

AcharyaNagarjuna University
Facultyof Engineering

B.TECH COURSE STRUCTURE

For Circuit Branches:CSE/ECE/EEE/IT/EIE
(2015-16)

I YEAR I Semester

Course Details		Scheme of Instruction			Scheme of Examination				
Code	Subject	L	T	P	Maxi Internal Marks	Maxi External Marks	Total Marks	Credits	Cat. code
BT/CSE/ECE/EEE-111	Mathematics –I	4	1	-	40	60	100	4	BSC
BT/CSE/ECE/EEE-112	Engineering Physics-1	3	1	-	40	60	100	3	BSC
BT/CSE/ECE/EEE-113	Engineering. Chemsitry-1	3	-	-	40	60	100	3	BSC
BT/CSE/ECE/EEE-114	Basic Mechanical Sciences	4	-	-	40	60	100	3	ESC
BT/CSE/ECE/EEE-115	Environmental science and Engineering	3	-	-	40	60	100	3	ESC
BT/CSE/ECE/EEE-116	Basic English for Engineers	4		-	40	60	100	4	HSC
BT/CSE/ECE/EEE-151	Physics Lab	-	-	3	40	60	100	2	BSC
BT/CSE/ECE/EEE-152	Engineering Graphics	-	-	6	40	60	100	2	ESC
BT/CSE/ECE/EEE-153	English Communications skills Lab	-	-	3	40	60	100	2	HSC
	Total	21	2	12	360	540	900	26	

I YEAR II Semester

Course Details		Scheme of Instruction			Scheme of Examination				
Code	Subject	L	T	P	Maxi Internal Marks	Maxi External Marks	Total	Credits	Cat. code
BT/CSE/ECE/EEE-121	Mathematics –II	4	1	-	40	60	100	4	HSC
BT/CSE/ECE/EEE-122	Engineering Physics-II	3	1	-	40	60	100	3	BSC
BT/CSE/ECE/EEE-123	Engineering Chemistry-II	3	-	-	40	60	100	3	BSC
BT/CSE/ECE/EEE-124	Basic Electrical & Electronic Sciences	3	1		40	60	100	3	BSC
BT/CSE/ECE/EEE-125	Problem solving using C	3	1	-	40	60	100	3	ESC
BT/CSE/ECE/EEE-126	Advanced English for Engineers	4	-	-	40	60	100	4	ESC
BT/CSE/ECE/EEE-161	Chemistry Lab	-	-	3	40	60	100	2	BSC
BT/CSE/ECE/EEE-162	Computer Programming Lab	-	-	6	40	60	100	2	ESC
BT/CSE/ECE/EEE-163	Workshop(IT)	-	-	3	40	60	100	2	ESC
	Total	20	4	12	360	540	900	26	

MATHEMATICS – I**Unit-I**

Matrices: Rank of a matrix, Consistency of linear system of equations, Linear transformations, vectors, Linear dependence, Eigen values and Eigen vectors, Properties of eigen values, Cayley-Hamilton theorem (without proof), Reduction to diagonal form, reduction of Quadratic form to canonical form, Complex matrices.

Unit-II

Rolle's Theorem(without proof), Lagrange's Mean value theorem (without proof), Taylor's theorem (without proof), Expansions of functions: Maclaurin's series, Taylor's series, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers, Principle of least squares, method of least squares, fitting of other curves.

Unit-III

Double integrals, Change of order of integration , Double integrals in polar coordinates, Area enclosed by plane curves, Triple integrals, Change of variables, Beta function, Gamma function, Relation between beta and gamma functions, error function.

Unit-IV

Fourier Series: Introduction and Euler's formulae, Conditions for a Fourier expansion, Functions having points of discontinuity, Change of interval, Even and Odd functions, Half range series, Typical wave forms and Parseval's formulae, Complex form of the Fourier series.

Text book

- 1]. Higher Engineering Mathematics by B.S. Grewal, 43rd edition, Khanna publishers, New Delhi.

Reference books:

- [1]. Advanced Engineering Mathematics by kreyszig.
- [2]. Engineering Mathematics by Babu Ram
- [3] Engineering Mathematics– I BYN.P. Bali, SatyanarayanaBhavanari and IndraniKelkerLaxmipublications, New Delhi.
- [4]Mathematical Foundations for Computer Sciences- by SatyanarayanaBhavanari, Pradeep Kumar T.V, ShaikMohiddinshaw, BSP Publications.

ENGINEERING PHYSICS - I**UNIT-I**

Ultrasonics

12 Periods

Production of Ultrasonics by Piezo electric oscillator method, Detection by Acoustic grating method, Applications - Pulse echo technique, ultrasonic imaging and some general applications.

Interference

Stokes principle (Phase change on reflection), Interference in thin films due to reflected light (Cosine law), Newton's rings experiment – Determination of radius of curvature, Michelson's interferometer: Principle, construction working and its application (Determination of wavelength of monochromatic source).

UNIT-II**10 Periods**

Diffraction – Single slit (Qualitative and quantitative treatment).

Polarisation – Polarisation by reflection, Refraction and double refraction in uniaxial crystals, Nicol prism, Quarter and half wave plate, circular and elliptical polarization and detection.

UNIT-III**14 Periods**

Lasers: Laser characteristics, Spontaneous and Stimulated emissions, Basic requirements of a laser, Population inversion – Solid state laser (Ruby laser), Gas (He-Ne) laser, Semiconductor (GaAs) laser, Applications of lasers.

