CURRICULUM FOR ALL B.TECH PROGRAMME

I YEAR – ANNUAL PATTERN

THEORY:

Subject Code	Course Title	L	T	P	C
GEA001	Communication in English	3	0	0	6
GEA002	Engineering Mathematics	3	1	0	8
GEA003	Engineering Physics	3	0	0	6
GEA004	Engineering Chemistry	3	0	0	6
GEA005	Basic Electrical & Electronics Engineering	3	0	0	6
GEA006	Basic Mechanical & Civil Engineering	3	0	0	6
GEA007	Engineering Graphics	3	1	0	8
GEA008	Introduction to Computing	3	0	0	6

PRACTICAL:

Subject Code	Course Title	L	T	P	C
GEA009	Physics & Chemistry Laboratory	0	0	3	4
GEA010	Basic Engineering Practices	0	0	3	4
GEA011	Computer Practice Laboratory	0	0	3	4

Total Credits : 64

Course Code: GEA001

Course Name: COMMUNICATIVE IN ENGLISH

Designed for: Year: I
Credits: 6

Course Objective

- To enable the students to become aware of their present communication skills and the skills they will need to function as successful professionals.
- To encourage them to acquire the necessary skills so that they can handle day to-day personal and professional responsibilities
- To build their confidence and to instill competitiveness by projecting a positive image of themselves and their future

Course Outcomes

After undergoing this course students will be able to:

- Communicate academic knowledge by using specific, technical vocabulary in various contexts
- Write well articles on various topics.
- Ready to speak in any situations.
- Prepare themselves to face the challenges in the interviews at global level.
- competent in any kind of literary activities boldly.

UNIT-I

GENERAL VOCABULARY

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

TECHNICAL VOCABULARY

- Definitions and extended definitions
- 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 50 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 Thorpe, Showick Thorpe, "Objective English", Second Edition, Pearson Education, 2007.

Course Code: GEA002

Course Name: - ENGINEERING MATHEMATICS

Designed for: Year: I Semester: I

Credits: 8

L	T	P	C
3	1	0	8

COURSE OBJECTIVES:

- To develop the basic mathematical knowledge and computational skills of the students in the areas of applied mathematics.
- To develop the skills of the students in the areas of several variable Calculus, Matrices, and sequences and series.
- To develop the skills of the students in the areas of Vector Calculus, Integral Calculus, Complex variables, Laplace Transform and ordinary differential equations.
- To serve as a pre-requisite mathematics course for post graduate courses, specialized studies and research.

COURSE OUTCOMES:

On successful completion of this course students will be able to:

- demonstrate understanding of the derivatives of functions of several variables, viz., partial and total differentiation, and differentiation of implicit functions and optimize the functions of several variables using Hessian method and Lagrangian method, and perform gradient, divergence and curl operations in vector and scalar fields

- apply Green's theorem, Gauss Theorem and Stokes theorem as the generalization of Fundamental theorem of Integral calculus and evaluate double integration and triple integration using Cartesian, polar co-ordinates and the concept of Jacobian of transformation from one coordinate system to another coordinate system.

- discuss the convergence and divergence of sequence and series of real numbers using various tests. Take Laplace transformation of different types of functions, derivatives and integrals, and how it converts complex systems into simple algebraic equations to find out solutions.
- distinguish between real function differentiation and complex function differentiation, applicability of analytic and harmonic nature of complex valued function in electrical engineering and study of fluids. Apply complex integration using Cauchy's integral theorem and Cauchy's residue theorem and their applications in evaluating integrals.

- demonstrate the understanding of solving ordinary differential equations using operator methods, method of undetermined coefficients, method of variation of parameters and Laplace transformation techniques, calculate eigenvalues and eigenvectors, apply Caley-Hamilton theorem, and diagonalize of symmetric matrices and demonstrate the nature of quadratic forms.

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

$\int_0^{\pi/2} \sin^m\theta \cos^n\theta d\theta$ 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^{nd} and 3^{rd} 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, 9th edition, Addison-Wesley Publishing House, 1995.

2.E. Kreyszig, Advanced Engineering Mathematics, 9th edition, Wiley, 2005.

3.R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, 3rd 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, 9th edition, Wiley, 2008.

3.J.W. Brown and R.V. Churchill, Complex Variables and Applications, 8th 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.

Course Code: GEA003

Course Name: ENGINEERING PHYSICS

Designed for: Year: I

Credits: 6

L	T	P	C
3	0	0	6

COURSE OBJECTIVE:

- To understand the basic laws of physics and their applications in engineering and technology.
- To develop scientific temper and analytical capability.
- To solve various engineering problems.
- Basically this is a basic course to understand properties of various materials.
- To develop basic understanding of the rapidly changing technological scenario.
- To impart the requisite understanding for the appropriate selection of materials for various engineering applications

COURSE OUTCOME:

Upon completing this course**,** students will be able to

- Provide accurate diagrams of oscillators and distinguish piezo electric and magentostriction generators, characterize different types of crystal system, demonstrate the understanding of the structure and dynamics of both atoms and molecules, and, basics of energy band structures of an insulator, semiconductor and conductors.

