERCONDUCTORS AND ITS APPLICATIONS

Superconductors - Properties of superconductors, electrical resistance, and diamagnetic property - Effect of magnetic filed, heavy current and pressure - Josephson's effect - Isotope effect - BCS theory- Type I and type II superconductors - High temperature superconductors- Applications - SQUID, cryotron and magnetic levitation. **(8)**

MAGNETIC MATERIALS

Origin of magnetic moment - Bohr magneton - Dia and Para magnetism - Ferro magnetism - Domain theory -Hysteresis-Soft and hard magnetic materials - Anti ferromagnetic materials - Ferrites - applications- Magnetic recording and readout-Storage of magnetic data- tapes, and magnetic disc drives. **(8)**

NANO TECHNOLOGY AND NEW ENGINEERING MATERIALS

Introduction - Preparation of nano materials - Physical vapour deposition - Sol gel method - Properties of nano particles - Applications - Shape memory alloys - Principle and working of shape memory alloy material - Applications - Liquid crystal display - Twisted pneumatic and dynamic scattering crystal displays - Metallic glasses- Preparation, properties and applications. **(10)**

Total : 45

TEXT BOOKS

1. Rajendran. V,"Engineering Physics" Tata McGraw Hill publishing Company, New Delhi, 2009.
2. Avadhanulu. M.N."Engineering Physics" Vol II, S. Chand & Company Ltd. 2009.

REFERENCE BOOKS

1. Jayakumar, S. "Materials Science", RK Publishers, Coimbatore, 2004.
2. Ganesan, S. Iyandurai, N. "Materials Science", KKS Publishers, Chennai, 2008.

09FY27 - ENGINEERING GRAPHICS

L	T	P	C
1	0	3	4

ASSESSMENT : PRACTICAL

OBJECTIVE

To give hands-on training to the students on drafting and to develop graphic skills for the expression of graphics concepts, ideas and design of engineering products to give exposure to national standards in connection with technical drawings.

CONCEPTS AND CONVENTIONS

Steps involved in the Conventional and Computer Aided Design (CAD) process - Product conception, visualization, communication and documentation - BIS conventions - tools used for drafting - Lettering Practice, Lines and Dimensioning. Construction of curves like ellipse, parabola, hyperbola, spirals, cycloids and involutes. Free hand sketching. Introduction to Computer Aided 2-D Drafting. **(25)**

PROJECTION OF POINTS, LINES, PLANES AND SOLIDS

Concept of orthographic projection, projection of points, straight lines, plane figures, polyhedra and solids of revolution - Auxiliary projection **(35)**

SECTION OF SOLIDS, DEVELOPMENT OF SURFACES AND INTERPENETRATION OF SOLIDS

Sectioning of solids of revolution and polyhedra and obtaining the true shapes and section, Development of these solids - Interpenetration of solids (cylinder and cylinder, cone and cylinder only)- drawing intersection curves. **(35)**

PICTORIAL PROJECTIONS

Isometric projection of solids, oblique and perspective projection - Free hand sketches of orthographic projections from pictorial views for simple machine components - Missing lines and missing views. **(25)**

Total : 120

TEXT BOOKS

1. Gopalakrishnan K R, "Engineering Drawing Vol I & II", Subhas Publications, Bangalore, 2008
2. Venugopal K, and Prabhu Raja V, "Engineering Graphics", New Age International (P) Limited Publishers, New Delhi, 2009

REFERENCE BOOKS

1. Bertoline & Wiebe, "Fundamentals of Graphics Communications", 3rd Edition, McGraw Hill, 2002
2. Narayana K L and Kannaiah P, "Text Book on Engineering Drawing-First Angle Projection", SCITECH Publications (India) Private Limited, Chennai - 17, 2004
3. Jeyapoovan T, "Engineering Graphics using AUTOCAD", Vikas Publishing House Private Limited, New Delhi-14, 2004
4. www.finctionwise.com
5. www.amazon.com/exec/obidos/tg/detail
6. CDs on Engineering Drawing can be had from Sona College of Engineering, Salem.

ASSESSMENT : PRACTICAL

L	T	P	C
0	0	3	4

PHYSICS LABORATORY

List of Experiments

1. Torsional pendulum - Rigidity modulus
2. Air wedge -Thickness of thin wire
3. Spectrometer - Dispersive power
4. Potentiometer - Ammeter and Voltmeter calibration
5. Figure of merit of galvanometer
6. Post office box - Temperature coefficient of resistance
7. Magnetic field along the axis of a current carrying coil
8. Implementation of basic logic gates using universal gates
9. Determination of band gap of a semiconductor
10. Determination of particle size using laser
11. Numerical aperture of optical fiber - Fiber optics kit (Demonstration)
12. Characteristics of LED - Fiber optics kit (Demonstration)
13. Solar cell characteristics

CHEMISTRY LABORATORY

List of Experiments

1. Conductometric titration of a strong acid with a strong base
2. Estimation of ferrous ion by potentiometric titration
3. Determination of molecular weight of a polymer by viscosity average method
4. Determination of strength of a given HCl using NaOH by pH measurement
5. Determination of sodium in water sample by flame photometer
6. Determination of equivalent conductance of a strong electrolyte
7. Estimation of iron in water by spectrophotometry
8. Determination of corrosion rate of steel in acid medium by weight loss method
9. Determination of inhibitor efficiency on the corrosion rate of steel in acid medium by weight loss method
10. Estimation of acid in a mixture by conductometry
11. Estimation of dissolved oxygen in water sample
12. Determination of total, permanent and temporary hardness of water sample by EDTA method

09FY29 – WORKSHOP

L	T	P	C
0	0	3	4

ASSESSMENT : PRACTICAL

OBJECTIVE

This laboratory course helps the students acquire practical skills on the basics of general workshops. Students are exposed to fundamental working skills on carpentry, fitting, sheet metal; plumbing and electrical wiring, essential for day to day life.

