



B. Tech. Common Syllabus

Semester I

HS 1101

ENGLISH FOR PROFESSIONAL COMMUNICATION'

(2-1-0)

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 & effectively in that Language in the Professional Sphere of their life.

Desired Entry Behaviour

The student must have some basic command of English so that the Student must be able to:

1. Write reasonably & grammatically
2. Understand (if not use) at least some 2500 general purpose words of English
3. Use some 2000 (at least 1500) general-purpose words of English to express himself in writing & 1500 such words to talk about day-to-day events & experiences of life.
4. Understand slowly-delivered spoken material in Standard Indian English, and
5. Speak reasonably clearly (if not fluently) on routine matters with his fellow Students.

Teaching Method

1. The topics must be covered essentially through plenty of examples. Lecture Classes must be conducted as Lecture-cum-Tutorial Classes.
2. It is a 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 & outside the Classroom.
3. The Teacher must not depend on a single or a set of two to three Text Books. He must choose his materials from diverse sources.
4. Keeping in view the requirements of his Students, the Teacher may have to prepare some teaching & exercise materials.
5. 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.
6. The Teacher must function as a creative Monitor in the Classroom.
7. 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 from a Learner's Dictionary. In Teaching speaking, emphasis should be on clarity, intelligibility & reasonable fluency rather than on "Correct" pronunciation of words. Classroom Presentation & Group Discussion Sessions should be used to teach Speaking

Units to be taken up to meet the Objectives of the Course as per AICTE Curriculum

Sections	Sl. No.	Units
COMMUNICATION	01.	INTRODUCTION
	02.	ROLE OF COMMUNICATION
	03.	OBJECTIVE OF COMMUNICATION
	04.	PROCESS OF COMMUNICATION
	05.	ELEMENT OF COMMUNICATION
	06.	ESSENTIALS OF COMMUNICATION
	07.	FLOW OF COMMUNICATION
	08.	BARRIERS / FACTORS INHIBITING COMMUNICATION
	09.	VERBAL / NON-VERBAL COMMUNICATION
	10.	KINETICS / BODY LANGUAGES
	11.	STYLE IN TECHNICAL COMMUNICATION
	12.	COMMUNICATION SKILLS – READING, WRITING, SPEAKING, LISTENING & TALKING
PROFESSIONAL WRITING	01.	BUSINESS LETTERS / OFFICIAL LETTERS
	02.	LETTER WRITING SKILLS
	03.	LETTER WRITING PROCESS
	04.	FORM & STRUCTURE
	05.	LETTER FORMATS
	06.	ESSENTIALS OF LETTER WRITING
	07.	TYPES OF PROFESSIONAL LETTERS
	08.	PLANNING OF THE LETTERS
	09.	D. O. LETTER
	10.	RESUME & JOB APPLICATION
GRAPHICS	01.	INTRODUCTION
	02.	PLANNING OF GRAPHICS
	03.	PLACING OF GRAPHICS
	04.	CONSTRUCTION OF GRAPHICS
	05.	TYPE OF GRAPHICS
PHONETICS & PHONOLOGY	01.	INTRODUCTION / PHONETICS & PHONOLOGY
	02.	ORGANS OF SPEECH / SPEECH MECHANISM
	03.	PHONETICS SYMBOLS
	04.	CONSONANTS / VOWELS / DIPHTHONGS – CLASSIFICATION

