

SYLLABUS

(w.e.f. 2010-2011)

B.Tech.
Chemical Engineering
(Semester System)



BAPATLA ENGINEERING COLLEGE
(Autonomous)

(Affiliated to Acharya Nagarjuna University)
(Sponsored by Bapatla Education Society)
BAPATLA-522101, Guntur District, A.P.

BAPATLA ENGINEERING COLLEGE : BAPATLA
(Autonomous)
 SCHEME OF INSTRUCTION & EXAMINATION
 FOR
 CHEMICAL ENGINEERING
 w.e.f 2010-2011 (Semester System)

First Year B.Tech., (SEMESTER – I)

Code No.	Subject	Scheme of Instruction (Periods per week)			Scheme of Examination (Maximum marks)			No. of Credits
		Theory	Tutorial	Lab	CA	FE	Total Marks	
CH111 / MA01	Mathematics-I	4	1		40	60	100	4
CH112 / PH01	Engineering Physics-I	3	1		40	60	100	3
CH113 / CY01	Engineering Chemistry-I	3	1		40	60	100	3
CH114 / EN01	English Language and Communication	3	1		40	60	100	3
CH115 / BT01	Environmental Studies	3			40	60	100	3
CH116 / ME01	Engineering Graphics	3	3		40	60	100	3
CH151 /PHL01	Physics Laboratory-I	-	-	3	40	60	100	2
CH152 / CYL01	Chemistry Laboratory-I	-	-	3	40	60	100	2
CH153/MEL01	Work Shop	-	-	3	40	60	100	2
	TOTAL	19	7	9	360	540	900	25

CA: Continuous Assessment

FE: Final Examination

BAPATLA ENGINEERING COLLEGE : BAPATLA
(Autonomous)
SCHEME OF INSTRUCTION & EXAMINATION
FOR
CHEMICAL ENGINEERING
w.e.f 2010-2011 (Semester System)

First Year B.Tech., (SEMESTER – II)

Code No.	Subject	Scheme of Instruction (Periods per week)			Scheme of Examination (Maximum marks)			No. of Credits
		Theory	Tutorial	Lab	CA	FE	Total Marks	
CH121 / MA02	Mathematics-II	4	1		40	60	100	4
CH122 / PH02	Engineering Physics-II	3	1		40	60	100	3
CH123 / CY02	Engineering Chemistry-II	3	1		40	60	100	3
CH124	Introduction to Chemical Engineering	3	1		40	60	100	3
CH125 / CE01	Engineering Mechanics	4	1		40	60	100	4
CH126 / CS01	Computer Programming with C	4	1		40	60	100	4
CH161 / PHCYL01	Physics & Chemistry Laboratory-II	-	-	3	40	60	100	2
CH162 / ENL01	English Language Laboratory	-	-	3	40	60	100	2
CH163 / CSL01	Computer Programming Lab	-	-	3	40	60	100	2
	TOTAL	21	6	9	360	540	900	27

CA: Continuous Assessment

FE: Final Examination

MATHEMATICS – I
(Common for all branches)
MA01
I B.Tech I Semester

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT - I

Matrix Algebra: Rank of a Matrix, Linear Independence, Vector Space, Solutions of Linear Systems, Inverse of a Matrix by Gauss-Jordan Elimination, Vector Spaces, Inner Product Spaces, Linear Transformations. Eigen Values, Eigen Vectors, Some applications of Eigen value problems. Symmetric, Skew-Symmetric and Orthogonal Matrices.

UNIT - II

Matrix Algebra: Complex Matrices: Hermitian, Skew-Hermitian and Unitary. Similarity of Matrices, Basis of Eigen Vectors, Diagonalization.

Differential Calculus: Rolle's Theorem, Lagrange's Mean Value Theorem and Taylor's Theorem (without Proofs), Taylor's and, Maclaurin's Series for functions of one variable. Maxima and Minima of functions of Two Variables, Lagrange's method of Multipliers.

UNIT - III

First Order Differential Equations: Basic concepts, Geometrical meaning, Separable Differential Equations, Exact Differential Equations, Integrating Factors, Linear Differential Equations, Bernoulli's Equation, Orthogonal Trajectories of curves, Some Engineering Applications: Growth-Decay and Newton's Law of Cooling.

UNIT - IV

Linear Differential Equations of Second Order: Homogeneous Linear Equations of Second Order, Second Order Homogeneous Equations with Constant Coefficients, Case of Complex Roots, Euler-Cauchy Equations, Non-Homogeneous Equations, Solution by Undetermined Coefficients, Solution by Variation of Parameters, Applications-Modeling of Electric Circuits.

TEXT BOOK:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", 8th edition, John Wiley & Sons.

REFERENCE BOOK:

1. George B, Thomas, Jr. and Ross L. Finney, "Calculus and Analytic Geometry", Addison Wesley.

ENGINEERING PHYSICS – I
(Common to all branches)
PH01

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

OPTICS (11 Periods)

INTERFERENCE: Two-wave interference, coherence, cosine law, Michelson interferometer and its applications, (determination of wavelengths of monochromatic light and resolution of two nearby wavelengths).

DIFFRACTION: Fresnel & Fraunhofer diffraction, Fraunhofer diffraction due to single slit, plane diffraction grating, dispersive and resolving power of grating.

POLARISATION: Introduction, Brewster's and Malus law, double refraction, Nicol prism, quarter wave plate, half wave plate.