CARPENTRY

Study of Carpentry tools, Exercise on Planing, Marking, Chiseling, Half Lap Joint, Lap Dovetail Joint, Square Tongue Joint, Bridle Joint, Halving Dovetail Joint. Demonstration on usage of precompressed wood - awareness to plywood, chip board, laminated boards and sheets.

FITTING

Study of fitting tools, Exercise on Marking, Punching and Filing, Square Joint, Dovetail Joint, V-Joint, One Side Dovetail Joint, Diagonal Square Joint and Diagonal Dovetail Joint.

SHEET METAL

Study of sheet metal tools, Exercise on development of surfaces - tray, dust pan, cylinder, rectangular box.

PLUMBING

Study of plumbing tools, study of valves and taps, cutting and threading of GI pipes, preparation of saddle connection, T, elbow and union joint. Pumps and foot valve connections.

ELECTRICAL WIRING AND HOME APPLIANCES

Study of single and three phase connections - Ammeter, Voltmeter, Frequency Meter, Energy Meter. Single phase and three phase lighting and power connection, domestic wiring - soldering - selection of fuse wire- MCB and earthing as per ISS/IE rules, UPS connections. Installation and maintenance of home appliances - fan and regulator, iron box, mixie, refrigerator, water heater, single phase and three phase motors - Safety measures.

REFERENCE BOOKS

1. Fitter first trade theory - Central Instructional Media Institute, Chennai. Directorate General of Employment and Training, Ministry of Lobour, Govt. of India, University Press (India) Ltd., Hyderabad, 2005.
2. Santhakumar.S.R.J., "Workshop Practice Manual", Anuradha Agencies Publishers, Kumbakonam 2004.
3. Swaran Singh.S.K., "Workshop Practice", Kataria & Sons, New Delhi 2004.
4. Basic Machine Shop -Vol. 1 by TESWANI, Tata McGraw Hill, 2005.

(S-1) BASIC CIVIL ENGINEERING

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To impart the knowledge about the fundamentals of Engineering Mechanics and also Basics of Building Components

BASICS

Introduction - Units and Dimensions - Laws of Mechanics - Vectors- Vectorial representation of forces and moments - Vector operations. **(4)**

STATICS OF PARTICLES

Coplanar forces - Resolution and composition of forces - Equilibrium of a particle - Equivalent system of forces - Principle of transmissibility - Single equivalent force. **(6)**

EQUILIBRIUM OF RIGID BODIES

Free body diagram - Types of supports and their reactions - Equilibrium of rigid bodies in two dimensions. **(4)**

PROPERTIES OF GEOMETRICAL SECTIONS

Determination of areas - First moment of area and the centroid - Second and product moments of plane area - Parallel axis theorem and perpendicular axis theorem - Polar moment of inertia - Principal moment of inertia of plane areas. **(8)**

BUILDING CONSTRUCTION

Building components - Their functions - Requirements - Orientation of Buildings - Principles of planning **(6)**

FOUNDATION

Types of footings - Importance - Settlement - Bearing capacity - Shallow footings - pile foundations. **(5)**

Concrete - Plain and Reinforced - Materials - Mixing, Placing **(2)**

MASONRY CONSTRUCTION

Brick Masonry - Stone Masonry - Load bearing walls - Partition walls - Different types of Flooring - Different types of Roofing. **(10)**

Total : 45

TEXT BOOKS

1. Rajasekaran, S and Sankara Subramanian.G. "Engineering Mechanics" Vikas Publishing House (p) Limited, New Delhi, 2005.
2. Punmia, B.C, "Building Construction", Laxmi Publications, New Delhi - 1997.

REFERENCE BOOKS

1. Beer and Johnson, "Vector Mechanics for Engineers" Vol.1, Statics, Mc-Graw Hill International Edition, 1995.
2. Irving Shames, "Engineering Mechanics", Prentice Hall of India, 1993
3. Arora, S.P. and Bindra S.P, "Building Construction", Dhanpat Rai & Sons, New Delhi - 1997.
4. National Building Code of India Parts III, IV, VIII & IX, 1983.

S-2 BASIC MECHANICAL ENGINEERING

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To impart knowledge on fundamentals of Manufacturing Sciences, Thermal Engineering and Power Transmission Systems.

