

NITTE MEENAKSHI INSTITUTE OF TECHNOLOGY

(An Autonomous Institution recognized by UGC, affiliated to VTU, Belgaum)

Yelahanka, Bangalore – 560 064



KNOWLEDGE • CHARACTER • UNITY

TENTATIVE COURSE CONTENT, SCHEME OF TEACHING AND EXAMINATION

FOR I AND II SEMESTER B.E. PROGRAMME (AUTONOMOUS SCHEME)

2014 - 2015

(COMMON TO ALL BRANCHES)

FOR I SEMESTER
(COMMON TO ALL BRANCHES)

SEMESTER: I

Physics Group

Sl No	Subject Code	Subject Name	Course Type	Teaching Dept.	Teaching Hours/week			Examination			Credits
					L#	T#	P#	CIE*	SEE**	Total	
1	14MAT11	Engineering Mathematics – I	BS^	MAT	4	1	0	50	50	100	4
2	14PHY12	Engineering Physics	BS^	PHY	4	0	0	50	50	100	4
3	14CIV13	Engineering Mechanics	EC\$	CV	4	1	0	50	50	100	4
4	14EME14	Elements of Mechanical Engineering	EC\$	ME	4	1	0	50	50	100	4
5	14ELE15	Basic Electrical Engineering	EC\$	EEE	4	1	0	50	50	100	4
6	14WSL16	Workshop Practice	EC\$	ME	0	0	3	50	50	100	1.5
7	14PHL17	Engineering Physics Lab	BS^	PHY	0	0	3	50	50	100	1.5
8	14CIP18	Constitution of India & Professional Ethics	Hu@	HUM	2	0	0	50	50	100	-
TOTAL								400	400	800	23

SEMESTER: I

Chemistry Group

Sl No	Subject Code	Subject Name	Course Type	Teaching Dept.	Teaching Hours/week			Examination			Credits
					L#	T#	P#	CIE*	SEE**	Total	
1	14MAT11	Engineering Mathematics –I	BS^	MAT	4	2	0	50	50	100	4
2	14CHE12	Engineering Chemistry	BS^	CHE	4	0	0	50	50	100	4
3	14CCP13	Computer Concepts & C Programming	EC\$	CS/IS	4	1	0	50	50	100	4
4	14CED14	Computer Aided Engineering Drawing	EC\$	ME	2	0	4	50	50	100	4
5	14ELN15	Basic Electronics Engineering	EC\$	ECE	4	1	0	50	50	100	4
6	14CPL16	Computer Programming Lab	EC\$	CS/IS	0	0	3	50	50	100	1.5
7	14CHL17	Engineering Chemistry Lab	BS^	CHE	0	0	3	50	50	100	1.5
8	14CIV18	Environmental Studies	Hu@	HUM	2	0	0	50	50	100	-
9	14ENG19	Communicative English	Hu@	HUM	2	0	0	50	50	100	2
TOTAL								450	450	900	25

^BS- Basic Science, \$EC-Engg.Core,@Hu-Humanities,*Continuous Internal Evaluation, ** Semester End Examination,
L- Lecture, T- Tutorial, P- Practical,

FOR II SEMESTER
(COMMON TO ALL BRANCHES)

SEMESTER: II

Physics Group

Sl No	Subject Code	Subject Name	Course Type	Teaching Dept.	Teaching Hours/week			Examination			Credits
					L#	T#	P#	CIE*	SEE**	Total	
1	14MAT21	Engineering Mathematics – II	BS^	MAT	4	2	0	50	50	100	4
2	14PHY22	Engineering Physics	BS^	PHY	4	0	0	50	50	100	4
3	14CIV23	Engineering Mechanics	EC\$	CV	4	1	0	50	50	100	4
4	14EME24	Elements of Mechanical Engineering	EC\$	ME	4	1	0	50	50	100	4
5	14ELE25	Basic Electrical Engineering	BC\$	EEE	4	1	0	50	50	100	4
6	14WSL26	Workshop Practice	EC\$	ME	0	0	3	50	50	100	1.5
7	14PHL27	Engineering Physics Lab	BS^	PHY	0	0	3	50	50	100	1.5
8	14CIP28	Constitution of India & Professional Ethics	Hu@	HUM	2	0	0	50	50	100	-
TOTAL								400	400	800	23

SEMESTER: II

Chemistry Group

Sl No	Subject Code	Subject Name	Course Type	Teaching Dept.	Teaching Hours/week			Examination			Credits
					L#	T#	P#	CIE*	SEE**	Total	
1	14MAT21	Engineering Mathematics –II	BS^	MAT	4	2	0	50	50	100	4
2	14CHE22	Engineering Chemistry	BS^	CHE	4	0	0	50	50	100	4
3	14CCP23	Computer Concepts & C Programming	BC\$	CS/IS	4	1	0	50	50	100	4
4	14CED24	Computer Aided Engineering Drawing	BC\$	ME	2	0	4	50	50	100	4
5	14ELN25	Basic Electronics Engineering	EC\$	ECE	4	1	0	50	50	100	4
6	14CPL26	Computer Programming Lab	BC\$	CS/IS	0	0	3	50	50	100	1.5
7	14CHL27	Engineering Chemistry Lab	BS^	CHE	0	0	3	50	50	100	1.5
8	14CIV28	Environmental Studies	Hu@	HUM	2	0	0	50	50	100	-
9	14ENG29	Communicative English	Hu@	HUM	2	0	0	50	50	100	2
TOTAL								450	450	900	25

^BS- Basic Science, \$EC-Engg. Core,@Hu-Humanities, *Continuous Internal Evaluation, ** Semester End Examination, # L- Lecture, T- Tutorial, P- Practical

ENGINEERING MATHEMATICS- I

Sub Code : 14MAT11
Hours/Week : 4+1+0 (L+T+P)
Total hours : 52
Exam Hours : 03

Credits : 04
CIE Marks : 50
SEE Marks : 50
Course type : Basic Sc.

Expected Course outcomes:

- Students understand basics of differential calculus, learn the importance of Taylor series
- Students learn to differentiate functions with several variables and will be able to apply same
- Students learn to integrate functions of two and three variables and apply the concepts
- Students understand the concepts, importance and applications of vector calculus
- Students learn to fit the data using least square methods.

Unit 1: Differential Calculus

11 hours

Polar curves, angle between tangent and radius vector, angle of intersection, pedal equation, derivatives of arc, radius of curvature.

Successive differentiation – nth derivative of standard functions, Leibnitz rule, Taylor's and Maclaurin series (without proof), Indeterminate forms- problems

4.1, 4.2, 4.4, 4.5, 4.7, 4.8, 4.9, 4.11 (text book 1)

Unit 2: Partial differentiation

10 hours

Partial derivatives, Homogeneous function, Euler's theorem, Total derivative, Implicit and composite function, Jacobian, Maxima and Minima for function of two variables, differentiation under integral sign- problems

5.2, 5.4, 5.5, 5.7, 5.11(1), 5.13 (text book 1)

Unit 3: Integral Calculus

10 hours

Reduction formula $\int \sin^n x dx$, $\int \cos^n x dx$ and $\int \sin^m x \cos^n x dx$, for Multiple integrals - double and triple integration, application to find area and volume, Gamma and Beta functions- problems

6.2, 6.3, 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.14, 7.15, 7.16 (text book 1)

Unit 4: Vector Calculus

11 hours

Differentiation of vectors, velocity and acceleration, Gradient, divergence and curl of a vector, solenoidal and irrotational vectors, Laplacian, vector identities,

Line integral, Surface integral and volume integral. Green's theorem, Stokes theorem and Gauss divergence theorem (without proof), problems

8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.11, 8.12, 8.13, 8.14, 8.15, 8.16 (text book 1)

Unit 5: Curve fitting

10 hours

Curvilinear coordinates: Representation of vectors in cylindrical and spherical coordinates.

Curve fitting using least square method, straight line, parabolic and exponential curves, Regression lines, correlation, rank correlation, multiple linear regression

8.20, 8.21, 24.5, 24.6, 25.12, 25.13, 25.14, 25.15, 25.16 (text book 1)

Text Book:

1. Higher Engg. mathematics by Dr. B S Grewal, 42nd Edition.
2. Advanced Engg. Mathematics by Erwin E Kreyszig, 8th edition, Wiley.