	05.	STRESS PATTERN / INTONATION
	06.	PRONUNCIATION GUIDELINE
	07.	SYLLABLE / SYLLABLE DIVISION
	08.	TONES
REPORT WRITING	01.	INTRODUCTION
	02.	IMPORTANT FEATURE OF REPORT
	03.	TYPES OF REPORT
	04.	STRUCTURE & LAYOUT FORMAT
	05.	LANGUAGE & STYLE
	06.	PROJECT REPORT, LABORATORY REPORT, INDUSTRY REPORT, SOCIO-CULTURAL SURVEY REPORT & TECHNICAL REPORT
	07.	PROPOSALS - NATURES, SIGNIFICANCE, TYPES, STRUCTURES
DISCUSSION SKILLS	01.	INTRODUCTION
	02.	IMPORTANCE OF GROUP DISCUSSION SKILLS
	03.	PROCESS OF GROUP DISCUSSION
	04.	GROUP DISCUSSION STRATEGIES, INTERACTION STRATEGIES, INDIVIDUAL CONTRIBUTION
	05.	LEADERSHIP SKILLS, TEAM MANAGEMENT, CREATING A FRIENDLY CO-OPERATIVE ATMOSPHERE
PRESENTATION SKILLS	01.	NATURE & IMPORTANCE OF PRESENTATION
	02.	INTRODUCTION - MEANING OF PRESENTATION
	03.	PLANNING PRESENTATION
	04.	OBJECTIVE WITH CENTRAL IDEA, MAIN IDEAS, ROLE OF SUPPORTING MATERIAL - STEPS
	05.	HANDLING STAGES FRIGHT
STUDY SKILLS	01.	NOTE MAKING <ul style="list-style-type: none"> • MECHANICS OF NOTE MAKING • NOTE WRITING TECHNIQUES • REDUCTION DEVICES • ORGANISATION TECHNIQUES • METHOD OF SEQUENCING
	02.	SUMMARIZING & PARAPHRASING <ul style="list-style-type: none"> • MECHANICS OF SUMMARIZING • SUMMARIZING TECHNIQUES • OUTLINING & PARAPHRASING
	03.	REFERENCING <ul style="list-style-type: none"> • REFERENCE SKILLS • METHOD OF REFERENCING • USING FOOTNOTES • SCANNING SKILLS • SKIMMING SKILLS • LOCATING BOOKS IN THE LIBRARY / FINDING • REQUIRED INFORMATION / MEANING / PRONUNCIATION

WRITTEN COMMUNICATION	01.	<p style="text-align: center;">SENTENCES</p> <ul style="list-style-type: none"> • REQUISITES OF GOOD SENTENCE WRITING • EFFECTIVE SENTENCE STRUCTURE • SENTENCE BUILDING • SENTENCE COHERENCE • USE OF CONNECTIVES • SENTENCE EMPHASIS / SENTENCE THEME • DEVELOPMENT OF A PARAGRAPH
	02.	<p style="text-align: center;">PARAGRAPH WRITING</p> <ul style="list-style-type: none"> • PARAGRAPH STRUCTURE • PRINCIPLES OF PARAGRAPH WRITING • PARAGRAPH LENGTH / COHERENCE / DIVISION
	03.	<p style="text-align: center;">USE OF MODALS / CONNECTIVES / MODIFIES, PUNCTUATIONS & SPELLING</p> <ul style="list-style-type: none"> • CONCORD
TELEPHONIC CONVERSATION	01.	INTRODUCTION
	02.	LISTENING / SPEAKING
	03.	TELEPHONIC SKILLS REQUIRED
	04.	PROBLEMS OF TELEPHONIC CONVERSATION
	05.	INTENSIVE LISTENING
LISTENING COMPREHENSION	01.	TO COMPREHEND SPOKEN MATERIAL IN STANDARD INDIAN ENGLISH / BRITISH ENGLISH & AMERICAN ENGLISH
	02.	CURRENT SITUATION IN INDIA REGARDING ENGLISH
	03.	AMERICAN ENGLISH VS. BRITISH ENGLISH
INTERVIEW	01.	THE INTERVIEW PROCESS
	02.	PLANNING / PURPOSE / CONVERSATION / TWO - WAY INTERACTION / INFORMALITY
	03.	PRE-INTERVIEW PREPARATION TECHNIQUES
	04.	PROJECTING A POSITIVE IMAGE
	05.	ANSWERING STRATEGIES

Atoms and Molecules

Particle in a box illustrating energy quantization, angular momentum quantization, radial and angular parts of H atom, wave functions/orbitals, probability and charge distribution. Many electron atoms. Homonuclear and heteronuclear diatomics, covalent bonds, ionic bonds and electronegativity concepts. Hybridization and shapes of molecules. Non-covalent interaction (Van Der Waals and hydrogen Bonding).

Reaction Dynamics

Rate laws, mechanisms and theories of reaction rates (collision and transition state theory). Lasers in Chemistry.

Electrochemistry

Application of electrode potentials to predict redox reactions in solution with special reference to Lattimer and Frost Diagrams.

Transition Metal Chemistry

Structures of coordination compounds corresponding to coordination numbers up to 6. Types of ligands. Isomerism (geometrical, optical, ionization, linkage and coordination). Theories of bonding in coordination compounds, viz. crystal field theory, valence bond theory. Chelation. Brief application in organic synthesis and medicines etc.