UNIT – II

LASERS & FIBER OPTICS (10 Periods)

LASERS: Properties of lasers, Spontaneous and stimulated emission, Population inversion, active medium, Solid state (Ruby) laser, Gas (He-Ne) laser, semiconductor (Ga-As) laser, Applications.

HOLOGRAPHY: Principle, recording and reproduction of holography, Applications.

FIBER OPTICS: Structure and types of optical fibers, acceptance angle, Numerical aperture, fiber optic communication and its advantages.

UNIT – III

ELECTRICITY & MAGNETISM (10 Periods)

Gauss's law in static electricity (qualitative only), Gauss's law of magnetism, circulating charges, Cyclotron-constructing, working and limitations, Hall effect and its applications, displacement current, Maxwell's equations (qualitative treatment), E M oscillations, velocity of EM waves, energy transport and the pointing vector, radiation pressure, AC circuit containing series LCR circuit-resonance condition.

UNIT – IV

MODERN PHYSICS (11 Periods)

Dual nature of light, de-Broglie's concept of matter waves, Davison-Germer electron diffraction experiment, Heisenberg's uncertainty experiment and applications (non-existence of electron in a nucleus and finite width of spectral lines), one dimensional time-independent Schrödinger wave equation, physical significance of wave function, applications of time-independent wave equation to particle in a box (one dimensional), tunneling, the scanning tunneling microscope.

TEXT BOOKS:

1. R.K Goure and S.C. Gupta, "Engineering Physics", New Delhi.
2. Halliday, Resnik, Krane, "PHYSICS", John Wiley & Sons.

REFERENCE BOOKS:

1. "Optics", A. Ghatak (TMH).
2. "Concepts of Modern Physics", AurthurBeiser (TMG).
3. "A text book of engineering physics", M.N. Avadhanulu, P.G. Kshirasagar, S.Chand& Co.,.
4. Serway and jewett, "Physics for scientist and engineers with Modern physics", 6th edition, Tomson Brooks/Cole, Indian reprint.

ENGINEERING CHEMISTRY – I
(Common to all branches)
CY01

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

WATER TECHNOLOGY (11 Periods)

Characteristics – alkalinity – types of alkalinity and determination – hardness – types and estimation by EDTA method (problems); Domestic water treatment – disinfection methods (Chlorination, ozonation, UV treatment) – Boiler feed water – requirements – disadvantages of using hard water in boilers: Scales, Sludges, Caustic embrittlement, boiler corrosion, Priming and foaming – internal conditioning (phosphate, calgon and carbonate conditioning methods) – external conditioning –demineralization process –Lime Soda Process- desalination of brackish water by electro dialysis and reverse osmosis.

UNIT – II

POLYMERS: (12 Periods)

Polymers: Definition, Polymerization, types, addition and condensation polymerization, free radical polymerization mechanism.

Plastics: Classification, Preparation, Properties and uses of PVC, Teflon, polycarbonate, polyurethane, nylon-6,6, PET.

Rubber: vulcanization of rubber, synthetic Rubbers: Buna-S, Buna-N and Polyurethane rubbers.

SURFACE CHEMISTRY:

Surface Chemistry: Solid surfaces, types of adsorption, Freundlich and Langmuir adsorption isotherm, BET adsorption equip. Calculation of surface area of solid & application adsorption: role of adsorbents in catalysis, ion-exchange adsorption and pollution abatement; classification of colloids, Electrical & optical properties micelles, applications of colloids in industry.

UNIT – III

(11 Periods)

RENEWABLE AND NON RENEWEABLE ENERGY SOURCES

Thermal and Chemical energy: Introduction to solid fuels - calorific value (lower, higher)-determination of calorific value(Bomb Calorimeter) - pulverized coal – carbonization (Bee Haive method - Otto Hoffman by product method)- Proximate and ultimate analysis of coal -Flow Chart in Thermal Power Stations.- Introduction to Geo Thermal Energy-working –applications-Introduction to Solar Cells –Solar Panels-Applications-Green House Concept - wind energy – fuel cells – hydrogen – oxygen fuel cell – batteries – alkaline batteries – lead–acid, nickel–cadmium and lithium batteries.

UNIT – IV

ENGINEERING MATERIALS

(11 Periods)

Refractories – classification – acidic, basic and neutral refractories – properties: refractoriness, refractoriness under load, dimensional stability, porosity, thermal spalling – manufacture of alumina, magnesite and zirconia bricks, Abrasives – natural and synthetic abrasives – quartz, corundum, emery, garnet, diamond, silicon carbide and boron carbide.

Composites: definition, types, polymer matrix composites.

Lubricants – mechanism of lubrication, liquid lubricants - properties: viscosity index, flash and fire points, cloud and pour points, oiliness –solid lubricants – graphite and molybdenum sulphide.

Nanomaterials: Introduction to nanochemistry – preparation of few Nano materials: carbon nanotubes, Fullerenes etc – Properties of Nano materials and their Engineering applications.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. P.C.Jain and Monica Jain, "Engineering Chemistry", DhanpatRai Pub, Co., New Delhi (2002).
2. S.S. Dara & Mukkati K., "A text book of engineering chemistry", S.Chand & Co.Ltd., New Delhi (2006).
3. "Text Books of Engineering Chemistry", C.P. Murthy, C.V. Agarwal, A. Naidu B.S. Publications, Hyderabad (2006).

