

NITTE MEENAKSHI INSTITUTE OF TECHNOLOGY

(An Autonomous Institution under Visvesvaraya Technological University, Belgaum)

Yelahanka, Bangalore – 64



KNOWLEDGE • CHARACTER • UNITY

COURSE CONTENT, SCHEME OF TEACHING AND EXAMINATION

FOR I AND II SEMESTER B.E PROGRAMME
(AUTONOMOUS SCHEME) FOR THE YEAR 2008 - 2009
(COMMON TO ALL BRANCHES)

COURSE CONTENT, SCHEME OF TEACHING AND EXAMINATION
FOR I AND II SEMESTER
 (COMMON TO ALL BRANCHES)

SEMESTER: I

Physics Group

Sl No	Subject Code	Subject Name	Teaching Hours/week			Examination			Credits
			L	T	P	CIE*	SEE**	Total	
1	MAT11	Engineering Mathematics - I	4	1	0	50	50	100	4
2	PHY12	Engineering Physics	4	1	0	50	50	100	4
3	CIV13	Elements of Civil Engineering & Engineering Mechanics	4	1	0	50	50	100	4
4	EME14	Elements of Mechanical Engineering	4	1	0	50	50	100	4
5	ELE15	Basic Electrical Engineering	4	1	0	50	50	100	4
6	WSL16	Workshop	0	0	4	50	50	100	2
7	PHL17	Engineering Physics Lab	0	0	4	50	50	100	2
8	CIP18	Constitution of India & Professional Ethics	2	0	0	50	50	100	-
TOTAL						400	400	800	24

SEMESTER: I

Chemistry Group

Sl No	Subject Code	Subject Name	Teaching Hours/week			Examination			Credits
			L	T	P	CIE*	SEE**	Total	
1	MAT11	Engineering Mathematics -I	4	1	0	50	50	100	4
2	CHE12	Engineering Chemistry	4	0	0	50	50	100	4
3	CCP13	Computer concepts & C Programming	4	0	0	50	50	100	4
4	CED14	Computer Aided Engineering Drawing	2	0	4	50	50	100	4
5	ELN15	Basic Electronics Engineering	4	0	0	50	50	100	4
6	CPL16	Computer Programming Lab	0	0	4	50	50	100	2
7	CHL17	Engineering Chemistry Lab	0	0	4	50	50	100	2
8	CIV18	Environmental Studies	2	0	0	50	50	100	-
9	ENG19	Communicative English	2	0	0	50	50	100	2
TOTAL						450	450	900	26

*Continuous Internal Evaluation

** Semester End Examination

COURSE CONTENT, SCHEME OF TEACHING AND EXAMINATION
FOR I AND II SEMESTER
 (COMMON TO ALL BRANCHES)

SEMESTER: II

Physics Group

Sl No	Subject Code	Subject Name	Teaching Hours/week			Examination			Credits
			L	T	P	CIE*	SEE**	Total	
1	MAT21	Engineering Mathematics - II	4	1	0	50	50	100	4
2	PHY22	Engineering Physics	4	1	0	50	50	100	4
3	CIV23	Elements of Civil Engineering & Engineering Mechanics	4	1	0	50	50	100	4
4	EME24	Elements of Mechanical Engineering	4	1	0	50	50	100	4
5	ELE25	Basic Electrical Engineering	4	1	0	50	50	100	4
6	WSL26	Workshop	0	0	4	50	50	100	2
7	PHL27	Engineering Physics Lab	0	0	4	50	50	100	2
8	CIP28	Constitution of India & Professional Ethics	2	0	0	50	50	100	-
TOTAL						400	400	800	24

SEMESTER: II

Chemistry Group

Sl No	Subject Code	Subject Name	Teaching Hours/week			Examination			Credits
			L	T	P	CIE*	SEE**	Total	
1	MAT21	Engineering Mathematics -II	4	1	0	50	50	100	4
2	CHE22	Engineering Chemistry	4	0	0	50	50	100	4
3	CCP23	Computer concepts & C Programming	4	0	0	50	50	100	4
4	CED24	Computer Aided Engineering Drawing	2	0	4	50	50	100	4
5	ELN25	Basic Electronics Engineering	4	0	0	50	50	100	4
6	CPL26	Computer Programming Lab	0	0	4	50	50	100	2
7	CHL27	Engineering Chemistry Lab	0	0	4	50	50	100	2
8	CIV28	Environmental Studies	2	0	0	50	50	100	-
9	ENG29	Communicative English	2	0	0	50	50	100	2
TOTAL						450	450	900	26

*Continuous Internal Evaluation

** Semester End Examination

ENGINEERING MATHEMATICS I

Sub Code : MAT11
Hours/Week : 4 + 1 + 0
Total hours : 52
Exam Hours : 03

Credits : 04
CIE Marks : 50
SEE Marks : 50

UNIT I

Polar curves

Polar curves, angle between tangent and radius vector, angle of intersection, polar sub tangent and subnormal, pedal equation.

Derivative of arc, curvature, Radius of curvature, Cartesian and polar form

10 Hrs

UNIT II

Successive differentiation and mean value theorem

n^{th} derivative of standard function, Leibnitz rule, Mean value theorems- Roll's theorem, Lagrange's Mean value theorem, Cauchy's Mean value theorem, Taylor's theorem. Taylor's and Maclaurin series, Indeterminate forms

10 Hrs

Unit III

Partial differentiation

Partial derivatives, derivatives of higher order, Homogeneous function, Euler's theorem, Total derivative, Implicit and composite function, Jacobian, Maxima and Minima for function of two variables Lagrange's method of multipliers, Errors and approximation.(Engg. application oriented problems)

12 Hrs

Unit IV

Integral Calculus-I

Reduction formula $\int \sin^n x$, $\int \cos^n x$, $\int \sin^m x \cos^n x$, $\int \tan^n x$, $\int \sec^n x$, tracing of curves, double and triple integrals, Change of order and change of variable.