INTRODUCTION (Not included for examination)

Engineering and Technology - History of Mechanical Engineering- Mechanics - Statics and dynamics - Broad areas in Mechanical Engineering. **(1)**

MANUFACTURING PROCESSES

FOUNDRY - Principles - Patterns - Types, Molding Processes, Cupola and Induction Furnaces. METAL FORMING - Principles - Hot and cold working of metals - Forging, rolling, extrusion and wire drawing, sheet metal operations. WELDING - Principles - Oxy-Acetylene Welding and Manual Metal Arc Welding, Brazing and soldering. **(9)**

MACHINE TOOLS

Machining principles - Construction and working principles of basic machine tools - Lathe, Drilling, Shaper, Planer and Milling machine. Introduction to CAD/CAM, CNC and CIM. **(9)**

AUTOMOBILE ENGINEERING

Working principle of petrol and diesel engines - Four stroke and two stroke cycles - comparison between four stroke and two stroke engines. Working principle of simple carburetor, Multi Point Fuel Injection (MPFI) - CRDI, Lubrication system and cooling system. **(9)**

HYDRAULIC MACHINES

Turbines - Impulse turbine - Pelton wheel, Reaction turbines - Kaplan and Francis turbines. Pumps - Working principle of Reciprocating pumps and Centrifugal pumps. **(4)**

POWER TRANSMISSION SYSTEMS

Belt drives - Flat, V-belts - Rope, Chain drive. Gears - Spur, Helical, Bevel, Worm and worm wheel and Rack and pinion - simple problems in power transmission. **(4)**

ENERGY ENGINEERING

Introduction to Boilers -Working principle of Thermal, Hydro-Electric and Nuclear Power Plants- Merits and demerits. Solar - Wind power plants. **(5)**

REFRIGERATION AND AIR- CONDITIONING

Terminology of Refrigeration and Air Conditioning. Basic principles of Vapour Compression and Absorption Refrigeration System. - Window and Split Room Air Conditioners. **(4)**

Total : 45

TEXT BOOKS

1. Shanmugam G., Basic Mechanical Engineering, Tata McGraw Hill Publishing company Limited, New Delhi,2008
2. Rajput R.K., Basic Mechanical Engineering, Laxmi Publications (P) Ltd, New Delhi,2008

REFERENCE BOOKS

1. Venugopal K. and Prabhu Raja V., Basic Mechanical Engineering, Anuradha Agencies, Kumbakonam, 2009
2. Bansal R.K., A Text Book of Fluid Mechanics and Hydraulic Machines, Laxmi Publications, 2009
3. www.sharewareconection.com/titles/mechanical-engineering.htm
4. www.drifile.com/freeware/mechanical-engineering.htm

S-3 BASIC ELECTRICAL ENGINEERING

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

1. *To acquaint the students pursuing engineering disciplines other than electrical engineering, the fundamental concepts of electrical engineering.*
2. *To study the basics of AC and DC circuits.*
3. *To study the basic laws of electromagnetism.*
4. *To study the basic principle of operation of various types of measuring instruments used in AC and DC circuits.*
5. *To acquaint the students the techniques of wiring and various wiring materials.*

CIRCUIT ELEMENTS, LAWS AND ANALYSIS

Circuit elements and definitions - active and passive elements - voltage-current relationships - Ohm's law - Kirchhoff's laws - series and parallel circuits - star-delta transformation - mesh and nodal analysis for dc circuits. **(9)**

ELECTROMAGNETICS

Magnetic field - Biot savart's law - force on current carrying conductor in magnetic field - hysteresis - magneto motive force - magnetic field strength - reluctance - laws of magnetic circuits - Faraday's laws of electromagnetic induction - Lenz's law - Fleming's rules - statically and dynamically induced emf - energy stored in magnetic field. **(9)**

AC CIRCUITS UNDER STEADY STATE

Sinusoidal inputs and their representations - production of alternating voltage - phase and phase difference - instantaneous, average and rms values - steady state responses of R, L and C to sinusoidal input- impedance and series RLC circuits - admittance and parallel RLC circuits-three phase circuits - power in AC circuits - two wattmeter method of power measurements. **(9)**

MEASURING INSTRUMENTS

Classification of measuring Instruments - essential features of indicating instruments - deflecting torque, controlling torque and damping torque in indicating instruments - construction and operating principles of moving coil and moving iron instruments - voltmeters and ammeters-dynamometer type wattmeter -induction type energy meter-megger. **(9)**

ELECTRICAL INSTALLATION

Types of wiring systems - wiring accessories - earthing - fluorescent tubes - CFL - sodium vapour lamp- - simple domestic wiring layouts - staircase wiring - IE rules - testing of electrical installation. **(9)**

Total : 45

TEXT BOOKS

1. Mittle V.M., "Basic Electrical Engineering", Tata McGraw Hill, New Delhi, 2004.
2. Mehta V.K., "Principles of Electrical Engineering", S.Chand & Company Ltd, New Delhi, 2003

REFERENCE BOOKS

1. Soni M.L. Gupta J.C. and Gupta P.V., A Course in Electrical Circuits and Fields", Dhanpat Rai and Sons, New Delhi, 1998.
2. Raiput, R.K. "Basic Electrical Engineering", Dhanpat Rai and Sons, New Delhi, 2007.

S-4 BASIC COMMUNICATION ENGINEERING

(QUALITATIVE TREATMENT ONLY)

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To have a qualitative study about the analog and pulse modulation systems, transmission systems and communication networks.

