

WITH EFFECT FROM THE ACADEMIC YEAR 2010 - 2011

## SCHEME OF INSTRUCTION & EXAMINATION

### B.E. I YEAR (Full Time)

#### SEMESTER - I

Sl. No.	Syllabus Ref. No.	SUBJECT	Scheme of Instruction		Scheme of Examination		
			Periods per week		Duration In Hours	Maximum Marks	
			L	D/P		Univ. Exam	Sessionals
1.	EG 101	<b>THEORY</b> English	3	-	3	75	25
2.	MT 101	Mathematics-I	3	-	3	75	25
3.	MT 102	Mathematics-II	3	-	3	75	25
4.	PH 101	Engineering Physics	3	-	3	75	25
5.	CH 101	Engineering Chemistry	3	-	3	75	25
6.	CS 101	Programming in C & C++	3	-	3	75	25
7.	CE 101	Engineering Mechanics	3	-	3	75	25
8.	CE 102	Engineering Graphics	-	6	3	100	50
1.	PH 132	<b>PRACTICALS</b> Physics Lab	-	3	3	50	25
2.	CH 132	Chemistry Lab	-	3	3	50	25
3.	ME 131	Workshop Practice	-	3	3	50	25
4.	CS 131	Programming Lab	-	3	3	50	25
5.	EG 131	English Language Lab	-	2	3	50	25
		<b>TOTAL</b>	<b>21</b>	<b>20</b>	<b>-</b>	<b>875</b>	<b>350</b>

**EG 101 UE**

**ENGLISH (THEORY)**

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

**UNIT - I**

Effective Communication: Role and importance of communication; Features of human communication; Process of communication; Types of communication: Verbal - formal versus informal communication, one way versus two-way communication; Non-verbal communication; Barriers to communication; Importance of listening in effective communication

**UNIT - II**

Oral communication: Importance of oral communication; Seminar skills; Speech-making: Types of speeches; Situational dialogues; Speaking strategies; Interpersonal Communication, Models of interpersonal development - Johari Window; Styles of communication; persuasion techniques; Team work.

**UNIT - III**

Written Communication: Paragraph writing; Report writing: Types of reports, Writing technical reports and scientific papers; Communication through letters: official and personal letters, letters of complaint, letters of enquiry and responses, resume writing; cover letters, memos, circulars, notices, minutes of meeting, writing a statement of purpose, e-mail etiquette.

**UNIT - IV**

Remedial English: Common errors, words often confused, tense and aspect, articles, prepositions, connectives and correlative conjuncts, voice, concord, direct and indirect speech, question tags, punctuation, homonyms, homophones, synonyms, antonyms, one-word substitutes; Idiomatic usage.

**UNIT - V**

Reading comprehension, reading strategies.

The following four lessons are prescribed:

1. Barack Obama: A Trendsetter

2. Rendezvous with Indra Nooyi
3. Muthyala Raju Revu: An Engineer Turned IAS Officer
4. R. Madhavan: Engineering to Farming

**Note :** Units I and V are from the book 'Essential English', Unit-III is from Communication Skills & Soft Skills and Units-II and IV are from both Essential English and Communication Skills & Soft Skills. .

**Suggested Reading :**

1. E. Suresh Kumar et al., *Essential English*, Orient Blackswan, 2010.
2. E. Suresh Kumar et al., *Communication Skills and Soft Skills*, Pearson, 2010.
3. Meenakshi Raman et al., *Technical Communication*, Oxford University Press, 2009.
4. K K Ramachandran et al, *Business Communication*, Macmillan, 2009.
5. Sunita Mishra, C. Murali Krishna, *Communication Skills for Engineers*, Pearson, 2004.

**MT 101**

**MATHEMATICS - I**

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

**UNIT - I**

**Differential Calculus :**

Rolle's theorem - Mean value theorems - Taylor's series - expansion of functions on power series - curvature - radius of curvature (Cartesian, polar and parametric co-ordinates) Envelopes - Evolutes and Involutives.

**UNIT - II**

**Functions of Several Variables :**

Tracing of curves in Cartesian and polar coordinates - Limits and continuity of functions of two variables - partial derivatives - Total differentials and derivatives - Approximation by total differentials - Derivatives of composite and implicit functions - Higher order partial derivatives - Homogeneous functions - Taylor's theorem for functions of two variables -Maxima and minima of functions of two variables with constraints - Lagrange's method Jacobian - change of variables.