10 Hrs

Unit V

Integral Calculus-II

Application to find length of a curve, area under a curve, area by double integration, volume by triple integration

Gamma function, Beta function, properties, relation between β and Γ , Differentiation under integral sign, Leibnitz rule.

10 Hrs

Text Book: 'Higher Engineering Mathematics' by Grewal, 36th edition, Khanna Publication

Reference: Advanced Engg. Mathematics by Erwin E Kreyszig, 8th edition, Wiley

Scheme of Examination:

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 : PHY12/ 22
Hours/Week : 4 + 1 + 0
Total hours : 52
Exam Hours : 03

Credits : 04
CIE Marks : 50
SEE Marks : 50

UNIT I

Modern Physics:

Blackbody radiation spectrum and Planck's Law, photo-electric effect, Compton effect. Wave particle dualism. De Broglie hypothesis-de Broglie wavelength, extension to electron particle. – Davison and Germer Experiment. Matter waves and their characteristics properties. Phase velocity, and group velocity and particle velocity. Expression for the Broglie wavelength using group velocity.

Quantum Mechanics

Heisenberg's uncertainty principle and its physical significance (no derivation). Applications of uncertainty principle (non-existence of electron in the nucleus).

Wave function. Properties and physical significance of a wave function. Probability density and Normalization of wave function. Setting up of a one dimensional, time-independent, Schrodinger wave equation. Eigen values and Eigen function. Application of Schrodinger wave equation – Energy eigen values for a free particle. Energy eigen values of a particle in a potential well of infinite depth.

12 Hours

UNIT II

Electrical conductivity in Metals

Free electron concept. Classical free-electron theory-Assumptions. Drift velocity. Mean collision time and mean free path. Relaxation time. Expression for drift velocity. Expression for electrical conductivity in metals. Failure of classical free-electron theory. Quantum – free electron theory – Assumptions. Fermi-Dirac Statistics. Fermi energy – Fermi factor. Density of states (with derivation). Expression for electrical resistivity / Conductivity. Temperature dependence of resistivity of metals. Merits of Quantum free – electron theory.

Superconductivity

Temperature dependence of resistivity in superconducting materials. Effect of magnetic field (Meissner effect). Type I and II superconductors. Temperature dependence of critical field. BCS theory (qualitative). High temperature superconductors. Applications of superconductors – Superconducting magnets, Maglev vehicles and SQUIDS.

12 Hours

UNIT III

Dielectric and Magnetic properties of Materials

Dielectric constant and polarization of dielectric materials. Types of polarization. Equation for internal fields in liquids and solids (one dimensional). Clausius – Mossotti equation. Ferro and Piezo- electricity (qualitative). Frequency dependence of dielectric constant. Important applications of dielectric materials.

Ultrasonics

Generation of ultrasonic waves. Properties of ultrasonic waves. Ultrasonic non-destructive testing of materials Sonar. Measurement of velocity in solids and liquids.

Magnetic Materials

Qualitative treatment of Weiss theory for para and Ferro-magnetic materials. B-H graph in ferromagnetic materials. Soft and hard magnetic materials applications.

8 Hours

UNIT IV

Lasers

Principle and production. Einstein's coefficients (expression for energy density). Requisites of a Laser system. Conditions for Laser action. Principle, construction and working of He-Ne and semiconductor Laser. Applications of Laser- Laser welding, cutting, and drilling Measurement of atmospheric pollutants. Holography – Principle of recording and reconstruction of 3-D images. Selected applications of holography.

Optical Fibers.

Propagation mechanism in optical fibers. Angle of acceptance. Numerical aperture. Types of optical fibers and modes of propagation. Attenuation, Applications-block diagram discussion of point to point communication.

10 Hours

UNIT V

Crystal Structure and X-rays

Space lattice, Bravais lattice – unit cell, primitive cell. Lattice parameters. Crystal system. Direction and planes in a crystal Miller indices. Expression for interplanar spacing Coordination number. Atomic packing factor Bragg's law. Determination of crystal structure by Bragg's X-ray spectrometer. Crystal structures of NaCl, and diamond.

Material Science

Nano Technology. Carbon Nano-tubes. Explanation for smart materials and their types, Composite materials and their applications.

10 Hours

Text Books

1. 'Solid state Physics' by S.O.Pillani, New Age International 5th edition.
2. 'Engineering Physics' by Gaur & Guptha, Dhanapatrai and sons, New Delhi.

Reference Books

1. Nanosystems – Molecular Machinery, Manufacturing and Computation by K.Eric Drexler, John Wiley & Sons 2005 Ed.
2. Fundamentals and Applications of Ultrasonic Waves by J. David N Cheeke, CRC Press.
3. A text Book of & Engg Physics by M.N. Avadhanulu and P.G. Kshirsagar, S Chand & Company.

Scheme of Examination:

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 CIVIL ENGINEERING & ENGINEERING MECHANICS

Sub Code : CIV13 / 23
Hours/Week : 4 + 1 + 0
Total hours : 52
Exam Hours : 03

Credits : 04
CIE Marks : 50
SEE Marks : 50

UNIT I

Introduction to Civil Engg.: Introduction, branches of civil engg. and their importance

4 Hrs

Infrastructure

Introduction, types of infrastructure, role of civil engineer in the infrastructural development, Effect of infrastructural facilities on socio economic development of a country.

