

Course Contents & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			Theory	Practical	
B.E. Common	Engineering Physics	B.E.-1121	Min. "D"	Min. "D"	5.0

Unit I

Quantum Physics

Group and particle velocities & their relationship, Photoelectric effect, Uncertainty principle with elementary proof and applications (determination of position of a particle by a microscope, non existence of electron in nucleus, diffraction of an electron beam by a single slit). Compton scattering.

Wave function and its properties, energy and momentum operators, time dependent and time independent Schrödinger wave equation. Application of time independent Schrödinger wave equation to particle trapped in a one dimensional square potential well (derivation of energy eigen values and wave function). Analytical treatment of tunneling through a potential barrier, Conceptual description with labeled diagram of scanning electron microscope (SEM), scanning tunneling microscope (STM) and atomic force microscope (AFM).

Unit II

Wave Optics

Interference: Fresnel's biprism, Interference in thin films (due to reflected and transmitted light), interference from a wedge shaped thin film, Newton's rings and Michelson's interferometer experiments and their applications. Diffraction at single slit, double slit and n-slits (diffraction grating). Resolving power of grating. Concept of polarized light, Brewster's laws, Double refraction, Nicol prism, quarter & half wave plates, electro-optic effect (Kerr effect and Pockel's effect)

Unit III

Electromagnetism and Plasma Physics

Basic laws of electricity and magnetism in differential forms, equation of continuity, displacement current, modification of Ampere's law, Maxwell's equations, electromagnetic waves in free space, Poynting's theorem, boundary conditions. Electromagnetic wave propagation through a parallel plate guiding system.

Plasmas: Introduction, Debye shielding, plasma parameter, criteria for plasmas, Introductory discussion of Tokomak and laser induced fusion.

Unit IV

Solid State Physics and Particle Accelerators

Qualitative discussion of Kronig Penny model (no derivation), Effective mass, Fermi-Dirac statistical distribution function, intrinsic and Extrinsic semiconductors, Hall effect, Principle and characteristics of Zener diode, tunnel diode, photodiode, solar-cells, Hall effect. Complex permittivity, dielectric losses, loss tangent.

Cyclotron, general description of Synchrotron, Synchrocyclotron, and Betatron. Geiger-Muller Counter, Bainbridge mass spectrograph.

UNIT V

Laser and Fiber Optics

Laser: Stimulated and spontaneous processes, Einstein's A & B Coefficients, transition probabilities, active medium, population inversion, pumping, Optical resonators, characteristics of laser beam. Coherence, directionality and divergence of laser beams. Principles and working of Ruby, Nd:YAG, He-Ne & Carbon dioxide Lasers with energy level diagram. Idea about holography.

Fundamental idea about optical fiber, types of fibers, acceptance angle & cone, numerical aperture, V-number, propagation of light through step index fiber (Ray theory) pulse dispersion, attenuation, losses, couplers. Optical communication system (block diagram only), Idea about dispersion shifted and dispersion compensating fibers.

Reference Books: -

1. Engineering Physics by Dattu R. Joshi, McGraw Hill.
2. Concepts of Modern Physics by A.Beiser, McGraw Hill.
3. Optics by A. Ghatak, McGraw Hill.
4. Electromagnetic Theory for Telecommunications by C.S.Liu and V.K.Tripathi, Foundation Books.
5. Fundamentals of Plasma Physics by J.A.Bittencourt, Springer.
6. Introduction to Plasma Physics and Controlled Fusion by F.F.Chen, Springer.
7. Introduction to Solid State Physics by Charles Kittel, J.Wiley & Sons
8. Optoelectronics: An Introduction by Wilson and Hawkes, PHI.
9. Introduction to Fiber Optics by A.Ghatak and K.Thyagarajan, Cambridge Press.
10. Laser Fundamentals by W.T.Silfvast, Cambridge Press.

