

**VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY:ORISSA**  
(Formerly University College of Engineering, Burla )



**SYLLABUS FOR FIRST YEAR B.TECH**  
**(COMMON TO ALL BRANCHES)**

# MATHEMATICS

## **1<sup>st</sup> semester B. Tech (All Branch)**

*Calculus:* Curve tracing, curvature, asymptotes

*Ordinary differential equations:* First order differential equations, separable equations, exact differential equations, and Bernoulli's equation, application to electric circuits.

Linear differential equations of second and higher order, homogeneous equations with constant coefficients, Euler Cauchy equations, solution by undetermined coefficients, solution by variation of parameters, modeling of electric circuits.

Series solution of differential equation: Power series method, Legendre's equation, and Legendre's polynomial. Bessel's equation, Bessel's function  $J_n(x)$ .

*Laplace transformation:* Laplace transformation and its use in solving differential equations. Convolution, integral equation.

### ***Text Book:***

- 1) Calculus: Gorakh Prasad
- 2) Advance Engineering Mathematics – E. Kreyszig, John Wiley & Sons Inc.

*Chapter 1(1.1-1.7)*

*Chapter 2(2.1-2.10, 2.12)*

*Chapter 4(4.1-4.6)*

*Chapter 5(5.1-5.7)*

BME 101-                    **ENGINEERING MECHANICS**                    (3-1-0)

Module-I

1. Concurrent forces on a plane: Composition, resolution and equilibrium of concurrent coplanar forces, method of moment, friction (chapter 1). (7)
2. Parallel forces on a plane: General case of parallel forces, center of parallel forces and center of gravity, centroid of composite plane figure and curves(chapter 2.1 to 2.4) (4)

Module-II

3. General case of forces on a plane: Composition and equilibrium of forces in a plane, plane trusses, method of joints and method of sections, principle of virtual work, equilibrium of ideal systems. (8)
4. Moments of inertia: Plane figure with respect to an axis in its plane and perpendicular to the plane, parallel axis theorem(chapter 3.1 to 3.4, 5.1, appendix A.1 to A.3) (3)

Module-III

5. Rectilinear Translation: Kinematics, principle of dynamics, D Alembert's Principle, momentum and impulse, work and energy, impact (chapter 6). (11)

Module-IV

6. Curvilinear translation: Kinematics, equation of motion, projectile, D Alembert's principle of curvilinear motion. (4)
7. Kinetics of rotation of rigid body (chapter 7.1 to 7.4, 8.1) (3)

**Text book:**

1. Engineering mechanics: S Timoshenko & Young; 4<sup>th</sup> Edition (international edition) MC Grawhill.

**Reference books:**

1. Fundamental of Engineering mechanics (2<sup>nd</sup> Edition): S Rajesekharan & G Shankara Subramaniam; Vikas Pub. House Pvt Ltd.
2. Engineering mechanics: K.L. Kumar; Tata MC Graw Hill.

## SESSIONALS

### **BME 193- Computer Aided Machine Drawing (0-0-3)**

1. Sectional Views of Solids, Full section, half section, Screw threads, Screw Fasteners, Assembly drawings of Cotter Joints and Knuckle Joints, Flange coupling, Introduction to Computer-Aided Drafting.
2. Learning of the following Auto CAD Commands:
  - Line, polygon, Rectangle, Arc, Circle, Spline, Ellipse
  - Copy, Mirror, Offset, Array, Rotate, Mirror, Scale, Sketch, trim, extend, break, chamfer, fillet
  - Dimensioning
  - Pan, Zoom
3. Drawing of 2D objects :
  - Bars having different Cross sections

(Any other 2D drawing can be given)

Text Books:

Engg. Drawing and Graphics & Autocad by K. Venugopal

Reference:

- 1) Auto CAD Manual
- 2) Engineering Drawing by N.D. Bhatt & V.M. Panchal, Charotar Publishing.

### **BME 191- Workshop-I (0-0-3)**

1. Carpentry
2. Fitting
3. Smithy

Study of tool and equipments of each section, a small job for each student which can be completed in 4 classes.