**UNIT - III**

**Vector' Calculus :**

Multiple integrals - Double and triple integrals - change of order of integration - scalar and vector fields - Vector differentiation - Directional derivative - Gradient of a scalar field -Divergence - Curl of vector field - Line - Surface and volume integrals - Green's theorem in a plane - Gauss's divergence theorem - Stoke's theorem (without proofs) and their applications,

**UNIT - IV**

**Matrix Theory :**

Elementary row and column operations on a matrix - Rank of a matrix - Solution of system of linear equations - Linear dependence and independence of vectors - Characteristic equation- Characteristic roots and vectors - Caley -



Hamilton theorem - Reduction to diagonal form and normal form- Reduction of a quadratic form into canonical form.

## UNIT - V

### Infinite Series:

Sequences - Infinite series - Convergence and divergence - Comparison test - Ratio test, Cauchy's test - Raabe's test - Logarithmic series test - Alternating series - Absolute convergence - Conditional convergence.

### Suggested Reading:

- 1) R.K.Jain and S.R.K.Iyengar, *Advanced Engineering Mathematics* Narosa Publications, third Edition, 2009.
- 2) B.S.Grewal, *Higher Engineering Mathematics*, Khanna publications, 40th edition, 2007.
- 3) M. Venkata Krishna and G. Shanker Rao, *A text book of engineering Mathematics*, Jaico publishing house, Mumbai, 2010.
- 4) M.K Venkatraman, *Engineering Mathematics-I*, Technical Publishers, Chennai.
- 5) H.C. Taneja, *Advanced Engineering Mathematics*, Vol. I & II, I.K. International Publishing Pvt. Ltd., New Delhi, 2007.

**MT 102**

**MATHEMATICS - II**

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

**UNIT - I**

**Ordinary Differential Equations of first order :**

Introduction to differential equations - Solutions of differential equations - Exact first order differential equations - Integrating factors- Linear first order equations - Bernoulli's equation - Riccati's equation - Clairaut's equation - Orthogonal trajectories of a given family of curves, L-R circuits - LCR circuits - Simple Harmonic Motions.

**UNIT - II**

**Linear Differential equations :**

Solutions of linear differential equations - Methods for solutions of linear equations-differential operator - Solutions of second order linear homogenous equations with constant coefficients - Method of reduction of order for variable coefficients - solutions of higher order homogenous linear equations with constant coefficients - Solutions of non-homogenous linear equations- Method of variation of parameters.

**UNIT - III**

**Series solution of differential equations :**

Introduction - Ordinary and singular points of an equation - Power series solution -Frobenius method - Special differential equations - Legendre's differential equation and its series solution - Rodrigue's formula - Generating function for Legendre's polynomials -Recurrence relations for Legendre's polynomials - Orthogonal property of Legendre polynomials - Chebyshev polynomials - Zeros and extreme points of  $T_n(x)$  - Orthogonal properties of Chebyshev polynomials - Recurrence formulae for  $T_n(x)$  and  $U_n(x)$ .

#### UNIT - IV

##### Special functions :

Gamma function - Beta function - Relation between Gamma function and



Beta function - Error function - Bessel's differential equation and its solution  
Bessel's function and its generating function.

#### UNIT - V

##### Laplace Transforms :

Laplace transforms - Inverse Laplace transforms - Properties of Laplace transform - Laplace transform of unitstep function - Impulse function and periodic functions - Convolution theorem - Solution of ordinary differential equations with constant coefficients using Laplace transform.

##### Suggested Reading:

- 1) R.K.Jain and S.R.K.Iyengar, *Advanced Engineering Mathematics*, Narosa Publications, third Edition, 2009.
- 2) B.S.Grewal, *Higher Engineering Mathematics*, Khanna publications, 40th. edition, 2007.
- 3) M. Venkata Krishna and G. Shanker Rao, *A text book of engineering Mathematics*, Jaico publishing house, Mumbai, 2010.
- 4) M.K Venkatraman, *Engineering Mathematics-II*, Techpical Publishers, Chennai.
- 5) H.C. Taneja, *Advanced Engineering Mathematics*, Vol. I & II, I.K. International Publishing Pvt. Ltd., New Delhi, 2007.



**PH 101****ENGINEERING PHYSICS**

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

**UNIT - I Physical Optics and Lasers (24 periods)**

- 1.1 Interference- Coherent and non-coherent sources, division of amplitude and division of wave front, Interference in thin films (reflected light)- Newton's rings
- 1.2 Diffraction- Distinction between Fresnel and Fraunhofer diffraction, diffraction at a single slit- double slit diffraction-diffraction grating (N-slits)
- 1.3 Polarization- Introduction - Malus law, double refraction, Nicol's prism, quarter wave and half wave plates - optical activity- Laurent's half shade polarimeter
- 1.4 Lasers and holography: Characteristics of Lasers - Spontaneous and stimulated emission of radiation -Einstein's coefficients - Population inversion - Ruby laser - Helium-Neon Laser -Semiconductor Laser - Applications of lasers. Basic principles of holography - Construction and reconstruction of image' on hologram - Applications of holography.
- 1.5 Fiber Optics: Introduction - Types of optical fibres - propagation of light through an optical fiber-Critical angle - Acceptance angle - Numerical aperture (NA)- Types of optical fibers and refractive index profiles -fibre drawing process (double crucible method)- Application of optical fibers.