List of suggestive core experiments: -

1. Biprism, Newton's Rings, Michelsons Interferometer.
2. Resolving Powers –Telescope, Microscope, and Grating.
3. To determine plank's constant.
4. Spectrometers-R.I., Wavelength, using prism and grating
5. Optical polarization based experiments: Brewster's angle, polarimeter etc.
6. Measurements by LASER-Directionality, Numerical aperture, Distance etc.
7. Uses of Potentiometers and Bridges (Electrical)..
8. Experiments connected with diodes and transistor.
9. Measurement of energy band gap of semiconductor.
10. Hall effect.
11. Solar cell.
12. To find the width of a single slit by He-Ne Laser.
13. To determine the numeral aperture (NA) of a Optical Fibre.
14. Other conceptual experiments related to theory syllabus.

Course Contents & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.E. Common	Energy, Environment, Ecology & Society	B.E.-1122	Theory		5.0
			Min. "D"		

Unit – I

Energy – Sources of Energy : Renewable & Non Renewable, Fossil fuel, coal, oil, Gas, Geothermal, Hydrogen, Solar, Wind hydal, nuclear sources, Green energy solution.

Unit – II

Ecosystem – Introduction & Composition of Atmosphere, hydrosphere, Lithosphere, biosphere. Cycles in Ecosystem – Water, Carbon, Nitrogen. Biodiversity: El - Nino, La - Nino, Threats and conservation, Food Chain.

Unit – III

Air Pollution & Noise Pollution –

Air Pollution: Air pollutants, classification, (Primary & secondary pollutants) Adverse effects of pollutants. Causes of Ail pollution, photochemical smog Green house effect, ozone layer depletion & acid Rain. Sampling & Monitoring of Air pollution.

Noise pollution: Causes, controlling measures, measurement of Noise pollution.

Unit –IV

Water Pollution – Pollutants in water, adverse effects. Treatment of Domestic & Industrial water effluent & pollution load determination, Total Solid, Dissolve Oxygen, BOD, COD & PV Test.

Soil Pollution – Soil Profile, Pollutants in soil, their adverse effects, controlling measures.

Unit – V

Society & Ethics – Impact of waste on society. Solid waste management (Nuclear, Thermal, Plastic, medical, Agriculture, domestic and e-waste). Ethics and moral values, ethical situations, objectives of ethics and its study. Preliminary studies regarding Environmental Protection Acts, Environmental Impact Assessment.

Reference:

1. Harris, CE Prichard MS, Rabin's MJ, "Engineering Ethics' Cengage Pub.
2. Rana SVS; Essentials of Ecology and Environment PHI pub.
3. Taynold GW Ethics in information Technology; Cengage.
4. Svakumar ; Energy Environment & Ethics in society; TMH
5. AK De " Environmental Chemistry; New Age Int. Publ..
6. BK Sharma " Environmental Chemistry; Goel Publ. House.
7. Bala Krishnamoorthy; Environmental management ; PHI
8. Gerard Kiely " Entironmental Engineering; TMH
9. Miller GT JR; living in the Environment Thomson/cengage
10. Cunningham WP and MA principles of Environment Sc; TMH

Course Contents & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of Odd Sem.
			Theory	Practical	
B.E.Common	Basic Civil Engineering & Engineering Mechanics	BE-1124	Min. "D"	Min. "D"	5.0

Unit I **Statics and Trusses:** Concurrent, Non concurrent and parallel forces in a plane, Composition and resolution of forces, Free body diagrams, Moment of a force and Varignon's theorem, Conditions of Equilibrium, Polygon of forces and Funicular Polygon of Forces, Equivalent Force System, Analysis of forces in the members of a Perfect truss: Method of joints, Method of Section, Graphical Methods.

Unit II **Centroid & Moment of Inertia, Friction:** Location of centroid and Moment of Inertia of Plane areas, Perpendicular Axis and Parallel Axis theorems, Product of Inertia, Principal Axes and Principal Moments of Inertia. Coulomb's law of friction, Friction on inclined plane, Screw and Nut friction, Ladder and wedge friction, Flywheel, Lifting machines.