BME 192-

**Workshop-II (0-0-3)**

1. Lathe section: Study of Lathe M/c component and different operations, small job on a lathe.
2. Welding: Study of basic principle of Arc (A.C and D.C) and gas welding. A welding joint will be prepared by each student.
3. Machine shop: Study of basic principle of Milling, Shaping, Planner and Drilling machines.

# **BCE 101 Fluid Mechanics**

(First/Second Semester: for all branches)

## ***Introduction***

Physical properties of fluids; Density; Specific weight; Specific volume; Specific gravity; Compressibility; Elasticity; Surface tension; Capillarity; Vapour pressure; Viscosity; Ideal and real fluids; Concept of shear stress; Newtonian and non-Newtonian fluids.

## ***Fluid statics***

Pressure-density-height relationship; Manometers; Pressure on plane and curved surface; Centre of pressure; Buoyancy; Stability of immersed and floating bodies; Fluid masses subjected to uniform accelerations.

## ***Fluid kinematics***

Steady and unsteady, uniform and non-uniform, laminar and turbulent flows and enclosed flows; Definition of one-, two- and three-dimensional flows; Stream-lines, streak-lines, and path-lines; Stream-tubes; elementary explanation of stream-function and velocity potential; Basic idea of flow-nets.

## ***Fluid dynamics***

Basic equations: Equation of continuity; One-dimensional Euler's equation of motion and its integration to obtain Bernoulli's equation and momentum equation.

## ***Flow through pipes***

Laminar and turbulent flow in pipes; Hydraulic mean radius; Concept of losses; Darcy-Weisbach equation; Moody's (Stanton) diagram; Flow in sudden expansion and contraction; Minor losses in fittings; Branched pipes in parallel and series; Transmission of power; Water hammer in pipes; Sudden closure condition.

## ***Open channel flow***

Definition; Uniform flow; Chezy's, Kutter's and Manning's equations; Channel of efficient cross section.

## ***Measurements***

Hook gauge; Point gauge; Pitot tube; Current meter; Venturi meter; Orifice meter; Orifices and mouthpieces; Notches and weirs.

## Text Books:

1. Hydraulics and Fluid Mechanics including Hydraulic Machines by P. N. Modi and S. M. Seth, Standard Book House.
2. Fluid mechanics by A. K. Jain, Khanna Publishers.

## Reference Books:

1. Engineering Fluid Mechanics by K. L. Kumar, S. Chand & Co.
2. Fluid Mechanics by V. L. Streeter, Wylie, MGH

## **BEG 1003 BASIC ELECTRICAL ENGINEERING (3-1-0)**

### **OBJECTIVES**

This is a foundation course to understand basic principles underlying the behaviour of "Electric circuits, Electric Power apparatus, generation, transmission, distribution and utilization of electric energy.

#### **MODULE – I (12 hours)**

**I.DC Networks:** Kirchhoff's laws, node and mesh analysis,

Delta-star and star-delta transformations.

Superposition, Thevenin and Norton's theorem.

Transients, in R-L, R-C and R-L-C circuits with DC. excitation. *(6 Lectures)*

**II.Single Phase AC Circuits:** Single phase EMF generation, average and effective values of sinusoids, j operations, complex representation of impedances, phasor diagrams, power factor, power in complex notation, solution of series and parallel circuits.

Introduction to resonance in series RLC circuit. *(6 Lectures)*

#### **MODULE – II (9 Hours)**

**III. Three Phase AC Circuit:** Three phase EMF generation, delta and star connection,

Line and Phase quantities. Solution of 2- phase circuits with balanced load. Power in 3-phase balanced circuits. *(5 Lectures)*

**IV.Magnetic Circuits:** B-H Curve, Hysteresis, Permeability and reluctance, solution of simple magnetic circuits, Hysteresis and Eddy current losses. *(4 Lectures)*

#### **MODULE – III (12 Lectures)**

**V. DC Machines:** Different types, Principle of Operation of D.C. generator EMF equation, methods of excitation.

D.C. Motor, Back e.m.f., speed and torque of a DC Motor, Conditions for maximum Power.

Speed control of D.C.. shunt motor. *(5 Lectures)*

**VI.Transformers:** Construction and Principle of operation of single phase transformer,

EMF equation,

Single phase autotransformer. *(3 Lectures)*

**VII Three phase Introduction Motor:** Construction and principle of operation, types;

Slip-torque characteristics. *(3 Lectures)*

**VIII, Introduction to single-phase induction Motor.** *(1 Lecture)*

**MODULE – IV( 7 hours)**

**IX. Electrical Measuring Instruments:** DC PMMC instruments

Extension of range by shunts and multipliers.