Holography: Principle, recording, reproduction and applications.

Fiber optics: Structure of optical fiber, Types of optical fibers, Numerical aperture, Fiber optics in communications and advantages.

UNIT –IV**14 Periods**

Electricity and Magnetism

Gauss's law in electricity (statement & proof), Coulomb's law from Gauss law, Gauss law for magnetism, Faraday's law of electromagnetic induction, Lenz's law, Self Inductance, Mutual inductance, energy stored in a magnetic field, Displacement current, Maxwell's equations (qualitative treatment), electromagnetic wave equation and Velocity, A.C. circuit containing series LCR circuit (resonance condition).

TEXT BOOKS:

1. Engineering Physics - R .K. Gaur & S. L. Gupta ,DanpatiRai Publications, Delhi, 2001.
2. Engineering Physics - Hitendra K. Malik &A.K.Singh, Tata MacGraw Hill, New Delhi,2009.

REFERENCE BOOKS:

1. Fundamentals of Physics - Resnick&Halliday, John Wiley sons ,9th Edition.
2. Applied Physics-S. Mani Naidu, Pearson Publishers, Chennai
3. Engineering Physics - M.Arumugam, Anuradha Publications, Chennai ,5thEdition , 2006.
4. Engineering Physics - B. K. Pandey& S. Chaturvedi, CengageLearningIndia Pvt. Ltd., Delhi.
- 5.Engineering Physics, D.K. Bhattacharya and PoonamTandon, oxford university Press, New Delhi

ENGINEERING CHEMISTRY – I

UNIT-I: WATER TECHNOLOGY

Various impurities of Water, WHO guidelines, Hardness units and determination by EDTA method (simple problems), water treatment for drinking purpose-sedimentation, coagulation, filtration (slow sand filter), various methods of chlorination, breakpoint chlorination.

Water treatment for industrial purpose: Boiler troubles, scales, sludges, caustic embrittlement, boiler corrosion, priming and foaming- causes and prevention, Internal conditioning -Phosphate, Calgon and carbonate treatment, External conditioning-Lime Soda process (simple problems), softening by ion exchange process, Desalination of brackish water by electro dialysis and reverse osmosis.

UNIT-II: ELECTROCHEMICAL ENERGY SYSTEMS

Primary and Secondary batteries, Reserve batteries, Solid state and molten solvent batteries, Recent technological trends, Lithium ion batteries, Nanostructured electrode materials, Lithium and carbon based nanomaterials and nanocomposites, Solid-state Lithium ion batteries, Energy storage and backup. Fuel cells, Scientific prospects of fuel cells, Electrochemistry, In-situ and ex-situ electrochemical characterizations, Current-Voltage measurement, Current Interrupt measurements, Porosity, BET surface area analysis, Gas permeability, Hydrogen as future fuel, Alkaline-, acid- and molten carbonate-fuel cells, Solid oxide fuel cells.

UNIT-III: CORROSION AND ITS PREVENTION

Introduction, electrochemical theory of corrosion, dry corrosion, corrosion due to differential aeration, Types of corrosion-galvanic corrosion (galvanic series), Pitting, Stress and microbiological corrosion, Factors affecting corrosion-oxidizers, pH, over voltage and temperature. Protection methods: Cathodic protection, (Impressed current and sacrificial anode) anodic protection, corrosion inhibitors- types and mechanism of inhibition

UNIT-IV: POLYMERSS

Monomer functionality, degree of polymerization, Tacticity, classification of polymerization- addition, condensation and co-polymerization, mechanism of free radical polymerization.

Plastics- Thermoplastic and thermosetting resins, preparation, properties and uses of Bakelite, and PVC. Compounding of plastics.

Conducting polymers: Polyacetylene, mechanism of conduction, examples and applications.

Rubber- Processing of latex, Drawbacks of natural rubber- Vulcanization, Synthetic rubbers- Buna-S and Buna-N.

Prescribed Text Books

1. Engineering Chemistry, P.C. Jain and M. Jain - Dhanapathi Rai & Sons, Delhi
2. A text book of Engineering Chemistry, S.S. Dara - S. Chand & Co. New Delhi
3. Engineering Chemistry, B.K. Sharma - Krishna Prakashan, Meerut
4. Shashichawla, A text book of engineering chemistry, 3rd Edition, Dhanpatrai & co new delhi, 2007.

Basic Mechanical Sciences

Unit – I

Transmission of Motion and Power

Introduction, Methods of drive, Power transmission elements, shaft and axle, Belt-drive, Pulleys, Power transmitted by a belt, Chain drive, Friction drive, Gear drive

Governors

Introduction, Speed Control, Types of Governors, Watt Governor, Porter Governor, Hartnell Governor

Unit – II

Basic Thermodynamics: Work, Power, Energy, Heat, Temperature, Mechanical equivalent of heat, Internal energy, Enthalpy, Entropy, Efficiency, Statements of Zeroth law, First Law and Second Law of Thermodynamics

Internal Combustion Engines

Introduction, Classification, Engine details, Otto four-stroke cycle, Diesel-four-stroke cycle, Difference between Otto cycle and Diesel cycle, Two-stroke cycle, Difference between two-stroke and four-stroke cycles, Indicated Power (ip), Brake Power (bp), Efficiencies

Unit – III

Steam Boilers

Introduction, Classification, Simple vertical boiler, Vertical multi tubular boiler, Cochran type, Lancashire boiler, Locomotive boiler, Babcock and Wilcox boiler, High pressure boilers, Boiler details, Boiler performance. Functioning of different mountings like Pressure gauge, Water level indicator, Safety Valve etc. and Accessories like Feed Pump, Injector, Economizer, Steam trap etc.