Reference Books:

1. Mathematics for science students by Louis Lyons, Cambridge university press, 2005
2. Vector calculus by P C Matthews, Springer, 2005
3. Advanced Engg. Mathematics by Erwin E Kreyszig, 8th edition, Wiley.

Assessment Method:

- CIE:**
1. Three internals tests (each 30 marks) are conducted, average of best two tests marks will be considered.
 2. Every week Tutorials classes are conducted and evaluated for 10 marks. Average of all will be considered.
 3. Two written surprise quiz tests conducted and evaluated for 10 marks. Average of these two will be considered.
- SEE:**
1. Two Questions are to be set from each unit, carrying 20 Marks each.
 2. Students have to answer 5 questions selecting one full question from each unit.

ENGINEERING PHYSICS

Sub Code : 14PHY12/22
Hours/Week : 4+0+0 (L+T+P)
Total hours : 52
Exam Hours : 03

Credits : 04
CIE Marks : 50
SEE Marks : 50
Course type : Basic Sc.

Expected Course outcomes:

- Students able to apply the physical optical phenomena 'Interference in thin films' and 'Diffraction' in designing optical instruments.
- Students can assess defects in the objects without destructing them in different methods and systems by using ultrasonic's.
- Students able to design and analyze optical sensing and communication instruments.
- Students able to extrapolate properties of magnetic, dielectric and semiconducting materials in designing magnetic, electrical & electronic devices.
- Student able to examine the discrepancy between classical estimates and laboratory observations of physical properties exhibited by materials would be lifted out through the understanding quantum picture of sub-atomic world dominated by electron and its presence.

Unit 1: Wave optics and Ultrasonic applications**10 hours**

Interference: Introduction, Interference in thin films by reflection, Wedge shaped film, Newton's rings, problems.

Diffraction: Introduction, Fraunhofer diffraction at Single, double & N-slit, Diffraction grating, Grating spectrum, Rayleigh's criterion for resolving power. Resolving power of a grating, problems.

Non-Destructive Testing: Ultrasonic waves properties and generation - Ultrasonic transducers - Ultrasonic Non-destructive testing systems and Methods - Applications of NDT in Engineering and Industry.

Unit 2: Lasers and Fiber optics**10 hours**

Lasers: Introduction, Basic concepts (absorption, spontaneous emission and Stimulated emission) Einstein coefficients and their relations, Population inversion, Lasing action, - Characteristics of Lasers Working principle and components of He-Ne laser, CO₂ laser and Semiconductor Laser, Applications of Laser in Industry and medicine, Holography and its applications, problems.

Fiber Optics: Introduction, Basic structure of optical fiber, Principle of optical fiber - Acceptance angle, acceptance cone and Numerical aperture - Types of optical fibers (Material, Refractive index and Mode guiding) - V-number, Attenuation -Advantages and disadvantages of Optical fibers - Fiber optic Communication system - Fiber optic sensors, problems.

Unit 3: Magnetic and Dielectric Properties

10 hours

Magnetic Properties: Origin of magnetic moment - Classification of Magnetic materials - Diamagnetism - Langevin's theory of paramagnetism - Domain theory of ferromagnetism - B-H curve - Soft and hard magnetic materials - applications, problems.

Dielectric Properties: Dielectric constant - polarization - Polarizability - Internal field - Clausius-Mossotti equation - Orientation, Ionic and Electronic Polarizability- frequency dependence of Polarizability - Frequency dependence of Total Polarizability- Piezo electricity, Ferro electricity- non linear properties, problems.

Unit 4: Basics of Quantum mechanics and electrical conductivity in metals

11 hours

Quantum Mechanics: Introduction, Wave particle dualism, de-Broglie hypothesis, Davison & Germer experiment, matter waves and their characteristic properties, Phase velocity, Group velocity and relation between phase velocity and group velocity, relation between group velocity and particle velocity- Schrodinger Time Independent wave equation – Eigen values and Eigen functions, Physical significance of wave function - Particle in a box (one dimensional), problems.

Free electron theory of Metals: Classical free electron theory –drawbacks- Quantum free electron theory – Fermi-Dirac distribution function and its dependence on temperature - Heat capacity and electrical conductivity through quantum considerations, problems.

Unit 5: Semiconductor and thin films

11 hours

Semiconductor Physics: Introduction –carrier concentration and position of Fermi level in Intrinsic semiconductors - Temperature dependence, Equation for conductivity – carrier concentration and position of Fermi level in Extrinsic semiconductor – Temperature dependence Drift and diffusion – Einstein's equation – Hall Effect, problems.

Thin Film Material Science: Thin film deposition techniques- PVD, Thin film characterization- Optical techniques, electrical & magnetic techniques, Material techniques and special properties of thin films- optical, electrical, magnetic and mechanical.

Text Book:

1. Solid state Physics by S O Pillai -New age Publications (Unit II, III, IV and V)
2. Engineering Physics by R K Gaur, S L Gupta - Dhanpat Rai Publications. (Unit I)
3. Thin Film phenomena by K L Chopra. (Unit V)

Reference Books:

1. Solid state physics by R L Singhal, Kedar Nath Ram Nath and Co., Meerut
2. Optic by Ajay Ghatak (McGrawhill Education)
3. Introduction to solid state physics” by Charles Kittel (Willey India Pvt.Ltd)
4. Lasers & Nonlinear optics, B B Laud, New Age International Ltd.
5. Engineering Physics, V Rajendran Tata McGraw Hill
6. Material Science, R S Kurmi, R S Sedha, S Chand Publications

Assessment Method:

- CIE:**
1. Three internal tests (each 30 marks) are conducted, average of best two tests marks will be considered.
 2. Minimum two Assignments - evaluated through rubrics for 10 marks. Average of two will be

considered.

3. Two written surprise quiz tests conducted and evaluated for 10 marks. Average of these two will be considered.

SEE: 1. Two Questions are to be set from each unit, carrying 20 Marks each.

2. Students have to answer 5 questions selecting one full question from each unit.

ENGINEERING MECHANICS

Sub Code : 14CIV13/23
Hours/Week : 4+1+0 (L+T+P)
Total hours : 52
Exam Hours : 03

Credits : 04
CIE Marks : 50
SEE Marks : 50
Course type : Engg. Core

Expected Course outcomes:

- Compute the resultant of concurrent and non-concurrent system of forces
- Solve the equilibrium problems of concurrent and non-concurrent system of forces
- Solve the problems related to plane truss, Plane, Wedge, and ladder frictions
- Calculate centroidal distances and moment of inertia of compound lamina
- Solve the problems related to Rectilinear motion, projectiles, work power energy

Unit 1

10 hours

Concurrent system of forces: Introduction, definition of a force, classification of system of forces, principle of transmissibility, resolution of a force, composition of forces, resultant and equilibrant. Triangle law of forces, polygon law of forces. Analytical method of determination of the resultant of the system of forces. Problems on the determination of resultant of concurrent coplanar system of forces.

Non-concurrent system of forces: Moment of a force, Varignon's theorem of moments, couples and their characteristics. Determination of magnitude, direction and position of resultant of non-concurrent coplanar system of forces. Example problems

Unit 2

10 hours

Equilibrium of system of forces: Definition, conditions of equilibrium for concurrent coplanar system of forces, Lami's theorem. Example problems

Types of supports, loads and beams. Determination of support reactions for statically determinate beams and other simple structures.

Unit 3

10 hours

Trusses: Definition: Plane truss, space truss, determinate truss and indeterminate truss. Analysis of plane truss using method of joints and method of sections. Numerical examples.

Friction: Introduction, angle of friction, coefficient of friction, cone friction, limiting friction, types of friction, laws of static friction, Example problems related to impending motion on horizontal and inclined planes, wedge friction.

Unit 4

10 hours

Centroid and Centre of Gravity: Definition, derivation of expressions for centroidal distances of simple planar laminas like rectangle, triangle, quarter and semi circle. Determination of centroidal distances of compound laminas.