Moving iron ammeters and voltmeters,

Dynamometer type Wattmeters,

Induction type Energy Meter.

*(4 Lectures)*

**X. Power supply systems:** Principle of generation - thermal, hydel and nuclear.

Transmission and distribution of electric energy.

*(2 Lectures)*

**Introduction to Electric Heating & Welding**

*(1 Lecture)*

**TEXT BOOKS AND REFERENCES**

1.Edward Hughes (revised by Ian McKenzie Smith). "Electrical & Electronics Technology" Pearson Education Limited. Indian Reprint 2002.

Chapters 3,4,7,10, 11,12,13,14,34,35,39,41,47

2.H. Cotton" Advanced Electrical Technology"CBS Publishers, New Delhi, 7<sup>th</sup> Edition. Reprint-1999.

3.C.L. Wadhwa, "Electrical Engineering", New Age International Publishers, 1<sup>st</sup> Edition revised 2006.

4.S. Parker Smith: "Problems in Electrical Engineering" Asia Publications,

5. J. J. Cathey , "Schaum's Outline of Basic Electrical Engineering" McGraw-Hill Professional,

# **BASIC ELECTRONICS**

## **UNIT-1**

**(10 Hours)**

Introduction to Electronics: Signals, frequency Spectrum of Signals, Analog and Digital Signals, Amplifiers, ICs.

Linear Wave Shaping Circuits: RC LPF, Integrator, HPF, Differentiator.

Properties of Semiconductors: Intrinsic, Extrinsic Semiconductors, Fermi Level, Current Flow in Semiconductors, Hall effects, Diffusion, Lifetime of minority Carriers.

Diodes: p-n junction theory, Current-Voltage characteristics, Analysis of Diode circuits, Rectifiers, Clippers, Clampers, Special diodes.

## **UNIT-II**

**(14 Hours)**

Bipolar junction Transistor (BJTs): Physical Structures & Modes of Operation, Transistor Characteristics, DC analysis, Transistor switch, Introduction to Small Signal Analysis, The RC coupled amplifiers, Introduction to Power Amplifiers.

Field Effect Transistors (FETs): Physical Structures & Modes of Operation of MOSFETs, MOSFET Characteristics, DC Analysis.

Feedback Amplifiers & Oscillators: General Principles, Topologies, Properties of Negative Feedback, Barkhausen criteria for Oscillation.

Operational Amplifiers (OP-Amps): Ideal OP-AMP, Inverting Amplifier, Adder, Integrator, Differentiator, Non-Inverting Configuration.

## **UNIT-III**

**(10 Hours)**

Digital Fundamentals: Binary Numbers, Decimal-to-Binary & Binary-to-Decimal Conversion, Binary Addition, Subtraction, Multiplication and Division, Hexadecimal Number Systems, Logic Gates, Boolean Algebra, De Morgan's Theorems, Laws of Boolean Algebra, Flip flops, Shift Registers.

## **UNIT-IV**

**(10 Hours)**

Cathode Ray Oscilloscope(CRO): Introduction, Cathode Ray Tube, Deflection Sensitivity, Waveform Display, A Basic Oscilloscope, CRO types, Application of CROs. Digital Multimeters.

Principles of Communication: Fundamentals of AM & FM, Radio & TV Transmitters & Receivers, Basic Principles of Optical Fiber Communication.

### **TEXT BOOKS:**

1. Microelectronics Circuits, A.S Sedra, K.C. Smith, Oxford University Press. Selected portions from chapters 1 to 5, 8, 13.
2. Electronics Fundamentals and Applications, D Chattopadhyay and P.C. Rakshit, New Age International Publications. Selected portions from chapters 4 to 14, 16 to 20.

### **REFERENCE BOOKS:**

1. Integrated Electronics, Millman and Halkias, Mc.Graw Hill Publications.
2. Electronic Devices & Circuit Theory, R.L Boylestad and L. Nashelsky, Pearson Education.