Organo metallic Chemistry and Catalysis

Structure and bonding in organo metallic complexes, the sixteen and eighteen electron rules, Homogeneous catalysis, the role of metals in catalytic cycles during some chemical reactions (e.g. Hydroformylation; hydrogenation etc.). Role of metals in biology; oxygen carrier, electron transfer

Structure and Reactivity of Organic Molecules

Inductive effect, resonance, hyper conjugation, electrometric effect. Carbonation, carbanion and free Radicals. Brief study of some addition, elimination and substitution reactions. Conformational analysis (acyclic and cyclic molecules), geometrical and optical isomerism; E, Z and R, S nomenclature.

Polymerization

Basic concepts, classification and industrial application.

Photochemistry

Photo excitation of carbon substrates (Norrish type I and type II reactions), selected examples of the Application of photolysis. Photosynthesis (Z-diagram). Chemistry of vision.

- Acid-base titration (estimation of commercial caustic soda).
- Redox titration (estimation of iron using permanganometry).
- Preparation and analysis of a metal complex (for example thiourea/copper sulfate or nickel chloride / ammonia complexes).
- Chemical kinetics (determination of relative rates of reaction of iodide with H_2O_2 at room temperature (clock reaction)
- Heterogeneous equilibrium (determination of partition coefficient of acetic acid between n-butanol and water.
- Photochemical oxidation-reduction (study of photochemical reduction of ferric salt).
- Viscosity of solutions (determination of percentage composition of sugar solution from viscosity).
- Synthesis of aspirin.
- Synthesis of p-nitro aniline from acetanilide.
- Detection of functional groups in organic compounds.
- Radical polymerization of vinyl monomers such as styrene, acrylonitrile etc.
- Conductometric titration (determination of the strength of a given HCl solution by titration against a standard NaOH solution.

Theory of Relativity

Inertial frame of reference, Noninertial frames and fictitious forces, Outline of relativity, Michelson-Morley experiment, Lorentz transformation of space and time, length contraction, variation of mass with velocity, equivalence of mass and energy.

Geometrical Optics

Combination of thin lenses, cardinal points of coaxial system of thin lenses, thick lenses. location and properties of cardinal points, graphical construction of images.

Physical Optics

Interference analytical treatment of interference, intensity distribution of fringe system, coherent and Non-coherent sources, fundamental conditions of interference, Fresnel's biprism, displacement of fringes, wedge shaped films, Newton's rings.

Diffraction – single slit and double slit diffraction, diffraction grating, Limit of resolution, resolving Power of grating and image forming systems.

Polarisation – Brewster' law, double refraction, geometry of calcite crystal, optic axis, nicol prism. Circularly and elliptically polarized light, retardation plates, production and analysis of planes, polarimeter.

Thermal Physics

Kinetic theory of gases, Maxwellian distribution, mean free path, transport phenomena in gases, imperfect gases and Vander Waal's equation of state.

Acoustics

Production and applications of Ultrasonics, Acoustics of buildings.

Dynamics of fluids

Continuity equation; Bernoulli's theorem and its applications, Torcelli's theorem, Viscosity flow of Liquid through a capillary tube, capillaries in series and parallel, Stoke's formula, rotation iscometer.

List of Experiments

- To determine the coefficient of viscosity of water by capillary flow.
- To determine the thermal conductivity of a bad and good conductor by Lee's method and Searl's method respectively.
- To determine the wave length of light by Newton's ring method.
- To determine the wave length of light by Fresnel's biprism.
- To determine the dispersive power of the given material of the prism.
- To determine the focal length of combination of two thin lenses by nodal slide assembly and its verification.
- Determination of e/m by J.J. Thomson's method.
- Measurement of thermo emf between different types of thermocouples as a function of temperature difference between the junction, measurement of an unknown temperature.
- Use of Carry Foster Bridge.
- Study of electromagnetic induction.
- Study of electromagnetic damping and determination of terminal velocity reached by a magnet falling in a metallic tube.
- Study of LCR circuits with AC current.
- Determination of Plank's Constant using photocells.

Calculus of Functions of One Variable

Successive differentiation, Leibnitz's theorem (without proof), Rolle's theorem, Mean value theorem and Taylor's theorem. Fundamental theorems of integral calculus, elementary reduction formulae for integrals. Applications to length, area, volume, surface area of revolution, moments and centers of gravity.