Refrigeration & Air Conditioning

Introduction, Refrigerant, Types of refrigerators, Vapor compression refrigerating system, Window and split-air conditioners.

Unit – IV

Pumps

Introduction, Reciprocating pump types, operation, Air Chamber, Centrifugal pumps types, Priming, Rotary pumps.

Air Compressors

Introduction, Uses of Compressed air, Reciprocating compressors, Operation of a compressor, Work for compression, Power required, Reciprocating compressor efficiency, Multistage reciprocating compressors, Rotary compressors.

TEXT BOOKS

1. Elements of Mechanical Engineering , by Rajput ,Laxmi Publications, New Delhi
2. Elements of Mechanical Engineering by K.P. Roy , Media Promoters
3. Thermal Engineering – by Rajput, Laxmi Publications, New Delhi
4. Theory of Machines , by R.S. Khurmi& Gupta, S.Chand Publishers
5. Elements of Mechanical Engineering -- by K.P. Roy , Media Promoters

ENVIRONMENTAL SCIENCE AND ENGINEERING**UNIT-I**

Introduction: Definition, Scope and Importance.

Natural Resources: Forest Resources – Use and over-exploitation, Deforestation, Mining, dams and their effects on forests and tribal people; Water Resources – Use and over-utilization of surface and ground water, floods and droughts, Water logging and salinity, Dams – benefits and problems, Conflicts over water; Energy resources – Energy needs, Renewable and non-renewable energy sources; Land resources – Land as a resource, land degradation, soil erosion & desertification, Effects of modern agriculture on land resources.

Ecosystems: Definition, Structure and functions of an Ecosystems, Biogeochemical cycles-water, carbon, nitrogen and water cycles, Types-Forest, Greenland, Desert, Aquatic ecosystem.

UNIT-II

Biodiversity and its Conservation: Definition, Value of biodiversity. Bio-geographical classification of India, India as a mega-diversity nation, Hot-spots of biodiversity, Threats to bio-diversity, Endemic and endangered species of India, Conservation of biodiversity.

Environmental Pollution:

Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, nuclear pollution, Solid waste management.

UNIT-III

Social Issues and Environment: From unsustainable to sustainable development, Population growth and environment, Greenrevolution, Rain water harvesting, watershed management, cloud seeding, Resettlement and rehabilitation of people - problems and concerns, Environmental Impact Assessment.

Climate Changes:

Global warming & Green house effect, Acid rain, Ozone layer depletion.

UNIT-IV

Environmental acts: Prevention and Control of Water pollution & Air Pollution act, Environmental protection act, Wildlife protection act, Forest Conservation act.

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

Case Studies: Chipko movement, Narmada Bachao Andolan, Silent Valley Project, Madhura Refinery and Taj Mahal, Chernobyl Nuclear Disaster, Ralegaon Siddhi, Florosis and Bhopal Tragedy.

Field work: Visit to a local area to document environmental assets – river/ forest/ grassland / hill /mountain. Study of local environment-common plants, insects, birds. Study of simple ecosystems – pond, river, hill, slopes etc. Visits to industries, water treatment plants, effluent treatment plants.

Text Books

1. Environmental Studies, by Dr. Suresh K. Dhameja, Published by S.K. Kataria & Sons, Ludhiana.

Reference Books

1. Environmental studies by Anubha Kaushik and C.P. Kaushik., New Age International Publishers, New Delhi.

2. T Benny Joseph, Environmental Studies, the Tata McGraw-Hill Publishing Company Limited, New Delhi.

3. Environmental chemistry by A.K. De.

Basic English for Engineers

UNIT-1:

1. Listening Skills: The boy who broke the bank (English and Soft Skills)
2. Sonnet - To Science (The Siren's Song)
3. Vocabulary Building: One-Word Substitutes, Words Often Confused
4. Reading Comprehension

UNIT- II:

1. Written Communication Skills: Gateman's Gift (English and Soft Skills)
2. Work without Hope (The Siren's Song)
3. Grammar: Correction of Sentences
4. Writing: Letter Writing-- Formal and Informal Letters

UNIT - III:

1. Assertive Skills: The Verger (English and Soft Skills)
2. Seven Ages of Man (The Siren's Song)
3. Writing: Note- Taking, Note-Making
4. Paragraph Writing: Technical Description-Process, Object

UNIT - IV:

1. Teamwork Skills: Whitewashing the fence (English and Soft Skills)
2. Ozymandias (The Siren's Song)
3. Vocabulary Building: Idioms
4. Writing: Essay Writing

TEXTBOOKS:

1. S.P.Dhanavel, *English and Soft Skills*, New Delhi: Orient Black Swan Pvt. Ltd., 2013.
2. David Murdoch, *The Siren's Song: An Anthology of British and American Verse*, Madras, Orient Longman, 1993.
3. V.R.Narayanaswami, *Strengthen Writing 3rd Edition* New Delhi: Orient Blackswan Private Ltd., 2009.

REFERENCE BOOKS:

1. Dr. ShaliniVerma, *Word Power Made Handy*, S.Chand& Co Ltd., 2009.
2. Sharon J.Gerson, Steven M.Gerson, *Technical Writing*, New Delhi: Pearson education, 2007.
3. Sanjay Kumar and PushpLata, *Communication Skills*, Noida: Oxford University Press, 2012.
4. M. Ashraf Rizvi, *Effective Technical Communication*, New Delhi: Tata Mc-Grew Hill, 2009.
5. Bikram K. Das, KalyaniSamantray, RathNayak, SusmitaPani&SaveetaMohanty, *An Introduction to Professional English and Soft Skills*, New Delhi: Foundation Books, 2009.