2 Hrs

Roads, Bridges and Dams

Introduction, types of roads, components of a road and their functions, types of bridges and dams (only classification)

4 Hrs

UNIT II

Concurrent Forces

Introduction, Classification, principle of transmissibility of forces, definition of resolution and composition of forces, triangular law of forces, problem on determination of resultant of concurrent coplanar forces.

Non-concurrent Forces

Introduction to non-concurrent coplanar forces, Varignon's theorem of moments, couple and its characteristics, problems

14Hrs

UNIT III

Equilibrium of Forces

Definition, conditions of equilibrium for concurrent and non concurrent coplanar forces, Lami's theorem, problems

5 Hrs

Support Reactions

Definition, types of supports, types of loads, support reactions for statically determinate beams

5 Hrs

UNIT IV

Centroid and moment of inertia of plane figures

Introduction, concept of axis of symmetry, definitions of polar moment of inertia, radius of gyration, derivation of parallel axis theorem, determination of Centroid and moment of inertia of simple geometrical figures (triangle, rectangle, circle, semi circle and quarter circle), built up sections, problems

10 Hrs

UNIT V

Friction

Introduction, types of friction, laws of static friction, limiting friction, impending motion on horizontal and inclined planes, ladder friction and problems

8 Hrs

Text Books:

1. 'A text book of elements of Civil Engg. and Engg. Mechanics' by S S Bhavikatti, New age international Publishers, New Delhi, 2007
2. 'A text book of Elements of Civil engg. and Engg. Mechanics' by Kolhapure
3. 'A text book of Engineering Mechanics' by R K Bansal, 5th edition , 2008, Laxmi publications.

Reference Books:

1. Mechanics for Engineers (statics) by Ferdinand P Beer and E Russel Johnson Jr. McGrawhill book company, New York
2. 'Engg. Mechanics' by K L Kumar, Tata Mcgrawhill
3. 'Elements of Civil Engg. & Engg. Mechanics' by Dr.T R Jagdish and M A Jayaram, Sapna book house, Bangalore.

Scheme of Examination:

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 : EME14 / 24
Hours/Week : 4 + 1 + 0
Total hours : 52
Exam Hours : 03

Credits : 04
CIE Marks : 50
SEE Marks : 50

UNIT I

SOURCES OF ENERGY

Conventional. Non conventional, Renewable and nonrenewable energy sources with examples. Brief study about the origin, utilization & application of various energy sources like Fossil fuel, Hydel energy, Nuclear energy, Solar energy Wind energy, OTCE, Geothermal energy with simple block diagrams.

3 Hours

STEAM

Formation of steam at constant pressure, Types of steam, Properties of steam – Enthalpy, Specific volume, Internal energy, External work of evaporation, simple numerical problems.

5 Hours

STEAM BOILERS

Steam Boilers: Classification, Construction and Working of water tube boiler (Babcock- Wilcox Boiler), Fire tube boiler (Lancashire Boiler); List of Boiler mountings and accessories with their location and applications.

3 Hours

UNIT II

TURBINES

Steam turbines – classification, working principle & operation of Impulse and reaction steam turbine

Gas turbines – classification, working principle & operation of open cycle and closed cycle gas turbine.

Water turbines – classification, working principle & operations of Pelton turbine, Francis Turbine and Kaplan turbine.

5 Hours

I C ENGINE

Internal combustion engines – classification, parts of I C engine, I C engine terminology; working principles of 2 stroke & 4 stroke Diesel & Petrol engines; Derivation for IP & BP, simple problems on indicated power, brake power, indicated thermal efficiency, Brake thermal efficiency, mechanical efficiency, BSFC.

6 Hours

UNIT III

Manufacturing Concepts: Introduction, Manufacturing Process – Definition & classification, Brief study of each process. **3 Hours**

MACHINE TOOLS

Lathe – classification, parts & working principle of Lathe; Lathe operations – facing, cylindrical turning taper turning by swiveling the compound rest, thread cutting, knurling.

Drilling Machine– classification, parts and working principle of sensitive and Radial drilling machine. Drilling Operations – Reaming boring, counter boring, counter sinking and tapping.

Milling Machine: classification, parts and working principle of Horizontal and Vertical type milling machine. Milling operations – plain, face, angular, form, straddle and end milling.

7 Hours

UNIT IV

WELDING, SOLDERING, BRAZING

Welding – classification, brief study of Arc welding and gas welding methods

Soldering & Brazing – Brief description about the process. Differences between welding, soldering & brazing.

5 Hours

REFRIGERATION & AIR CONDITIONING

Refrigeration – concept, unit of refrigeration, Refrigerant- Types & properties. Working principle & operation of vapor compression and vapor absorption refrigeration ,

Air Conditioning : Definition, classification working principle of Window Room air conditioner.

5 Hours

UNIT V

POWER TRANSMISSION IN MACHINE TOOLS.

Belt drives – Open & crossed belt drives, slip, velocity ratio, Length of belt for open & cross belt drive, ratio of tensions; simple numerical problems

Gear drives - Velocity ratio; types of gears – spur, helical, bevel, worm, elliptical gear & rack pinion; Advantages of gear drives over belt drives

Gear Trains – simple and compound gear trains—Velocity Ratio & simple problems.

7 Hours

COMPUTERS IN INDUSTRIAL MANUFACTURING:

Introduction, Brief study & advantages of CAD, CAM & CIM.

3 Hours

Text Book:

1. A Text Book of Mechanical Engineering Science, K. R. Gopalakrishna, 15th Edition, 1999
Subhas Publishers, Bangalore.
2. Elements of Mechanical Engineering, Praveen & Ramesh, Interline Publications.