Unit III **Kinematics & Kinetics:** Kinematics in Cartesian and polar coordinates, Particle under uniform and non-uniform acceleration Tangential and normal acceleration, Radial and Transverse velocity and acceleration, motion under gravity. Kinetics of particle, motion under constant force, momentum and energy principles, Impulse and angular momentum, D'Alembert's principle, Motion under constant torque, Collision of Elastic Bodies.

Unit IV **Building Materials & Construction** Stones, bricks, cement, lime, timber-their types, properties, tests & uses, laboratory tests of concrete and mortar Materials: Workability and Strength properties of Concrete, Preparation of concrete, compaction, curing, etc.
Elements of Building Construction, Foundations: conventional, spread footings, RCC footings, Brick masonry walls, plastering and pointing, floors, roofs, Doors, windows, lintels, staircases – types and their suitability

Unit – V **Surveying & Mapping:** Principles of Surveying, Measurement of distances by conventional and EDM methods, Measurement of directions and measurement of elevations by different methods, Plane Table Surveying, Introduction to Theodolite Survey.

Reference Books:

1. Shesha Prakash and Mogaveer; Elements of Civil Engg & Engg. Mechanics; PHI
2. R.C. Hibbler – Engineering Mechanics: Statics & Dynamics
3. Beer & Johnston, Vector Mechanics for Engineers –Statics & Dynamics.
4. Civil Engineering materials, TTTI, Chandigarh.
5. Building Materials by S.C. Rangwala- Charotar publications House, Anand
6. Building Construction by Sushil Kumar.
7. Building Construction by B.C. Punmia, Laxmi Pub.
8. Basak N.N., Surveying, Tata McGrawHill
9. Surveying by Duggal – Tata McGraw Hill, New Delhi.
10. Punmia, B.C., Surveying, Laxmi Pub.

Course Contents & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.E. Common	Basic Computer Engineering	BE-1125	Theory	Practical	
			Min. "D"	Min. "D"	5.0

Unit-I

Programming fundamentals: Introduction to computer, block diagram and organization of computer, number system and binary arithmetic, processing data, hardware, software, firmware, types of programming language-Machine language, ALL, HLL, source file, object file, translators-assembler, compiler, interpreter, testing and debugging, software maintenance, hardware maintenance.

Unit-II

Programming Techniques: Problem Solving Strategies, Steps of program development, Algorithm, Flowchart and its Characteristics, Pseudo code and its Characteristics, History, evolution and classification of programming languages and their comparison.

Unit-III

Fundamentals of C Programming: History of C; Structure of a C Program; Data types; Constant & Variable, naming variables; Operators & expressions; Control Constructs – if-else, for, while, do-while; Case switch statement; Arrays; Formatted & unformatted I/O; Type modifiers & storage classes; Ternary operator; Type conversion & type casting; Priority & associativity of operators.

Unit-IV

Modular Programming: Functions; Arguments; Return value; Parameter passing – call by value, call by reference; Return statement; Scope, visibility and life-time rules for various types of variable, static variable; Calling a function; Recursion – basics, comparison with iteration, types of recursion-direct, indirect, tree and tail recursion, when to avoid recursion, structures and unions

Unit-V

Introduction to OS, Definition and Roles of Operating System, Types of Operating System, Function of OS, Introduction to DBMS, File-Based Approach and Database Approach, DBA, Introduction to NETWORKING, Types of Networks, Internet.

Recommended Books:

1. Fundamentals of Computers : E Balagurusamy, TMH
2. Basic Computer Engineering : Sanjay Silakary, Rajesh Shukla, Wiley India.
3. Fundamentals of Computers : V Rajaraman, PHI
4. Computer Fundamentals: Anita Goel, Pearson
5. Information Technology Principles and Application: Ajoy Kumar Ray & Tinku Acharya PHI.
6. Concepts in Computing: Kenneth Hoganson, Jones & Bartlett.
7. Operating Systems – Silberschatz and Galvin - Wiley India
8. Computer Networks: Andrew Tananbaum, PHI
9. Programming with C: Y. Kanitkar

Course Contents & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.E. Common	Engineering Chemistry	BE-1111	Theory	Practical	5.0
			Min. 'D'	Min. 'D'	

Unit – I

WATER AND ITS INDUSTRIAL APPLICATIONS:

Sources, Impurities, Hardness & its units, Industrial water characteristics, softening of water by various methods (External & Internal treatment), Boiler trouble, causes, effects & remedies, characteristics of municipal water & its treatment, (Numerical problems based on softening methods & water analysis). Alkalinity, hardness (complexometric), Chloride, Free chlorine, Dissolved Oxygen.

