Semester- I

1. Engineering Physics (BSH 101)

	L	P
Credits	**2**	**+ 1**
Contact Hours	**2**	**+ 2**

Theory: Dia, Para and ferromagnetism-classification. Langevin theory of dia and paramagnetism. Adiabatic demagnetization, Weiss molecular field theory and ferromagnetism. Curie-Weiss law. Wave particle quality, de-Broglie concept, uncertainty principle. Wave function, Time dependent and time independent Schrodinger wave equation, Qualitative explanation of Zeeman effect, Stark effect and Paschan Back effect, Raman spectroscopy. Statement of Bloch's function, Bands in solids, velocity of Bloch's electron and effective mass. Distinction between metals, insulators and semiconductors, Intrinsic and extrinsic semiconductors, law of mass action, Determination of energy gap in semiconductors, Donors and acceptor levels. Superconductivity, critical magnetic field, Meissner effect, Isotope effect, Type-I and II superconductors, Josephson's effect DC and AC, Squids, Introduction to high Tc superconductors. Spontaneous and stimulated emission, Einstein A and B coefficients, Population inversion, He-Ne and Ruby lasers, Ammonia and Ruby masers, Holography-Note. Optical fiber, Physical structure, basic theory. Mode type, input output characteristics of optical fiber and applications. Illumination: laws of illumination, luminous flux, luminous intensity, candle power, brightness

Practical: To find the frequency of A.C. supply using an electrical vibrator; To find the low resistance using Carey Foster bridge without calibrating the bridge wire; To determine dielectric constant of material using De Sauty's bridge; To determine the value of specific charge (e/m) for electrons by helical method; To study the induced e.m.f. as a function of velocity of the magnet; To obtain hysteresis curve (B-H curve) on a C.R.O. and to determine related magnetic quantities; To study the variation of magnetic field with distance along the axis of a current carrying circular coil and to determine the radius of the coil; To determine 183 the energy band gap in a semiconductor using a p-n Junction diode; To determine the slit width from Fraunhofer diffraction pattern using laser beam; Determination of ultrasonic wave velocity in a liquid medium; To find the numerical aperture of optical fiber; To set up the fiber optic analog and digital link; To study the phase relationships in L.R. circuit; To study LCR circuit; To study the variations of thermo e.m.f. of a copper-constantan thermocouple with temperature; To find the wave length of light by prism.

2. Engineering Chemistry (BSH 102)

	L	P
Credits	**2**	**+ 1**
Contact Hours	**2**	**+ 2**

Theory: Phase rule and its application to one and two component systems. Fuels: classification, calorific value. Colloids: classification, properties. Corrosion: causes, types and method of prevention. Water: temporary and permanent hardness, disadvantages of hard water, scale and sludge formation in boilers, boiler corrosion. Analytical methods like thermogravimetric, polarographic analysis, nuclear radiation , detectors and analytical applications of radio active materials. Enzymes and their use in the manufacturing of ethanol and acetic acid by fermentation methods. Principles of food chemistry, introduction to lipids, proteins, carbohydrates, vitamins, food preservators, colouring and flavouring reagents of food. Lubricants: properties, mechanism, classification and tests. Polymers. types of polymerization, properties, uses and methods for the determination of molecular weight of polymers. Introduction to IR spectroscopy.

Practical: Determination of temporary and permanent hardness of water by EDTA method; Estimation of chloride in water; Estimation of dissolved oxygen in water; Determination of BOD in water sample; Determination of COD in water sample; Estimation of available chlorine in bleaching powder; Determination of viscosity of oil; Estimation of activity of water sample; Estimation of alkalinity of water sample; Determination of carbonate and noncarbonated hardness by soda reagent; Determination of coagulation of water and chloride ion content; Determination of specific rotation of an optically active compound; Determination of λmax and verification of Beer Lambert Law; Determination of calorific value of fuel; Identification of functional groups (alcohol aldelyde, keline, carbonylic acid and amide) by IR; Chromatographic analysis; Determination of molar refraction of organic compounds.