**UNIT- II Modern Physics (16 periods)**

- 2.1 Elements of Statistical Mechanics: Concept of phase -space, derivation of  $S=k \log W$ , Types of ensembles - Maxwell-Boltzmann statistics, Bose -Einstein statistics, Fermi-Dirac statistics - photon gas- Planck's law of black-body radiation distribution - Rayleigh Jeans law and Wien's law
- 2.2 Wave mechanics: Wave function and Schrodinger time dependent and time independent wave equations- particle in an Infinite Square well (particle in a box) potential, potential barrier and quantum tunneling.



- 2.3 Electromagnetic theory: Review of steady and varying fields - conduction and displacement current, Maxwell's equations in integral and differential forms, electro magnetic waves, plane wave, and

Poynting vector.

#### **UNIT- III Condensed matter physics (18 periods)**

- 3.1 Crystallography: Introduction -Space lattice - Basis - Unit cell - Bravais lattices and crystal systems -atomic radius, coordination number, effective number of atoms per unit cell, packing fraction simple cubic - Body centered cubic - Face centered cubic crystals - Miller Indices - Bragg's law, Experimental determination of lattice constant by powder diffraction method, Classification of defects in crystals - line defects, point defects and volume defects- number of point defects in metals- concentration of Schottky defects and Frankel defects in a crystal - Glasses - characterizing properties
- 3.2 Band Theory of Solids: Classical free electron theory(qualitative) - Energy band formation in solids-Kronig-Penney model (qualitative treatment)- Electron gas - Fermi energy and Fermi level in metals- Classification of solids into good conductors, semiconductors and bad conductors
- 3.3 Semiconductors: Intrinsic and Extrinsic semiconductors-concept of a hole -concept of Fermi level in semiconductor-carrier concentration in intrinsic semiconductors -conductivity in intrinsic semiconductors-Hall effect - LED - Thermistor

#### **UNIT- IV Materials Science (18 periods)**

- 4.1 Dielectric materials: Dielectrics- types of dielectric polarizations. Electronic, ionic, orientation and space-charge polarizations - Frequency and temperature dependence of dielectric polarizations -Ferro electricity- Barium titanate- Determination of dielectric constant by capacitance Bridge method- Applications of Ferroelectrics.
- 4.2 Magnetic Materials: Classification of magnetic materials - dia, para, ferro, anti ferro and ferrimagnetism -Weiss molecular field theory of ferromagnetism- magnetic domains- hysteresis curve - Soft and hard magnetic materials- Ferrites structure - spinel and inverse spinel and applications of ferrites.

- 4.3 Superconductivity: Superconductivity -General properties of superconductors - Meissner effect - Type I and Type II superconductors - BCS Theory( in brief) - high T<sub>c</sub> superconductors (in brief) and their preparation - Applications of superconductors.

**UNIT- V Materials at Reduced size and Characterization Techniques (14 periods)**

- 5.1 Thin film: Distinction between bulk, thin films and nano materials- Thin film preparation techniques-physical vapor deposition (PVD)- thermal evaporation- electron beam evaporation-sputtering and chemical vapour deposition (CVD)-applications of thin films-solar cell.
- 5.2 Nanomaterials: Zero dimensional materials. Properties of materials at reduced size- nano scale surface to volume ratio-quantum confinement- preparation of nano materials - bottom-up methods-sol gel, pulsed laser, sputtering and CVD (Qualitative)- Top-down methods -ball milling- elementary ideas of Carbon nanotubes - Applications.
- 5.3 Experimental techniques: X-ray diffraction-X-ray fluorescence- Auger(OJ)process- atomic force microscopy ( basics) -electron microscope (SEM and TEM)

**Suggested Reading:**

01. M.S Avadhanulu and P.G. Kshirasagar, *Engg.Physics*, S.Chand 1st edition 1992.
02. R.K Gaur and S.L. Gupta, *Engg.Physics*, Dhanpath Rai 7th edition, 2005.
03. A.K Bhandhopadhy, *Nano materials*, New Age International, 1st edition 2007.
04. V.Rajendran, *Engineering Physics*, Tata Mcgrahill, 1st Edition 2008.