Engineering Physics Lab**Any 15 experiments from the following list****LIST OF EXPERIMENTS**

1. Compound pendulum –Determination of acceleration due to gravity (g)
2. Interference fringes - measurement of thickness of a foil / diameter of Wire using wedge method.
3. Sensitive galvanometer - Determination of figure of merit
4. Newton's rings – Measurement of radius of curvature of plano convex lens
5. Lissajous' figures –Calibration of an audio oscillator
6. Photo cell – I-V Characteristic curves and determination of stopping potential
7. Diffraction grating – Measurement of wavelengths
8. Torsional pendulum- Determination of rigidity modulus of the wire material.
9. Carey- Foster's bridge: Determination of specific resistance/Temperature coefficient of resistance.
10. Photo voltaic cell - Determination of fill-factor
11. Variation of magnetic field along the axis of a current carrying circular coil.
12. Series LCR resonance circuit - Determination of "Q" factor.
13. Thomson's method - determination of e/m of an electron.
14. Determination of A.C. Frequency – Sonometer.
15. Prism/Grating - Determination of dispersive power.
16. To determine the wavelength of Laser source.
17. Hall effect – Determination of Hall coefficient.
18. Determination of energy band gap.
19. Determination of Numerical Aperture of an optical fiber.
20. Determination of Amplitude and Frequency of an AC signal using a CRO.

Engineering Graphics**Unit – I**

General: Use of Drawing instruments, Lettering .-Single stroke letters, Dimensioning- Representation of various type lines. Geometrical Constructions..Representative fraction, Scales.-Plain Scales, Diagonal Scales, Comparative Scales, Vernier Scales.

Unit – II

Curves :Curves used in Engineering practice - conic sections - general construction and special methods for ellipse, parabola and hyperbola. cycloid, epicycloids, hypocycloid involute of circle and Archimedian Spiral.

Unit – III

Method of Projections: Principles of projection - First angle and third angle projection of Points.Projection of Straight lines.Traces of lines. (Limited to first angle projection only)

Projections of Planes :Projections of planes, projections on auxiliary planes.

Unit – IV

Projections of Solids :Projections of Cubes, Prisms, Pyramids, Cylinders and Cones with varying positions.

Sections Of Solids: Sections of Cubes, Prisms, Pyramids, cylinders and Cones, true shapes of sections. (Limited to the Section Planes perpendicular to one of the Principal Planes).

Unit - V(Demonstration only).

Computer Aided Drafting (using any Standard Package): Setting up a drawing, starting main menu (New, Open Save, Save Asetc), Opening Screen error correction on screen units, co-ordinate system, limits, grid, snap, ortho.

Tool bars: Draw tool bar, object snap, tool bar, modify tool bar, dimension tool bar

TEXT BOOK:

- Engineering Drawing by N.D. Bhatt & V.M. Panchal. (Charotar Publishing House,Anand).

REFERENCE BOOK:

- Engineering Drawing by Prof.K.L.Narayana& Prof. R.K.Kannaiah. SciTech Publisher.

English Communication Skills Lab**Module-1: Phonetics**

- a) Introduction to Phonetics
- b) Vowels and Consonants
- c) Accent, Intonation and Rhythm

Module-2: Listening Comprehension

- a) Comprehending Spoken material in British English
- b) Comprehending Spoken material in American English
- c) Intelligent listening in situations

Module-3: Role Play/Dialogue Writing

- a) Introducing oneself & others
- b) Asking for & giving permissions
- c) Asking for and responding to give directions
- d) Seeking request
- e) Inviting and responding invitations
- f) Apologizing

Module-4: Reading Skills

- a) Reading for Facts.
- b) Reading for main idea.
- c) Scanning and skimming the text
- d) Inference of lexical and contextual meaning

Module-5: Presentation Skills

- a) Extempore (JAM)) Sessions
- b) Paper Presentation:
 - i) Identification of Source Material
 - ii) Arrangement of Collected Data
- c) Elocution

Suggested List of Activities:

Module 1	1. Identifying phonemes 2. Listening to the sounds, practice and record the sounds from software
Module 2	3. Listening to the comprehensions from computers and complete the tasks related to the comprehension passages 4. Facilitators will play audios (great speeches, conversations etc) and students listen & answer the questions asked by the facilitators
Module 3	5. Role-playing takes place between two or more people, who act out roles to explore a particular scenario. 6. Shared spaces (asking for and giving permissions)
Module 4	7. Students are asked to read English Newspaper and they have to express the main idea of any article.