Unit – II

FUELS & COMBUSTION:

Definition and classification of fuel. Criteria of selection of fuel Calorific value, Determination of calorific value by Bomb calorimeter, Proximate and Ultimate analysis of coal and their significance, calorific value computation based on ultimate analysis data, carbonization, manufacturing of coke & recovery of by products. Refining of crude petroleum oil. Cracking of gasoline and its mechanism. Knocking, Anti knocking (Octane and Cetane number). Simple problems based on combustion of solid, liquid and gaseous fuel. Brief Idea of Bio Fuels.

Unit – III

A. LUBRICANTS:

Introduction, Mechanism of lubrication, Classification of lubricants, Properties and Testing of lubricating oils, Numerical problems based on testing methods.

B. CEMENT & REFRACTORIES:

Manufacture, IS-Code, setting and hardening of cement, refractory ; Introduction classification and properties of refractories.

Unit – IV

HIGH – POLYMER:

Introduction, Classification, Types, Mechanism & methods of Polymerization.

Natural Rubber - Introduction, Properties vulcanization, Rubber compounding , Reclaimed Rubber. Preparation Properties, uses of SBR, Neoprene.

Plastics - Introduction, preparation, properties & uses of PMMA, Nylon 6:6, Terylene Phenol formaldehyde, Kevlar, Silicon Resin, flow sheet digram nylon 6:6, SBR, Polymeric gels, biopolymer gel & electro active polymer.

Unit – V

INSTRUMENTAL TECHNIQUES IN CHEMICAL ANALYSIS:

Introduction principal Instrumentation and application of IR, NMR, UV, Visible, Gas Chromatography Colorimetric.

Introduction of Nano materials, Their Electronic and mechanical properties & application.

Reference: 1. A Text Book of Engineering Chemistry - S. S. Dara & A.K. Singh S. Chand Publication.

2. Chemistry for Environmental Engineering - Sawyer, McCarty and Parkin – McGraw Hill, International.
3. Engineering Chemistry - Gopalan Venkappayya, Vikash Publication.
4. Applied Chemistry - N. Krishnamurthy, Jayasubramaniam, Tata Mc Graw-Hill Pub. Co. Ltd..
5. Engineering Chemistry - B.K. Sharma, Krishna Publication.

Course Contents & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.E. Common	COMMUNICATION SKILL	BE-1113	Theory	Practical	5.0
			Min. "D"	Min. "D"	

Unit I – Skills of Communication

Process of Communication, The importance of Effective Communication in Business, Objectives of Communication, Verbal and Non Verbal Communication, Oral and Written Communication, Barriers to Communication, Interviews.

Unit II - Technical English

Style of writing, Features of Technical writing, Definitions, Technical Description of Objects and Processes, Writing Instructions, Technical Proposals.

Unit III – Business Correspondence

Letter Writing, Structure and Layout, Application, Enquiry, Quotations, Tenders, Order and Complaint, Memorandum, Notices, Agenda, Minutes.

Unit IV - Comprehension

Précis Writing, Unseen Comprehension, Passage Writing.

Unit V – Technical Reports

Definition, Importance, types of Reports, Structure and Layout.

Language Lab. BE 103

Course objective: The language lab focuses on the production and practice of sounds of English through audio – visual aids and Computer software. It intends to enable the students to speak English correctly with confidence and intends to help them to overcome their inhibitions and self – consciousness while speaking in English.

This course intends to impart practical training in the use of English Language for communicative purposes and aims to develop students' personalities through Language Lab.

1. Grammar and its application

Articles, Modals, Auxiliaries, Tenses, Determiners, Personal Pronouns, Question Tags, Adverb Order, Adjective Order, Narration, Voice, Conditionals, Prepositions, Relative Pronouns, Transformation of Sentences, Spoken English Stress Pattern).