Moment of Inertia: Introduction, Definition, Theorems of perpendicular and parallel axis. Concept of axis of symmetry, derivations of expressions for moment of inertia of simple planar laminas like rectangle, triangle, quarter, and semi circle and circle. Definitions of polar moment of inertia, radius of gyration, Determination of moment of inertia, polar moment of inertia, radius of gyration of compound laminas about centroidal axes and about any specified reference line.

Unit 5

12 hours

Introduction to rectilinear motion of a particle, projectiles, D'Alembert's principle, super elevation, Work power energy, work energy equation and related problems

Text Book:

1. Meriam&Craig, Engineering Mechanics, John Wiley & Sons.
2. Ferdinand P Beer and E RusselJohnson , Mechanics for Engineers (Statics and dynamics) McGraw Hill book company, New York.

Reference Books:

1. Irwing Shames ,Engineering Mechanics, Prentice Hall of India
2. K L Kumar, Engineering Mechanics, Tata McGraw Hill Publishers, New Delhi
3. T.R.Jagdish and M A Jayaram, Elements of Civil Engg & Engg. Mechanics , Sapna book house, Bangalore
4. S.S Bhavikatti, Engg Mechanics, New Age International Publishers
5. B.K. Kolhapure, Engineering Mechanics, Eastern Book Promoters Belgaum [EBPB]

Assessment Method:

- CIE:**
1. Three internal tests (each 30 marks) are conducted, average of best two tests marks will be considered.
 2. Minimum two Assignments - evaluated through rubrics for 10 marks. Average of two will be considered.
 3. Two written surprise quiz tests conducted and evaluated for 10 marks. Average of these two will be considered.
- SEE:**
1. Two Questions are to be set from each unit, carrying 20 Marks each.
 2. Students have to answer 5 questions selecting one full question from each unit.

ELEMENTS OF MECHANICAL ENGINEERING

Sub Code	: 14EME14/24	Credits	: 04
Hours/Week	: 4+1+0 (L+T+P)	CIE Marks	: 50
Total hours	: 52	SEE Marks	: 50
Exam Hours	: 03	Course type	: Engg. Core

Expected Course outcomes:

- Students will be able to describe different forms of energy and their inter conversion.
- Students should be able to comprehend, substitute and solve problems related to the energy conversion and interpret different manufacturing processes.
- Students will be able to distinguish between facts related to materials or concepts into component parts and other applications.

Unit 1**10 hours**

Thermodynamics: Basic concepts of thermodynamics, First and Second laws of thermodynamics, thermodynamic cycles (Carnot cycle, Rankine cycle, Otto cycle, Diesel cycle, Brayton cycle)

Steam: Formation, types, properties-Specific Volume, Enthalpy and Internal energy (Simple numerical on properties of steam).

Unit 2**10 hours**

Turbo machinery:Classification, Construction and working principle of Steam Turbines: Impulse-De-Laval's turbine and reaction turbines- Parson's turbine (No compounding of turbines). Gas Turbines: Open cycle and closed cycle gas turbines .Water Turbines: Pelton wheel, Francis turbine and Kaplan turbine .Centrifugal compressor, Centrifugal pump, Blowers.

Internal Combustion Engines:Classification, I.C. Engines parts and terminology, principle and operation of 2 Stroke and 4 stroke Petrol engines, 4 stroke diesel engines with P-V diagrams. Performance parameters: indicated power, brake power, friction power, indicated thermal efficiency, brake thermal efficiency, mechanical efficiency, specific fuel consumption, simple numerical problems.

Unit 3**10 hours**

Machine tools and Operations:Lathe operations-Turning, facing, knurling, thread cutting, drilling, Taper Turning by swiveling the compound rest.Drilling Operations- Boring, Reaming, Tapping, Counter Sinking, Counter Boring.Milling Operations- Plane milling, End Milling Operations: Face milling, Slot milling. (No sketches of Machine tools. Sketches to be used only for explaining operations.Students to be shown the available machine tools in the Machine Shop before explaining the operations of machine tools).

Robotics:Introduction, classification based on robots configuration: Polar, cylindrical, Cartesian coordinate and spherical. Application, Advantages, and disadvantages

Unit 4**10 hours**

Engineering Materials :Properties of materials, types and applications of Ferrous & Nonferrous metals and alloys. Stress-strain curve for ductile and brittle materials.Composites: Introduction: definition, classification and applications (Air craft and Automobiles).

Joining Processes: Permanent Joints: Soldering, Brazing and Welding: Definitions, classification and method of soldering, Brazing and welding. Differences between soldering, brazing and Welding.Description of Electric Arc Welding, Oxy-acetylene Welding, TIG and MIG welding.Temporary Joints: Fasteners like Bolts, nuts, screws (square and hexagonal bolts and nuts, m/s screw).

Unit 5**12 hours**

Belt drives: Open & crossed belt drives, Definitions- slip, creep, velocity ratio, derivations for length of belt in open and crossed belt drive, ratio of tension in flat belt drives, advantages and disadvantages of V belts, simple numerical problems.

Gear drives: Types–spur, helical, bevel, worm, and rack and pinion. Velocity ratio, advantages and disadvantages over belt drives, Simple numerical problems on velocity ratio.

Refrigeration and Air-Conditioning: Refrigeration: Definitions- Refrigerating effect, Ton of Refrigeration, COP, Working principle of vapor compression refrigeration and vapor absorption refrigeration. Refrigerants: properties, list of commonly used refrigerants.Air conditioning: working principle of Room (window) air conditioner and applications.

Text Books:

1. Basic Mechanical Engineering by N R Banapurmath, V S Yaliwal, 1st Edition, 2014, Vikas publishing house Pvt Ltd Noida
2. Elements of Mechanical Engineering, M.Srinivasa Reddy,H.G.Shenoy and Sundaresh,3rd Edition, Subhash Stores, Avenue Bangalore.

Reference Books:

1. A Text Book of Mechanical Engineering Science, K R Gopalkrishna, 30th Edition, 2012, SubasPublishers, Bangalore
2. Elements of Mechanical Engineering, SKH Chowdhary AKH Chowdhary&Nirjar Roy, MediaPromotors and Publishers, Mumbai.
3. Industrial Robotics, GrooverMcGrawHill 2003
4. Engineering Thermodynamics by P.K.Nag, Tata McGrawHill 2005
5. Understanding combustion by H.S.Mukunda, 2nd edition.

Assessment Method:

- CIE:** 1.Three internals tests (each 30 marks) are conducted, average of best two tests marks will be considered.
2. Project evaluated through rubrics / Minimum two Assignments Average of two will be considered - for 10 marks.
- 3.Two written surprise quiz tests conducted and evaluated for 10 marks. Average of these two will be considered.
- SEE:** 1. Two Questions are to be set from each unit, carrying 20 Marks each.
2. Students have to answer 5 questions selecting one full question from each unit.

BASIC ELECTRICAL ENGINEERING

Sub Code : 14ELE15/25
Hours/Week :4+1+0 (L+T+P)
Total hours : 52
Exam Hours : 03

Credits : 4
CIE Marks : 50
SEE Marks : 50
Course type : Engg. Core

Expected Course Outcomes:

- Students will be able to solve problems in DC circuits using Kirchhoff's laws, Single phase and three phase balanced circuits by understanding the concepts of impedance, phase angle and power factor.
- Students will be able to understand the working of DC generators, DC motors, Transformers, Alternators and Induction motors and solve problems.
- Students will have the fundamental knowledge of Electrical measuring instruments, concepts of various lamps, domestic wiring and different types of earthing.

Unit1**10 hours**

D.C. Circuits: Solution by Loop Analysis. Analysis of series, parallel and series – parallel resistive circuits excited by independent voltage sources, Power and Energy in such circuits. Illustrative examples.

Electromagnetism: Statically and dynamically induced emf. Concept of self-inductance, mutual inductance and coefficient of coupling. Energy stored in magnetic field. Illustrative examples.

Domestic Wiring: Two-way and three-way position control of a lamp. Elementary discussion on fuses . Necessity and types of earthing. Electric Shock and precautions against it.