	8. Reading comprehensions and complete the tasks related to them.
Module 5	9. Each student will be given a topic on the spot for extempore speech 10. Students are asked to prepare on any topic of their own for Oral/Paper presentations

Suggested Software:

- Cambridge Advanced Learners' English Dictionary with CD.
- Clarity Pronunciation Power
- The Rosetta Stone English Library
- Dorling Kindersley series of Grammar, Punctuation, Composition etc.
- English in Mind Series : Starter and 1 to 5 work books, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge
- Language in Use, Foundation Books Pvt. Ltd with CD.
- Mastering English in Vocabulary, Grammar, Spellings, Composition
- Telephoning in English
- Oxford Advanced Learner's Compass, 7th Edition
- Communicate to Conquer: A Handbook of Group Discussions and Job Interviews

Reference Books: Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

1. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
2. Daniel Jones, *English Pronouncing Dictionary* Current Edition with CD.
3. T. Balasubramanian, *A Text book of English Phonetics for Indian Students*, Macmillan, 2003.
4. J. Sethi, KamleshSadanand and D.V. Jindal, *A Practical Course in English Pronunciation* (with two Audio cassettes), New Delhi: Prentice-Hall of India Pvt. Ltd.,
5. R. K. Bansal and J. B. Harrison, *Spoken English*, Orient Longman, 2006.
6. Krishna Mohan & NP Singh, *Speaking English Effectively*, Macmillan,
7. T. Samson, *Innovate with English*, New: Delhi: OUP, 2010.

Mathematics-II**Unit-I**

Ordinary differential equations (first order): Introduction, variables separable equations, Linear equations, Bernoulli's equations, Exact equations, equations reducible to exact equations, Orthogonal trajectories, Newton's law of cooling, Rate of Decay of Radio-Active Materials.

Unit-II

Ordinary differential equations (higher order): Linear Differential equations: Definition, Theorem, Operator D, Rules for finding the complementary function, Inverse operator, Rules for finding the particular integral, Working procedure to solve the equation, Linear dependence of solutions, Method of variation of parameters, Equations reducible to linear equations, Cauchy's homogeneous linear equation, Legendre's linear equation, Simultaneous linear equations with constant coefficients.

Unit-III

Laplace Transforms : Introduction, Transforms of elementary functions, Properties of Laplace Transforms, existence conditions, Transforms of derivatives, Integrals, multiplication by t^n , division by t , Evaluation of integrals by Laplace Transforms, Inverse transforms, convolution theorem, Application to Differential equations with constant coefficients, transforms of unit step function, unit impulse function, periodic function.

Unit-IV

Vector Calculus: Scalar and vector point functions, Del applied to scalar point functions. Gradient, Del applied to vector point functions, Physical interpretation of divergence, Del applied twice to point functions, Del applied to products of point functions, Integration of vectors, Line integral, Surfaces, Green's theorem in the plane (without proof), Stoke's theorem (without proof), Volume integral, Gauss divergence Theorem (without proof),.

Text book

- 1]. Higher Engineering Mathematics by B.S. Grewal, 43rd edition, Khanna publishers, New Delhi.

Reference books:

- [1]. Advanced Engineering Mathematics by kreyszig.
- [2]. Engineering Mathematics by Babu Ram.
- [3] Engineering Mathematics– I BYN.P. Bali, SatyanarayanaBhavanari and IndraniKelkerLaxmipublications, New Delhi.
- [4]Mathematical Foundations for Computer Sciences- by SatyanarayanaBhavanari, Pradeep Kumar T.V, ShaikMohiddinshaw, BSP Publications

Engineering Physics-II**Unit-I****12 Periods****Principles of Quantum Mechanics**

Dual nature of light, Matter waves & properties, de Broglie's concept of matter waves, Davisson and Germer experiment, Heisenberg's uncertainty principle and applications (non-existence of electron in nucleus). One dimensional time independent Schrodinger's wave equation, Physical significance of the wave function, Particle in a box (one dimensional).

Unit-II**12 Periods**

ELECTRON THEORY OF METALS: Classical free electron theory - Mean free path - Relaxation time and drift velocity - Quantum free electron theory - Fermi - Dirac (analytical) and its dependence on temperature - Fermi energy, Hall effect and its uses.

BAND THEORY OF SOLIDS: Bloch theorem (qualitative) - Kronig - Penney model - Origin of energy band formation in solids - Classification of materials into conductors, semi- conductors & insulators -Concept of effective mass of an electron.

Unit-III**12 Periods****Dielectric and Magnetic Materials**

Electric dipole moment, polarization, dielectric constant, polarizability, types of polarizations, internal fields (qualitative), Clausius-Mossotti equation, Frequency dependence of polarization, Ferroelectrics and their applications.

Origin of magnetic moment of an atom, Bohr magneton, classification of dia, para and ferro magnetic materials on the basis of magnetic moment, Hysteresis curve, soft and hard magnetic materials, Ferrites and their applications.

UNIT –IV**Advanced Materials of Physics****14 Periods**

Optoelectronic devices: Qualitative treatments of Photo diode, LED and LCD; Solar cell and its characteristics.

Superconductivity: First experiment, critical parameters (T_c , H_c , I_c), Meissner effect, types of superconductors, BCS Theory (in brief) and Applications of superconductors.

NanoTechnology : Introduction to nano materials, nano scale, surface to volume ratio, fabrication of nanomaterials, sol-gel and chemical vapour deposition methods, Carbon nano tubes-preparation and properties (thermal, electrical and mechanical - in brief), some applications of nanomaterials.

TEXT BOOKS

1. Engineering Physics - R .K. Gaur & S. L. Gupta ,DanpatiRai Publications, Delhi, 2001.
2. Engineering Physics – V. Rajendran, Tata MacGraw Hill, New Delhi, 2009.

REFERENCE BOOKS

1. Engineering Physics-P.K. Palanisamy, Scitech Publications PVT. Ltd, New Delhi
2. Engineering Physics – M.R. Srinivasan, New age International Publishers, New Delhi
3. Materials science – M.Vijaya and G.Rangarajan, TMH, New Delhi
4. Engineering Physics, D.K. Bhattacharya and PoonamTandon, Oxford university Press, New Delhi

ENGINEERING CHEMISTRY -II**UNIT-I: CHEMISTRY OF NANOMATERIALS**

Introduction to nano chemistry, preparation of nano materials - carbon nanotubes and fullerenes and their engineering applications.

