



SAMBHRAM

UNIVERSITY

FOUNDATION COURSE FOR ENGINEERING Scheme of Teaching and Examinations

SL NO	COURSE TITLE	Teaching hours per week			Examination			Credits
		Theory	Tutorial	Practical	Internal	External	Total	
1	Mathematics	4	2	0	40	60	100	10
2	Physics	2	2	2	40	60	100	5
3	Chemistry	2	2	2	40	60	100	5
4	Electronics	3	1	3	40	60	100	10
5	Computers	3	1	3	40	60	100	10
6	English	8	4	0	40	60	100	20
Total							600	60

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FOUNDATION COURSE FOR ENGINEERING

PHYSICS

Objectives:

After completing the course:

- Able to understand the physics laws implemented in our daily life.
- Will be able to understand the SI units and Time measurements.
- Will be able to calculate the average speed and average velocity of motion objects.
- Will be able to understand the Energy types and gravitation concepts.
- Will be able to understand the Solids, Fluids and Matter properties.
- Will be able to understand the Oscillation, Waves and Magnetism concepts.

Duration: 50 Hours

Sl.No.	Chapter Name	Course Outline	Duration
1	Physical World	Scope and excitement of physics, technology and society, Mention of fundamental forces in nature, Nature of physical laws	3hr
2	Units And Measurements	Unit of measurement, System of units, SI units, Fundamental and derived units, Length, mass and time measurements, Accuracy and precision of measuring instruments, Errors in measurement: Significant figures.	4hr
3	Motion In A Straight Line	Position and frame of reference, Definitions of path length and displacement, Definitions of average speed and average velocity, instantaneous speed and instantaneous velocity & uniform and non-uniform motion.	3hr
4	Motion In A Plane	Scalars and vectors, Position and displacement vectors, Equality of vectors, Multiplication of a vector by real number, Addition and subtraction of two vectors.	3hr
5	Laws Of Motion	Aristotle's fallacy, Newton's first law of motion: Concept of inertia and force, Concept of momentum, Newton's second law of motion, SI unit of force, Impulse, impulsive force and examples, Newton's third law of motion examples in everyday life. Friction: Static and kinetic friction, Laws of friction, Rolling friction, Methods of reducing of friction.	4hr
6	Work, Energy And Power	Definition of Work Kinetic energy, Work, energy theorem Power: Definition Elastic and inelastic collisions, Collisions in one dimension: Derivation of loss of kinetic energy in completely inelastic collisions.	3hr

7	Systems Of Particles And Rotational Motion	Definitions of a rigid body, translatory motion and rotatory motion, Centre of mass of a two, particle system, Definitions of ω Definition of angular velocity and mention of the relation $v = r$ angular acceleration, torque, Angular momentum. Definitions of moment of inertia	4hr
8	Gravitation	Kepler's laws of planetary motion: Statement and explanation, Universal law of gravitation: Statement and explanation Earth satellites: Derivation of orbital speed of earth satellite , Geostationary and polar satellites	2hr
9	Mechanical Properties Of Solids	Elasticity and plasticity, Elastic behavior of solids, Stress and strain, Hooke's law, Stress, strain curve, Elastic moduli : Definitions and expressions of Young's modulus, Bulk modulus and Shear modulus of rigidity, Elastic energy.	4hr
10	Mechanical Properties Of Fluids	Pressure: Definition, Derivation of pressure at a point inside a liquid, Gauge pressure. Pascal's law: Statement and its applications (hydraulic lift and hydraulic brakes). Streamline flow: Equation of continuity, Turbulent flow, Critical speed Viscosity: Definition and mention of expression for coefficient of viscosity. Stokes' law.	4hr
11	Thermal Properties Of Matter	Temperature and heat , Thermal expansion of solids: linear, area and volume expansion of solids , Thermal expansion of liquids: Anomalous expansion of water Principle of calorimetry, Change of state: melting, fusion, melting point, regelation, boiling point, sublimation point, Latent heat: Latent heat of fusion and vaporization. Heat transfer: Conduction and thermal conductivity , Convection	5hr
12	Thermodynamic	Thermal equilibrium, Zeroth law of Thermodynamics: Statement and explanation, Heat, internal energy and work, First law of thermodynamics: Statement and explanation, Isothermal process	3hr
13	Kinetic Theory	Equation of state of a perfect gas, Kinetic theory of an ideal gas.	2hr
14	Oscillations	Periodic and oscillatory motion: Definitions of Period and Frequency, Displacement as a function of time, Periodic functions. Simple harmonic motion. Mention of expressions for velocity and acceleration Oscillations due to a spring, Restoring force & force constant, Simple pendulum.	4hr
15	Waves	Wave motion, Longitudinal and transverse waves, Mention of displacement relation in a progressive wave, Amplitude and phase, Wavelength and angular wave number, Period, frequency and angular frequency, Doppler effect.	4hr