Infinite Series : Convergence, divergence, comparison test, ratio test, Cauchy Leibnitz's theorem, absolute and conditional convergence. Expansions of functions into Taylor and Maclaurin series.

Calculus of Functions of Several Variables

Partial derivatives, chain rule, gradient and directional derivative. Differentiation of implicit functions. Exact differentials. Tangent planes and normals. Maxima, minima and saddle points. Simple problems in extrema of functions with constraints – methods of Lagrange multipliers. Multiple integrals- double, and triple integrals. Jacobians and transformations of coordinates. Applications to areas, volumes etc.

Vector Calculus

Scalar and vector fields. Line and surface integrals. Gradient, divergence and curl. Line integrals independent of path. Green's theorem, divergence theorem and Stoke's theorem (without proofs) and their simple applications.

Fundamentals of Mechanics – Basic concepts

Force Systems and Equilibrium

Force, Moment and couple, Principle of Transmissibility, Varignon's theorem, Resultant of force systems-Concurrent and non-concurrent coplanar forces, Free body diagram, Equilibrium equations and their uses in solving elementary engineering problems.

Plane Trusses

The structural model, simple trusses, analysis of simple trusses : method of joints, method of sections, graphical method.

Friction

Introduction, laws of coulomb friction, simple contact friction problems, belt friction, the square screw thread, rolling resistance.

Properties of Surfaces

First moment of an area and centroid, second moment and product of area of a plane area, transfer theorems, relations between second moment and product of area, polar moment of inertia, principal axes, mass moment of inertia.

Virtual Work

Work of a force, Principle of Virtual work and its application.

Kinematics of Rigid bodies

Plane motion, Absolute motion, Relative motion, Translating axes and rotating axes.

Kinetics of Rigid bodies

Plane motion, Work and energy, Impulse and momentum.

List of Experiments

- To determine the Newton's second law of motion by Fletcher's trolley apparatus.
- To determine the moment of inertia of a flywheel about its axis of rotation.
- To verify : (a) the conditions of equilibrium of forces by parallel force apparatus.
- (b) The principal of moments by crank lever.
- To determine the dry friction between inclined plane and slide boxes of different materials.
- To determine the coefficient of friction between the belt and rope and the fixed pulley.
- To determine the velocity ratio of a simple screw jack and to plot graph between (a) Effort-Load (b) Friction-Load (c) Efficiency-Load
- To measure the area of a figure with the help of a Polar Planimeter.

DC Networks

Kirchoff's laws, node voltage and mesh current methods; Delta-star and star-delta conversion; Classification of Network Elements, Superposition principle. Thevenin's and Norton's theorems.

Single Phase AC Circuits

Single phase EMF generation, average and effective values of sinusoids; Solution of R,L,C series circuits, the j operator, complex representation of impedances; Phasor diagram, power factor, power in complex notation; Solution of parallel and series-parallel circuits; Resonance.

Three phase AC Circuits

Three phase EMF generation, delta and Y-connection, line and phase quantities; Solution of three phase circuits, balanced supply voltage and balanced load; Phasor diagram, measurement of power in three phase circuits; three phase four wire circuits; Unbalanced circuits.

Magnetic Circuits

Ampere's circuital law, B-H curve, solution of magnetic circuits, Hysteresis and eddy current losses. Relays, an application of magnetic force.

Transformers

Construction, EMF equation, ratings; Phasor diagram on no load and full load; Equivalent circuit, regulation and efficiency calculations; Open and short circuit test; Auto-transformers and three phase transformers.

Induction Motors

The revolving magnetic field, principle of operation, ratings; Equivalent circuit; Torque-speed characteristics; Starters for squirrel cage and wound rotor type induction motors; Single phase induction motors.

DC Machines

Construction, EMF and torque equations; Characteristics of DC generators and motors; Speed control Of DC motors and DC motor starters; Armature reaction and commutation.

Electrical Measuring Instruments

DC PMMC instruments, shunts and multipliers, multi-meters, Moving iron ammeters and voltmeters; Dynamometer wattmeters, AC watt-hour meters, Extension of instrument ranges.

Power Supply Systems

General structure of electrical power systems; power transmission and distribution via overhead lines and underground cables, steam, hydro, gas and nuclear power generation.