Reference book:

1. 'Conventional Energy Resources', G.D.Rai, 2007, Khanna Publishers.
2. 'Elements of Manufacturing Process', B.S Nagendra Parashar & R.K.Mittal, Prentice Hall India.
3. 'Materials & process in Manufacturing', Paul Degarmo, Prentice Hall India.
4. 'CAD/CAM, Principles & Applications', P.N Rao, Tata McGrawHill.

Scheme of Examination:

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 : ELE15 /25
Hours/Week : 4 + 1 + 0
Total hours : 52
Exam Hours : 03

Credits : 04
CIE Marks : 50
SEE Marks : 50

Unit I

1-a) D.C.Circuits: Ohm's law and Kirchhoff's current law, Kirchhoff's voltage law- applications for the analysis of only series and parallel resistive circuits excited by independent voltage sources, Power and Energy in such circuits. Illustrative examples.

4 hrs

1-b) Electromagnetism : Faraday's Laws, Lenz's laws, Fleming's Rules, Statically and dynamically induced E.M.Fs. Concept of self and mutual inductance. Concept of coefficient of coupling. Energy stored in magnetic field. Illustrative examples.

3 hrs

2-a) Measuring Instruments: Construction and principle of operation of dynamometer type wattmeter and single phase induction type energy meter (problems excluded)

3 hrs

2-b) Domestic wiring: Two-way position and three way position control of a lamp. Necessity and type of earthing. Elementary discussion on fuses. Electric shock and precautions against it.

3 hrs

Unit II

3) Single Phase A.C.Circuits: Generation of sinusoidal AC voltage, Definition of average value, R.M.S. value, form factor and peak factor of sinusoidally varying voltage and current, Concepts of phase angle, power factor Lagging, Leading and unity power factors of sinusoidal AC System concepts of phasor diagram. Definition of real power, reactive power, apparent power.

Analysis with phasor diagram of circuits with R, L, C, R-L, R-C, R-L-C elements Illustrative examples involving series and series parallel circuits.

7 hrs

4) Three Phase Circuits: Necessity and advantages of three phase systems, meaning of phase sequence, balanced supply and load. Obtaining the relationship between line and phase values for balanced star and delta connections. Power in balanced three phase circuits. Illustrative examples.

6 hrs

Unit III

5) DC Machines: Working principle of a D.C machine as a generator and motor. Constructional features. E.M.F equation of generator and illustrative examples. Back E.M.F and torque equations of D.C motor. Types of D.C motors---Characteristics and applications. Necessity of starter for motor. Illustrative examples on motors.

7 hrs

Unit IV

6) Transformers: Principle of operation and construction of single phase transformers (core and shell type). E.M.F equation, power losses, efficiency and voltage regulation (O.C and S.C tests. Equivalent diagram and phasor diagrams are excluded), illustrative problems on E.M.F. Equation and efficiency only.

6 hrs

Unit V

7) Synchronous Generators: Principle of operation, types and constructional features. E.M.F equation, concept of winding factor,(excluding derivation). Illustrative examples on EMF equation and efficiency only.

6 hrs

8) Three phase induction Motors: Concept of rotating magnetic field. Principle of operation, Constructional features, Slip and its significance, applications of squirrel cage and slip ring motors, Necessity of starter, Illustrative examples only on slip calculations.

6 hrs

Text Books:

1. 'Electrical Technology' E.Hughes International students 9th edition, Pearson, 2005
2. 'Fundamentals of Electrical Engineering', Rajendra Prasad, Prentice Hall of India Pvt Ltd.2005,

Reference Books:

1. M.R.Raghuveer, and K.A.Krishnamurthy 'Electrical, Electronics and computer Engineering', 2nd edition, T.M.H.,2001

Scheme of Examination:

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 : WSL16 / 26
Hours/Week : 0 + 0 + 4
Total hours : 52
Exam Hours : 03

Credits : 02
CIE Marks : 50
SEE Marks : 50

Unit I

Fitting:

1. Study of Fitting tools, Fitting operations and types of Joints,
2. Preparation of models involving Profile practice, Square, Dovetail and Arc Joints (4 models).

Unit II

Welding:

1. Study of Electric Arc Welding, Welding Tools and Equipments,
2. Preparation of Models involving Lap, Butt, Tee and Angular joints(4 Models)

Carpentry: Study of Carpentry Tools and Joints (Demonstration only)

Scheme of Examination:

- | | |
|------------------|----------|
| 1. Fitting model | 30 Marks |
| 2. Welding Model | 12 Marks |
| 3. Viva- voce | 08 Marks |

TOTAL 50 Marks

ENGINEERING PHYSICS LAB

Sub Code : PHL17 / 27
Hours/Week : 0 + 0 + 4
Total hours : 52
Exam Hours : 03

Credits : 02
CIE Marks : 50
SEE Marks : 50

1. Ultrasonic Interferometer
2. Dielectric Constant
3. Energy gap of a Semiconductor
4. Planck's constant.
5. Series and Parallel Resonance.
6. Fermi energy.
7. Stefan's law
8. Zener Diode Characteristics
9. Diffraction grating
10. Transistor Characteristics.
11. Young's Modulus by Single Cantilever Method
12. Sonometer

Reference Book

1. Laboratory Manual in Applied Physics- By H.Sathyasheelan, New Age International 2nd Edition.

Scheme of Examination:

Students will be asked to conduct two experiments.