3. Engineering Mathematics-I (BSH 103)

	L	P
Credits	**2**	**+ 1**
Contact Hours	**2**	**+ 2**

Theory: Differential calculus: Taylor's and Maclaurin's expansions; indeterminate form; curvature, asymptotes, tracing of curves, function of two or more independent variables, partial differentiation, homogeneous functions and Euler's theorem, composite functions, total derivatives, derivative of an implicit function, change of variables, Jacobians, error evaluation, maxima and minima. Integral calculus: Reduction formulae; rectification of standard curves, volumes and surfaces of revolution of curves; double and triple integrals, change of order of integration, Gamma and Beta functions, application of double and triple integrals to find area and volume. Ordinary differential equations: Exact and Bernoulli's differential equations, equations reducible to exact form by integrating factors, equations of first order and higher degree, Clairaut's equation, Differential equations of higher orders, methods of finding complementary functions and particular integrals, method of variation of parameters, Cauchy's and Legendre's linear equations, simultaneous linear differential equations with constant coefficients, series solution techniques, Bessel's and Legendre's differential equations. Vector calculus: Differentiation of vectors, scalar and vector point functions, vector differential operator Del, Gradient of a scalar point function, Divergence and Curl of a vector point function and their physical interpretations, identities involving Del, second order differential operator; line, surface and volume integrals, Stoke's, divergence and Green's theorems (without proofs).

4. Professional English (BSH104)

	L	P
Credits	**1**	**+ 1**
Contact Hours	**1**	**+ 2**

Objective of the Course

To impart basic skills of communication in English through intensive practice to the first year UG students of engineering so as to enable them to function confidently and effectively in that language in the professional sphere of their life.

Desired Entry Behaviour

The student must have some basic command of English i.e., must be able to

- Write reasonably and grammatically.
- Understand at least some 250 general purpose words of English.
- Use some 2000 general purpose words of English to express himself in writing and 1500 such words to talk about day-to–day events and experience of life.
- Understand slowly-delivered spoken material in Standard Indian English.
- Speak reasonably clearly (if not fluently) on routine matters with his fellow students.

Teaching Method

- The topics must be covered essentially through plenty of examples.
  Lecture classes must be conducted as lecture-cum-tutorial classes.

  • Its is course that aims to develop skills. It is therefore "practical" in orientation. Plenty of exercises of various kinds must be done by the students both inside and outside the class-room.

  • The teacher must not depend on a single or a set of two or three text book. He must choose his materials from diverse sources.

  • Keeping in view the requirements of his students, the teachers may have to prepare some teaching and exercise materials.

  • For practice in listening, good tape recorders can be used if the more advanced facilities (for example, language laboratory) are not available in fact they can be used very fruitfully.

  • The teacher must function as a creative monitor in the class-room.

  • Minimum time should be spent in teaching phonetic symbols, stress, intonation, etc., the aim should be to enable the student to find out for himself the correct pronunciation of a word form a learner's dictionary in teaching speaking, emphasis should be on clarity, intelligibility and reasonable fluency rather than no "correct' pronunciation of words. Classroom presentation and group discussion sessions should be used to teach speaking.

Some Key Concepts

Communication as sharing; context of 'communication' the speaker/writer and the listen/reader; medium of communication; barriers to communication; accuracy brevity, clarity and appropriateness in communication.

Writing

Selecting material for expository, descriptive and argumentative pieces; business letters; formal report; summarizing and abstracting; expressing ideas within a restricted word limit; paragraph division; the introduction and the conclusion; listing reference material; use of charts, graphs and tables, punctuation and spelling; semantics of connectives, modifiers and modals; variety in sentences and paragraphs.

Reading Comprehension

Reading at various speeds (slow, fast , very fast); reading different kinds of texts for different purposes (for example, for relaxation, for information, for discussion at a latter stage, etc) reading between the lines.

Speaking

Achieving desired clarity and fluency; manipulating paralinguistic features of speaking (voice quality, path, tone, etc); pausing for effectiveness while speaking; task oriented, interpersonal, information and semiformal speaking making a short, classroom presentation.

Group Discussion

Use of persuasive strategies including some rhetorical devices (for emphasizing for instance; being polite and firm; handling questions and taking in criticism of self; taking strategies and effective intervention; use of body language.

Telephonic Conversation

Achieving ability to comprehend material delivered at relatively fast speed; comprehending spoken material in Standard Indian English, British English and American English; intelligent listening in situations such as an interview in which one is a candidate.

5. Workshop Technology-I (FPM 101)

	L	P
Credits	**1**	**+ 2**
Contact Hours	**1**	**+ 4**

Theory: Classification of materials, Iron-carbon phase diagram, heat treatment of metals. Classification of manufacturing processes, industrial safety, objectives and type of plant layout.

Introduction to pattern making and moulding; pattern making material, tools, type of patterns. Pattern making allowances, moulding tools and equipment, moulding process based on methods used.

Introduction to welding, type of welding, oxyacetylene gas welding and equipment, type of flames. Principle of arc welding, types of arc welding, arc welding equipments and tools.