Unit2**08 hours**

DC Machines: Working principle of DC machine as a generator and a motor. Types and constructional features.Emf equation of generator, Illustrative examples, Operation of DC motor, back emf and its significance, torque equation.Types of DC motors, characteristics and applications.Necessity of a starter for DC motor.Illustrative examples on back emf and torque.

Unit3**10 hours**

Single-phase A.C. Circuits: Generation of sinusoidal voltage, definition of average value, root mean square value, form factor and peak factor of sinusoidally varying voltage and current, phasor representation of alternating quantities. Analysis, with phasor diagrams of R, L, C, RL, RC and RLC elements (illustrative examples involving series, parallel and series-parallel circuits). Real power, reactive power, apparent power and power factor. Illustrative examples.

Measuring Instruments and Illumination: Construction and Principle of operation of dynamometer type wattmeter. Measurement of energy using single phase Induction type energy meter . Concepts of CFL, LED and Induction lamps.

Unit4**12 hours**

Three Phase Circuits: Necessity and advantages of three phase systems, generation of three phase power, definition of Phase sequence, balanced supply and balanced load. Relationship between line and phase values of balanced star and delta connections. Power in balanced three-phase circuits, measurements of power by two-wattmeter method. Determination power factor using wattmeter readings. Illustrative examples.

Synchronous Generators: Principle of operation. Types and constructional features. Emf equation. Concept of winding factor (excluding derivation of distribution and pitch factors). Illustrative examples on emf Equation.

Unit5**12 hours**

Transformers: Principle of operation and construction of single-phase transformers (core and shell types). Emf equation, losses, efficiency ,condition for maximum efficiency, voltage regulation and its significance (Open circuit and Short circuit tests, equivalent circuit and phasor diagrams are excluded). Illustrative problems on emf equation and efficiency only.

Three Phase Induction Motors: Concept of rotating magnetic field, Principle of operation, Types and Constructional features. Expression for torque, Slip and its significance ,torque slip characteristics . Applications of squirrel cage and slip ring motors. Necessity of a starter. Illustrative examples on slip calculations.

Text Books:

1. "Basic Electrical Engineering", D C Kulshreshtha, ,TMH,2009 Edition.
2. "Electrical Technology", E. Hughes International Students 9th Edition, Pearson, 2005.

Reference Books:

1. "Fundamentals of Electrical Engineering", Rajendra Prasad, PHI, Second Edition, 2009.
2. "Basic Electrical Engineering", M.V.Rao, Edition 2010

Assessment Method:

CIE:

1. Three internals tests (each 30 marks) are conducted, average of best two tests marks will be considered.
2. Assignments will be conducted for 10 marks. Average of all will be considered.
3. Two written surprise quiz tests conducted and evaluated for 10 marks. Average of these two will be considered.

SEE:

1. Two Questions are to be set from each unit, carrying 20 Marks each.
2. Students have to answer 5 questions selecting one full question from each unit.

WORKSHOP PRACTICE

Sub Code : 14WSL16/26
Hours/Week : 0+0+3 (L+T+P)
Total hours : 39
Exam Hours : 03

Credits : 1.5
CIE Marks : 50
SEE Marks : 50
Course type : Engg. Core

Expected Course outcomes:

- Students will be able to identify and understand the use of marking tools, hand tools, measuring equipment and work to prescribed tolerances with workshop safety regulations.
- Students will be able to develop and convert a raw sheet metal into required shape as per the specified dimension.
- Students will be able to demonstrate the knowledge of welding, joint design and the application of welding to apply appropriate methodologies for quality control and inspection of welded joints.

Unit 1 **12 hours**

Profile Cutting: Models: Combination of straight and circular cut. (04 models).

Unit 2 **09 hours**

Development and sheet metal work: Models: Funnel, Tray, Transition Piece (Circular to hexagon/Pentagon, circular to square, square to rectangle). (04 models).

Unit 3 **06 hours**

Welding: Butt Joint, Lap joint, T-Joint, V-Joint (with edge preparations) models have to be prepared with Calculation of electrode length required for welding.

Unit 4 **12 hours**

Study Experiments (Only for CIE)

1. Domestic wiring- Control of Lamp by Two Way and Three Way
2. Measurement of power by two Wattmeters method
3. Power factor improvement
4. Energy measurement
5. Star-Delta connection

Text Book:

1. Workshop Technology, VOL I/IISKH Chowdhary AKH Chowdhary&NirjarRoy, Media Promoters and Publishers, Mumbai.
2. "Basic Electrical Engineering", D C Kulshreshtha, TMH, 2009 Edition.

Assessment Method:

CIE: Day to day work and submission - 30marks, Internal Test-15 marks, Viva Voce/surprise test-5 marks

SEE Question Paper Pattern: Fitting Model - 15 Marks, Welding model - 05 Marks, Sheet Metal Model - 20 Marks, Viva Voce - 10 Marks

ENGINEERING PHYSICS LAB

Sub Code : 14PHL17/27
Hours/Week : 0+0+3 (L+T+P)
Total hours : 39
Exam Hours : 03

Credits : 1.5
CIE Marks : 50
SEE Marks : 50
Course type : Basic Sc.

Expected Course outcomes:

- Students able to assess the behavior of light in the phenomena of interference, diffraction and propagation through the optical fiber.
- Students able to analyze experimentally the behavior of ultrasonic's in liquid media.
- Students able to examine the characteristic behavior of Zener diode, photo diode and transistor experimentally.
- Students able to extrapolate temperature dependence of electrical resistivity of semiconductors in its temperature sensing applications.

List of Experiments

1. **Newton's rings:** To determine the radius of curvature of given Plano convex lens by forming Newton's rings.
2. **Parallel fringes:** To find the diameter of thin wire by forming parallel fringes.
3. **Diffraction grating:** To determine the wave lengths of mercury spectral lines by grating minimum deviation method.
4. **Ultrasonic Interferometer:** To determine the velocity of ultrasonic waves in a liquid medium.
5. **Numerical aperture:** To determine the numerical aperture of step index optical fiber.
6. **Dielectric constant:** To determine the dielectric constant of given dielectric by capacitor charge and discharge method
7. **Photodiode Characteristics:** To study the V-I characteristics of photo diode for different light intensity in reverse bias condition
8. **Zener Diode Characteristics:** To study the V-I characteristics of Zener diode and find the reverse Zener break down voltage
9. **Transistor Characteristics:** To study the input and output characteristics of NPN Transistor in CE configuration and find the gain factor.
10. **Energy Gap:** To find the energy gap of a given thermistor.

Reference Books

1. Laboratory Manual in applied Physics, H Sathyaseelan, New age International.
2. Engg. Physics Practicals, S. P Basavaraju, Subhas stores
3. Practical Physics, R K Shukla & Anchal Srivastava, New Age International

Assessment Method:

CIE: Day to day work and submission -30marks, Internal Test-15 marks, Viva voce-5 marks

SEE Question Paper Pattern: Students are required to conduct two experiments. Viva voce 10marks

CONSTITUTION OF INDIA AND PROFESSIONAL ETHICS

(Non Credited Mandatory Course)

Sub Code	: 14CIP18 / 28	Credits	: --
Hours/Week	: 2+0+0 (L+T+P)	CIE Marks	: 50
Total hours	: 26	SEE Marks	: 50
Exam Hours	: 02	Course type	: Humanity

Expected Course Outcomes:

- Students understands the functions, different organizations, the fundamental rights and duties.
- Students will understand the union executive, emergency provisions and major amendments.
- Students will know the importance of various aspects of ethics, morality, honesty, integrity and safety of engineers in public life.

Unit 1

07 hours

Preamble to the Constitution of India. Fundamental Rights under part –III- Details of exercise of rights, Limitations and Important cases. Relevance of Directive Principles of State Policy under part-IV. Fundamental duties and their significance.

Unit 2

06 hours

Union Executive- President, Prime minister, Parliament and the Supreme Court of India. State Executive- Governor, Chief Minister, State Legislator, and high Courts.

Unit 3

05 hours

Emergency Provisions. Major Constitutional Amendment procedure – 42nd, 44th, 74th, 76th, 86th& 91st. Electoral process

Unit 4

04 hours

Scope and Aims of Engineering Ethics. Responsibilities of Engineers and Impediments.