AMPLITUDE MODULATION AND DEMODULATION

Introduction - The Importance of Communications - The Elements of a Communication System - Types of Electronic Communications - A Survey of Communications Applications - The Electromagnetic Spectrum- Bandwidth - Need for Modulation - FDM - AM Transmitter, Super heterodyne receiver - Amplitude Modulation Principles - Modulation Index - Sidebands - Power Distribution - High level collector modulator- Square law modulator - DSB SC Modulation - SSB SC modulation - VSB modulation - Linear Diode detector - Synchronous demodulator. **(10)**

ANGLE MODULATION AND DEMODULATION

Angle Modulation - Phase Modulation - Frequency Modulation - Sidebands and the Modulation Index - FM generation using Reactance Modulator - Armstrong method of FM generation - Foster Seeley Discriminator - Ratio detector - Differential peak detector - FM demodulation using PLL - Block Diagram of FM Transmitter - Block Diagram of FM Receiver - Comparison of AM and FM. **(9)**

PULSE AND DIGITAL MODULATION

Sampling theorem for low pass signals (statement & explanation)- Pulse Modulation Techniques - PAM, PWM, PPM, PCM and DM - Line codes - Time Division Multiplexing - Digital modulation Techniques - ASK, FSK and PSK. **(8)**

TRANSMISSION SYSTEMS

Antenna Fundamentals - Typical Antennas - Radio-Frequency Wave Propagation - Block diagram of Satellite Communication System- Block Diagram of Optic Fiber Communication System - Fixed Microwave links - Block Diagram of Microwave Transmitter and Receiver - Block Diagram of Color Television Transmitter and Receiver - RADAR systems. **(9)**

COMMUNICATION NETWORKS

Introduction to Networks - WAN - MAN - LAN - Network Topologies- Multiple Access Techniques, Principles of FDMA, TDMA, CDMA - Switching Concepts - Circuit, Message and Packet Switching - Basic Concepts of PSTN, ISDN - Basic Cellular Concepts, Block Diagram of Cellular Transmitter and Receiver. **(9)**

Total : 45

TEXT BOOKS

1. Louis Frenzel, "Communication Electronics Principles and Applications", Third Edition, Special Indian Edition, Tata McGraw Hill, 2008.
2. Roy Blake, "Electronic Communication Systems", 2nd Edition, Thomson Delmar, 2005

REFERENCE BOOKS

1. Kennedy Davis, "Electronic Communication Systems", 4th edition, Tata McGraw Hill, Publication 2008
2. Wayne Tomasi, "Electronic Communication Systems - Fundamental Through Advanced", Fifth Edition, Pearson Education, 2004.

S-5 BASIC COMPUTER ENGINEERING

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To introduce the technological aspects of computers - hardware, software, networks, software development and database management system.

HARDWARE AND I/O

Basic structure of a digital computer: functions of ALU, CU and MU. Memory: basic structure of a memory cell - memory organization - Types of RAM and ROM - cache memory. Input devices: keyboard, mouse, trackball, joystick, light pen, touch screen, scanner, OMR, MICR, OCR, bar coding and speech input devices. Output devices: different types of monitors, printers and plotters. Secondary storage devices: layout of magnetic tapes, floppy disks and hard disks - read/write operations. Optical storage devices: CDROM, WORM, CD-R, CD-RW, DVD-ROM. Magneto optical disk - Mass storage devices. **(12)**

DATA REPRESENTATION

Binary, octal and hexadecimal number system- base conversions- representation of integers, fractions and characters - signed and unsigned number representations - fixed and floating point number representation - complements - BCD, Excess-3, Gray, and ASCII codes- error detecting codes. Binary arithmetic: addition, subtraction, multiplication and division **(11)**

OS AND NETWORK

Basics of Operating systems: objectives and functions - evolution of operating systems - serial processing - batch processing - multiprogramming - timesharing systems - online and real time systems- Overview of UNIX, LINUX, WINDOWS. Networking concepts: LAN, MAN, WAN, PAN - Topologies - Transmission media: coaxial, twisted pair, optical fibre, wireless media - TCP/IP model - Introduction to Internet and www: web page, URL, web browser, ISP,Internet applications, VPN. **(11)**

IT AND SOFTWARE

Software Development Life cycle - software Testing. Structure of a database - Database Management system architecture - Database models. Electronic commerce, Multimedia and virtual reality - Security threats and protection. **(11)**

Total : 45

TEXT BOOKS

1. ITL Education Solutions Ltd, "Introduction to Information Technology", Pearson Education, 2006 (Chapters: 3, 4, 5, 8, 14, 15, 17, 18, 21)
2. Rajaraman . V, "Fundamentals of Computers", IV Edition, Prentice Hall, New Delhi, 2006. (Chapters: 1, 2, 4, 6, 10, 14)

S-6 BASIC C PROGRAMMING

L	T	P	C
2	0	3	4

ASSESSMENT : THEORY & PRACTICAL

OBJECTIVE

To develop the ability to draw flowcharts and write simple C programs

FUNDAMENTALS OF PROGRAMMING

Flowcharts. Introduction to C: C character set - constants, variables and keywords - data types - C compilation and execution. Operators: hierarchy of operators - associativity of operators - usage. Single dimensional arrays - Console I/O functions: Formatted I/O: scanf, printf - getchar, putchar **(6)**