CONSTITUTION OF INDIA AND PROFESSIONAL ETHICS

(Non Credited Mandatory Course)

Sub Code : CIP18 / 28
Hours/Week : 2 + 0 + 0
Total hours : 26
Exam Hours : 02

Credits : --
CIE Marks : 50
SEE Marks : 50

UNIT I

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- **7hrs**

UNIT II

Union Executive- President, Prime minister, Parliament and the Supreme Court of India. State Executive-Governor, Chief Minister, State Legislator, and high Courts. – **6hrs**

UNIT III

Constitutional provisions for scheduled castes and Tribes, Women and children and backward classes. Emergency provisions. - **4hrs**

UNIT IV

Electoral process. Amendment procedure, 42nd, 44th, 74th, 76th, 86th and 91st. **3hrs**

UNIT V

Scope and Aims of Engineering Ethics, Responsibility of Engineers. Honesty, Integrity and Reliability. Risks, Safety, and Liability in Engineering. - **6 hrs**

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
3. "Constitution of India and Professional Ethics" by VTU, Belguam.
4. "Constitution of India and Professional Ethics" by Mohan Das K & Kiran Kumar N – Akkaprakashan Publications.

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, Vidhyanidhi Prakashan, Gadag, 2006

Scheme of Examination:

Question paper is of objective type. Students have to pass the subject compulsorily. However marks will not be considered for awarding class/ rank.

ENGINEERING CHEMISTRY

Sub Code : CHE12 / 22
Hours/Week : 4 + 0 + 0
Total hours : 52
Exam Hours : 03

Credits : 04
CIE Marks : 50
SEE Marks : 50

UNIT I

Chemical Energy Sources

Introduction to energy; Fuels - Definition, Classification based on the physical state and occurrence with examples; Importance of hydrocarbons as fuels. Calorific value - definition, classification - Gross and Net calorific values, units (S.I). Experimental determination of calorific value of a solid and liquid fuels by using Bomb Calorimeter and Boys calorimeter, numerical problems. Petroleum cracking - Definition, Fluidized catalytic cracking. Reformation of petrol – explanation with reactions. Octane Number, Cetane Number. Knocking – mechanism, prevention of knocking - anti-knocking agents – Unleaded petrol. Synthetic petrol – Fischer Tropsch process. Power alcohol.

7 Hrs

Instrumental Methods of Analysis

Theory, Instrumentation and applications of Colorimetry. Potentiometry Conductometry and Flame photometry.

3 Hrs

UNIT II

Electro Chemical Energy Systems

Electrode potential and cells. Single electrode potential – Definition, Origin – Helmholtz Electrical double layer. Standard electrode potential – Definition. Sign conventions. Derivation of Nernst Equation. Measurement of single electrode potential; Numerical problems on electrode potential and E.M.F. E.M.F of a cell – definition, notation and conventions. Construction of Galvanic cell – classification – primary, secondary and concentration cells.

Reference electrodes – definition, limitations of primary reference electrode and the need for developing secondary reference electrodes. Calomel electrode - construction, cell representation, electrode reactions and applications;

Ion selective electrodes – definition; Glass electrode – construction, cell representation, electrode reactions, advantages and limitations; Determination of pH of a solution using glass electrode.

6 Hrs

Battery Technology

Batteries – Introduction, Basic concepts – principal components of a battery, operation of a battery during discharge and charge. Battery characteristics – voltage, capacity, energy density, efficiency, cycle life and shelf life. Classification of batteries – Primary, with example(Dry cell).

2 Hrs

Fuel Cells

Fuel cells - Introduction, Definition, differences between a battery and a fuel cell and advantages. Construction, working and applications of $H_2 - O_2$

2 Hrs

UNIT III

Corrosion Science

Corrosion – Definition; Chemical corrosion (Dry) and Electrochemical corrosion (Wet), Theory of electrochemical corrosion taking Iron as an example.

Types of corrosion – Differential metal corrosion – Concept of electrode potential difference; Differential aeration corrosion – concept of medium having different oxygen concentration – e.g. pitting corrosion and water line corrosion; Stress corrosion – concept of higher potential at stressed areas e.g. Caustic embrittlement of boiler.

Factors affecting the rate of corrosion – Related to nature of metal: Potential of electrode, relative areas of anodic and cathodic parts, hydrogen over voltage, tendency to form protective films and nature of corrosion product. pH of the medium, temperature, humidity of air, conductance of medium

6 Hrs

Corrosion Control

Protective coatings - Inorganic coatings – (i) Anodizing – meaning, anodizing of Al and applications and (ii) Phosphating – process and applications;

Metal coatings – (i) Galvanization (anodic metal coating) and (ii) Tinning (cathodic metal coating). Cathodic protection methods/ Sacrificial and impressed current method.

4Hrs

UNIT IV

Metal Finishing

Introduction, Technological importance of metal finishing – To impart - corrosion resistance, particular physical and mechanical properties to the surface (e.g. electrical conductivity, heat, abrasion, wear and thermal resistance); Polarization, Decomposition potential and Over voltage – explanation and their applications with reference to the electro plating of the metals.

Electroplating process – Electroplating of Cu, Cr and Au – Bath composition, additives, pH, current density, current efficiency, temperature, anode, cathode (including reactions) and applications.

Effects of plating variables on the nature of electro deposit – Metal ion concentration, organic additives (brighteners, levellers, structure modifiers and wetting agents), current density, pH, and throwing power.

Surface preparation – Importance: steps - (i) Removal of organic substances – Degreasing – use of organic solvents and alkaline solution, (ii) Removal of inorganic substances – Descaling processes – Grinding, polishing, sand blasting and pickling & (iii) Rinsing with water.

7 Hrs

Electro less Plating

Meaning, Electro less plating of Copper on PCB and Nickel on Al – bath composition, additives, pH, temperature, anodic and cathodic reactions and applications.