UNIT-II: INSTRUMENTAL METHODS OF ANALYSIS

Basic principles, instrumentation and applications of UV-Visible, Infra-Red, Nuclear Magnetic Resonance (NMR), Gas Chromatography and High Performance Liquid Chromatography.

UNIT-III: SOLID STATE CHEMISTRY

Band theory of solids, types of semiconductors, preparation of semiconductors and semiconductor devices.

UNIT-IV: SOLAR ENERGY HARNESSING

Fundamentals, Conversion into electrical energy, Photovoltaic and Photogalvanic energy storage, Semiconductor photoelectrochemical cells, Photoelectrochemical reactions, Regenerative photoelectrochemical cells, Basic problems, Photocorrosion and protection of semiconductor electrodes, Protective coatings, Coatings of metals and electrically conductive polymers, Electrodes with chemically modified surfaces.

Prescribed Text Books

1. Engineering Chemistry, P.C. Jain and M. Jain – DhanapathRai& Sons, Delhi
2. Text book of Nano Science and Nano technology, B.S. Murthy and P. Shankar, University press.
3. Text book of engineering chemistry, Shasichawla,Dhanapathrai&sons,Delhi.
4. Gurudeep raj & chatwalanand , “Instrumental methods of analysis “, 7thedition,CBS publications,1986.
5. Quantitative analysis by day&underwood.
- 6.A Text book of Instrumental methods by Skoog and West.
7. H.W. Wilard and demerit, “Instrumental methods of analysis “, 7thedition,CBS publications,1986.

Basic Electrical and Electronic Sciences

UNIT – I

Basic concept components and Electrical Circuits: The unit of charge, voltage, current, power and energy. Circuit elements, circuit concept, Kirchhoff's voltage law and Kirchhoff's current law applied to simple series and parallel circuits.

Alternating currents: Definition of Peak value, RMS value, Average value, Peak factor and Form factor of Alternate current, Behaviour of Resistance, Inductance and Capacitance to Sinusoidal voltage.

Vector and J-notation as applied to the resolution of AC circuit, Vector diagrams, Single-phase series, and Parallel and Series-parallel circuits to sinusoidal excitation. Calculation of Active, Reactive and Complex power and Power factor.

UNIT-II

Polyphase circuits: 3-phase supply, star-delta connections, Voltage, Current and Power relationships.

Electromagnetic Induction: Introduction – Electromagnetic Induction – Faraday's Laws of Electromagnetic Induction – Direction of Induced EMF and current – Induced EMF – Dynamically induced EMF – Statically induced EMF – Self Inductance – Mutual Inductance - Coefficient of coupling – Inductances in Series – Inductances in parallel – Energy stored in a magnetic field.

Measuring Instruments: Classification of instruments, construction and Principle of operation of permanent magnetic moving coil, moving iron dynamo meter type wattmeter Induction Type Energy Meter. Principle of operation of DVMS and CROs.

UNIT - III

Semiconductor Diodes: Characteristics of Semiconductor junction Diode, Zener diode transistor, JFET, UJT, SCR and their applications. Half-wave, full-wave rectifiers and Bridge rectifier, with (L and LC) and without filters, Zener Voltage Regulator and their applications.

Bipolar Junction Transistor: Transistor operation, Common base configuration, Common emitter configuration, Transistor amplifying action, Common collector configuration, Operating point, Principal and characteristics of JFET.

UNIT - IV

AMPLIFIERS: Need of biasing, Thermal runaway, Types of biasing-fixed bias, collectorbase bias, self bias, CE amplifier, frequency response.

Feedback and Oscillator Circuits: Feedback concepts, feedback connection types, Barkhausen criteria, Phase-Shift oscillator, Wien bridge oscillator, Hartley oscillator, Colpitts oscillator.

LEARNING RESOURCES

TEXT BOOKS:

1. A.Sudhakar and Shyam Mohan SP, Circuits and Networks: Analysis and Synthesis, 3rd Edition, TMH, 2006.
2. Robert Boylestad, Louis Nashelsky, "Electronic Devices and Circuit Theory", 6th Edition, PHI.

REFERENCE BOOKS:

1. MahmoodNahvi and Joseph Edminister, Electric Circuits, 4th Edition, Schaum's outline series, TMH, 2004.
2. Electrical Technology, B.L.Theraja&A.K.Theraja, Volume – I & II
3. S.Salivahanan, A.Vallavaraj, "Electronic Devices and Circuits", Tata McGraw Hill Publishers
4. N.N.Bhargava&D.C.Kulshreshtha, "Basic Electronics", Tata McGrawHill Publishers

Problem Solving using C**UNIT-1 (16 Periods)**

Computer Basics: The Computer System, Generations of Computer, Classification of Computer, Block diagram of digital Computer, Inside the Computer-Processor, Memory, External Ports, PCI Card, Formatting Hard disk, Understanding BIOS, BIOS Commands, Algorithm, Flowchart, Programming Paradigms.

C-Basics: C-character set, Data types, Constants, Expressions, Structure of C program, Operators and their precedence & associativity, Simple programs in C using all the operators, Type casting, type coercion.