CONTROL STATEMENTS

If statement, if - else statement, nested if statements - ternary operator - while loop, do - while loop, for loop - break statement - continue statement - switch case statement - goto statement and statement labels **(6)**

POINTERS AND ARRAYS

Array of pointers - multi-dimensional arrays- pointers and strings- standard string library functions: strlen( ), strcpy( ), strcat( ), strstr( ) and strcmp( ) - dynamic memory allocation and deallocation. **(6)**

FUNCTION

Function declaration and prototypes - parameter passing - recursion - storage classes. **(6)**

STRUCTURES AND FILES

Definition of structure - array of structures - pointer to structures- union -Bit fields - typedef - enum data type - high level file I/O - text and binary file processing. **(6)**

Theory : 30

Practicals : 45

Total : 75

TEXT BOOK

1. Byron S.Gottfried, "Programming with C", II Edn, Schaum's outline Series, Tata McGraw Hill, New Delhi, Reprint 2008.

REFERENCE BOOK

1. Brian.W.Kernigham and Dennis M.Ritchie, "The C Programming Language", II Edn, Prentice Hall of India, New Delhi, 2008.

ASSESSMENT PROCEDURE

THEORY :

Final Examination	=	25%
Internal Assessment	=	25%

PRACTICAL :

Continuous Assessment	=	50%

S-7 BUILDING MATERIALS

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

At the end of this course the student should be able to understand the properties of stones, bricks, building blocks, Timber, Steel, Paint, Bitumen and other special materials. Further he should be able to understand the importance of cement, mortar and concrete. He also should be able to understand the used of all the materials at various stages of construction activities. All these should be achieved by demonstrating the materials visually as well as explaining them in the class room lectures.

STONESClassification Selection - Application of stone in buildings - Requirement and testing of stones - Deterioration and preservation of stone work - Artificial stones. **(9)**

BRICKS AND BUILDINGS BLOCKS

Manufacture of bricks - Classification - Qualities - Test on Bricks- Fire Bricks -Tiles - Manufacture - Tests - Building blocks - Types and uses - Joists and filler blocks - Curved shell units - Light weight concrete blocks. **(9)**

MORTAR - CEMENT - CONCRETE

Classification of mortar - Preparation - Selection for mortar - Tests for mortars - Manufacture of cement - Types of cement - Characteristics - Aggregates - Basic Characteristics - Types of aggregates - Admixtures - properties of fresh concrete - Properties of hardened concrete - Types of Concrete. **(9)**

TIMBER, STEEL ETC. Timber - Market forms - Industrial timber - Plywood - Veneer - Thermocole - Panels of laminates.

Steel-Composition - Uses - Market forms - Mechanical treatment.

Paints - vanishes - Distempers.

Asphalt, Bitumen and Tar - Terminology, Specifications and Uses. **(9)**

SPECIAL MATERIALS

Glass - Ceramics - Sheets for pitched roof coverings - Fibre glass reinforced plastics - Refractories - Types - Fibre textiles - Mats and pads for earth reinforcement - Aluminum - Wall panels - Mountings - Polymers in Civil Engineering. **(9)**

Total : 45

TEXT BOOKS

1. Varghese PC, "Building Materials ", Prentice Hall India Pvt. Ltd, New Delhi, 2008.
2. Surendra Singh, "Building Materials", Vikas Publishing Company, New Delhi, 1996

REFERENCE BOOKS

1. Neil Jackson and Dhir,R.K., "Civil Engineering Materials", McMillan Publishers Ltd, New Delhi, 1996
2. Duggal SK., "Building Materials", New Age International (P) Ltd., New Delhi, 2008
3 Rangwala, SC., "Engineering Materials", Charotar Publishing House, Anand, 1997.

(S-8) ENGINEERING MECHANICS

L	T	P	C
3	1	0	4

ASSESSMENT : THEORY

OBJECTIVE

At the end of this course the student should be able to understand the vectorial and scalar representation of forces and moments, static equilibrium of particles and rigid bodies and the concept of friction. Further he should be able to understand centre of gravity, moment of inertia, kinematics and kinetics of particles, impulse and basics of vibration. All these should be achieved conceptually with worked out examples

STATICS OF PARTICLES

Forces in plane and space - Vector addition of concurrent forces in plane and space-Problems involving the equilibrium of a particle - Free body diagram - Equilibrium of particle in space. **(6)**

STATICS OF RIGID BODIES IN TWO DIMENSIONS

Rigid bodies - Two dimensional structure - Moment of force about a point and about an axis - Moment of a couple - Equivalent systems of coplanar forces - Rigid body in equilibrium - Problems involving equilibrium of rigid body **(6)**

FRICTION

Laws of friction - Coefficient of friction - Problems involving dry friction - Wedge & ladder friction. **(4)**

APPLICATION OF STATICS

Types of supports - Reactions of beams and rigid frames - Plane roof trusses - Method of joints and sections **(6)**

CENTROID, CENTRE OF GRAVITY AND MOMENT OF INERTIA

Centroids of areas, composite areas - Determination of moment of inertia of plane figures, polar moment of inertia - Radius of gyration. **(5)**