REFERENCE BOOKS:

1. B.K.Sharma, "Engineering chemistry", Krishna Prakasan Media (P) Ltd., Meerut (2001).
2. B. Sivasankar, "Engineering Chemistry", Tata McGraw-Hill Pub.Co.Ltd, New Delhi (2008).
3. "Engineering Chemistry", J.C. Kuriacase & J. Rajaram, Tata McGraw Hill co., New Delhi 1. (2004).
4. "Chemistry of Engineering Meterials", R.P Mani and K.N.Mishra, CENGAGE learning.
5. "Applied Chemistry – A text for Engineering & Technology", Springar (2005).
6. "Text Book of Engineering Chemistry", ShasiChawla, DhantpatRai Publishing Company, NewDelhi (2008).
7. "Engineering Chemistry", R. Gopalan, D. Venkatappayya, D.V. SulochanaNagarajan, Vikas Publishers (2008).

ENGLISH LANGUAGE AND COMMUNICATION

(Common to all branches)

EN01

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

Objective of the course: To impart Basic skills of communication in English in through intensive practice to the First year student, So as to enable them to function confidently and effectively in that language in the professional sphere of their life.

Unit – 1

Grammar: This area exposes the learners to improve the standard proficiency level, avoiding grammatical mistake in communication.

1. Tenses
2. Preposition
3. Parts of speech

Unit – 2

Writing skills: This area promotes a format and well structured sentences required in professional writing

1. Paragraph writing
2. Letter writing
3. Essay writing

Unit – 3

Vocabulary: This unit offers an extensive knowledge of words and word meaning, essential for communication and contemporary test

1. Analogies
2. Idioms and phrases and their use
3. Antonyms & Synonyms

Unit – 4

Reading skills: Reading skills enable the student to turn writing into meaning and achieve the goals of reading independently, comprehensibly and fluently

1. Reading comprehension
 - i. Scanning
 - ii. Skimming
 - iii. Glance

TEXT BOOK:

1. "Objective English for Competitive Examination (Third edition)", Hari Mohan Prasad, Uma ReniSinha, Tata McGraw Hill.

REFERENCE BOOKS:

1. "Effective Technical Communication", M.AshrafRizvi, Tata McGraw Hill.
2. "Cambridge Preparation Guide for TOFEL".
3. "Dictionary of Technical Terms".
4. "Cambridge Advanced Learner's Dictionary".
5. "Cambridge Idioms Dictionary".
6. "Basic Correspondence & Report Writing", Sharma, Tata McGraw Hill.
7. "Business Correspondences and Report Writing", R.C.Sharma, Krishna Mohan, Tata McGraw Hill.
8. "Dictionary of Misspelled and Easily Confused Words", David Downing, Deborah K.Williams, Tata McGraw Hill.

ENVIRONMENTAL STUDIES
(Common for all branches)
BT01

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

Introduction: Definition, Scope and Importance, Need for public awareness.

Ecosystems: Introduction, types, Structure and Functions of Ecosystems, Forest, Grassland, Desert, Aquatic (lakes, rivers and estuaries)

Biodiversity: Definition and levels of Biodiversity, Bio-geographical Classification of India, India as a mega diversity nation and Hot Spots of Biodiversity.

Values of Biodiversity: Consumptive use, Productive use, Social, Ethical, Aesthetic and Option values.

Threats to Biodiversity: Habitat loss, Extinction of Species, Poaching of wildlife

Conservation of Biodiversity: In-situ and Ex-situ conservation of biodiversity

UNIT – II

Natural Resources: Exploitation and Related Pollution Problems

Land: Land as a resource, causes and effects of land degradation

Forest: Use of forests, causes and effects of deforestation and conservation of forests

Water: Distribution of Water Resources, floods and drought, causes, effects and control of water pollution.

Energy: Classification of Resources, Importance of energy, causes and effects of nuclear pollution.

Causes, Effects and Control of Air Pollution and Noise Pollution.

Solid Waste Management: Urban and Industrial wastes, Composting and Vermiculture and 3 R - approach.

UNIT –III

Sustainability: Theory and Practice, Equitable use of resources for sustainable life styles. Rain water harvesting, Watershed management, Cloud Seeding, Acid rain, Ozone layer depletion, Global warming, Population Growth and its Impact on environment, Green Revolution, Resettlement and Rehabilitation program, Mining and Dams and their conflicts, Environmental Impact Assessment

UNIT –IV

Environmental acts: Water (Prevention and Control of pollution) act, Air (Prevention and Control of pollution) act, Environmental protection act, Wild life protection act, Forest Conservation act.

International Conventions: Stockholm Conference 1972, Earth Summit 1992 and Copenhagen Conference 2009

Case Studies: Chipko movement, Narmada BachaoAndolan, Silent Valley Project, Madhura Refinery and TajMahal, Chernobyl Nuclear Diaster, Ralegaon Siddhi (Anne Hazare) and Bhopal Tragedy.

Text Book:

1. Environmental Studies by Benny Joseph, Tata McGraw-Hill Publishing Company Limited, New Delhi.

Reference Books:

1. Text Book of environmental studies, ErachBharucha, UGC.
2. Environmental Studies, AnubhaKaushik and C. P. Kaushik.
3. A basic course in environmental studies, S. Deswal and A. Deswal, DhanapathRai& Co.
4. Essentials of environmental studies, Kurian Joseph and R.Nagendram, Pearson Education Pt Ltd, Delhi.
5. Environmental studies, R.Rajagopalan, Oxford University Press.
6. Environmental Pollution Control Engineering, C. S. Rao, Wiley Eastern Ltd., New Age International Ltd.,
7. Introduction to Environmental Science, Anjaneyulu Y, B S Publications
8. Principles of Environmental Studies, Manoharachary C and Jayarama Reddy P, B S Publications.
9. Comprehensive environmental studies- JP Sharma, Laxmi Publications.
10. Environmental Science, 11th Edition – Thomson Series – By G Tyler Miller, Jr.
11. Environmental Science and Engineering by Dr. Suresh, K.Dhaneja, Publishers SK Kataria& Sons, New Delhi-110006.