Unit 5

04 hours

Honesty, Integrity, & Reliability. Risk, Safety and Liability in Engineering.

Text Books:

1. "Constitution of India and Professional Ethics" by K R Phaneesh – Sudha Publications.
2. "Constitution of India and Professional Ethics" by Dr. Umapathi K.L, Ramesh L. Chakrasali- Sahana Publications-2005

Reference Books:

1. Durga Das Basu: "Introduction to the Constitution Of India"-Prentice Hall of India, 19th/20th Edn., 2001
2. "Engineering Ethics" By Charles E. Haries, Michael. S. Pritchard and Michael J. Robins- Thompson Asia, 2003.
3. "Introduction to Constitution of India" by M.V. Pylee, Vikas Publishing, 2002.
4. "Constitution of India- A Road to social revolution" by B.S. Lingaraj, VidhyanidhiPrakashan, Gadag, 2006

Assessment Method:

- CIE:**
1. Three internal tests (each 30 marks) are conducted, average of best two tests marks will be considered.
 2. Minimum two Assignments - evaluated through rubrics for 10 marks. Average of two will be considered.
 3. Two written surprise tests conducted and evaluated for 10 marks. Average of these two will be considered.
- SEE:** Question paper is of objective type consisting of 50 questions.

ENGINEERING CHEMISTRY

Sub Code : 14CHE12/22
Hours/Week : 4+0+0 (L+T+P)
Total hours : 52
Exam Hours : 03

Credits : 4
CIE Marks : 50
SEE Marks : 50
Course type : Basic Sc.

Expected Course Outcomes:

- An ability to apply knowledge of redox reactions in the emerging science fields.
- To understand the impact of engineering chemistry solutions in a global, economic, environmental, and societal context
- Demonstrate knowledge of solids state chemistry and its application with direct application to the built environment.
- Analyze chemical reactions according to stoichiometric methodology and be able to predict the outcome of reactions, including those involving acids and bases and their applications
- An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

Unit 1

11 hours

Chemical energy sources: Introduction to energy, Fuels-definition, classification, importance of hydrocarbon fuels, Calorific value-definition, Gross and Net calorific value, (SI units). Determination of calorific value of a solid/liquid fuel using Bomb calorimeter. Determination of calorific value of a gaseous fuel using Bouy's calorimeter Petroleum cracking-Fluidized catalytic cracking, Reformation of petrol. Numericals.

Conversion and storage of electrochemical energy: Single electrode potential- definition, origin, sign convention. Derivation of Nernst equation. Standard electrode potential- definition. Construction of galvanic cell-classification of primary, secondary and concentration cells. EMF of a cell-definition, notation and convention.

Batteries: primary, (dry cell) and Secondary battery (Li-Ion) construction and working principle.

Fuel cells: Fuel cells -definition, classification, construction and working principle of H₂-O₂ Fuel cell.

Unit 2

10 hours

Corrosion Science: Corrosion- definition, Chemical Corrosion and electrochemical theory of Corrosion, Types of Corrosion, Differential metal corrosion, Differential aeration corrosion (Pitting and water line corrosion) Stress corrosion, Factors effecting the rate of corrosion. Corrosion control: Design, Metal coatings- Galvanizing and Tinning, Cathodic Protection.

Water technology: Impurities in the water, Definition- COD and BOD: Determination of different constituents in water- COD and DO. Numericals. Sewage Treatment, Potable water, Purification of water-, Electrodialysis, and Reverse osmosis.

Unit 3**10 hours**

Crystal structure: Introduction,- Space Lattice and unit cell, Basis. Unit cell, Bravais lattice and Non Bravais lattice, crystal systems Types-7, Elements of symmetry-13, plane of symmetry-13, Axis of symmetry-13, Centre of symmetry or inversion, Crystallographic planes, Miller indices, Features of Miller indices, Packing fraction or atomic packing factor(APF) OR relative density of packing, Inter planar spacing, Expression for spacing between lattice planes, Solved Problems, Exercises

Liquid crystals and their application: Introduction, Classification thermotropic and Lyotropic with examples Types of Mesophases-Nematic and Chiral nematic (cholesteric) smectic and columnar with example. Application of liquid crystals in display systems. Working of L.C.D.

Unit 4**11 hours**

Introduction to semiconductors and Renewable energy sources to renewable energy sources -definition, history, importance of renewable energy sources, notational and international energy scenario, Main stream renewable technologies- solar energy(PV Cells dye sensitizer), bio fuel, bio mass,. Application of each form of energies.

Unit 5**10 hours**

Nanoscience: Introduction- Overview of Nanoscience Theory, definitions and history – Properties at nanoscale. Different classes of Nanomaterials –1D, 2D, 3D and 0D: Synthesis by “Top-down” approach: Mechanical grinding .Photolithography; “Bottom up approach” – CVD.Determination of particle size, Introduction to characterization. Applications of Nanomaterials Nano Solar cells and Bio medical (nano medicine)

Polymer Nano composites: Introduction- Overview of nanocomposites, classification Properties and Applications- Nanoclay-reinforced composites. Carbon nanotube-reinforced composites.Nanofibre-reinforced composites, and.Inorganicparticle-reinforced composites.Nanocomposites.applications

Text Books:

1. Engg.Chemistry by M.M.Uppal, Khanna publishers, Sixth edition,.
2. A text book of Engg .Chemistry by Jain and Jain ,Dhanpatrai Publications, New -Delhi.
3. Renewable energy technologies: Chetansinghsolanki.PHIpvt Ltd, New -Delhi
4. Polymer nano composites: M.C gupta A.P gupta new age publishers ,New -Delhi

Reference Books:

1. Principles of Physical chemistry by B.R .Puri, L.R. Sharma and Co, 1992.
2. Text book of Polymer Science By F.W. Billmeyer, John Wiley & Sons,1994.
3. Liquid crystals and Plastic crystals, Vol –edited by G.W.Gray and P.A. Winsor, Ellis Horwood series in Physical chemistry New York,.(p. No 106-142).
4. Corrosion Engg.- by M.G. Fontana, McGraw Hill Publication.
5. Environmental Chemistry by Stanley and Co,.
6. Solid chemistry –D.K. Chakrabarty
7. G.L. Hornyak, J.Dutta, H.F. Tibbals, A.K.Rao, Introduction to Nanoscience, CRC Press, 2008, ISBN: 978-1-4200-4805-6
8. A.Nabok, Organic and Inorganic Nanostructures, Artech House 2005
9. C. Dupas, P. Houdy, M. Lahmani, Nanoscience: Nanotechnologies and Nanophysics,
10. Hari Singh Nalwa, Nanostructured Materials and Nanotechnology, Academic Press.

CIE: 1. Three internal tests (each 30 marks) are conducted, average of best two tests marks will be considered.

2. ASSIGNMENTS/MINIPROJECTS (20 Marks):

1. Solar nano cells proto type.
2. Study of Mechanical properties of Polymer nano composite.
3. Food Adulteration.
4. Water analysis
5. Preparation of nano materials
6. Preparation of thin films

- SEE:** 1. Two Questions are to be set from each unit, carrying 20 Marks each.
2. Students have to answer 5 questions selecting one full question from each unit.

COMPUTER CONCEPTS AND C PROGRAMMING

Sub Code	: 14CCP13/23	Credits	: 4
Hours/Week	:4+1+0 (L+T+P)	CIE Marks	: 50
Total hours	: 52	SEE Marks	: 50
Exam Hours	: 03	Course type	: Engg. Core

Expected Course Outcomes:

- Student will Identify and understand the working of key components of a computer system (hardware, software, firmware etc.) with respect to programming fundamentals.
- Student will analyze and write algorithm/pseudo codes for the given application
- Students will be able to design, write, debug, and document well-structured C programs for the given problem using appropriate features.