KINEMATICS OF PARTICLES

Introduction - Plane, Rectilinear motion - Time dependent motion- Rectangular coordinates - Projectile motion. **(5)**

KINETICS OF PARTICLES

Equation of motion - Rectilinear motion - Work energy method - Potential energy - Kinetic energy - Conservation of energy. **(5)**

IMPULSE & MOMENTUM

Impulse - momentum principle - Concept of conservation of momentum - Impact -Direct central impact - Oblique central impact **(4)**

INTRODUCTION TO VIBRATION

Simple Harmonic Motion - Mass spring system-Free vibration (elementary treatment only) **(4)**

Theory : 45 Tutorials : 15 Total : 60

TEXT BOOKS

1. Rajasekaran S and Sankarasubramanian G, "Engineering Mechanics- Statics and Dynamics", Vikas Publishing House Pvt. Ltd., New Delhi, 2005
2. Natesa S.C.,"Engineering Mechanics-Statics andDynamics",UmeshPublications,NewDelhi,2002.

REFERENCE BOOKS

1.Beer F P and Johnston E R, "Vector Mechanics for Engineers, Statics & Dynamics", Tata Mc-Graw Hill Publishing Co., Ltd., New Delhi, 2007

2.Irving H Shames,"Engineering Mechanics-Statics and Dynamics",IV Edition,Pearson Education Asia Pvt Ltd, 2003

3.Hibbeller R C,"Engineering Mechanics,Vol I,Statics and Vol II Dynamics",Pearson Education Asia Pvt Ltd, 2001

4.Bhavikatti S S & Rajasekarappa KG, "Engineering Mechanics", New Age International (P) Ltd., NewDelhi, 2008

5.Bansal R K, "Engineering Mechanics", Laxmi Publications (P)., New Delhi, 2007

S-9 ELECTRIC CIRCUITS

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To introduce to the students the fundamental concepts of analysis of AC and DC circuits that involves the application of different laws and network theorems.

Learning Objectives include the following:

1. Application of Ohm's law and Kirchhoff's laws in the analysis of electric circuits.
2. Analysis of single-phase RLC circuits.
3. Analysis of magnetically coupled circuits.
4. Fundamental concepts of three-phase circuits.

BASIC CIRCUIT CONCEPTS AND DC CIRCUITS

Concept of linearity and bilateral property-passive and active elements-independent and dependent sources-Ohm's law-Kirchhoff's laws-analysis of DC series and parallel circuits-network reduction-source transformation-star/delta transformation-mesh current and node voltage method of analysis of simple DC circuits. **(9)**

SINUSOIDAL STEADY STATE ANALYSIS

Sinusoidal voltage and current-peak, average and rms values-peak (crest) and form factors for sinusoidal and nonsinusoidal periodic waveforms-R, L, and C elements and their voltage-current relationships- phasor diagrams-concept of phasor and complex impedance and admittance-analysis of simple, single phase ac series and parallel circuits-apparent power, active power, reactive power and power factor-concept of complex power-impedance and power triangle.

Resonance in series and parallel circuits-Q factor-half power frequencies and bandwidth of resonant circuits. **(10)**

NETWORK THEOREMS

Superposition theorem-Thevenin's theorem-Norton's theorem-Maximum power transfer theorem-Reciprocity theorem-application to AC and DC circuits. **(9)**

COUPLED CIRCUITS

Self and mutual inductance-coefficient of coupling-dot convention-analysis of simple coupled circuits-ideal transformer-conductively coupled circuits-analysis of single tuned circuits involving mutual inductance. **(9)**

THREE PHASE CIRCUITS

Three phase star and delta connections-phase sequence-line and phase quantities-analysis of three phase circuits with star and delta connected balanced loads-phasor diagram representation-two wattmeter method of power measurement-reactive power measurement. **(8)**

Total : 45

TEXT BOOKS

1. Joseph A. Edminister and Mahmood Nahvi, "Electric Circuits", Schaum's Series, Tata McGraw-Hill, Edition 2004, New Delhi.
2. Sudhakar A. and Shyammohan S.P., "Circuits and Networks: Analysis and Synthesis", Tata McGraw-Hill, Edition 2004, New Delhi.

REFERENCE BOOKS

1. Paranjothi S.R., "Electric Circuit Analysis", New Age International (P) Ltd, Edition 2000, New Delhi.
2. William H.Hayt Jr, Jack E. Kemmerly, and Steven M.Durbin, "Engineering Circuit Analysis", Tata McGraw-Hill, Edition 2002, New Delhi.
3. Gupta B.R, "Fundamentals of Electric Circuits", S.Chand & Company (Pvt) Ltd, New Delhi, 2002.

S-10 NETWORK THEORY

L	T	P	C
3	0	1	4

ASSESSMENT : THEORY

OBJECTIVE

To have a detailed study of electric networks, theorems, its behaviour and response with excitation.

KIRCHOFF'S LAWS AND METHODS OF ANALYSING CIRCUITS

Kirchoff's voltage law - voltage division - power in a series circuit- Kirchoff's current law - parallel resistance - current division - power in a parallel circuit.