ENGINEERING GRAPHICS
(Common to all branches)
ME01

Lectures	:	3 Periods/Week, Tutorial: 3	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

INTRODUCTION: Introduction to Drawing instruments and their uses, geometrical construction procedures *2x3 =6 periods*

CURVES: Conic sections – general construction methods for ellipse, parabola and hyperbola. Other methods to construct ellipse only, cycloid, involute of a circle *4x3=12periods*

UNIT – II

METHOD OF PROJECTIONS: Principles of projection - First angle and third angle projection of points. Projection of straight lines. Traces of lines. *6x3=18periods*

UNIT – III

PROJECTIONS OF PLANES : Projections of plane figures: circle, square, rhombus, rectangle, triangle, pentagon and hexagon. *4x3=12periods*

UNIT – IV

PROJECTIONS OF SOLIDS: Projections of Cubes, Prisms, Pyramids, Cylinders and Cones with varying positions. *5x3=15 periods*

UNIT – V

ISOMETRIC PROJECTIONS: Isometric Projection and conversion of Orthographic views into isometric views. (Treatment is limited to simple objects only). *3x3=9 periods*

ORTHOGRAPHIC PROJECTIONS: Conversion of pictorial views into Orthographic views. (Treatment is limited to simple castings). *4x3=12 periods*

TEXT BOOK:

1. Engineering Drawing by N.D. Bhatt & V.M. Panchal. (Charotar Publishing House, Anand). (First angle projection)

REFERENCE BOOK:

1. Engineering Drawing by Dhananjay A Jolhe, Tata McGraw hill publishers
2. Engineering Drawing by Prof.K.L.Narayana& Prof. R.K.Kannaiah.

PHYSICS LAB – I
(Common to all branches)
PH L01

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

LIST OF EXPERIMENTS

1. Determination of acceleration due to gravity at a place using compound pendulum.
2. Study the variation of intensity of magnetic field along the axis of a circular coil using Stewart-Gee's apparatus.
3. Determination of thickness of thin wire using air wedge interference bands.
4. Determination of radius of curvature of a Plano convex lens by forming Newton's rings.
5. Determination of wavelengths of mercury spectrum using grating normal incidence method.
6. Determination of dispersive power of a given material of prism using prism minimum deviation method.
7. Draw the resonant characteristic curves of L.C.R. series circuit and calculate the resonant frequency.
8. Draw the characteristic curves of a photocell and calculate the maximum velocity of electron.
9. Verify the laws of transverse vibration of stretched string using sonometer.
10. Determination of numerical aperture of an optical fiber.

CHEMISTRY LAB – I
(Common to all branches)
CY L01

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

LIST OF EXPERIMENTS

1. Introduction to Chemistry Lab (the teachers are expected to teach fundamentals like Primary, Secondary Standard Solutions, Normality, Molarity, Molality etc and laboratory ware used, error, accuracy, precision, Theory of indicators, use of volumetric titrations.
2. Volumetric Analysis:
 - a. Estimation of acid content in un-known solution
 - b. Estimation of Iron by Dichrometric method
 - c. Estimation of Copper by Iodometric method
 - d. Estimation of available chlorine in bleaching powder
3. ANALYSIS OF WATER: Estimation of :
 - a. TOTAL HARDNESS BY EDTA METHOD
 - b. TURBIDITY
 - c. CONDUCTIVITY
 - d. pH
 - e. TOTAL DISSOLVED SALTS
 - f. SALINITY
 - g. ALKALINITY
 - h. DISSOLVED OXYGEN
4. BACTERIAL COUNT: The student has to get his water sample and the teacher has to explain the analysis and the results are to be compared with the INDIAN STANDARDS.
5. CONSTRUCTION OF GALVANIC CELL: Based on the position of the metals in the electrochemical series a model electrochemical Cell is constructed and the values are determined and effect of metal ion concentration, Temperature etc. on emf are calculated.

TEXT BOOKS:

1. "Practical Engineering Chemistry", K. Mukkanti, et al, B.S. Publications, Hyderabad.
2. "Inorganic quantitative analysis", Vogel.

REFERENCE BOOKS:

1. "Text Book of engineering chemistry", R. N. Goyal and HarmandraGoel.
2. "A text book on experiments and calculation Engg.", S.S. Dara.
3. "Instrumental methods of chemical analysis", Chatwal, Anand, Himalaya publications.

WORKSHOP
(Common to all branches)
ME L01

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

1. Carpentry

- a. Half Lap joint
- b. Dovetail joint
- c. Mortise & Tenon joint

2. Welding using electric arc welding process/gas welding

- a. Lap joint
- b. Tee joint
- c. Butt joint

3. Sheet metal operations with hand tools

- a. Trapezoidal tray
- b. Funnel
- c. T-joint

4. House wiring

- a. To control one lamp by a single switch
- b. To control two lamps by a single switch
- c. Stair-case wiring

MATHEMATICS – II
(Common for all branches)
MA02
I B.Tech. II Semester

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

Fourier Series: Periodic Functions, Trigonometric Series, Fourier Series, Functions of Any Period $P = 2L$, Even and Odd Functions, Half Range Expansions, Complex Fourier Series, Approximation by Trigonometric polynomials.