Unit 1

08 hours

Introductory concepts: Introduction to computers, What is a computer, block diagram of computer, computer characteristics, hardware vs software, how to develop a program, Software development lifecycle, structured programming, **Introduction to C programming:** The C characters set, Identifiers and Keywords, Data Types, Are Characters Signed or Unsigned?(Ref 2), Integer Overflow(Ref 2), Constants, variables and Arrays, Subscripts Start from Zero(Ref 2), Declarations, Expressions Statements, Symbolic Constants

Additional topics to be covered: Type Conversion

Aptitude Test Topics from Let Us C: **Data types, Constants, Variables, Declarations(04 marks)**

Unit 2

09 hours

Operators and expressions: Arithmetic operators, Unary operators, relational and logical operators, assignment operators, conditional operators. *The &&, ||, and !Operators(Ref 2), How Does Division Truncate?(Ref 2), Operators don't always have the precedence you want(Ref 2), Expression Evaluation Sequence(Ref 2), Shift Operators(Ref 2), = is not == (Ref 2)*, library Functions, Single Character Input –The get char() , *getchar returns an integer*, Single Character Output-The put char() Function, **Data Input and Output:** Preliminaries, Entering Input Data the scanf() function. Writing output –the printf() function.. The gets and puts functions, interactive (conversational) Programming.

Aptitude Test Topics from Let Us C: **Operators, Library functions, gets ,puts, data input and output(04 marks)**

Unit 3

10 hours

Control Statements: Preliminaries, Branching: the if-else Statement, *The Dangling else Problem(Ref 2)* looping: the while statement, more looping: the do while statement, more looping: the for statements, Nested control structures. The switch statement ,the continue statement ,the coma operator –the goto statement,

Watching those semicolons(Ref 2) ,**Arrays:** defining an array, processing an array , passing arrays to functions , multidimensional arrays,

Aptitude Test Topics from Let Us C: **If, for, while, do while, switch, arrays(04 marks)**

Unit 4

10 hours

Functions:-A brief overview , defining a function , *Understanding declaration(Ref 2)*accessing a function, function prototypes, passing arguments to a function , *C Doesn't Always Cast Actual Parameters(Ref 2)* , recursion, **Program Structure:** storage classes, automatic variables, external (global) variables, static variables, multifile programs, **Strings:** Defining a string, NULL character, Initialization of Strings, reading and writing a string, processing the strings, searching and sorting of strings,. *Strings and Characters(Ref 2)* , *The Pre-processor(Ref 2)*

Aptitude Test Topics from Let Us C: **Functions, Recursion, program structure, strings(04 marks)**

Unit5

15 hours

Pointers:- Fundamentals, pointer declarations, passing pointers to a function ,pointers and one dimensional array, dynamic memory allocation, **Linkage:** What is a linker, Declaration vs definitions, name conflicts and the static modifier, arguments, and return values, checking external types, header files,*Pointers are not Arrays(Ref 2)* , operations on pointers, *The Null Pointer is Not the Null String(Ref 2)*

Structures And Unions-Defining a structure, processing a structure, unions, **File Handling:** opening and closing a data file, reading and writing a data file, processing a data file, unformatted data files.

Aptitude Test Topics from Let Us C: **Pointers, dynamic memory allocation, structure, files(04 marks)**

Text Books:

1. Byron 1 and Gottfried: Programming with C-|| edition Shaum's outlines (Unit 2, Unit 3, Unit 4, Unit 5(part)).
2. Andrew Koenig: C Traps and Pitfalls. Pearson Education, India 2006.
3. <http://www.literateprogramming.com/ctraps.pdf>.

Reference Books:

1. Brian W. Kernighan and Dennis Ritchie: the C programming language second edition PHI, 1998.
2. Peter Norton: Introduction to Computer, 7th edition TATA MCGRAWHILL, 2010.
3. YashvantKanetkar:Let Us C,

Assessment Method:

CIE: 1. Three internals tests (each 30 marks) are conducted, average of best two tests marks will be considered.

2. C Aptitude test on each unit.

SEE: 1. Two Questions are to be set from each unit, carrying 20 Marks each.

2. Students have to answer 5 questions selecting one full question from each unit.

COMPUTER AIDED ENGINEERING DRAWING

Sub Code : 14CED14/24
Hours/Week : 2+4+0 (L+T+P)
Total hours : 78
Exam Hours : 03

Credits : 4
CIE Marks : 50
SEE Marks : 50
Course type : Engg. Core

Expected Course Outcomes:

- Students will understand the various concepts like dimensioning, conventions and standards related to working drawings in order to inculcate proper understanding of the theory of orthographic projections.
- Students will be able to organize, demonstrate and arrange solids and planes for different positions.
- Students will be able to improve their visualization skills so that they can apply these skills to develop a sketch into orthographic 3D.

Unit1

06 hours

Introduction to Computer Aided Sketching: Introduction, Drawing instruments and their uses, BIS Conventions, Lettering, Dimensioning, geometrical constructions and freehand practicing. Introduction to software, commands used for engineering drawing.

Unit2

22 hours

Orthographic Projections

Introduction – Planes of projection, reference line, and conventions employed.

Projection of Points- in all the four quadrants.

Projection of straight Lines (First angle projection) - True and apparent lengths, true and apparent Inclinations to reference planes, application problems (Chimney, Tripod, Flag post, Room problems) Orthographic projection of Plane surfaces (First angle projection)

Introduction, projection of triangle, square, rectangle, pentagon, hexagon and circular lamina.

Unit3

22 hours

Projections of Solids

Introduction, Projections of right regular prisms, pyramids, cylinder, cone and cube in different positions (Inclined to both HP and VP. No problems on octahedrons and combination of solids).

Unit4

28 hours

Sections of Solids

Introduction to truncation and frustum, Section of solids like prisms, pyramids, cylinder and cone in simple vertical position by cutting planes inclined to HP and perpendicular to VP-true shapes of sections.

Isometric Projection

Introduction, Isometric scale, Isometric projection of simple plane figures, Isometric projections of Tetrahedron, hexahedron (cube), right regular prisms, Pyramids, cylinders, cones, spheres, cut spheres and combination of solids (Maximum of two solids).

Text Books:

1. Computer Aided Engineering Drawing – K. R. Gopalakrishna, 32nd edition, 2005 – Subash Publishers, Bangalore.
2. 'Engineering Drawing' by N D Bhat and V M Panchal, 37th Ed. 1996, Charotar Publishing.

Reference Books:

1. 'A Primer on Computer aided Engineering drawing' – 2006, published by VTU, Belgaum.

2. 'Fundamentals of Engineering drawing with an Introduction to Interactive Computer Graphics for Design and Production' – Luzadder Warren J., Duff John M., Eastern Economy Edition, 2005 – Prentice– Hall of India Pvt. Ltd., New Delhi.
3. 'Introducing Graphics' by Arnold J N McGraw Hill Publications.

Assessment Method:

- CIE:**
1. Three internals tests (each 30 marks) are conducted, average of best two tests marks will be considered.
 2. Submission of drawing sheets/printouts will carry 10 marks.
 3. Two written surprise quiz tests conducted and evaluated for 10 marks. Average of these two will be considered.

SEE:

1. Q1 for 30 Marks from Unit 2.
2. Q2 for 40 Marks from Unit 3
3. Q3 for 30 Marks from Unit 4.

Evaluation: Sketching – 40%, Implementation Using Computer software – 60%

BASIC ELECTRONICS ENGINEERING

Sub Code	: 14ELN15/25	Credits	: 04
Hours/Week	: 4+1+0 (L+T+P)	CIE Marks	: 50
Total hours	: 52	SEE Marks	: 50
Exam Hours	: 03	Course type	: Engg. Core

Expected Course outcomes:

- Analyze and understand the working and applications of Semiconductor diodes.
- Analyze the characteristics and applications of BJT, MOS and OPAMP.
- Understand the basics of Communication System and Digital Electronics.

Unit 1

10 hours

Number system and Digital logic: Introduction, Decimal, Binary, Octal & hexadecimal number system conversion, Compliments (only 2's,1's,10's & 9's compliment) Addition and Subtraction (Binary and Decimal number system), Binary coded number, Boolean Algebra, Logic Gates .Introduction to Combinational Logic : Half Adder, Full adder ,Introduction to Sequential circuits : Flip Flops (RS FF , JK FF , D FF , T FF) (only truth table)

T1 Ch: 1.2,1.3,1.4,1.5,1.6,2.1,2.3,2.4,2.7,4.1,4.3,6.1,6.2

Unit 2

11 hours

Semiconductor Diode and Applications: PN junction Diode, Characteristics and parameters, Diode approximations, Zener diode, ,Half wave Rectification, Full wave diode Rectification , Bridge rectifier, Half wave rectifier DC power supply, full wave rectifier DC power supply, numerical problems . Optoelectronics devices: Light Emitting Diode, Photo diode.