Distinction between electroplating and electroless plating (Driving force, anodic and cathodic reactions, site of anode and cathode reactions and nature of deposit). Advantages of electroless plating.

4 Hrs

UNIT V

Liquid Crystals and their Applications

Introduction, meaning, positional and orientational order in solid, liquid crystals and liquids. Classification – Thermo tropic and Lyo tropic with examples. Types of mesophases - Nematic, Chiral nematic (Cholesteric), Smectic and Columnar – molecular ordering with examples.

Applications of liquid crystals in display systems – explanation of display working, mention of LCD devices.

5 Hrs

Water Technology

Natural sources of water - impurities in water – Dissolved, suspended, colloidal and biological. Biological Oxygen Demand – Definition, determination and numerical problems; Chemical Oxygen Demand – Definition, determination and numerical problems. Water analysis – Determination of different constituents in water –Alkalinity – Definition and its determination by phenolphthalein and methyl orange indicator method – numerical problems;

Sewage treatment – Primary treatment, Secondary treatment by activated sludge method and Tertiary treatment.

Potable water – Meaning, purification of water by Electro dialysis and Reverse Osmosis.

6 Hrs

Text Books:

1. "Engineering Chemistry" By R.V.Gadag and A. Nityananda Shetty – I .K International Publishing House Pvt.Ltd
2. "Engineering Chemistry" By Jai Prakash, R Venugopal, Shivakumariah, Puspa Iyengar – Subhas Stores.

REFERENCES:

1. Environmental Chemistry By A.K.De
2. Advanced Chemistry By Philip Matthews – Cambridge University Press.

Scheme of Examination:

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 : CCP13 / 23
Hours/Week : 4 + 0 + 0
Total hours : 52
Exam Hours : 03

Credits : 04
CIE Marks : 50
SEE Marks : 50

UNIT I

Introducing Computer System : The Computer Defined , the parts of a computer system, Information processing cycle, and essential hardware.

Interacting Data and Storage Data : keyboard layout , how it accepts data from it , mouse and variants. Monitor, Printing-commonly used – dot matrix, ink jet, laser.

Processing Data and Storage Data : data into information , representation of data, process data, and types of storage devices.

Using Operating Systems : basics, purpose, types – DOS, Windows and Linux.

Networks and the Internet : Basics, uses, types, topologies and protocols What is Internet ? Internet major services, WWW, using E-mail.

8 Hours

UNIT II

Algorithms and Flowcharts : Algorithms, flowcharts divide and conquer strategy , Writing and drawing flowcharts for Swapping two variables, Largest of three & quadratic equation, Factorial.

Constants, variables and data types : Character set, C tokens, keywords and identifiers, Constants variables. Data types, Declaration of variables

Operators and Expressions: Arithmetic, Relational, Logical Assignment, increment and Decrement, Conditional, Bitwise, special operators. Arithmetic expression, evaluation, precedence, type conversion. Operator precedence and associativity.

10 Hours

UNIT III

Managing Input and Output Operations : Reading a character , Writing Formatted input and output.

Decision making and Branching : If statement, if..else, else...if ladder.

Switch statement : operator, goto statement

Decision making and looping : While, do.. while statement for statement programs, Jumps In loops.

12 Hours

UNIT IV

Array : 1D Array, Declaration, initialization, 2D - Initializing, declaration

Character Arrays and Strings: Declaration and Initializing string variables, Reading and writing, Arithmetic operations on characters, Putting strings together, Comparing of two strings, string handling functions.

Structures and Unions: Defining a structure, declaring structure, accessing and structure initialization, copying and comparing structure variables, operations on individual members, arrays of structures, Unions, size of structures.

10 Hours

UNIT V

User defined Functions :

Need, Multi function, Elements, definition, Return values and their types, Function call, declaration, category, 4 types, Functions that return multiple values.

Pointers: Understanding pointers , accessing the address of a variable, declaration of pointer variable, initialization, accessing variable through pointers.

File Management in C : Defining and opening a file, closing, I/O operation on files.

12 Hours

Text Books:

1. 'Introduction to Computers', Peter Norton, 6th edition, Mc Graw Hill
2. 'Programming in ANSI C, E Balagurusamy', 3rd edition, Mc Graw Hill
3. 'Programming techniques through C: A Beginners Companion', M G Venkateshmurthy, Pearson Education India.

Reference Books:

1. 'The C Programming language (ANSI C version)', Kernighan & Retchie, 2nd edition , PHI India.
2. 'Let Us C, Yashvant Kanetkar', bpb, 3rd edition

Scheme of Examination:

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 : CED14/24
Hours/Week : 2 + 0 + 4
Total hours : 78
Exam Hours : 03

Credits : 04
CIE Marks : 50
SEE Marks : 50

UNIT I

Introduction to Computer Aided Sketching

Introduction , Drawing instruments and their uses, BIS Conventions, Lettering, Dimensioning and free hand practicing.

Introduction to software, commands used for engineering drawing.

10 Hours

UNIT II

Orthographic Projections

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

Projections of points – In all the four quadrants.

Projections of straight lines – True and apparent lengths, True and apparent inclinations to reference planes, application problem (Chimney, Tripod Fig post Room problems)

Orthographic Projections of Plane Surface

Introduction, Projections of plane surface – triangle, square, rectangle, pentagon, hexagon and circle (inclined to both HP and VP).

15 Hours

UNIT III

Projections of Solids

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

25 Hours

UNIT IV

Sections and Development of Lateral Surface of Solids

Introduction, Section planes, Section planes, Sections, Sectional Views.