List of Experiments

- To measure the armature and field resistance of a DC machine.
- To calibrate a test (moving iron) ammeter and a (dynamometer) wattmeter with respect to standard (DCPMMC) ammeter and voltmeters.
- Verification of circuit theorems, Thevenin's and Superposition theorems (with DC Sources only).
- Voltage-current characteristics of incandescent lamps and fusing time-current characteristics of fuse wire.
- Measurement of current, voltages and power in R-L-C series circuit excited by (single phase) AC supply.
- Open circuit and short circuit tests on a single-phase transformer.
- Connection and starting of a three-phase induction motor using direct online (DOL) or star-delta starter.
- Connection and measurement of power consumption of a fluorescent lamp.
- Determination of open circuit characteristics (OCC) of a DC machine.
- Starting and speed control of a DC shunt motor.
- Connection and testing of a single-phase energy meter (unity power factor load only).
- Two-wattmeter method of measuring power in three-phase circuit (resistive load only).
- Measurement of thermo emf between different types of thermocouples as a function of temperature difference between the junction, measurement of an unknown temperature.
- Design and use of potentiometer.
- Study of LCR circuits with AC current.

General

Importance, Significance and scope of engineering drawing, Lettering, Dimensioning, Scales, Sense of proportioning, Different types of projections, Orthographic projections, B.I.S. Specifications.

Projections of Points and Lines

Introduction of planes of projection, Reference and auxiliary planes, projections of points and lines in different quadrants, traces, inclinations, and true lengths of the lines, projections on auxiliary planes. shortest distance, intersecting and non-intersecting lines.

Planes Other than the Reference Planes

Introduction of other planes (perpendicular and oblique), their traces, inclinations etc.. projections of points and lines lying in the planes, conversion of oblique plane into auxiliary plane and solutions of related problems.

Projections of Plane Figures

Different cases of plane figures (of different shapes) making different angles with one or both reference planes and lines lying in the plane figures making different given angles (with one or both reference planes). Obtaining true shape of the plane figure by projection.

Projection of Solids

Simple cases when solid is placed in different positions Axis faces and lines lying in the faces of the solid making given angles.

Development of Surface

Development of simple objects with and without sectioning.

Isometric Projection

Nomography

Basic concepts and uses

WP1101-P WORKSHOP PRACTICE I & II

(0-0-3)

Carpentry: Timber, definition, engineering applications, seasoning and preservation, plywood and plyboards.

Foundry: Moulding sands, constituents and characteristics, Pattern, definition, materials, types, core prints Role of gate, runner, riser, core and chaplets. Causes and remedies of some common casting defects like blow holes, cavities, inclusions.

Metal Joining: Definitions of welding, brazing and soldering processes and their applications. Oxy-acetylene gas welding process, equipment and techniques, type of flames and their applications. Manual metal arc welding technique and equipment, AC and DC welding, electrodes, constituents and functions of electrode coating. Welding positions. Type of weld joint. Common welding defects such as cracks, undercutting, slag inclusions, porosity.

Metal Cutting: Introduction to machining and common machining operations. Cutting tool materials. Definition of machine tools, specification and block diagram of lathe, shaper, drilling machine and grinder. Common

Lathe operations such as turning, parting, chamfering and facing. Quick return mechanism of shaper. Difference between drilling and boring. Files – material and classification.

Forging: Forging principle, materials, operations like drawing, upsetting, bending and forge welding. use of forged parts.

List of Jobs to be made in the Workshop

Group A

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| 1. T-Lap joint and Bridle joint (Carpentry shop) | 4 hrs. |
| 2. Mould of any pattern (Foundry shop) | 2 hrs |
| 3. Casting of any simple pattern (Foundry shop) | 2 hrs |

Group B

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|--|-------|
| 1. (a) Gas welding practice by student on mild steel flat | 2 hrs |
| (b) Lap joint by Gas welding | |
| 2. (a) MMA Welding practice by students | 2 hrs |
| (b) Square butt joint by MMA Welding | |
| 3. (a) Lap joint by MMA Welding | 1 hrs |
| (b) Demonstration of brazing | 1 hrs |
| 4. Tin smithy for making mechanical joint and soldering of joints. | 2 hrs |

Group C

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|---|-------|
| 1. Job on lathe with one step turning and chamfering operations | 2 hrs |
| 2. Job on shaper for finishing two sides of a job | 2 hrs |
| 3. (a) Drilling two holes of size 5 and 12 mm diameter on job used/to be used for shaping | 2 hrs |
| (b) Grinding a corner of above job on bench grinder | 2 hrs |
| 4. Finishing of two sides of a square piece by filing | 2 hrs |