- Understand the difference between thermal and electrical conductivity; to distinguish the between classical and quantum theory of electrons.

- Explain the laser action, analyze different types of lasers and their applications, classify fibers as single-mode, multimode step index and multi-mode graded index, describe modes in multimode fibers and mode field parameter in single-mode fibers, classify fiber optic cables, connectors, sensors and explain the basis of signal degradation in optical fibers.

- Differentiate different types of semiconductors and apply the concepts to obtain its applications like semiconductor diodes, transistor; distinguish between perfect conduction and perfect diamagnetism, and give a qualitative description of the Meissner effect.

- Distinguish magnetic and non-magnetic materials and types of magnetic materials, understand the types of materials with respect to the presence of materials such as, insulators, dielectric, ferro and paraelectric materials; and to distinguish between the polar and nonpolar molecules and synthesize nano particles by different methods.Students will be able to describe some of the applications of nanoparticles.

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_2 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", 2nd 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 {5th Edition – 2002)
4.Murugeshan and Kiruthiga Sivaprakash, "Modern Physics", 13th Edition, S. Chand Publications (2007)
5.Ali Omer, "Elementary Solid State physics", Person Publications 5th Edition (2004)
6.A.S. Vasudeva, "Modern Engineering Physics", S. Chand and Company Ltd, 3rd Revised Edition.

Course Code: GEA004

Course Name: - ENGINEERING CHEMISTRY

Designed for: Year: I

Credits: 6

L	T	P	C
3	0	0	6

Course Objective:

- Impart a sound knowledge on the principles of chemistry involving the different application oriented topics required for all engineering branches
- Develop understanding of principles of water treatment, surface chemistry, thermodynamics, electrochemistry, corrosion, fuels and combustion along with preparation and application of important engineering materials and polymers
- Develop communication and interpersonal skills, scientific approach towards solving time bound theoretical and experimental problems and ability to work in a team both as members and leaders.

Course Outcome:

After completing first year, students from all branches of engineering will possess:

- Students will have knowledge about the design of boilers and its conditioning methods.
- Students will develop understanding of the concepts and importance of the domestic water treatment methodology which is useful for the industries.
- Students will have knowledge about the industrial applications of adsorption techniques.
- Students will have knowledge about the energy sources and batteries along with the need of new materials to improve energy storage capabilities.
- Students will develop understanding of thermodynamics and its applications
- Students will have understanding about spectroscopic instruments required for discovery and characterization methods of new materials.
- Students will have knowledge about fuels and importance of new compounds which can be used as fuels.
- Students will be acquainted with industrially important Engineering polymers; their nature, chemical compositions and mode of action.
- Students will have knowledge about the alloys which are useful to design the new materials for domestic and industrial purpose.
- Students will develop understanding of industrially important Engineering materials which will motivate students towards development of novel materials for the human community.

UNIT I

THERMODYNAMICS

Introduction – thermodynamic equilibrium-work and heat- heat capacity of a system- relation between Cp and Cv – 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 anaysis-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.

ENERGY SOURCES & STORAGE DEVICES

Renewable and non – renewable energy resources – nuclear fission – fusion – chain reaction – nuclear energy – nuclear reactor – light water nuclear power plant – breeder reactor – wind energy – solar energy – tidal energy – types of battery – alkaline battery – lead acid, NiCad & Li batteries – H_2 – O_2 fuel cell.

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- Buckminister 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 Engineeing 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

Course Code: GEA005

L	T	P	C
3	0	0	6

Course Name: - BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Designed for: Year: I

Credits: 6

Course Objective:

- To impart knowledge in various AC circuit parameters. To impart knowledge in various DC circuit parameters.
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Course Outcomes:

- Students are expected to learn the physical recognition of different electrical components like Resistances, Inductances, Capacitances and their ratings.
- Students are expected to have learnt the verifications of basic laws of electric circuits like Ohm's law and Kirchhoff's laws.

Students are expected to connect electric circuits, and able to use electric instruments to perform experiment

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 devices

(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.Thereja, - "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.

L	T	P	C
3	0	0	6

Course Code: GEA006

Course Name: BASIC MECHANICAL AND CIVIL ENGINEERING

Designed for: Year: I

Credits: 6

PART A – MECHANICAL ENGINEERING

Course Objectives:

- Understand the concept of manufacturing processes and basic mechanical principles
- To impart knowledge on fundamentals of civil engineering.

Course Outcomes:

- Knowledge on basic mechanical and civil engineering principles
- Apply engineering principles for the design of mechanical and civil structures

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 comparision - Two stroke and four stroke engines, working principle and comparision - 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.