Development of lateral surface of right regular prisms, pyramids, cylinders and cones resting with base on HP.

14 Hours

UNIT V

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).

14 Hours

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 Mc Graw Hill Publications.

Scheme of Examination

- Q1 for 30 Marks from Unit 2 and Unit 3 with internal choice.
- Q2 for 40 Marks from Unit 4 with internal choice
- Q3 for 30 Marks from Unit 5 and Unit 6 with internal choice.

Evaluation

- Sketching – 40%
- Implementation Using Computer – 60%

BASIC ELECTRONICS ENGINEERING

Sub Code : ELN 15/25
Hours/Week : 4 + 0 + 0
Total hours : 52
Exam Hours : 03

Credits : 04
CIE Marks : 50
SEE Marks : 50

UNIT-I

Semiconductor diodes and Applications:

p-n junction diode, Characteristics and Parameters, Diode approximations, DC load line, Temperature dependence of p-n characteristics, AC equivalent circuits, Zener Diodes, Half-wave diode rectifier, Ripple factor, Full-wave diode rectifier, Other full-wave circuits, Shunt capacitor - Approximate analysis of capacitor filters, power supply performance, Zener diode voltage regulators, Numerical examples (T1 - 2.1,2.2,2.3,2.4,2.5,2.6,2.9, R1 - 20.1,20.2,20.3,20.4,20.8, T1 - 3.5,3.6)

06 Hours

UNIT-II

Transistors and Biasing Methods:

Bipolar Junction transistor, Transistor Voltages and currents, amplification, Common Base, Common Emitter and Common Collector Characteristics, DC Load line and Bias Point, Base Bias, Collector to Base Bias, Voltage divider Bias, Comparison of basic bias circuits, Bias circuit design, Thermal Stability of Bias Circuits (T1 - 4.1,4.2,4.3,4.4,4.6,5.1,5.2,5.3,5.4,5.5,5.7,5.9).

12 Hours

UNIT-III

Other devices, Amplifiers & Oscillators:

Silicon Controlled Rectifier (S.C.R), SCR Control Circuits and S.C.R applications; Uni junction transistor, UJT applications, Junction Field effect Transistors (Exclude Fabrication and Packaging), JFET Characteristics, FET Amplifications, Decibels and Half power points, Single Stage CE Amplifier and Capacitor coupled two stage CE amplifier, Series voltage negative feedback and Additional effects of Negative feed back, The Barkhausen Criterion for Oscillations, BJT RC phase shift oscillator, Hartley , Colpitts and crystal oscillator. Numerical problems (T1 - 19.1,19.2,19.3,19.7.9.1,9.2,9.4,8.2,12.1,12.3,13.1,13.7; R1 - 17.15, 17.16,17.17,17.18,17.19)

13 Hours

UNIT-IV

Introduction to Operational Amplifiers and Communication Systems:

Ideal OPAMP, Saturable property of an OP AMP inverting and non inverting OPAMP circuits, need for OPAMP, Characteristics and applications - voltage follower, addition, subtraction, integration, differentiation; Cathode Ray Oscilloscope (CRO), Numerical examples as

applicable. Block diagram, Modulation, Radio Systems, Superhetrodyne Receivers, Numerical examples (T2 – 11.1 – 11.8, 9.6, T2 – 13.1, 13.2, 13.4, 13.5)

12 Hours

UNIT-V

Number systems and Digital logic :

Introduction, decimal system, Binary, Octal and Hexadecimal number systems, addition and subtraction, fractional number, Binary Coded Decimal numbers, Boolean algebra, Logic gates, Half-adder, Full-adder, Parallel Binary adder (T2: 14.1 – 14.14)

14 Hours

Text books:

1. (T1) 'Electronic Devices and Circuits': David. A. Bell; PHI, New Delhi, 2004
2. (T2) 'Electrical and Electronics & Computer Engineering for Scientists and Engineers' Second Edition -K.A. Krishnamurthy & M.R. Raghuvver- New Age International Publishers (Willey Eastern) 2001

Reference Books:

1. (R1). 'Electronic Devices and Circuits' : Jacob Millman, Christos C. Halkias TMH, 1991 Reprint 2001
2. (R2) 'Electronic Communication Systems', George Kennedy, TMH 4th Edition
3. (R3) 'Digital Logic and Computer Design', Morris Mano, PHI, EEE

Scheme of Examination:

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 CHEMISTRY LABORATORY

Sub Code : CHL16 /26
Hours/Week : 0 + 0 + 4
Total hours : 52
Exam Hours : 03

Credits : 02
CIE Marks : 50
SEE Marks : 50

PART – A

1. Determination of Total Hardness of a sample of water using di sodium salt of EDTA.
2. Determination of Calcium Oxide (CaO) in the given sample of cement by rapid EDTA method.
3. Determination of percentage of Copper in brass using standard sodium thiosulphate solution.
4. Determination of Iron in the given sample of Haematite is solution using potassium dichromate crystals by external indicator method.
5. Determination of Chemical Oxygen Demand (COD) of the given industrial waste water sample.

PART – B

1. Potentiometric estimation of FAS using standard $K_2Cr_2O_7$ solution
2. Colorimetric determination of copper
3. Conductometric estimation of an Acid (HCl) using standard NaOH solution
4. Flame photometric estimation of sodium in the given sample of water.
5. Determination of pKa of a weak acid using pH meter
6. Determination of viscosity coefficient of a given liquid using Ostwald's viscometer.

References:

1. 'Vogels text book of quantitative inorganic analysis', revised by J. Bassett, R.C. Denny, G.H. Jeffery, 4th Ed.
2. 'Practical Engineering Chemistry' by Sunita & Ratan.