UNIT – II

Laplace Transforms: Laplace Transform, Inverse Transform, Linearity, Shifting, Transforms of Derivatives and Integrals, Differential Equations, Unit Step Function, Second Shifting Theorem, Dirac's Delta Function, Convolution theorem (without proof).

UNIT – III

Integral Calculus: Evaluation of double integrals (Cartesian & Polar), Changing the order of integration, Evaluation of triple integrals, Applications of triple integrals to find area and volume.

UNIT – IV

Vector calculus: Scalar and vector point functions, Gradient of a scalar field, Directional derivative, Divergence of a vector field, curl of a vector field, Line integrals, Line integrals independent of path, Green's theorem in the plane (without proof), Surface integrals, Triple integrals, Divergence theorem of Gauss (without proof), Applications to Engineering problems, Stokes theorem (without proof).

TEXT BOOK:

1. "Advanced Engineering Mathematics", Erwin Kreyszig, 8th edition, John Wiley & Sons.

REFERENCE BOOKS:

1. "Advanced Engineering Mathematics", Peter V. O'Neil, Thomsons Brooks/Cole.
2. "Advanced Calculus", Murray R Spiegel, Schaum's outline series.

ENGINEERING PHYSICS – II
(Common to all branches)
PH02

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT - I

Electron theory of solids & semiconductor physics (10 periods)
 Electron theory of solids: Failure of classical free electron theory, quantum free electron theory, Fermi-Dirac distribution and its temperature dependence, Kronig-Penny model (Qualitative), effective mass of electron, concept of hole.
 Semiconductor physics: Classification of semiconductors, P-N junction diode and its characteristics, carrier concentration in P and N type semiconductors, Equation of continuity.

UNIT – II

Magnetic, Dielectric and Ferro-electric materials (10 periods)
 Origin of magnetic moment of an atom, Bohr magneton, Weiss theory of Ferro magnetism (Qualitative), Hysteresis curve, soft and hard magnetic materials, ferrites and its applications.
 Dielectric materials, Types of polarizations, internal field (qualitative), Classius – Mossetti equation, Frequency dependence of polarization, Ferroelectrics and its applications.

UNIT – III

Advanced materials (12 periods)
 Nano-materials: Introduction to nano-materials, Fabrication of nano-materials and carbon nano tubes (CVD and sol-gel), physical and chemical properties of nano materials, Applications of nano materials (Structural point, Storage of information, Strength point)
 Superconductivity: Meissner effect, types of superconductors, elements of BCS theory, Applications of superconductors.
 Opto-electronic devices: Working and applications of solar cell, LED, LCD, Photo Diode.

UNIT – IV

Analytical techniques (10 periods)
 Nuclear techniques: Radio isotopes and its applications (Medical and Industrial), GM-counter, scintillation counter.
 Ultrasonics: Properties of ultrasonics, General applications of ultrasonics.
 Medical applications: Cardiology, Neurology, Ultrasonic imaging.
 NDT: Pulse echo technique, cavitation effect, Time of flight diffraction technique.
 Structure determination: Crystal planes, Bragg's law, structural analysis of crystal using X-Ray powder diffraction method.

TEXT BOOKS:

1. "Engineering physics", M.R.Sreenivasan, Newage International Publication.
2. "Engineering Physics", Palaniswamy, Scitech Publishers.
3. "Solid State Physics", Dekkar.

REFERENCE BOOKS:

1. "Material Science for scientists and Engineers", Srinivasan & Srivastava, TMH Publishers.
2. "A text book of engineering physics", M.N. Avadhanulu & P. Krushisagar, S.Chand Pub.
3. "Material Science", VijayaRangarajan.

ENGINEERING CHEMISTRY – II
(Common to all branches)
CY02

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(11 Periods)

ELECTROCHEMISTRY

Electrochemical cells – reversible and irreversible cells – EMF – measurement of emf – Single electrode potential – Nernst equation (problem) – reference electrodes – Standard Hydrogen electrode – Calomel electrode – Ion selective electrode – glass electrode and measurement of pH – electrochemical series – significance – potentiometer titrations (redox - Fe^{2+} vs dichromate and precipitation – Ag^+ vs Cl^- titrations) and conductometric titrations (acid-base – HCl vs, NaOH) titrations.

UNIT - II

(11 Periods)

CORROSION AND CORROSION CONTROL

Chemical corrosion – Pitting – Bedworth rule – electrochemical corrosion – different types – galvanic corrosion – differential aeration corrosion – factors influencing corrosion – corrosion control – sacrificial anode and impressed cathodic current methods – corrosion inhibitors – protective coatings – paints – constituents and functions – metallic coatings – electroplating (Au) and electroless (Ni) plating.

GREEN CHEMISTRY: Introduction-concepts-Engineering Applications.

UNIT – III

(12 Periods)

LIQUID AND GASEOUS FUELS AND COMBUSTION: Petroleum based: Petroleum processing and fractions – cracking – catalytic cracking and methods-knocking and anti-knocking Agents – octane number and cetane number – synthetic petrol – Fischer Tropsch and Bergius processes.

Gaseous fuels- water gas, producer gas, CNG and LPG, Flue gas analysis – Orsat apparatus – theoretical air for combustion.

PHASE RULE AND ALLOYS: Statement and explanation of terms involved – one component system – water system – condensed phase rule – construction of phase diagram by thermal analysis – simple eutectic systems (lead-silver system only) – alloys – importance, ferrous alloys – nichrome and stainless steel – heat treatment of steel, non-ferrous alloys – brass and bronze.