UNIT-II (16 Periods)

Control Structures, Basic input and output statements, Preprocessor directives. Functions: Concept of a function, passing the parameters, automatic variables, scope and extent of variables, storage classes, recursion, iteration vs recursion, types of recursion, Simple recursive and non recursive programs, Towers of Hanoi problem.

UNIT-III (16 Periods)

Arrays: Single and multidimensional Arrays, Character array as a string, string functions, Programs using arrays and string manipulation. Pointers: Pointers declarations, Pointer expressions, Pointer parameters to functions. Pointers, Pointers and array, Pointer arithmetic.

UNIT-IV (16 Periods)

Structures: Declaring and using structures, operations on structures, structures and arrays, user defined data types, pointers to structures. Command line arguments. Files: Introduction, file structure, file handling functions, file types, file error handling, Programs using file functions.

Text Books:

1. Programming with C-Gottfried-Schaums Outline Series-TMH
2. C Programming – AnithaGoel/Ajay Mittal/E.Sreenivasa Reddy-Pearson India

References :

1. Problem Solving with C- Somasekharan-PHI.
2. C Programming- Behrouz A forouzan – CENGAGE Learning
2. Test your c skills-Yaswanthkanithker
3. Let us C- Yaswanthkanithker

Advanced English for Engineers

UNIT-1:

1. Learning Skills: Three Questions (English and Soft Skills)
2. The Human Seasons (The Siren's Song)
3. Vocabulary Building: Root Words (100)
4. Writing: Data Interpretation (IELTS Model)

UNIT- II:

1. Problem - Solving Skills: (English and Soft Skills)
2. On His having arrived at the Age of Twenty Three (The Siren's Song)
3. Grammar: Text Completion (GRE Model)
4. Writing: Technical Reports (Factual Reports, Feasibility Reports, Survey Reports)

UNIT - III:

1. Interview Skills: The lighthouse keeper of Aspinwall (English and Soft Skills)
2. Youth and Age (The Siren's Song)
3. Grammar: Sentence Equivalence (GRE Model)
4. Analytical Writing: Analyzing an Issue, Analyzing an Argument (GRE Model)

UNIT - IV:

1. Adaptability Skills: Senior Payroll (English and Soft Skills)
2. The Marriage of True Minds (The Siren's Song)
3. Vocabulary Building: Foreign Expressions (100)
4. Writing: Office Correspondences (Memos, Circulars, Notice, Agenda of a meeting)

TEXTBOOKS:

1. S.P.Dhanavel, *English and Soft Skills*, New Delhi: Orient Black Swan Pvt. Ltd., 2013.
2. David Murdoch, *The Siren's Song: An Anthology of British and American Verse*, New Delhi: Orient Longman, 2012.

REFERENCE BOOKS:

1. B. Theodore, *Easy Way to Learn Difficult Words: The Unique English Etymology Dictionary*, Theos Publications, 2011.
2. Gill, Japinder. *Vocabulary Advantage*, Pearson Publication, 2012.
3. Philip G., *Pearson's Essential Words for GRE*, New Delhi :New Age International Publishers, 2012.
4. V.R.Narayanaswami, *Strengthen Writing 3rd Edition* New Delhi: Orient Blackswan Private Ltd., 2009.
5. Sharma C. *Business Correspondence & Report Writing*, Tata McGraw –Hill, 2002.
6. Kirkman, John .*Good Style: Writing for Science & Technology*, Routledge Study Guides,
7. Alec Fisher, *Critical Thinking An Introduction*, New Delhi: CUP, First South Asian Edition, 2011.

ENGINEERING CHEMISTRY LABORATORY

LIST OF EXPERIMENTS:

1. Determination of purity of washing soda
2. Determination of alkalinity of water
3. Determination of iron from Mohr's salt by permanganometry
4. Determination of iron from hematite by dichrometry
5. Determination of copper from brass by iodometry
6. Determination of available chlorine in bleaching powder.
7. Determination of hardness of water by EDTA method
8. Determination of tin and lead from solder by complex metric titrations
9. Determination of chloride by precipitation titration method
10. Determination of calcium by semi gravimetric method
11. Preparation of phenol-formaldehyde resin
12. Chemistry of blue printing

DEMONSTRATON:

13. Acid-Base titration by pH meter, conductivity meter and potentiometer
14. Determination of viscosity of viscosity of lubricating oil.

Computer Programming Lab**CYCLE-I Basics of Hardware and Software Exercises:**

1. Explore Mother Board components and Layouts, identifying external ports and interfacing, identifying PCI cards and interfacing.
2. Practice partitioning and formatting Hard disks.
3. Install and Uninstall system and application software.
4. Understand BIOS configuration.
5. Connect 2 or more computers in a LAN network.
6. Assembling a Computer and troubleshooting a Computer.
7. Study and practice of operating system commands
 - a. Study and practice of directory Related Utilities.
 - b. Study and practice of file and Text Processing Utilities.
 - c. Study and practice of disk, Compress and Backup Utilities.
 - d. Study and practice of Networking Utilities

CYCLE-II Programming Exercises:**1.Exercises on data types and operators?**

- a) Practice exercises 3.1 to 3.16 and 4.1 to 4.17 and 14.1 to 14.20 Test your C Skills - yaswanthkanitkar text book.
- b) Write a program which determines the largest and the smallest number that can be stored in different data types of like short, int., long, float and double. What happens when you add 1 to the largest possible integer number that can be stored?
- c) Write a program to find greatest of three numbers using conditional operator?
- d) Write a program to swap two numbers with and without temp variable?
- e) Practice a program using multiple unary increment and decrement operators in arithmetic expressions?