T2 Ch: 2.1,2.2,2.3,2.9,3.1,3.2,3.3,3.4,20.2

Unit 3

10 hours

Transistors:

Bipolar Junction transistor, Transistor voltages and currents, Amplification, Common Base, Common Emitter and common Collector Characteristics (only input and output characteristics). numerical s.

Introduction to IC Technology : The IC era , Basic MOS transistor .
T2 CH:4

Unit 4

10 hours

Amplifiers, Oscillators & Op-Amps :

Amplifiers: Classification of Amplifiers, Single stage CE amplifier, Cascaded amplifier and capacitor coupled 2-stage CE amplifier.

Oscillator: Introduction to Oscillator , RC phase shift Oscillator, Hartley Oscillator, Colpitt Oscillator, Numerical.

Introduction to Operational Amplifiers: Ideal Op-Amp, Voltage follower , Non Inverting amplifier ,Inverting amplifier , Summing amplifier, Difference amplifier (circuits, derivations of output voltage and numerical).

T2 Ch : 14.1,14.3,14.4,14.5,14.6,14.7 , 16.1,16.2,16.3

Unit 5

11 hours

Introduction to Communication systems:

Communication system: Introduction, Block diagram of communication system, Definition of modulation, need for modulation, Types of modulation, Amplitude modulation: concept, waveform (no derivation & problems), Frequency modulation: Concept & waveform (No derivation), Comparison between AM&FM, Super heterodyne receivers,

Optical Fiber Communication : Block diagram ,Advantage & Disadvantage of OFC cable, OFC construction.

Cellular Telephone Concept: Cellular telephone, Frequency reuse(no problems),Cellular system topology , Roaming & Hands off

T3 Ch :13.5,13.3,13.6.1,19.4,19.5,19.8,19.9

Text Books:

1. Text(T1): "Digital Logic and Computer Design", Morris Mano ,PHI 2002
2. Text(T2): "Electronics Devices and circuits", David A. Bell, PHI, 2004
3. Text(T3): " Electronic Communications Systems ", Wayne Tomasi , Fifth edition.

Reference Books:

1. "Principles of Electronics " , V K Mehta , S Chand publications , 2003
2. "Basic VLSI Design " , Douglas A Pucknell& Kamran Eshraghian , Third Edition (PHI)

Assessment Method:

- CIE:**
1. Three internal tests (each 30 marks) are conducted, average of best two tests marks will be considered.
 2. Minimum two Assignments for 10 marks. Average of two will be considered.
 3. Two written surprise tests conducted and evaluated for 10 marks. Average of these two will be considered.
- SEE:**
1. Two Questions are to be set from each unit, carrying 20 Marks each.
 2. Students have to answer 5 questions selecting one full question from each unit.

COMPUTER PROGRAMMING LAB

Sub Code : 14CPL16/26
Hours/Week : 0+0+3 (L+T+P)
Total hours : 39
Exam Hours : 03

Credits : 1.5
CIE Marks : 50
SEE Marks : 50
Course type : Engg. Core

Expected Course outcomes:

- Student will be able to design and write programs using appropriate features of C.
- Student will be able to analyse, design, develop and interpret results for the given problem using appropriate features of C.

Sl. No.

List of Programs Part A

1. a. Secure life an insurance company issues special returns to its customers on leap years. Given a year design a C program to find whether the customer is due for special returns or not using ternary operator.
b. The tallest of the three pupils are to be selected for the basket ball tournament being held in the university next year. Design a C program using branching statements to find the candidate selected for the tournament. (if else)
2. Design, develop and execute a program in C to find and output all the roots of a given quadratic equation, for non-zero coefficients.
3. Using Euclid's algorithm design a C program to find GCD and LCM of two numbers.
4. A criminal leaves a four digit number as his calling card, Design an algorithm and develop a C program to test the four digit number left by the criminal is palindrome or not.
5. Design a C program to check if the substring is present in the given string
6. The books in the library are randomly placed on the shelves. Design a C program that sorts the books based on ISBN
Use bubble sort to implement the program
7. Given a ISBN Design a C program to search and display the book if present in the library.
Use binary search to design the program
8. Design, develop and execute a program in C to read two matrices A(M x N) and B(p x q) and compute the product of A and B.
9. Design, develop and execute a program in C to swap two integers using methods
 - a. Call by value.
 - b. Call by reference
10. You have been asked to arrange a lucky draw in college and the person who picks a prime number always wins a prize. Design a C program to test if the participant has won or lost (Prime number)
11. The local government school needs a simple recording software which accepts names of the students in random order prepares the nominal roll in alphabetical order. Help the school by designing a simple c program to sort the given names and display using sorted names using file handling functions.
12. Using structures design a C program that accepts the details such as student roll no, student name and marks of three subjects of n students and prints theirs details along with their total marks.

Part B

Student has to execute a program of Examiners Choice/preference within the scope of the CCP syllabus

Assessment Method:

CIE: Day to day work and submission -30marks, Internal Test-15 marks, Viva-5 marks

SEE: Students has to execute two programs, one from part A(30 Marks) and another from part B (10 Marks).
Viva-Voce (10 Marks)

ENGINEERING CHEMISTRY LAB

Sub Code : 14CPL17/27
Hours/Week : 0+0+3 (L+T+P)
Total hours : 39
Exam Hours : 03

Credits : 1.5
CIE Marks : 50
SEE Marks : 50
Course type : Basic Sc.

Expected Course outcomes:

- an ability to function on multidisciplinary teams
- an ability to formulate the reaction and conduct experiments, as well as to analyze and interpret data
- an ability to identify, formulate, and solve engineering chemistry problems
- Apply fundamental chemical principles in laboratory experiments keeping safety in mind
- Collect, represent and interpret experimental results accurately and concisely using technical narrative, graphs, and tables.

PART A

1. Estimation of total hardness, temporary and permanent hardness of the given water sample.
2. Estimation of %Ca in the given cement solution.
3. Estimation of amount in the given milk solution of urea (only demo).
4. Estimation of alkalinity / acidity in the natural sea water using methyl orange
5. Estimation of COD of the waste water sample

PART B

1. pK_a value of the weak acid
2. Potentiometric titrations
3. Conductometric titration of weak and strong acid Vs Strong base
4. Colorimetric estimation of copper
5. Viscosity coefficient of the organic liquid
6. Flame photometric estimation of NaCl

Assessment Method:

CIE: Day to day work and submission -30marks, Internal Test-15 marks, Viva-5 marks

SEE: One experiment from Part A and Part B shall be set different experiments may be set from Part A and common experiment from Part B

ENVIRONMENTAL STUDIES
(Non Credited Mandatory Course)

Sub Code : 14CIV18 / 28
Hours/Week : 2+0+0 (L+T+P)
Total hours : 26
Exam Hours : 02

Credits : --
CIE Marks : 50
SEE Marks : 50
Course Type : Humanity

Expected Course Outcomes:

- Students will be able to understand how rapid and unsustainable development has caused various damages to ecosystem.
- Students will be able to understand basic aspects of environment including natural resources, ecosystem, different types of pollution, its prevention method and the various social issues connected with environment along with Environmental Protection Acts.
- Students will become aware about the damages that are caused by human beings to the environment and this will help them to develop a concern toward the same.

Unit1

5 hours

Environment:

Definition, Ecosystem, Balanced ecosystem, Human activities – Food Shelter, Economic and Social security. Effects of Human Activities on Environment – Agriculture, Industry, Mining. Environmental impact assessment, Sustainable Development.

Unit2

5 hours

Natural resources :

Water resources- Availability and quality aspects. Water borne disease and Water induced disease. Fluoride problems in drinking water, Mineral resources, Forest resources. Material cycles – Carbon, Nitrogen, and Sulphur cycles.