**Reference Books:**

01. M.Armugam - *Materials science* - Anuradha Agencies
02. R.Murugeshaam - *Moderna Physics* - S.Chand and co.
03. J.MSenior - *Optial Fibre communications*.
04. A..Goswami - *Thin film fundamentals*, New Age International
05. C.MSrivastava and C.Srinivasan - *Science of Engg. Materials* - New Age International



**CH 101**

**ENGINEERING CHEMISTRY**

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

**UNIT - I : ELECTROCHEMISTRY**

**1.1. Electrodicts:**

Electrode Potentials-Standard Electrode Potentials-SOP & SRP. Electrochemical series-significance. Types of Electrodes (a) Gas Electrode (Hydrogen electrode) (b) Metal ion Electrode( $Zn/Zn^{+2}$ ) (c) Redox Electrode (Quinhydrone Electrode) (d) Metal- insoluble salt Electrode (Calomel Electrode)-. Nernst equation and its derivation and applications. Reversible and Irreversible cells: EMF of electrochemical cells-cell notation and cell reaction- Numerical Problems.

**1.2. Battery Chemistry:**

Primary batteries: Zinc-Carbon battery. Secondary batteries Lead-acid battery, Nickel-Cadmium and Lithium-Ion batteries - Charging and Discharging reactions and applications. Fuel Cells: Concept of fuel cells, Methanol-Oxygen fuel cells.

**1.3. Electro analytical Techniques:**

Principle, Method and Applications of the following techniques

Conductometry : Acid - Base titrations

Potentiometry : Acid - Base and Redox titrations

pH metry : Acid - Base titrations

**UNIT-II: THERMODYNAMICS AND PHASE RULE:**

**2.1. Thermodynamics:**

The Concept of Reversible and Irreversible processes. Work done in Isothermal & Adiabatic reversible and irreversible processes.

Success and limitations of First law of Thermodynamics. The need for Second law of thermodynamics. . Statements of Second law of thermodynamics. The Cannot Cycle. Heat engine and its efficiency. Carnot theorem. The Concept



of entropy. Criteria for spontaneity of a process in terms of entropy. Entropy changes in reversible and irreversible processes. Physical significance of entropy. Gibbs and Helmholtz free energies and their significance. Conditions of equilibrium and spontaneity in terms of free energy. Variation of free energy with temperature and pressure. Gibbs-Helmholtz equation and its applications- Numericals.

## **2.2 Phase Rule:**

Definition of terms phase, components and degrees of freedom. Statement of Phase rule. Phase rule equation and its application to one component system-water system and two components system- Pb-Ag system. Pattinson's Process of desilverization of lead

## **UNIT III : CORROSION AND WATER CHEMISTRY**

### **3.1 Corrosion and its control:**

Causes and effects- Types of corrosion-Chemical (dry) and electrochemical (wet) corrosion -Mechanism of electrochemical corrosion -Formation of anodic and cathodic areas -Galvanic corrosion, differential aeration corrosion (waterline and pitting corrosion)

Factors affecting the rate of Corrosion (a) Position of metals in Galvanic Series, (b) Relative areas of anode and cathode, (c) Nature of corrosion product, (d) Temperature (e) Humidity and (f)pH

Corrosion Control Methods: Cathodic Protection -Sacrificial Anode and Impressed Current Methods.

### **3.2 Surface Coating:**

Types of Metallic Coatings, Anodic and cathodic Coatings-Methods of Application of metallic coatings-Electroplating (Nickel Plating) & Electroless plating (Copper Plating) Paints-constituents and their functions.

### **3.3. Water Chemistry :**

Hardness of water-types - units of hardness-determination of temporary & Permanent Hardness of water by EDTA Method (numerical problems)- Alkalinity of Water & its determination -water softening by ion- exchange and reverse osmosis methods-specification of potable water. Disinfection of drinking water by chlorination-Break point Chlorination and Ozonization - Boiler troubles: Causes & effects.

## UNIT-IV: MATERIAL Chemistry

### 4.1 Polymers:

Definitions of the terms: Monomer, Polymers. Nomenclature: Homo-Hetero

and Copolymers. tacticity of polymers. Types of Polymerization (i) Addition (ii) Condensation (iii) Co-Polymerisation -Examples.

Thermoplastics & Thermosetting resins

Types of Polymers: (i) Plastics: preparation, Properties & uses of PVC (Plasticized & unplasticised) Teflon and Bakelite. (ii) Fibers: Preparation, Properties & uses of Kevlar and Polyurethanes (perlon-U).

(iii) Rubbers/Elastomers: Natural rubber and its chemical structure, Vulcanization and its significance. Preparation, Properties & Uses of Buna-S, Butyl Rubber and Silicone Rubbers.

### 4.2 Biodegradable polymers - Concept and significance - Polylactic acid.

### 4.3. Conducting polymers :

Definition, Classification into extrinsic and intrinsic polymers. Mechanism of conduction in polyacetylene. Structure of polyaniline and its doping. Applications of conducting polymers.