**Module 1:** C Language Fundamentals, Arrays and Strings (10 Period)

Character set, Identifiers, Keywords, Data Types, Constant and Variables, Statements, Expressions, Operators, Precedence of operators, Input – output Assignments, Control structures, Decision making and Branching, Decision making & looping. Declarations, Manipulation & String-handling functions, Monolithic vs Modular programs, User defined vs standard functions, formal vs Actual arguments, Functions category, function prototypes, parameter passing, Recursion, Storage Classes: Auto, Extern, Global, Static.

*Module 2: Pointers, Structures, Union & File handling (10 Period)*

Pointer variable and its importance, Pointer Arithmetic, passing parameters, Declaration of structures, pointer to pointer, pointer to structure, pointer to function, unions dynamic memory allocations, unions, file management.

**Module 3:** Development of Algorithms: (05 Period)

Notations and Analysis, Storage structures for arrays-sparse matrices, Stacks and Queues: Representations and applications.

**Module 4:** Linked Lists: (05 Period)

Singly linked lists – Linked stacks and queues – operations on Polynomials, Doubly Linked Lists – Circularly Linked Lists, Garbage collection and compaction.

**Module 5:** Binary Trees: (05 Period)

Binary Search Trees – General Trees – Tree Traversing – Operations on Binary Trees – Symbol Table construction – Height Balanced Trees.

**Module 6:** Graphs: (05 Period)

Representation of Graphs – Path Matrix – BFS, DFS – Shortest path problems.

**Books:**

1. E. Balaguruswamy “Programming in C”, Tata McGraw Hill
2. Data Structures Using C & C++, Yedidyah Langsam Moshe J, Augenstein, Aaron M.Tenenbaum, Prentice, Hall of India, New Delhi.

**Reference Books:**

1. Y.Kanetkar, “Let us C”, BPB Publications.
2. Fundamentals of Data Structure, in c by Hariwitz and Sahni & Anderson Freed, University Press.
3. Data Structures by S.Lipschutz, Schaum’s outline series in Computes.

**BME 102- ENGINEERING THERMODYNAMICS (3-0-0)**  
Module -I

1. Basic concept: thermodynamics system and surroundings, state properties, processes and cycles, thermodynamic equilibrium, heat and work transfer across boundary. Quasi-static process. Zeroth law and concept of thermal equilibrium. (4)
2. First law of thermodynamics: first law for a closed system undergoing a cycle and undergoing a change of state. Internal energy as a system property, specific heats. (4)

#### Module-II

3. Second law of thermodynamics: reversible and irreversible processes. Equivalence of Kelvin-Planck and Clausius statement, Carnot cycle and its efficiency. Inequality of Clausius and entropy concept. Change of entropy for various processes. Temperature-Entropy diagram. (8)

#### Module-III

4. Properties of gases and vapours: Ideal gas law, Entropy change of an ideal gas. Properties of steam. Measurement of dryness fraction. Use of steam table, T-s diagram and H-s diagram for representing thermodynamics processes. (8)

#### Module-IV

5. Air standard cycle and introduction to IC engines: Otto, diesel and dual cycles, Description and operation of four stroke and two stroke SI and CI engines, Power output and efficiency calculation. (4)
6. Reciprocating Air compressor: Work required for single and two stage air compressor. Effect of inter cooling, optimum inter stage pressure. Effect of clearance on volumetric efficiency. (4)

#### **Text books:**

1. Engineering thermodynamics  
By P.K.Nag, Tata Mc Grawhill

#### **Reference books:**

1. Thermal engineering  
By P.L Ballaney – Khanna Publishers
2. A course in thermodynamics

By Kothaandaraman, Khajuria & Domkundwar – Dhanpat Rai & Sons.

#### **BCE 191 Engineering Graphics**

(First Semester, Common to all branches of Engineering)

Concept of orthographic projection, First angle projection, Projections of points, straight lines, planes and solids.

Intersection and development of surfaces.

Isometric Projection.

Text Book:

Engineering Drawing by N. D. Bhatt and V. M. Panchal, Charotar Publishing House, Anand.

Reference Books:

1. Engineering Drawing by Venugopal

## **PHYSICS – I (3 – 1 – 0)**

This one semester Physics core course is divided into three parts. Part-I covers oscillations, waves and wave optics. Part-II introduces some basic concepts in electromagnetism and Part-III includes introductory aspects of Quantum mechanics.