Concept of tree and co-tree - twigs and incidence matrix properties- incidence matrix and KCL - link currents - tie-set matrix - cut-set tree and branch voltages - Mesh analysis - mesh equations by inspection method - super mesh analysis - Nodal analysis: nodal equations by inspection method - supernode analysis. **(9)**

THEOREMS IN CIRCUIT ANALYSIS

Star-delta transformation - Superposition theorem - Thevenin's theorem - Norton's theorem - Reciprocity theorem - Compensation (Substitution) theorem - maximum power transfer theorem - duals and duality - Tellegen's theorem - Millman's theorem. **(9)**

RESONANCE AND COUPLED CIRCUITS

Series resonance - impedance and phase angle in of a series resonant circuit - Voltages and currents in a series resonant circuit - Bandwidth of an RLC circuit - Quality factor and its effect on bandwidth - magnification in resonance - Parallel resonance - Resonant frequency for a tank circuit - Variation of impedance with frequency - Q-factor of parallel resonance magnification - Reactance curves in Parallel resonance.

Conductively coupled circuit and mutual inductance - Mutual inductance Dot convention - Coefficient of coupling - Analysis of multi-winding coupled circuit - Tuned circuits. **(9)**

TRANSIENTS

DC response of RL, RC and RLC circuits -Classical and Lapalace Transform methods of analysis - Sinusoidal response of RL, RC and RLC circuits. **(9)**

ELEMENTS OF REALIZABILITY AND SYNTHESIS OF ONE-PORT NETWORKS

Hurwitz polynomials - positive real functions - frequency response of reactive one port - Synthesis of reactive one port - R-L network and R-C network by Foster and Cauer method. **(9)**

Theory : 45

Practical : 15

Total : 60

TEXT BOOKS

1. Sudhakar A. and Shyam Mohan S.P.,“Circuits and Networks-Analysis and Synthesis”, 3rd Edition, Tata McGraw Hill, New Delhi, 2007.
2. Joseph A.Edminister, “Electric Circuits”, 4th Edition, Schaum's outline series, Tata McGraw Hill, New Delhi, 2004

REFERENCE BOOKS

1. Van Valkenberg, "Networks Analysis", 3rd Edition, Prentice Hall, 2006
2. Stanley, "Networks Analysis with applications", 4th Edition, Pearson Education, 2006
3. Chakrabarti A., "Circuit theory", 4th Edition, Dhanpat Rai & Co., New Delhi, 2005.
4. Suresh Kumar K.S., “Electric circuits and networks”, 1st edition, Pearson Education, Delhi, 2009.

S-11 C PROGRAMMING - THEORY & PRACTICE

L	T	P	C
2	0	3	4

ASSESSMENT : THEORY & PRACTICAL

OBJECTIVE

To develop the ability to draw flowcharts and write C programs for the following concepts.

Basic structure of a digital computer - Fundamentals of programming -Flowcharts. Programming strategies (Introduction): top-down, structured programming, object oriented. **(3)**

INTRODUCTION TO C

C character set - constants, variables and keywords - Data types- C compilation and execution. Operators: hierarchy of operators - associativity of operators - usage. Single dimensional array - console I/O functions: formatted I/O: scanf, printf - getchar, putchar. **(3)**

CONTROL STATEMENTS

If statement, if -else statement, nested if statements - ternary operator - while loop, do-while loop, for loop- break statement - continue statement - switch case statement - goto statement and statement labels. **(6)**

POINTERS AND ARRAYS

Array of pointers - multi-dimensional arrays - pointers and strings- standard string library functions: strlen( ), strcpy( ), strcat( ), strstr( ) and strcmp( ) - dynamic memory allocation and deallocation. **(6)**

FUNCTION

Function declaration and prototypes -Parameter passing - recursion- command line arguments - function pointers - passing pointers to functions - passing arrays to functions - passing function to other functions. Storage classes - C preprocessor. **(6)**

STRUCTURES AND FILES

Definition of structure - array of structures - pointer to structures- self referential structures - union - bit fields - typedef - enum data type- High level file I/O - text and binary file processing - low level file I/O & processing. **(6)**

Theory : 30

Practical : 45

Total : 75

TEXT BOOK

1. Byron S.Gottried, "Programming with C", II Edn, Schaum's outline series, Tata McGraw Hill, New Delhi, Reprint 2008.

REFERENCE BOOK

1. Brian.W.Kernigham and Dennis M.Ritchie, "The C Programming Language", II Edn, Prentice Hall of India, New Delhi, 2008.

ASSESSMENT PROCEDURE

THEORY :

Final Examination	=	25%
Internal Assessment	=	25%

PRACTICAL :

Continuous Assessment	=	50%

(S-12) FUNDAMENTALS OF DIGITAL COMPUTERS

L	T	P	C
3	1	0	4

ASSESSMENT : THEORY

OBJECTIVE

To learn the basics of data representation, arithmetic algorithms, Boolean algebra, digital circuit design and different types of memory.