2. Vocabulary.

3. Introducing oneself, family, social roles, personal image design, building relationships.

4. Phonetics

Symbols and signs, The Mechanism of Air Stream, Pronunciation (IPA, RP, GIE/SIE)

5. Listening skills (Including Listening Comprehension)

6. Reading Skills (Including Reading Comprehension)

7. Writing Skills (Including structuring resume and cover letter)

8. Speaking Skills (Conversational Practice, Role Plays, Extempore, JAM.

9. Body Language
 10. Describing Objects and Situations.
 11. Giving Directions.
 12. Translation from English to Hindi and vice versa.
 13. Oral Presentation: (Topic to be selected by the teacher.)
- Final Assessment should be based on Assignment, presentation and interview.

Reference Books:-

1. Business Correspondence and Report Writing - By R C Sharma; TMH.
2. Living English Structure – By W.S. Allen; Longmans.
3. English Grammar – Ehrlich, Schaum Series; TMH.
4. Spoken English for India – By R.K. Bansal and IB Harrison Orient Longman.
5. New International Business English – by Joans and Alexander; OUP.
6. Effective Technical Communication – Rizvi; TMH
7. Body Language – Vinay Mohan Sharma

Course Contents & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
B.E. Common	Basic Electrical & Electronics Engineering	BE-1114	Theory	Practical	5.0
			Min. "D"	Min. "D"	

Unit I

Electrical circuit analysis- Voltage and current sources, dependent and independent sources, source conversion, DC circuits analysis using mesh & nodal method, Thevenin's & superposition theorem, star-delta transformation.

1-phase AC circuits under sinusoidal steady state, active, reactive and apparent power, physical meaning of reactive power, power factor, 3-phase balanced and unbalanced supply, star and delta connections.

Unit II

Transformers- Review of laws of electromagnetism, mmf, flux, and their relation, analysis of magnetic circuits. Single-phase transformer, basic concepts and construction features, voltage, current and impedance transformation, iron losses and copper losses, equivalent circuit, phasor diagram.

Unit III

Rotating Electric machines- Constructional details of DC machine, induction machine and synchronous machine, Working principle of DC machines, classification of DC machine, EMF equation, armature reaction, characteristic of separately excited and self excited generator. Working principle of DC motor, Importance of back EMF, Starting of DC motor, speed torque characteristic of separately excited and self excited DC motor.

Unit IV

Measuring Instruments : Construction and operation of moving coil, moving iron ammeter and voltmeter, hotwire instruments, theory and operation of D'Arsonval, Ballistic and vibration galvanometer, instrument transformers, extension of instrument ranges, AC and DC current probes.

Unit V

Electronics: Binary Number system binary addition, subtraction, multiplication and division, subtraction operation using 1's and 2's complement forms, Octal number system, hexadecimal number system conversion of number system from one number system to another number system, types of Resistor, Inductor and capacitor, color coding of resistor and capacitor P-type and N-type semiconductor, semiconductor diode its operation in forward and reverse bias, V-I characteristics, half wave and full wave rectification, application.

References:

1. Basic Electrical & Electronics Engineering by V.N. Mittle & Arvind Mittle.
2. Vincent Del Toro, Electrical Engineering Fundamentals, PHI Learning, II Edition
3. S.Ghosh, Fundamentals of Electrical and Electronics Engineering, PHI, II Edition.
4. Millman, Halkias & Parikh, Integrated Electronics, Mc Graw Hill, II Edition
5. Nagrath & Kothari, Basic Electrical Engineering, III Edition TMH.
6. J.S. Katre, Basic Electronics Engg, Max Pub. Pune.
7. Hughes, Electrical and Electronic Technology, Pearson Education IX Edition

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Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
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B.E. Common	Engineering Graphics	BE 1115			
			Min. "D"	Min. "D"	5.0

UNIT I

Introduction To Engineering Drawing: Principles of Engineering Graphics and their Significance – Drawing Instruments and their Use- Conventions in Drawing – Lettering – BIS Conventions. Various types of lines, principle of dimensioning, types of dimensioning, Concept of Engineer's Scale, Graphical Scales, Differences and their Construction. Curves used in Engineering Practice & their Constructions – Conical curves: Ellipse, Parabola, Hyperbola by different methods. Construction of Cycloid, Trochoid inferior and superior, Epicycloid, Epitrochoid inferior and superior, Hypocycloid Hypotrochoid inferior and superior, special conditions, Involutives of different polygons, Drawing of tangent and normal to the above curves.