### **Module-I**

#### **Unit-I (Oscillations and Waves)**

The aim of this unit is to familiarize the students with basic features of different oscillatory systems and waves in general.

- a) Oscillatory systems : Simple harmonic oscillation, Damped harmonic oscillation, Forced vibration, Resonance, Amplitude resonance, velocity resonance and sharpness of resonance.
- b) Waves as periodic variation of physical quantity in space and time, wave equation, longitudinal and transverse waves, Progressive waves, Stationary waves, Nodes and Antinodes. Examples of different waves.
- c) Reflection and transmission of waves at boundary of two media.

## **Unit-II (Interference)**

In this unit some systems for production of observable interference pattern are covered.

- a) Wave fronts and Huygen's principle, Superposition of waves, two beam superposition, coherent and incoherent superposition,
- b) Two source interference pattern, Coherent sources of light, Conditions of interference, Young's double slit experiment, Fringe width and Intensity distribution.
- c) Newton's Rings, Determination of wavelength of light and refractive index of liquid.

## **Unit-III (Diffraction)**

Diffraction of light waves at some simple obstacles is to be covered in this unit.

- a) Fresnel and Fraunhofer diffraction, Fresnel's half period zones : construction, Intensity at a point due to a plane wave front
- b) Zone plate : Construction and Theory, similarities and dissimilarities with a convex lens.
- c) Plane Diffraction grating – Diffraction spectra, Determination of wavelength of light, angular dispersion.

## **Unit-IV (Polarization)**

The unit covers elementary features of polarization of light waves.

- a) Polarization of transverse waves : plane, circular and elliptically polarized light. Pictorial representation.
- b) Production of circular and elliptically polarized light, Polarization by reflection, Brewster's law.

## **Module-II**

### **Unit-V (Electromagnetism)**

Students will be familiarized with some basic terms used in vector calculus prior to development of Maxwell's electromagnetic wave equation. No proof of theorems and laws included in this unit is expected- statement and interpretation should suffice.

- a) Vector Calculus : Gradient, Divergence, Curl of vector field, Gauss divergence theorem. Stoke's theorem, Green's theorem.

- b) Gauss law of electrostatics in free space and in a medium, Electric displacement D, Magnetic induction B and magnetic intensity H. Amperes circuital law, displacement current. Faraday's law of electromagnetic induction.
- c) Maxwell's electromagnetic equation in differential form and in integral form.

### Unit-VI

Some aspects of propagation of EM waves are to be covered in this unit.

- a) Electromagnetic energy density, Poynting theorem, vector potential and scalar potential.
- b) Electromagnetic wave equations for E and B, transverse nature and speed of em waves, wave equation in terms of scalar and vector potentials.

### Module-III

#### Unit-VII (Quantum Physics)

This unit deals with elementary concepts of Quantum Physics and basic formulation to deal with physical systems.

- |    |  |   |  |
|----|--|---|--|
| 1. | Need for Quantum Physics<br>Particle Aspect of Radiation | - | Historical Overview<br>Blackbody radiation,<br>Photo electric effect.<br>Compton Scattering, pair production                           |
|    | Wave Aspect of Particles                                 | - | Matter waves:de. Broglie Hypothesis<br>Experimental evidence   |
|    | Atomic Transition and Spectroscopy                       | - | Bohr Model of Hydrogen Atom.<br>Spectral lines   |
|    | Heisenberg Uncertainty Principle                         | - | Statement, interpretation and examples.  |
| 2. | Basic features of Quantum Mechanics-                     |   | Transition from deterministic to<br>probabilistic  |
|    | States of a system                                       | - | Wave functions Probability Density.<br>Superposition Principle. Observable<br>and operators. Expectation values.<br>Stationary states. |

Schrodinger equation : Time dependant and time in-dependant wave packets.

### Unit-VIII

Thus unit deals with application of quantum Mechanics to specific problems.  
Application of quantum mechanics.