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 Prahu 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.

Course Code:GEA007

L	T	P	C
3	1	0	8

Course Name: ENGINEERING GRAPHICS

Credits: 8

Designed for: Year: I

First angle projection method is to be followed.

(4 Hours/Week)

Course Objectives:

- To familiarize the students in basic concept of conic sections, projections and developments of objects.
- To develop the imagination and drafting skills of students.

Course Outcomes:

- Frame ideas based on the conceptual modeling and design
- Provide good understanding of the methods involved in preparing various views in engineering drawings

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

Course Code: GEA008

L	T	P	C
3	0	0	6

Course Name: INTRODUCTION TO COMPUTING
Designed for : I year
Credit: 6

Course Objective:

The objective is to know

- Understand to express solution of a problem using an algorithm,
- Understand to argue that the solution (algorithm) is correct and efficient
- . Learn basics of C and C++ programming

Course Outcome:

The student are expected to

- Be able to identify computer hardware and peripheral devices
- Be familiar with software applications

- Understand file management .

- Distinguish the advantages and disadvantages of networks

- Explore the Web and how to conduct research

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", 4TH edition, Yashavant Publisher:BPB
2. Balagurusamy E - "Programming in ANSI C", 2nd edition Tata McGraw-Hill Publishing Company Ltd

Course Code:GEA009

L	T	P	C
0	0	3	4

Course Name:PHYSICS & CHEMISTRY LABORATORY

Designed For: I year

Credit:4

PHYSICS LABORATORY:

Course Objective:

- To impart skills in measurements and hand on operation
- To design and plan the experimental procedure and to record and process the results.
- To reach non trivial conclusions of significant of the experiments.

Course Outcomes

After the completion of the experiments in Physics lab, students gain

- Skills on measurements.
- Knowledge to design
- Plan the experimental procedure
- To record and process the results.
- Ability to analyze the results

(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.

CHEMISTRY LABORATORY

Course Objective:

- To develop an understanding of basic titration setup and methodologies for determining strength, hardness and alkalinity of various unknown solutions.
- To design and plan experimental procedures using basic instruments like conductometer, pH-meter, viscometer and spectrophotometer and to record and process the results.

Course Outcomes

1. Students will have knowledge about handling analytical instruments.
2. Students will become well acquainted to test amount of hardness present in sample of water for their engineering needs.
3. Students will be efficient in estimating acidity/alkalinity in given samples.
4. Students will have knowledge about estimating amount of dissolved oxygen in water.
5. Students will be efficient in quantitative analysis of given samples.
6. Students will become well acquainted to estimate copper in brass.
7. Students will have knowledge about determination of molecular weight and degree of polymerization using Ostwald's viscometer.
8. Students will be efficient in analysis of solutions using conductometric and potentiometric methods.
9. Student will having knowledge about estimation of iron using spectrophotometer.

LIST OF EXPERIMENTS

(Any Ten)

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 $BaCl_2$ Vs Na2 SO_4

11. Determination of specific and equivalent conductance at infinite dilution of a given electrolyte

V. POTENTIOMETRY

12. Potentiometric Titration ($Fe^{2+}/KMnO_4$ or $K_2Cr_2O_7$

VI. PH

13. PH titration (acid & base)

VII. SPECTROPHOTOMETRY

14. Estimation of Ferric iron

VIII. FLAME PHOTOMETRY

15. Estimation of Na & K

Course Code:GEA010

Course Name: BASIC ENGINEERING PRACTICES

Designed for : I year

Credit:4

L	T	P	C
0	0	3	4

GROUP A (MECHANICAL & CIVIL)

MECHANICAL ENGINEERING PRACTICE

Course Objective:

- Plumbing tools – house hold plumbing fittings and Carpentry process – Carpentry tools, types of joints.
- Types of welding & tools.
- Types of machining and operations, machine tools, cutting tools (Lathe, Drilling).
- Sheet metal – definition, working tools, operations - forming & bending.

Course Outcomes:

- A wide knowledge on mechanical and civil operations.

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.

Course Code: GEA011

Course Name: COMPUTER PRACTICE LABORATORY

L	T	P	C
0	0	3	4

Designed For: I year

Credit: 4

Course Objective:

- To Practice the concepts of MS Word and MS excel
- To learn the C control structure and functions.
- To study the C Pointers and file system**.**

Course Outcome:

• Students are expected to perform well in sessional tests/ class assignments/ viva-voce examination.

• Students are expected to design a program related to challenging questions.
• Students are expected to have knowledge about MS_WORD and the internet.

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

1. Write a C++ Program with a Simple Class.
2. Write a C++ Program for Object Comparison.
3. Write a C++ Program to Implement Polymorphism.
4. Write a C++ Program for processing Student Mark Sheet using Inheritance.
5. Write a C++ Program for array with different objects.
6. Write a C++ Program using Operator Overloading.