DATA REPRESENTATION

Binary , Octal, Hexadecimal Number System-Base Conversion- Binary Representation Integers, Fractions Characters- Signed Unsigned Number Representation -Fixed Floating point Number Representation - Complements - Binary Codes : BCD, Excess-3, Gray, ASCII, Error Detecting Code -Binary Arithmetic : Algorithms for Addition, Subtraction, Multiplication , Division on Signed Magnitude , 2's Complement Numbers and Floating point Numbers. **(12)**

BOOLEAN ALGEBRA LOGIC GATES

Boolean Algebra - Basic Definitions, Theorem Properties -Canonical Standard Forms - Min term, Max term, SOP, POS - Digital Logic gates - NAND NOR Implementations- Simplification Boolean Functions - Karnaugh map- Don't Care Conditions- Quine-Mccluskey Method . **(9)**

COMBINATIONAL LOGIC

Adders - Half Adder, Full Adder, Binary Parallel Adder, BCD Adder- Subtractor - Half Subtractor , Full Subtractor - Code Converter - Multilevel NAND Circuit , Multilevel NOR Circuit- Magnitude Comparator- Decoders -Encoder - Multiplexer - Demultiplexer - Introduction to PLAS and PALS. **(8)**

SEQUENTIAL LOGIC

Synchronous Sequential Circuits : Flip Flops - Types - Analysis Clocked Sequential Circuits : State Table , State Diagram , State Equation, State Reduction Assignment - Flip Flop Excitation Table - Design Procedure - Registers - Shift Register - Counters- Binary BCD Counters- Design Counters. Asynchronous Sequential Circuits: Introduction. (**10)**

MEMORY

Structure of Memory Cell - Memory Organization - Dimensions- Memory Access - Random Access Memories - SRAM - DRAM -SDRAM- ROM- Types ROM - Flash Memory. **(6)**

Theory : 45

Tutorials : 15

Total : 60

TEXT BOOKS

1. Morris Mano M., "Digital Logic and Computer Design", Prentice Hall, 2007.
2. Morris Mano M., "Computer System Architecture", Prentice Hall India, 3rd Edition, 2006 (For Unit I - Algorithms)

REFERENCE BOOKS

1. Tocci R.J., Neal S. Widemer, Gregory L. Moss "Digital Systems: Principles and Applications", Prentice Hall of India (New Delhi), Ninth edition, 2007.
2. Floyd T.L., Charles E., "Digital Fundamentals", Pearson Education, Ninth edition, 2005.
3. Charles H. Roth Jr., "Fundamentals of Logic Design ", Brooks Cole; 5th Revised edition, 2003.
4. Thomas C. Bartee, "Digital Computer Fundamentals", McGraw Hill, New Delhi, 6th edition, 1997.

S-13 CHEMISTRY FOR CHEMICAL ENGINEERS

L	T	P	C
3	0	0	3

ASSESSMENT : THEORY

OBJECTIVE

To make the students knowledegeable in the fundamental and applied aspects of Inorganic chemistry, Analystical chemistry and Bio-technology.

CO-ORDINATION COMPOUNDS

Co-ordination compounds - Terminology - IUPAC Nomenclature- Werner's Theory - EAN concept - Factors affecting stability of a complex ion - Shortcomings of VB theory - Crystal Field Theory - CFSE- Crystal field splitting - Factors influencing crystal field splitting - Octahedral, tetrahedral and Square planar complexes. Magnetic properties - MOT (Basic concepts only). **(10)**

INORGANIC POLYMERS

Inorganic polymers - properties - Glass transition temperature - Important inorganic polymers - Structures, Properties and industrial applications of Phosphorus-based, Boron-based polymers, Sulphur-based polymers, silicon based and coordination polymers. **(7)**

LUBRICANTS

Functions - Mechanism of lubrication - Classification - properties of lubricating oils - Semi-solid lubricants - Solid lubricants - Synthetic lubricants. **(5)**

NANOCHEMISTRY

Carbon nanotubes - Structure and properties - Fabrication of carbon nanotubes - Applications of carbon nanotubes. **(3)**

POWDER METALLURGY

Principles of powder metallurgy - Characteristics of metal powders- Methods of producing metal powders - stages involved - Applications of powder metallurgy. **(3)**

THEORETICAL BASIS FOR ANALYSIS

Volumetric titrations - Terminology - Basic requirement for a titration reaction - Standard solutions - Primary standards - Expressing concentrations of standard solutions - Acid-base titrations - Mathematical treatment of acid-base titrations - redox titrations - Complexometric titrations - EDTA titrations - Masking agents - Indicators for EDTA titrations - Cautions in volumetric titrimetry - Correction for unavoidable errors - Analytical applications of DMA and oxine. **(9)**

BIOTECHNOLOGY

Introduction - Biotechnology processes - chemical synthesis through biotechnology - production of Ethanol from Molasses, production of acetic acid, production of lactic acid - Industrial Enzymes used in food and beverages.

Biofuels - Biofertilizers - Biosurfactants - Biomembranes - starch processing for textiles - Biochips(A brief account only) **(8)**

Total : 45

TEXT BOOKS

1. Jain P.C. and Monikka Jain, "Engineering Chemistry" - Dhanpat Rai and Co (2004).
2. Puri B.R. Sharma L.R "Principles of Inorganic Chemistry" S. Chand and Company Ltd (2002).
3. Manjula Devi M, Revathi P, and Jalaja D - "Engineering Chemistry Volume I" R.K Publishers (2008).

REFERENCE BOOKS

1. Chawla S. "A Text book of Engineering Chemistry" - Dhanpat Rai and Company (2005).
2. Dara, S.S. “A Text Book of Engineering Chemistry” S. Chand and Company Ltd (2006).