UNIT – IV

(11 periods)

ANALYTICAL TECHNIQUES: Beer-Lambert's law (problem) – UV-visible spectroscopy and IR spectroscopy – principles – instrumentation (problem) (block diagram only) – estimation of iron by colorimetry – flame photometry – principle – instrumentation (block diagram only) – estimation of sodium by flame photometry – atomic absorption spectroscopy – principles – instrumentation (block diagram only) – estimation of nickel by atomic absorption spectroscopy.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. P.C.Jain, Monica Jain, "Engineering Chemistry", DhanpatRai Pub, Co., New Delhi (2002).
2. S.S.Dara, Mukkanti K., "A text book of Engineering Chemistry", S.Chand& Co., Ltd., New Delhi (2006).
3. B. Sivasankar, "Engineering Chemistry", Tata McGraw-Hill Pub.Co.Ltd, New Delhi (2008).

REFERENCE BOOKS:

1. B.K.Sharma, "Engineering Chemistry", Krishna Prakasan Media (P) Ltd., Meerut (2001).
2. "Engineering Chemistry", J.C.Kuriacase&J.Rajaram, Tata McGraw Hill, New Delhi (2004).
3. "Chemistry of Engineering Materials", R.P Mani, K.N.Mishra, CENGAGE learning.
4. "Applied Chemistry - A text for Engineering & Technology", – Springar (2005).
5. "Text Book of Engineering Chemistry", ShasiChawla, DhantpatRai Publishing Company, NewDelhi (2008).
6. "Engineering Chemistry", R. Gopalan, D. Venkatappayya, D.V. SulochanaNagarajan, Vikas Publishers (2008).

INTRODUCTION TO CHEMICAL ENGINEERING
CH124

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I:

Definition of Chemical Engineering, Basic Concepts in Chemical Engineering: Unit Operations, Basic laws, Useful mathematical methods, Units and Dimensions.

Flow of fluids: Nature of Fluid, Viscosity, Flow Field, Flow of Fluid Past a Solid Surface, Conservation Of Mass and Energy, Friction Losses in Laminar Flow through a Circular Tube, Hagen-Poiseuille Equation, Friction Losses in Turbulent Flow, Fanning Equation

UNIT – II: Heat & Mass Transfer

Heat Transfer: Fundamental Concepts of Conduction, Convection and Radiation.

Heat Transfer Equipment: Double Pipe, Shell and Tube Heat Exchangers and Evaporators (Description with Diagrams)

Mass Transfer:

Uses and Characteristics of Separation Processes: Examples: Cane Sugar Refining, Manufacture of P-Xylene, Importance and Variety of Separations, Economic Significance of Separation Processes, Inherent Separation Factors: Equilibrium Processes and Rate Governed Processes

UNIT – III:

Chemical Kinetics: Introduction, Thermodynamics of Reactions, Determination of the Rate Equation, Effect of Temperature on Reaction Rate, Reactors (Description with Diagrams)

UNIT – IV

Natural Resources and Their utilization: Water based resources, Air based resources. Solvay process, Contact and Chamber Processes, Haber process, Crude oil refining.

Text Book:

1. Introduction to Chemical Engineering, S. K. Ghosal, S. K. Sanyal & S. Datta, Tata-McGraw-Hill,.
2. Separation Processes by C. Judson King, Tata-McGraw Hill (For Mass Transfer)

Reference Books:

1. Introduction to Chemical Engineering, Walter L. Badger & Julius T. Banchero, Tata-McGraw-Hill, New Delhi.
2. Unit Operations of Chemical Engineering, Warren L. McCabe, Julian C. Smith, Peter Harriot, 7th edition, McGraw Hill, New Delhi.
3. Mass Transfer Operations, Robert E. Treybal, 3rd edition, McGraw Hill, New Delhi.
4. Introduction to Chemical Engineering, Smith J. M., McGraw Hill, New Delhi.

ENGINEERING MECHANICS
(Common to all branches except Mechanical Engineering)
CE01

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

General Principles: Mechanics, Fundamental concepts, Units of measurements, International systems of units, Numerical calculations, General procedure for analysis.

Force Vectors: Scalars and vectors, Vector operations, Vector addition of forces, Addition of a system of coplanar forces.

Equilibrium of a Particle: Condition for equilibrium of a particle, The free body diagram, Coplanar force system.

Force System Resultants: Moment of a force (Scalar formation), Principle of moments, Moment of a couple (Scalar formation), and Equivalent system, Resultants of a force and couple system (Coplanar force system), further reduction of a force and couple system (Coplanar force system).

Equilibrium of a Rigid Body: Conditions for rigid body equilibrium (Equilibrium in two dimensions), Free body diagrams, Equations of equilibrium, Two and three force members.

UNIT – II

Friction: Characteristics of dry friction, Problems involving dry friction.

Center of Gravity and Centroid: Center of gravity and center of mass for system of particles, Center of gravity, center of mass and centroids for a body, Composite bodies.

Moments of Inertia: Definition of moments of inertia for areas, Parallel axis theorem for area, radius of gyration of an area, Moments of inertia of an area by integration, Moments of inertia for composite areas.

UNIT – III

Kinematics of a Particle: Introduction, Rectilinear kinematics: Continuous motion, General curvilinear motion, Curvilinear motion: Rectangular components, Motion of a projectile, Curvilinear motion: Normal and tangential components, Absolute dependent motion analysis of two particles.