### 4.4 Composite Materials:

Definition. Types of composites (Fibre reinforced, glass fibre reinforced and carbon fibre reinforced) - Advantages.

### 4.5 Nanomaterials :

Introduction. Production methods and applications of Graphite, fullerene and Carbon nanotubes.

## UNIT-V: CHEMICAL FUELS

### 5.1 Fossil fuels

Classification of fuels, primary, secondary-solid, liquid and gaseous fuels-requirements of a good fuel. Determination of Calorific value by Bomb Calorimeter - HCV, LCV. Theoretical calculation of calorific value by Dulong's formula-numericals. Combustion -Ignition temperature of a fuel, calculation of Air quantities by Weight and Volume required for combustion of a fuel-Numerical problems.

Solid Fuels: Coal and its chemical composition, Proximate and Ultimate analysis. Liquid Fuels: Fractionation of Petroleum. Composition and uses of



-Gasoline, Diesel and Kerosene. Cracking & its Significance- Catalytic cracking by fixed bed method, Knocking. Fuel rating - Octane and Cetane numbers. Unleaded Petrol- composition and significance.' Automobile Exhaust - Catalytic Converters. Gaseous Fuels- LPG, CNG composition and uses.

## 5.2 Bio Diesel

Sources. Concept of Trans esterification. Properties and significance

## 5.3 Rocket Fuels:

Principles of rocket propulsion, Characteristics of a good propellant  
Classification of rocket fuels.

### Suggested Reading :

1. Principles of *Physical Chemistry* by Puri, Sharma and Pathania
2. Text Book of *Physical Chemistry* by P L Soni and O P Dharmarha, S Chand & Sons, New Delhi.
3. *Engineering Chemistry* by PC Jain and M Jain Dhanpat Rai & Sons (15th Edn), New Delhi.
4. *Engineering Chemistry* by C P Murthy and A Naidu, B S Publications, Hyderabad.
5. *Chemistry in Engineering and Technology* by J C Kuriacose and J Rajaram, TMH, New Delhi.
6. *Engineering Chemistry* by O.G. Palanna, TMH, and New Delhi.
7. *Engineering Chemistry* by S S Dara, S Chand & Sons, New Delhi.
8. *Engineering Chemistry* by Sashi Chawla. Dhanpat Rai & Sons, New Delhi.



CS 101

## PROGRAMMING IN C & C++

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

### UNIT - I

**Introduction of Computers :** Components, Block diagram, Operating Systems, Programming Languages, Assembler, Interpreter, Compiler, Loader, Linkers. Number Systems (Binary, Octal, Decimal and Hexa), Representation of numbers (fixed and floating point), Problem Solving: Algorithm, Flow Charts.

**Types, Operators and Expressions :** Variable Names, Data Types and Sizes, Constants, Declarations, Type Conversions, Operators, Precedence and Order of Evaluation.

**Control Flow and Behavior Flow Charts :** Statements and Blocks, If Else, Switch.

**Loops :** While, For, Do-While, Break, Continue, Goto and Labels.

### UNIT - II

**Functions :** Basic of Functions, Parameter Passing Techniques, Functions Returning Non-integers.

Storage Classes, External Variables, Scope Rules, Header Files, Static and Auto Variables, Register Variable, Block Structure, Initialization.

Recursion, The C Preprocessor: # include, # define, conditional compilation

**Arrays :** One Two and Multi-dimensional arrays. Linear and Binary Search, Selection and Bubble Sort.

**Pointers :** Pointers and Addresses, Pointers and Function Arguments, Pointers and Arrays, Address Arithmetic, Command line arguments.

### UNIT - III

**Structures and Unions :** Basics, Structure and functions, array of structures pointers to structures, Self referential structure, Union.

**Files:** Basics and File Handling functions: Copy file and display file.

#### UNIT - IV

**C++ :** Introduction, simple program, standard library, header files, inline functions, references and reference parameters, default arguments, empty parameter lists, unary, scope resolution operator, function overloading, function templates.

**Classes and data abstraction :** Class scope, accessing class members, interface, constructions, destructions, const objects and member functions, this pointer, new and delete operators, static class members.

**C++ Operator overloading :** Fundamentals, restrictions, overloading unary / binary operators, overloading ++ and --.

#### UNIT - V

**C++ Inheritance:** Base and derived classes, casting base class, pointers to derived class pointers, using member functions overriding, public, protected and private inheritance, constructors and destructors in derived classes.