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FOUNDATION COURSE FOR ENGINEERING CHEMISTRY

Objectives:

After completing the course:

- Will be able to understand the types of solid, properties and crystal lattice
- Will be able to apply the basic principles of electrochemistry and its applications.
- Will be able to prepare Haloalkanes and Haloarenes and their properties.
- Will be able to prepare alcohols and phenols and their properties.
- Will be able to understand the classification and types of polymer and chemical compounds in everyday life.

Duration: 50 Hours

Sl. No.	Chapter Name	Course Outline	Duration
1	Solid state	General characteristics of solids: amorphous and crystalline solids – examples, differences.	12
2	Electrochemistry	Redox reaction – As fundamental reaction in electrochemical cells, electronic and electrolytic conductors – differences. strong and weak electrolytes, Galvanic cells : Electrode potential, half cell concept, standard electrode potential, galvanic cell, Daniell cell, cell potential, EMF Batteries: types-difference, examples, Leclanche cell (dry cell) and Lead acid battery– anode, cathode, electrolyte, reactions at anode and cathode (diagram not required)	10
3	Haloalkanes and Haloarenes	Classification based on hybridization of carbon to which halogen is bonded-alkyl halides (haloalkane), allylic, benzylic, vinylic, aryl halides Primary, secondary and tertiary alkyl halides, nomenclature, nature of C X bond.	12
4	Alcohols and Phenols	Classification: mono, di, tri, allylic, and benzylic alcohols, mono, di and trihydric phenols and cresols.	12
5	Polymers and Chemistry in Everyday Life	Definitions: Polymer, monomer, polymerization, macromolecule. Classification: based on source, structure, types (mode) of polymerization and molecular forces- examples for each type.	10
6	Solutions	Types of Solutions – binary – gaseous, liquid and solids, expressing the concentration of a solution of a solid in a liquid mole fraction, molarity and molality.	12
7	Biomolecules	Carbohydrates: Glucose: Maltose, lactose and sucrose Proteins: Vitamins:	12

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FOUNDATION COURSE FOR ENGINEERING MATHEMATICS

Objectives:

After completing the course:

- Will be able to understand the concepts on Sets and its types.
- Will be able to understand the Relations, functions and its types.
- Will be able to find out the Matrices and its operations.
- Will be able to work on the Trigonometric Function.
- Will be able to understand the Integrals, Calculus and differential equations.
- Will be able to work on the Complex numbers and Probability.

Duration: 100 Hours

SI No	Chapter Name	Course Outline	Duration
1	Sets	Sets and their representations Types of sets Operation on sets	12hr
2	Relations and Functions	Cartesian product of sets Relations & Functions Types of Relations & Functions	12hr
3	Matrices	Types of Matrices Algebra of Matrices	10hr
4	Determinants	Determinant of a square matrix (up to 3x3)	10hr
5	Trigonometric Functions	Angle Definition of Trigonometric functions Trigonometric functions of sum and difference Trigonometric ratios of multiple angles	10hr
6	Calculus	Continuity and Differentiability Derivative of implicit function and problems	10hr
7	Integrals	Integration by parts	10hr
8	Differential Equations	Definition Formation of differential equation	10hr
9	Complex Numbers	Definition of Complex number, Representation of complex Argand plane and polar representation of complex numbers and problems	8hr
10	Probability	Probability - Definition, Properties, Problems. Conditional Probability. Baye's theorem. Probability distribution of a random variable	8hr

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FOUNDATION COURSE FOR ENGINEERING ENGLISH

Objectives:

After completing the course:

- Will be able to understand the total content and meaning in the context.
- Will be able to understand statements, questions, instructions, and commands.
- Will be able to follow simple narratives and description.
- Will be able to narrate simple experiences and series of events to convey its essence and intention.
- Will be able to imbibe ethical, moral, national and cultural values through various forms of literature.