UNIT II

Computer Aided Drafting (CAD): Introduction of Design and Drafting, Benefit, Software Wire frame, Surface and Solid Model, Basic commands of drafting, Entities like line, polygon, polyhedron, cylinders. Modification and editing commands like offset, fillet, chamfer, trim, extend, mirror, array etc. Solution of projection problems on CAD.

Principle of projection: Introduction, types of projections, plane of projection first angle and third angle projection system. Projection of points.

UNIT III

Projection of Lines, Projection of parallel Line, perpendicular line and oblique Line, line placed in two quadrants, line contained by Profile Plane, Traces of lines, methods of determining T.L. and T.I. of oblique line, Rotating line method, Trapezoidal method, Real world problems.

Projection of planes: Projection of perpendicular and oblique plane. Traces of plane.

UNIT IV

Projection of Solids: Classification of Solids, Position of solids with respect to R.P. projection of platonic solids, polyhedrons, Solids of revolution, projection of solids on Auxiliary plane, Projection of Combination of Solids.

Section of Solids: Classification of section planes, B.I.S representation, Section of right solids by normal and inclined planes, Section of platonic solids, True and apparent shape of section,

UNIT V

Development of Surfaces: Principle of development of surfaces, method of development Parallel line and radial line method for right solid, solids with cutouts, Intersection of cylinders. **Isometric Projections:** Principle of Isometric projection, Isometric scale, Isometric axes, isometric views, methods of drawing isometric projections, Combinations of Solids, Isometric Projection from orthographic drawing.

Conversion of isometric views to Orthographic Views

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B.E. Common	Engineering Mathematics - I	BE-1112	Theory		5.0
			Min. "D"		

Unit I

Differential Calculus:

Expansion of Maclaurin's and Taylor's theorem Partial differentiation, Euler's theorem and its application in approximation and errors, Maxima and Minima of function of two variables, Tangent & Normal. Curvature: Radius of curvature, center of curvature.

Unit II

Integral Calculus:

Definite Integrals: Double and Triple Integrals, Change of order of Integration, Area, Volume and surface using double and triple integral, Beta and Gamma function.

Unit III

Differential Equation:

Solution of Ordinary Differential Equation of first order and first degree for Exact differential Equations, Solution of Ordinary Differential Equation of first order and higher degree (Solvable for p, x and y , Clairaut's Equation), Linear Differential Equations with Constant Coefficients, Cauchy's Homogeneous differential equation, Method of Variation of Parameters.

Unit IV

Matrices:

Rank, Solution of Simultaneous equation by elementary, consistency of system of Simultaneous Linear Equation, Eigen Values and Eigen Vectors, Cayley-Hamilton Theorem and its application to find the inverse, Quadratic forms and their diagonalization, Bilinear forms.

Unit V

Logic and Algebra of Propositions, Boolean, Algebra and Graph Theory

Algebra of Logic, Boolean Algebra, Principle of Duality Basic Properties, Boolean Expressions and Functions.

Graph Theory : Graphs, Digraphs, Subgraphs, Degree and Distance, Matrix representation of Undirected & Directed graphs, Trees & their Properties,

References:

1. Adv. Engg. Mathematics by Ramana, TMH Publication
2. Higher Engineering Mathematics by Dr. B.S. Grawal, Khanna Publication
3. Adv Engineering Mathematics by D.G.Guffy, CRC Press
4. Mathematics for Engineering by S. Arunungam, SCITECH Publication
5. Advanced Engineering Mathematics by Erwin Kreyszing, Wiley India