**C++ Virtual Functions :** Abstract base class, polymorphism, dynamic binding, virtual destructors.

**C++ Stream Input / Output :** Streams, stream output, stream input.

**C++ Templates :** Introduction, class templates, templates and inheritance, templates and static members.

**C++ Exception Handling :** Try, throw, catch.

#### Suggested Reading:

1. Rajaraman V. *"Computer Programming in C"*, Prentice - Hall of India 2008.
2. Walter Savitch, *"Programming in C/C++"*, Fourth Edition, Pearson Education Publishing, 2008.
3. Harry H. Cheng, *"C / C++ for Engineers and Scientists"*, TMH 2010.
4. Pradip Dey, Manas Ghosh, *"Programming in C"*. Oxford, 2007.
5. DM Capper, *"Introducing C++ for Scientists"*, Engineers and Mathematicians, Edition, Springer, 2001.
6. Bjarne Stroustrup, *"The C++ Programming Language"*, Pearson, Third Edition, 2000.
7. K.R.Venugopal, Sudeep R. Prasad, *"Mastering in C "*, TMH, 1997.
8. K.R.Venugopal, Raj Kumar, T.Ravi Shanker, *"Mastering in C++"* TMH, 1997.

CE 101

## ENGINEERING MECHANICS

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

### UNIT-I

**System of forces :** Concepts of force, components of forces in a plane and in space various system of forces and their resultants, moment of force and its applications and couples.

**Equilibrium of force system :** Free body diagrams, equations of equilibrium of planar force system and spatial force systems.

### UNIT-II

**Centroid and Centre of gravity :** Significance of centroids, and moment of area, theorems of Pappus, centroids of line elements, plane areas, composite areas and volumes, centre of gravity of bodies.

**Friction :** Types of friction, limiting friction, laws of friction, static and dynamic friction, belt friction, Application of friction to a single body and connecting systems, wedge.

### UNIT-III

**Area moment of inertia :** Definition, polar moment of inertia, transfer theorem, moment of inertia of composite areas, product of inertia, transfer formula for product of inertia. Mass moment of inertia: Moment of inertia of masses, transfer formula and moment of inertia of composite bodies.

### UNIT-IV

**Kinematics :** Rectilinear motion, curvilinear motion, velocity and acceleration, types of rigid bodies, motion, and analysis in a plane.

**Kinetics :** Analysis as a particle and analysis as a rigid body in translation, central force Motion, equations of planar motion, fixed axis rotation.

### UNIT-V

**Work energy method :** Equation for translation, work energy principles applied to particle motion, connected systems, fixed axis rotation, and plane motion.



**Impulse and momentum:** Introduction, linear impulse-momentum, force of jet on a vane, principle of conservation of linear momentum, elastic impact and types of impacts, loss of kinetic energy, coefficient of restitution.

**Suggested Reading:**

1. F.L. Singer, *Engineering Mechanics*, Harper Collins Publishers, India 1904.

**Text Books for Reference:**

1. F.P. Beer & E.R. Johnston, Jr. *Vector Mechanics for Engineers*, TMH, 2004
2. S. Rajasekaran, et al, *Engineering Mechanics*, Vikas Publications, 2002
3. S.B. Junarkar & H.J. Shah, *Applied Mechanics*, Charotar Publications, 2001
4. A. Nelson, *Engineering Mechanics*, Tata McGraw Hill Publications, 2009
5. Basudeb Bhattacharya, *Engineering Mechanics*, Oxford Press, 2008.
6. Irving H. Shames & G Krishna Mohana Rao, *Engineering Mechanics*, Pearson Education, 2006
7. M.C. Goyal & G.S. Raghuvanshi, *Engineering Mechanics*, PHI Learning Private Limited, 2009.
8. MV. Seshagiri Rao & D. Rama Durgaiah, *Engineering Mechanics*, Universities Press, 2005.
9. R.S. Khurmi, *A Text book of Engineering Mechanics*, S. Chand & Company Ltd., 2010.
10. R.C. Hibbeler & Ashok Gupta, *Engineering Mechanics*, Pearson Education, 2010.

CE 102

## ENGINEERING GRAPHICS

Instruction	6	Periods per week
Duration of University Examination	3	Hours
University Examination	100	Marks
Sessional	50	Marks

### UNIT-I

**Instruments and their use :** Lettering and various types of lines, scales, reduced and enlarged scales, representative fraction, types of scales plain, diagonal and vertical.

**Geometrical construction :** Construction of regular polygons inscribed in a circle given the side of the polygon.

**Curves in engineering practice :** Construction of engineering curves such as ellipse parabola, hyperbola, cycloid, epicycloids, hypocycloid and involute.

### UNIT-II

**Projections of points and straight lines :** Points placed in different quadrants projections-of straight lines, parallel to one or both the reference planes and contained by one or both the reference planes, perpendicular to one and inclined to the other and inclines to both the reference planes and traces.