Duration: 100 Hours

SI No	Chapter Name	Duration
1	Prose: 1) The Bet – Anton Chekov 2) Socrates and the Schoolmaster – F. L. Brayne 3) An Astrologer's Day – R. K. Narayan	25 hrs
2	Spoken Communication: 1) Meeting People, Exchanging Greetings and Taking Leave 2) Introducing Yourself 3) Introducing People to Others	25 hrs
3	Grammar and Vocabulary: Articles, Prepositions, Modal Auxiliaries, Antonyms, Synonyms, One-Word Substitutes	25 hrs
4	General English: Sentence types, tenses. Voice, parts of speech, word order. Expressing possibility, obligation. Necessity, prohibition. Criticism, expressing preferences, making assumptions. Asking for/ refusing/giving permission. Making offers, suggestions.	20 hrs
5	Written Communication: Summarizing	5 hrs

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FOUNDATION COURSE FOR ENGINEERING

COMPUTER SCIENCE

Objectives:

After completing the course:

- Able to the use the computer for basic purposes of preparing his business letters.
- Will be able to create data and basic operation with data using MS Word and MS Excel.
- Will be able to create and use basic presentation MS PowerPoint.
- Will be able to view information on Internet (the web).
- Will be able to create email account and send / receive emails.
- Will be able to use Social Media, e-Governance and their usage.

Duration: 50 Hours

SI No.	Chapter Name	Course Outline	Duration
1	Introduction to Computer	Introduction to Computers Basics of Hardware Basics of Software	12
2	Introduction to working on desktop computer	Desktop introduction, Task Bar Display Properties Types of File Extensions	12
3	Word Processing	Word Processing Basics Page Setup Formatting the Text	12
4	Working with Microsoft Excel	Introduction to Microsoft Excel Manipulation of Cells & Worksheet Basic Formulas, functions and Charts	10
5	Creating Presentations	Creation of Power Point Presentation (PPT) Manipulating Slides Presentation of Slides	12
6	Introduction to Network & Internet	Internet: Popular Web Browsers Exploring the Internet	12
7	Introduction to E-mail	Using E-mail Social Networking e-Governance Services	10

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FOUNDATION COURSE FOR ENGINEERING ELECTRONICS

Objectives:

After completing the course

- Will be able to understand different biasing techniques to operate transistor, FET, MOSFET.
- Will be able to understand different modes in operational amplifier.
- Will be able to understand logical gates & its operations.
- Will be able to understand different types of modulations
- Will be able to write assembly language programs of microcontrollers for various applications.

Duration: 50 Hours

SI No.	Chapter Name	Course Outline	Duration
1	Bipolar Junction Transistor (BJT) Biasing	Biasing Introduction Types of biasing	8hr
2	Transistor Amplifiers	Introduction to Amplifiers Feedback in Amplifiers	5hr
3	Operational Amplifier (Op-Amp)	Operational Amplifier (op-amp) Application of Op-Amp with negative feedback Differential amplifier	12hr
4	Power Electronics And Its Applications	Power Electronics: Field Effect Transistor (FET) Junction field effect transistor (JFET) Silicon controlled rectifier (SCR), Metal Oxide Field Effect Transistor (MOSFET)	7hr
5	Digital Electronics	Exclusive OR(XOR) and Exclusive NOR(XNOR) Alpha numeric codes Universal property of NAND and NOR gates: Half Adder and Half subtractor Arithmetic Logic Circuits : Full Adder:	18hr
6	Communication Systems	Amplitude modulation(AM) Modulation index Frequency modulation (FM) Basic Communication system	12hr
7	Microcontroller	Introduction to microprocessor & microcontroller Addressing modes Instructions set	18 hr