Introduction to lathe; principal components of lathe and their functions. Classification of lathe, operations of centre lathe, main accessories and attachment, cutting speed, depth of cut and machine time in turning.

Introduction to shaper, principal components, working principle. Type of shapers, shaper sizes and specifications, problems based on cutting speed and machining time.

Introduction to drilling machine, classification of drilling machines, different parts of radial drill. Specification of drilling machine, work holding devices, drilling machine operations.

Introduction to milling machine, Principle and operation of column and knee type universal milling machine. Different type of cutters, work holding devices and cutter holding devices.

Practical: Introduction to various carpentry tools, types of wood and their seasoning processes; Preparation of simple joints; Cross half Lap joint and T-Halving joint; preparation of Dovetail joint, Mortise and Tenon joint. Introduction to Smithy tools and operations; jobs on bending, shaping etc.; Introduction to tools and measuring instruments for fitting; jobs on sawing, filing and right angle fitting of MS Flat; Practical in more complex fitting job; operations of drilling, reaming, and threading with tap and dies; Introduction to tools and operations in sheet metal work and job preparation from GI sheet and pipe bending;

6. Agricultural Sciences -I (AGS 101)

	L	P
Credits	**2**	**+ 1**
Contact Hours	**2**	**+ 2**

Theory: Soils- Nature and origin of soil; soil forming rocks and minerals, their classification and composition, soil forming processes, classification of soils – soil taxonomy orders; important soil physical properties; and their importance; soil particle distribution; soil inorganic colloids – their composition, properties and origin of charge; ion exchange in soil and nutrient availability; soil organic matter – its composition and decomposition, effect on soil fertility; soil reaction – acid, saline and sodic soils; quality of irrigation water; essential plants nutrients – their functions and deficiency symptoms in plants; important inorganic fertilizers and their reaction in soils.

Agronomy- Definition and scope of agronomy. Classification of crops, Effect of different weather parameters on crop growth and development. Principles of tillage, tilth and its charactertistics. Soil water plant relationship and water requirement of crops, weeds and their control, crop rotation, cropping systems, Relay cropping and mixed cropping.

Plant Protection- Pest-definition, classification; Pesticides-classification, Formulation of pesticides; Integrated Pest Management (IPM)-concept; Integrated Crop Management (ICM)-concept.

Practical- Identification of rocks and minerals; Examination of soil profile in the field; Collection of soil samples, preparation of soil samples; Determination of bulk density; particle density and porosity of soil; Determination of organic carbon of soil; Identification of crops and their varieties, seeds and weeds; Fertilizer application methods; Different weed control methods; Judging maturity time for harvesting of crop; Study of seed viability and germination test. Identification & description of equipment used for application of different pesticides. Calculation of doses of pesticides needed for a particular area and crop.

7. Engineering Drawing (SWE 101)

	L	P
Credits	**0**	**+ 2**
Contact Hours	**0**	**+ 4**

Practical: Introduction of drawing scales; Principles of orthographic projections; References planes; Points and lines in space and traces of lines and planes; Auxiliary planes and true shapes of oblique plain surface; True length and inclination of lines; Projections of solids (Change of position method, alteration of ground lines); Section of solids and Interpenetration of solid-surfaces; Development of surfaces of geometrical solids; Isometric projection of geometrical solids.

8. Electrical Circuits (PFE 101)

	L	P
Credits	**2**	**+ 1**
Contact Hours	**2**	**+ 2**

Theory: Average and effective value of sinusoidal and linear periodic wave forms. Independent and dependent sources, loop current and loop equations (Mesh current method), node voltage and node equations (Nodal voltage method), Network theorems: Thevenin's, Norton's, Superposition, Reciprocity and Maximum power transfer, Star- Delta conversion solution of DC circuit by Network theorems, Sinusoidal steady state response of circuits, Instantaneous and average power, power factor, reactive and apparent power, Concept and analysis of balanced polyphase circuits, Laplace transform method of finding step response of DC circuits, Series and parallel resonance, Classification of filters, constant-k, m-derived, terminating half network and composite filters.

Practical: To familiarize with the components and equipments used in Laboratory; To verify Kirchhoff's current laws; To verify Kirchhoff's voltage laws; To verify Thevenin theorems; To verify Norton's theorems; To verify Superposition theorem; To verify reciprocity theorem; To study the sinusoidal response of RL series circuit; To study the sinusoidal response of RC series circuit; To study the step response of RL series circuit; To study the step response of RC series circuit; To study the response of constant K-filters; To study the response of m-derived filters; to study power consumed in a three-phase circuit.