COMPUTER PROGRAMMING LAB

Sub Code : CPL16 / 26

Hours/Week : 0 + 0 + 4

Total hours : 52

Exam Hours : 03

Credits : 02

CIE Marks : 50

SEE Marks : 50

Students require to create documents and manipulate them using a suitable word processing package like MS Word.

Students Must implement Programs in C to solve problems involving

- a) if....else....statement
- b) switch statement
- c) whileloop
- d) for..... ..loop
- e) String manipulations
- f) Arrays
- g) Structures
- h) User-defined functions
- i) Pointers

ENVIRONMENTAL STUDIES (Non Credited Mandatory Course)

Sub Code : CIV18 / 28
Hours/Week : 2 + 0 + 0
Total hours : 26
Exam Hours : 02

Credits : --
CIE Marks : 50
SEE Marks : 50

UNIT 1

Environment:

Definition, Ecosystem, Balanced ecosystem, Human activities – Food Shelter, Economic and Social security

Effects of human activities on environment – agriculture, Housing, Industry, Mining and Transportation Activities, Environmental impact Assessment, Sustainable Development

5 hrs

UNIT II

Natural resources :

Water resources- Availability and quality aspects. Water borne disease, Fluorides problems in drinking water, Mineral Resources, Forest Wealth, Material cycles- Carbon, Nitrogen, Sulphur cycles.

5 hrs

UNIT III

Energy – Different type of energy, Electromagnetic Radiation, Conventional and Non Conventional sources- Hydro electric, Fossil fuel based Nuclear, Solar, Biomass and Biogas, Hydrogen as an alternative future source of energy.

5 hrs

UNIT IV

Environmental pollution and their effects, Water Pollution, Noise Pollution, Automobile pollution. Public health aspects, Current Environmental issues of important: Population growth, Climate change and global Warming-effect, Urbanizations, Acid Rain, Ozone layer depletion, Animal husbandry.

6 hrs

UNIT V

Environmental Protection - Role of Government, Legal Aspects, Initiative by NGO's, Environmental education, Women education.-

5 hrs

Reference Books

1. Environmental Studies – Benny Joseph – Tata McGraw Hill 2005
2. Environmental Studies – DR. D.L. Manjunath, Pearson Education 2006
3. Principals of Environmental Science and Engineering – P. Venugopal Rao, Prentice Hall of India.

4. 'Environmental Science and Engineering' – Meenakshi, Prentice hall Of India.
5. 'Environmental Studies' – Dr. S.M. Prakash – Elite Publication.

Scheme of Examination:

Question paper is of objective type. Students have to pass the subject compulsorily. However marks will not be considered for awarding class/ rank.

COMMUNICATIVE ENGLISH

Sub Code : ENG19 / 29
Hours/Week : 2 + 0 + 0
Total hours : 26
Exam Hours : 02

Credits : 02
CIE Marks : 50
SEE Marks : 50

Unit I

Basics of Technical Communication

Introduction, Process of Communication, Language as a Tool, Levels of Communication, Communication Networks, Importance of Technical Communication.

3 Hours

Barriers to Communication

Definition of Noise, Classification of Barriers

2 Hours

Unit II

Active Listening

Introduction, Defining purpose, Analyzing Audience and Locale, Organizing Contents, Preparing outline, Visual Aids, Understanding Nuances of Delivery, Kinesics, Proxemics, Paralinguistic's, Chronemics, Sample speech

4 Hours

Unit III

Effective Presentation Strategies

Introduction, Defining purpose, Analyzing Audience and Locale, Organizing Contents, preparing outline, Visual Aids, Understanding Nuances of Delivery, Kinesics, Proxemics. Paralinguistic's, Chronemics, sample speech.

4 Hours

Unit IV

Group Communication

Introduction, Group Discussion, Organizational Group discussion, Group discussion as part of selection process Meetings, conferences.

4 Hours

Unit V

General English

Technical or administrative correspondences – letter writing, report writing, notices, agenda, minutes of meetings, memos.

2 Hours

Creative communication – slogan writing, advertisements.

2 Hours

Words – Vocabulary – antonyms, synonyms one word substitution, idioms, phrases,
Expansion of ideas

4Hours

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.

Scheme of Examination:

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 : MAT21
Hours/Week : 4 + 1 + 0
Total hours : 52
Exam Hours : 03

Credits : 04
CIE Marks : 50
SEE Marks : 50

Unit I

Differential equation of 1st order

Linear, Exact and equations reducible to these form, Application of differential equation, Orthogonal trajectories.

8 Hours

Unit II

Differential equation of higher order

Complimentary function, particular integral, Initial and boundary value problems, variations of parameter, Cauchy and Legendre Homogeneous equations, Methods of undetermined coefficients.

12 Hours

Unit III

Laplace Transforms

Transforms of standard functions, change of scale, Transforms of $t f(t)$, $f(t)/t$, Laplace transform of derivative and integral. Periodic, unit step and impulse function.

10 Hours

Unit IV

Inverse Laplace transform and application

Convolution theorem, in final and final value theorem, Inverse Laplace transforms by partial fractions and convolution theorem, Solution of differential equations and simultaneous equations. Problems related to Engg. applications.

8 Hours

Unit V

Vector Calculus

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

Line integral, Surface integral and volume integral. Green's theorem (with proof), Stokes theorem and Gauss divergence theorem.

12 Hours

Text Book:: Higher engineering Mathematics by Grewal, 36th edition, Khanna Publication

Reference : Advanced Engg. Mathematics by Erwin E Kreyszig, 8th edition, Wiley.

Scheme of Examination:

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.