2. Exercises on control structures?

- a) Practice exercise 2.1 to 2.15 Test your C Skills - yaswanthkanitkar text book.
- b) Write a program to find greatest of three numbers? Use nested if, if else if and switch statements?
- c) Write a program to read marks of a student and print the sum and average? Display the grade based on the sum of marks?
- e) write a program to count the digits of a number? Use for loop
- f) Write a program to check whether a number is perfect or not? Use do-while
- g) Write a program to check whether a number is strong or not? Use while
- h) Write a program to check whether a number is amstrong or not? Use for
- i) Write a program to check whether a number is palindrome or not? Use for
- j) Write a program to find the Fibonacci series upto the given number? Use while
- k) Write a program to print the pascals triangle? Used do-while
- l) Write a program to print the result of the series $1+x^2/2+x^3/3+\dots+x^n/n$

3. Exercises on functions?

- a) Practice exercise 5.1 to 5.14 Test your C skills -yaswanthkanitkar text book.
- b) Write program to swap two variables using functions?

- Write a program to perform menu driven arithmetic operations using functions?
- c) Write a program to find the factorial of a number using recursive and non- recursive functions?
 - d) Write a program to find the Fibonacci series using recursive functions?
 - e) Write a program to find the solution for towers of Hanoi using recursive function?
 - f) Write a program to pass parameters to a functions using call by value and call by reference?

4. Exercises on Arrays?

- a) Practice exercise 9.1 to 9.17 Test your C skills - yaswanthkanitkar text book.
 - b) Write a program to read n numbers and sort them?
 - c) Write a program to find the minimum and maximum numbers of the array?
 - d) Write a program to read two matrices and find their sum, difference and product of them?
- e) Find the transpose of a matrix?
- f) Write a program to print upper and lower triangle of a given matrix?

5. Exercises on strings?

- a) Practice exercise 10.1 to 10.15 yaswanthkanitkar text book.
 - b) Write a program to demonstrate the use of string manipulation functions?
 - c) Write a program to compare two strings?
 - d) Write a program to sort the names in Alphabetical order?

6. Exercises on pointers?

- a) Practice exercise 7.1 to 8.26 yaswanthkanitkar text book.
 - b) Write a program to read dynamic array and sort the elements?
 - c) Write a program to read dynamic array and find the minimum and maximum of the elements?
 - d) Write a program to perform pointer arithmetic?
 - e) Write a program on pointers for strings?
 - f) Write a program to use array of pointers?

7. Exercises on structures?

- a) Practice exercise 11.1 to 11.30 yaswanthkanitkar text book.
- b) Write a program to create student structure and read marks of three subjects and find the sum and total of the student?
- c) Write a program on arrays of structures for 60 students record using the above student structure?
- d) Write a program for complex structure? Perform addition, subtraction and multiplication of two complex numbers?
- e) Write a program for addition and multiplication of two polynomials?

8. Write a program on Files?

- a) Practice exercise 12.1 to 12.20 yaswanthkanitkar text book.
- b) write a program to append content of a file?
- c) Write a program to display the content of a file?
- d) Write a program to copy content of one file to other file?
- e) Write a program to count the no of characters in a file?
- f) Write a program to compare the contents of two files?

References:

- 1. Test your C Skills by – YaswanthKanithkar-BPB Publishers
- 2. C programming; Test your skills-A.N.Kamthane-Pearson India

Workshop(IT)**LIST OF EXPERIMENTS**

PC Hardware

Task 1 :

Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2 :

Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Task 3 :

Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 4 :

Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Task 5: Hardware Troubleshooting:

Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

Task 6 : Software Troubleshooting :

Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Internet & World Wide Web

Task 1

Orientation & Connectivity Boot Camp : Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN

Task 2 : Web Browsers, Surfing the Web :

Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plugins like Macromedia Flash and JRE for applets should be configured

Task 3

Search Engines & Netiquette :

Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4:

Cyber Hygiene:

Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install antivirus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

Task 5:

Develop your home page using HTML Consisting of your photo, name, address and education details as a table and your skill set as a list.

Productivity tools LaTeX and Word

Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that would be covered in each, using LaTeX and word Accessing, overview of toolbars , saving files, Using help and resources, rulers, format painter.

Task 1 :

Using LaTeX and Word to create project certificate. Features to be covered: Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

Task 2:

Creating project abstract Features to be covered: Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 3 :

Creating a Newsletter : Features to be covered: Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

EXCEL-

Excel Orientation:

The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the two tasks and features that would be covered in each. Using Excel –Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler

Features to be covered: -Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task 2 : Calculating GPA -.Features to be covered:-

Cell Referencing, Formulae in excel –average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting LaTeX and MS/equivalent (FOSS) tool

Power Point

Task1:

Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :-

PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting

Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Power

point. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

Task 2:

Second week helps students in making their presentations interactive. Topic covered during this week includes: Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Chart.

Task 3:

Concentrating on the in and out of Microsoft power point and presentations in LaTeX. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes: -

Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting –Back ground, textures, Design Templates, Hidden slides.

REFERENCE BOOKS:

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. LaTeX Companion Leslie Lamport, PHI/Pearson.
3. Introduction to Computers, Peter Norton, 6/e McGrawHillPublishers.
4. Upgrading and Repairing, PC's 18, Scott Muller QUE, Pearson Education
5. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
6. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. CISCO Press, Pearson Education.
7. PC Hardware and A+Handbook Kate J. Chase PHI (Microsoft)