Kinetics of a Particle: Force and Acceleration: Newton's law of motion, The equation of motion, Equation of motion for a system of particles, Equation of motion: Rectangular coordinates, Equation of motion: Normal and tangential coordinates.

UNIT – IV

Kinetics of Particle: Work and Energy: The work of a force, Principle of work and energy, Principle of work and energy for a system of particles, Power and efficiency, Conservative forces and potential energy, Conservation of energy.

Kinetics of Particle: Impulse and Momentum: Principle of linear impulse and momentum, Principle of linear impulse and momentum for a system of particles, Conservation of linear momentum for a system of particles, Impact.

TEXT BOOK:

1. "Engineering Mechanics Statics and Dynamics", R.C. Hibbeler and Ashok Gupta. Pearson Education.

REFERENCE BOOKS:

1. "Vector mechanics for Engineers Statics and Dynamics", Beer and Johnston, Tata McGraw-Hill publishing company, New Delhi.
2. "Engineering Mechanics", S. Timoshenko and D. H. Young – McGraw-Hill International Edition.
3. "Engineering Mechanics Statics and Dynamics", J. L. Meriam and L. Kraige.
4. "Engineering Mechanics for Engineers. Statics and Dynamics", Beer and Irving H. Shames, Pearson Education.

COMPUTER PROGRAMMING WITH C
(Common to all Branches)
CS01

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

Introduction:

Computer Fundamentals: Computer and its components, hardware/software, algorithm, characteristics of algorithms, flowchart, symbols used in flowchart, history of C, basic structure of a C program.

C Tokens: Character set, variables, keywords, data types and sizes, type qualifiers, numeric constants and their forms of representation, character constants, string constants, declaration and initialization of variables.

Operators & Expressions: Arithmetic operators and expressions, type-conversion rules, coercion, assignment operators and expressions, increment and decrement operators, conditional operator, statements, preprocessor directives, input/ output functions and other library functions. Relational operators and expressions, boolean operators and expressions, operator precedence and associativity.

Control Statements: if-else statement, else-if statement and switch statement.

Programming Exercises for Unit I :

C-expressions for algebraic expressions, evaluation of arithmetic and boolean expressions. Syntactic errors in a given program, output of a given program, values of variables at the end of execution of a program fragment, filling the blanks in a given program. Programs using Scientific and Engineering formulae. Finding the largest of the three given numbers. Computation of discount amount on different types of products with different discount percentages. Finding the class of an input character, finding the type of triangle formed with the given sides, computation of income-tax, computation of electricity bill and conversion of lower case character to its upper case.

UNIT – II

Control Statements: while loop, for loop, do while loop, nested Control statements, break and continue statements.

Arrays: One-Dimensional numeric and character arrays and Two-Dimensional numeric and character arrays.

Programming Exercises for Unit - II:

To print the sum of the digits of a given number and to display the image of a given number. To find whether a given number is prime, printing Fibonacci sequence and to find prime factors of a given number. To print graphic patterns of symbols and numbers and computation of statistical parameters of a given list of numbers. To find the length of a string, compare strings, reverse a string, copy a string and to find whether the given string is palindrome or not. Transpose of a matrix, product and sum of matrices and sorting of names using arrays.

UNIT – III

Functions: Function definition, parameter passing mechanisms and simple recursion.

Scope & extent: Scope rules and storage classes.

Pointers and Dynamic Memory Allocation: Pointer variables, pointer arithmetic, dynamic memory allocation, array of pointers, command line arguments, passing pointer variables as parameters to functions.

Programming Exercises for Unit - III:

Functions - Insertion sort, Linear search. Recursive functions to find factorial & GCD (Greatest Common Divisor), string operations using pointers and pointer arithmetic and dynamic memory allocation. Swapping two variable values. Sorting a list of names using array of pointers and command line arguments.

UNIT – IV

Structures: Structures, array of structures, pointers to structures, unions and difference between structure and union.

Files: File handling functions for input and output.

Programming Exercises for Unit - IV:

Operations on complex numbers, matrix operations with the matrix and the size of the matrix as a structure, sorting a list of student records on register number using array of pointers and to read an input file of marks and generate a result file.

TEXT BOOK:

1. Byron Gottfried, "Programming with C", Schaum's Outline series.

REFERENCE BOOKS:

1. Kernighan BW and Dennis Ritchie M, "C programming language", 2nded, Prentice Hall.
2. Yashavant P. Kanetkar, "Let us C", BPB Publications.
3. E. Balagurusamy, "Programming in ANSI C", 4thed, Tata Mcgraw-Hill.
4. Herbert Schildt, "C: The Complete Reference", 4th edition, Tata Mcgraw-Hill.

PHYSICS & CHEMISTRY LABORATORY – II
(Common to all branches)
PHCY L01

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

(A Selected list of Experiments from the following)
PHYSICS LAB-II

1. Determine the rigidity modulus of the given material of the wire using Torsional pendulum.
2. Determination of room temperature using platinum resistant thermometer.
3. Draw the load characteristic curves of a solar cell.
4. Determination of Hall coefficient of a semiconductor.
5. Determination of velocity of ultrasonic wave in a given liquid using ultrasonic interferometer.
6. Draw the characteristic curves of a G.M. counter and calculate the best operating voltage.
7. Determination of voltage and frequency of an A.C. signal using C.R.O.
8. Draw the I/V characteristic curves of a P-N junction diode.
9. Determination of Forbidden energy gap of Si & Ge.
10. Determination of wavelength of laser source using Diode laser.