**Projections of planes :** Perpendicular planes, traces of planes, Oblique planes and auxiliary planes.

### UNIT-III

**Sections of solids :** Polyhedra, solids of revolution, projections of solids with axis inclined to one or both the reference planes.

### UNIT-IV

**Sections of solids :** True shapes of section, sections of prisms, pyramids, cylinder and cones.

**Development of surface :** Development of surface of various solids such as prism pyramids, cylinders and cone in simple position.

### UNIT-V

**Isometric projections :** Isometric scale. Isometric projections of prisms, pyramids, cones, spheres and combination of two or three solids.

**Intersection of Surfaces :** Intersection of cylinder to cylinder and cylinder to cone.

**Suggested Reading:**

1. N.D. Bhatt, *Elementary Engineering Drawing*, Charotar Publications, 2004.

**Text Books for Reference:**

1. K.L. Narayana & P. Kannaiah, *Text Book on Engineering Drawing*, Scitech Publications, 2002.
2. P.J. Shah, *Engineering Graphics*, S. Chand & Company Ltd., 2010
3. Dhananjay Ajolhe, *Engineering Drawing*, Tata McGraw Hill Publishing Company Ltd., 2008.
4. K.C. John, *Engineering Graphics for Degree*, PHI Learning Private Limited, 2009
5. R.K. Dhawan, *Engineering Drawing*, S. Chand & Company Ltd., 2009
6. M.B. Shah & B.C. Rana, *Engineering Drawing*, S. Chand & Company Ltd., 2009
7. Basant Agarwal & C.M. Agarwal, *Engineering Drawing*, Tata McGraw Hill Education Pvt. Ltd., 2008.
8. B.V.R. Gupta & M. Raja Roy, *Engineering Drawing*, I.K. International Publishing House Pvt. Ltd., 2009 .



PH 132

# PHYSICS LAB

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

1. P - N Junction Diode Characteristics
2. Determination of Dielectric constant of a material
3. B - H Curve
4. Determination of Planck's constant using photocell Photo Cell
5. CRO - Measurement of frequency, phase and amplitude
6. Characteristics of a Solar Cell
7. Newton's Rings
8. Diffraction due to single slit
9. Diffraction due to double slit
10. Diffraction Grating (normal incidence)
11. Determination of wavelength of Semiconductor Laser
12. Determination of specific rotator power of an optically active substance -Polarimeter
13. Optical Fiber- NA, acceptance angle and power loss
14. Holography recording and reconstruction
15. Intensity measurement using He-Ne laser
16. Hall effect
17. Thermoelectric power
18. Verification of Malus law
19. Double refraction
20. Study of Thermistor characteristics
21. Determination of the energy gap of a semiconductor

## Demonstration Experiments:

- A. Preparation of single crystals - slow evaporation method
- B. Preparation of nano materials - sol-gel method
- C. Preparation of glasses
- D. Observation of microstructures using microscope
- E. Four- Probe Resistivity apparatus

**CH 132**

**CHEMISTRY LAB**

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

**VOLUMETRIC ANALYSIS**

1. Introduction to Volumetric Analysis.
2. Techniques of Weighing and usage of Simple analysis balance.

**PERMANGANOMETRY**

3. Preparation of standard solution of FAS and Standardization of  $\text{KMnO}_4$  Solution.
4. Preparation of Standard solution of Mohr Salt, Standardization of  $\text{KMnO}_4$  solution & Estimation of ferrous iron in the given solution.
5. Ore Analysis - Determination of Manganese in pyrolusite.

**DICHROMETRY**

6. Preparation of Standard solution of Potassium Dichromate, Standardization of Mohr salt solution & Estimation of Dichromate chromium in the given solution.

**IODOMETRY**

7. Preparation of standard solution of potassium dichromate and standardization of Sodium thiosulphate solution.
8. Estimation of copper in the Brass solution by using standard Hypo Solution.

**ACIDIMETRY**

9. Preparation of standard sodium carbonate solution, Standardization of hydrochloric acid & Estimation of Carbonate, Bicarbonate in the given mixture.

**COMPLEXOMETRY**

10. Preparation of standard Magnesium Sulphate solution, standardization of EDTA solution and estimation of temporary and permanent hardness in the given sample of water.

## ORGANIC POLYMERS

11. Preparation of Urea- Formaldehyde and Thiokol rubber.

## INSTRUMENTAL CHEMICAL ANALYSIS

12. Introduction to instrumental chemical analysis and use of electrical and electronic balance up to 4th decimal place.

### CONDUCTROMETRY

13. Acid-base titration
  - a. Strong acid Vs strong base.
  - b. Weak acid Vs strong base titration.
  - c. Mixture of acids Vs strong base titration.