Unit3

6 hours

Environmental Pollution and their effects- Water pollution, Noise pollution, Soil pollution, Air pollution, Radio-active pollution and Automobile pollution.

Current Environmental issues of importance: Population growth, Climate change, Global warming, Natural disasters, Urbanization, Acid rain, Ozone layer depletion, Animal husbandry– effects and Water Management and Conservation.

Unit4

5 hours

Energy:

Different types of energy, Electromagnetic radiation, Conventional and non-conventional resources- Hydroelectric , Fossil fuel, Nuclear energy, Solar energy, Bio-mass and Bio gas, Hydrogen as an alternative future source of energy.

Unit5

5 hours

Environmental Protection- Role of Government, legal aspects, initiative by NGO's, Central Pollution Control Board (CPCB), State Pollution Control Board (SPCB), Environmental education.

Reference Books:

1. Environmental Studies- Dr. S M Prakash – Elite Publications.
2. Environmental Studies- R GeethaBalakrishna, K G LakshminarayanaBhatta – S M Publications.
3. Introduction to Environmental Science and Engineering- Raman Sivakumar- Tata McGraw Hill

Assessment Method:

- CIE:**
1. Three internal tests (each 30 marks) are conducted, average of best two tests marks will be considered.
 2. Minimum two Assignments - evaluated through rubrics for 10 marks. Average of two will be considered.
 3. Two written surprise tests conducted and evaluated for 10 marks. Average of these two will be considered.

SEE: Question paper is of objective type with 50 questions.

COMMUNICATIVE ENGLISH

Sub Code : 14ENG19 / 29
Hours/Week : 2+0+0 (L+T+P)
Total hours : 26
Exam Hours : 03

Credits : 02
CIE Marks : 50
SEE Marks : 50
Course Type : Humanity

Expected Course Outcomes:

- Students will demonstrate an understanding towards the professional skills required in technical field.
- Students will be able to communicate effectively in both verbal and non-verbal forms in multidisciplinary activities and prove to be effective team players
- Students will have the confidence to apply their communication skills globally

Unit1**5 hours****Communication- An Introduction**

Definition, Process of communication, Language as a tool, Levels of communication, Flow of communication in an organization, Communication Networks, Meaning and Importance of technical communication
 Barriers of communication - Definition of Noise, Classification of barriers, Methods to overcome these barriers.

Unit2**5 hours****Verbal and non verbal communication**

Speaking in different simulated situations.

Importance of non verbal communication, Kinesics, Paralinguistics, Proxemics, Chronemics, Power Dressing and communication.

Unit3**3 hours****Listening**

Difference between hearing and listening, Importance of listening, Types of listening, Traits of a good listener, Implications of effective listening, Tips for effective listening.

Unit4**7 hours****Reading and writing skills**

Idioms and phrases, Expansion of ideas, Proverbs, Resume writing, Indianisms, Essay writing, Technical or administrative correspondences: Letter writing, Memo, Minutes of Meeting, Introduction- Research Proposals.

Plagiarism: Definition, consequences of plagiarism, information sharing today, unintentional plagiarism, forms of plagiarism, reusing a research paper, when documentation is needed, copy right infringement, collaboration work, softwares available for checking plagiarism.

Unit5**6 hours****Group Communication**

Introduction, Forms of group communication, Group discussion as a part of selection process, Organisational group discussion.

Team concept- Essentials of a team, Steps in formation of a team, Attributes of a successful team.

Effective Presentation Strategies- Steps in preparing a presentation, Defining Purpose, Analyzing audience and locale, Preparing outline, Understanding nuances of delivery, Visual Aids.

Text Books:

1. 'Technical Communication – Principles and Practices', Meenakshi Raman and Sangeeta Shama, Oxford University Press 2004
2. 'Effective Technical Communication' by M.Ashraf Rizivi, 1st Edition, Tata McGraw Hill, 2005.
3. MLA Handbook for writers of research papers, 7th edition, 2009

Assessment Method:

CIE: 1. Three internal tests (each 30 marks) are conducted, average of best two tests marks will be considered.

2. Language Lab only for CIE - 20 marks.

SEE: 1. Two Questions are to be set from each unit, carrying 20 Marks each.

2. Students have to answer 5 questions selecting one full question from each unit.

ENGINEERING MATHEMATICS- II

Sub Code : 14MAT21

Hours/Week : 4+1+0 (L+T+P)

Total hours : 52

Exam Hours : 03

Credits : 04

CIE Marks : 50

SEE Marks : 50

Course type : Basic Sc.

Expected Course outcomes:

- Students learn to solve ordinary and partial differential equations using different analytical methods.
- Students learn to model physical situations in terms of differential equations and solve them
- Students learn differentiation and integration of complex functions
- Students learn the concept of Eigen values and eigen vectors

Unit 1: Differential equations**12 hours**

Introduction of differential equations, recapitulation of variable separable and linear forms, Exact and equations reducible to these forms, Higher order linear differential equations with constant coefficients – finding complementary function and particular integral, Cauchy and Legendre equations, simultaneous equations, Method of variation of parameters.

11.11, 11.12, 13.4, 13.6, 13.8, 13.9, 13.11 (text book 1)

Unit 2: Series solution of ODE and applications**10 hours**

Singularities, series solution by Frobenius method, Bessel equation, Solution of Bessel equation, Bessel function, Properties Legendre polynomials and Rodrigues formula

Applications – Growth and decay, mixing problem, Newton's law of cooling, Population dynamics, simple harmonic oscillation, LC, LR and LCR circuits.

16.4, 16.5, 16.8, 16.11, 16.14, 12.5, 12.6, 12.8, 12.9, 14.2, 14.5 . (text book 1)

Unit 3: Partial differential equations**10 hours**

Partial Differential equations, formation, solution by direct integration, homogeneous linear equations with constant coefficient, Lagrange's linear PDE, separation of variables method.

Vibration of stretched string – wave equation (derivation and solution), one dimensional heat equation (derivation and solution), solution of Laplace equation.

17.2, 17.4, 17.5, 17.9, 18.2, 18.4, 18.5, 18.7(text book 1)

Unit 4: Calculus of complex functions**10 hours**

Functions of complex variables, Analytic function, C-R equations in polar and Cartesian forms, construction of analytic functions, bilinear transformation.

Complex Integration, Cauchy's theorem, Cauchy's integral formula, Laurent's series, singularities, poles, residue, residue theorem (statement and problems).

20.3, 20.4, 20.5, 20.6, 20.8(4), 20.12, 20.13, 20.14, 20.16(3), 20.18, 20.19(text book 1)

Unit 5: Linear algebra**10 hours**

Rank of a matrix by reducing to echelon form, Inverse of a matrix by echelon form, Normal form, Solution of linear system – Gauss elimination method.

Eigen values and Eigen vectors - Cayley – Hamilton theorem, Gerschgorin theorem to obtain bound of Eigen values, Properties of Eigenvalues.

2.7, 28.6(1), 2.13, 2.15, 2.14, (text book 1) 3.5, 3.6 (reference book 5)

Text Book:

1. Higher Engg. mathematics by Dr. B S Grewal, 42nd Edition
2. Advanced Engg. Mathematics by Erwin E Kreyszig, 8th edition, Wiley.

Reference Books:

1. Differential equations by Shepley Ross, 3rd edition, Wiley, 2004
2. Theory and functions of a complex variable by Shanti Narayan, S Chand, 2001
3. Introduction to Partial differential equations by K SankaraRao, PHI, 2004
4. Theory and problems of Complex variables, Murray R Spiegel, Schaum's outline series, Macgrawhill, 1981
5. Numerical methods (for scientific and engg. Computation) by M K Jain, S R K Iyengar, R K Jain, 6th edition, New Age, 2012

Assessment Method:

- CIE:**
1. Three internal tests (each 30 marks) are conducted, average of best two tests marks will be considered.
 2. Every week Tutorial classes are conducted and evaluated for 10 marks. Average of all will be considered.
 3. Two written surprise quiz tests conducted and evaluated for 10 marks. Average of these two will be considered.

- SEE:**
1. Two Questions are to be set from each unit, carrying 20 Marks each.
 2. Students have to answer 5 questions selecting one full question from each unit.