CHEMISTRY LAB – II

1. PRODUCTION OF BIODIESEL: The teacher has to perform the transesterification reaction of FATTY ACID and the Biodiesel thus produced can be used for analysis.
2. Estimation of properties of oil:
 - a. Acid Number
 - b. Viscosity
 - c. Saponification value
 - d. Aniline point
 - e. Flash and Fire points
 - f. Pour and Cloud point.
3. PREPARATION OF:
 - a. PHENOL –FORMALDEHYDE RESIN
 - b. ASPIRIN
 - c. Phenylbenzoate
 - d. Soap
4. SOIL ANALYSIS: pH, Determination of Zinc, Iron and Copper.
5. Kinetics: To determine the rate constant of hydrolysis of methyl acetate catalyzed by an acid and also the energy of activation. (or) To study the kinetics of reaction between $K_2S_2O_8$ and KI.

6. Demonstration Experiments (Any two of the following) :
 - a. Determination of dissociation constant of weak acid-by pH metry
 - b. Preparation of Thiokol rubber
 - c. Adsorption on Charcoal
 - d. Heat of reaction
7. FOOD ANALYSIS: Determination Saturated and Unsaturated Fatty Acids, pH,etc.

TEXT BOOKS:

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Vogels Text Book of Quantitative Chemical Analysis 6th Edition (2002).

REFERENCE BOOKS:

1. Text Book of engineering chemistry by R. N. Goyal and HarmendraGoel.
2. A text book on experiments and calculation Engg. S.S. Dara.
3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications, 5th edition 2004

ENGLISH LANGUAGE LAB
(Common to all branches)
EN L01

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

OBJECTIVES

This course enables the students to expedite the process of improving communication in both formal and in formal situation. A special attention has been paid to the needs of competitive and current demands.

Introduction to communication: Difference between communication and communication skills, Types of communication, Barriers to communication.

Introduction to skills: Listening skills, writing skills, Reading skills, and Speaking skills.

Pronunciation drills: Phonetics, British English and American English.

Conversational skills: Dialogue, Telephonic Interaction.

Professional writings & skills: Resumes, Reports, Business letters and Interview skills.

Practical: Extempore Debates, Group discussion, and Oral presentation.

RECOMMENDED SOFTWARES:

Digital Language Lab - Networking Software, HiClass – Software.

English Language – Listening, Speaking Reading, Writing Skills: A lania series – English Mastery, Levels A, B (Set of 2 CDs), English Discoveries (Set Of 12 CDs).

English Grammar / Pronunciation: Live Action English Interactive, Speech Solutions

Dictionaries: Cambridge Advanced Learner's, Oxford Genie & Advanced

Writing: Easy writer, Creative writing

Professional English: Telephonic English, English in mind

English for ETS: Barron's, TOEFL Mastery, IELTS, GRE

COMPUTER PROGRAMMING LAB
(Common to all Branches)
CS L01

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

LIST OF PROGRAMS

1. A program for electricity bill taking different categories of users, different slabs in each category. (Using nested if else statement).

Domestic Customer:	
Consumption Units	Rate of Charges(Rs.)
0 – 200	0.50 per unit
201 – 400	100 plus 0.65 per unit
401 – 600	230 plus 0.80 per unit
601 and above	390 plus 1.00 per unit
Commercial Customer:	
Consumption Units	Rate of Charges(Rs.)
0 – 50	0.50 per unit
100 – 200	50 plus 0.6 per unit
201 – 300	100 plus 0.70 per unit
301 and above	200 plus 1.00 per unit

2. Write a C program to evaluate the following (using loops):
- $1 + x^2/2! + x^4 / 4! + \dots$ upto ten terms
 - $x + x^3/3! + x^5/5! + \dots$ upto 7 digit accuracy
3. Write a C program to check whether the given number is
- Prime or not.
 - Perfect or Abundant or Deficient.
4. Write a C program to display statistical parameters (using one – dimensional array).
- Mean
 - Mode
 - Median
 - Variance.

NOTE: Use functions for each subtask in the following programs

- Write a C program to read a list of numbers and perform the following operations
 - Print the list.
 - Delete duplicates from the list.
 - Reverse the list.
- Write a C program to read a list of numbers and search for a given number using Binary search algorithm and if found display its index otherwise display the message "Element not found in the List".
- Write a C program to read two matrices and compute their sum and product.
- A menu driven program with options (using array of character pointers).
 - To insert a student name
 - To delete a name

- c) To print the names
-
9. Write a C program to read list of student names and perform the following operations
 - a) To print the list of names.
 - b) To sort them in ascending order.
 - c) To print the list after sorting.
 10. Write a C program that consists of recursive functions to
 - a) Find factorial of a given number
 - b) Solve towers of Hanoi with three towers (A, B & C) and three disks initially on tower A.
 11. A Bookshop maintains the inventory of books that are being sold at the shop. The list includes details such as author, title, price, publisher and stock position. Whenever a customer wants a book the sales person inputs the title and the author and the system searches the list and displays whether it is available or not. If it is not an appropriate message is displayed, if it is then the system displays the book details and request for the number of copies required ,if the requested copies are available the total cost of the requested copies is displayed otherwise the message "required copies not in stock" is displayed. Write a program for the above in structures with suitable functions.
 12. Write a C program to read a data file of student's records with fields(Regno, Name, M1,M2,M3,M4,M5) and write the successful students data (percentage > 40%) to a data file.