### POTENTIOMETRY

14. Acid base titration
  - a. Strong acid Vs strong base using quinhydrone electrode.
  - b. Weak acid-Vs strong base titration using quinhydrone electrode.
15. Estimation of Ferrous iron by Redox titration.

### pH METRY

16. Acid base titration
  - a. Strong acid Vs strong base.
  - b. Weak acid Vs strong base.

### COLOROMETRY

17. Verification of Beers law: using potassium permanganate and estimation of  $\text{KMnO}_4$  (Mn) in the given solution.
18. Determination of Ferrous iron in cement

### KINETICS

19. First order reaction - hydrolysis of methyl acetate

### SPECTROPHOTOMETER

20. Recording of  $\text{Cu}^{+2}$  spectrum, absorptivity (Demo only) determination of  $\lambda_{\text{max}}$  and molar

### Suggested Reading:

1. B.D.Khasla, A.Ojulati, V.C. Garg., *Senior Practical Physical Chemistry*, R.Chand and company, New Delhi 11th Edition.
2. *Laboratory Manual an Engineering Chemistry*, S.K.Bhasin and Sudha Rani Dhanpat Rai Publishing Company.



**ME 131****WORKSHOP PRACTICE**

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

Branch of Engg.	Trades for Practice	Trades for Demonstration
Mechanical Production Civil EEE	Fitting Carpentry House Wiring Welding Plumbing	Sheet Metal Work Smithy PC Assembly
CSE ECE IT IE	Fitting Carpentry House Wiring Sheet Metal Work Plumbing	Welding Smithy PC Assembly

Grades for exercises in the trades for practice shall be given to the students. Emphasis must be given for developing necessary skills.

CS 131

## PROGRAMMING LAB

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

1. Familiarization with an editor.
- Program to be written and tested for the following problems in 'c' Language:**
2. Sin x and Cos x values using series expansion.
3. Frequency of occurrence of characters and special characters like n, t, white spaces.
4. Bubble sort with an array.
5. Linear and Binary Searches.
6. Matrix addition and multiplication using pointers.
7. Generation of address labels using structures.
8. Sequential file operations.
9. Functions of string manipulations without using library functions.

### **The following problems should be programmed using C++ programming language.**

1. Finding maximum, minimum and sum of given set of numbers.
2. Implementation of a matrix class.
3. Classes for Bank Account, Student Information, Library catalog
4. Creation of complex class with operator overloading
5. Creation of inheritance hierarchy for graphic shapes.
6. Template functions for min( ) and max( ) for finding minimum and maximum in a list of numbers.
7. Programs for finding the number of characters, words, and sentences in the given test input.

**EG 131****ENGLISH LANGUAGE LAB**

Instruction	2	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

**Note :** While teaching the following items, emphasis may be laid on intensive practice in the language lab. Lecturing may be avoided as far as possible.

1. Introduction to English Phonetics: Introduction to auditory, acoustic and articulatory phonetics; Organs of speech: the respiratory, articulatory and phonatory systems.
2. Sound System of English: Phonetic sounds and phonemic sounds, introduction to International Phonetic Alphabet, classification and description of English phonemic sounds; minimal pairs; The syllable: types of syllables; Consonant clusters.
3. Aspects of connected speech: strong forms, weak forms, contracted forms, elision.
4. Word Stress: Primary stress, secondary stress, functional stress, rules of word stress.
5. Rhythm and Intonation: Introduction to rhythm and intonation; Major patterns of intonation in English with their semantic implications.
6. Presentation Skills: Making effective presentations, expressions which can be used in presentations, use of non-verbal communication, coping with stage fright, handling question and answer session; Use of audio-visual aids, PowerPoint presentations.
7. Interview Skills: planning and preparing for interviews, facing interviews confidently, use of suitable expressions during interviews.
8. Group Discussion: objectives of a GD; Types of GDs; Initiating, continuing and concluding a GD.
9. Debate: differences between a debate and a group discussion, essentials of a debate, conducting a debate.



10. Public Speaking: Advantages of public speaking, essentials of an effective speech, rehearsal techniques, planning and delivering a speech.
11. Role play: Use of dialogues in a variety of situations and settings.
12. Effective use of dictionary and thesaurus: Advantages of using a dictionary and thesaurus.

**Suggested Reading :**

1. E. Suresh Kumar et al, English for Success (with CD), Cambridge University Press India Pvt Ltd. 2010.
2. T. Balasubramanian, A Textbook of English Phonetics for Indian Students, Macmillan, 2008
3. Edgar Thorpe, Winning at Interviews, Pearson Education, 2006.
4. Hari Mohan Prasad, How to prepare for Group Discussions and Interviews, Tata McGraw Hill, 2006.
5. J. Sethi et al, A Practical Course in English Pronunciation (with CD), Prentice Hall India, 2005.