- |                   |   |  |
|-------------------|---|--|
| Solution of       | - | One dimensional problems                     |
| Free Particles    | - | Continuous States                            |
| Potential Steps   | - | Boundary conditions, Reflection Transmission |
| Potential Barrier | - | Tunneling                                    |

Infinite deep potential well - Energy Eigen values, Eigen function

Text Books :

1. Physics-I - B.B.Swain & P.K.Jena – Kitab Mahal – Cuttack

Reference Books :

1. Optics – A.K.Ghatak
2. Geometrical and Physical Optics – P.K.Chakraborty
3. Electricity & Magnetism - D.C.Tayal, Himalaya Publishing House, New Delhi
4. Concepts of Modern Physics – A. Beiser
5. E.Merzbacher, Quantum Mechanics, 3<sup>rd</sup> Edition, John Wiley NY ( 1998)
6. A.Bohm, Quantum Mechanics : Foundations and Applications, 2<sup>nd</sup> Edition, Springer Verlag(1986)
7. N.Zetli, Quantum Mechanics : Concepts and Applications, John Wiley & Sons (2001)

### PHYSICS-I LABORATORY ( 0 – 0 – 3)

A student is expected to perform ten experiments from the list given below.

1. Determination of Young's modulus by Searle's method
2. Determination of Rigidity modulus by static method
3. Determination of surface tension by capillary rise method
4. Determination of acceleration due to gravity by Bar/Kater's pendulum
5. Determination of thermal conductivity by Lee's method
6. Determination of wavelength of light by Newton's ring apparatus
7. Determination of grating element of a diffraction grating
8. Plotting of characteristic curve of a PN junction diode
9. Plotting of characteristic curves of BJT
10. Verification of laws of vibration of string using son meter
11. Determination of wavelength of laser source by diffraction grating method
12. Study of Hall effect
13. Study of RC circuit
14. Study of a power source-output impedance
15. Study of photoemission

## CHEMISTRY- 1

### Module-1

(To develop basic concept of quantum mechanics and its applications in bonding and spectroscopy)

1. Structure Bonding: Failure of classical mechanics, uncertainty principle, wave nature of particles, Schrödinger equation (need not be derived), interpretation of wave functions, Molecular Orbital theory of diatomic molecules and metallic bonding.

(No of lectures-7)

2. Spectroscopy and photochemistry: Interaction and radiation with matter, microwave, IR and UV-VIS spectroscopy: Basic Concepts of selection rules and application to molecular structure determination.

(No of lectures-5)

## **Module - 2**

(To develop the basic concepts of thermodynamics and its application to chemical systems)

1. Thermodynamics and chemical equilibrium: variables of states: 1<sup>st</sup> law of thermodynamics and applications to ideal gas, enthalpy and heat capacity, Measurement of enthalpy and heat capacity, thermo-chemical calculation 2<sup>nd</sup> law of thermodynamics concepts of entropy, entropy in physical and chemical changes, molecular interpretation of entropy.

The free energy concepts: application to gases: Gibbs Helmholtz equation: free energy change and criterion of spontaneity of chemical equation; free energy change and criterion of spontaneity of chemical reactions and chemical equilibrium.

Physical, ionic and chemical equilibrium.

(No of lecturers- 9)

2. Phase rule: one and two component systems H<sub>2</sub>O , S, Cd-Bi and Fe-C systems

(No of lecturers- 3)

## **Module - 3**

(To develop basic concepts about the rates of reactions Basic idea on homogeneous and heterogeneous catalysis process)

1. Reaction Kinetics and catalysis: collision theory; order and molecularity of reaction kinetics of zero, 1<sup>st</sup> and 2<sup>nd</sup> order reactions; activation energy, theory of absolute reaction rates, homogeneous and heterogeneous catalysis.

(No of lectures-6)

#### **Module-4**

(To develop concepts of electrochemistry and solid state)

1. Electro chemistry: Electro chemical cells, EMF and free energy change of electrochemical reactions, electrode potentials and measurements with reference to standard hydrogen electrode and their application to redox processes, Measurement of EMF, determination of pH, Dry cells , fuel cells and storage cells

(No of lectures – 6)

2. Solid state: crystal systems , Bravais lattices, closed packed structures, ionic solids, crystal defects including Schottky and Frankel defects

(No of lectures-4)

#### **BOOKS:**

1. Physical chemistry by G.M.Barrow, 5<sup>th</sup> edition, Tata McGraw Hill, New Delhi 1992
2. Physical Chemistry by P.W. Atkins, 5<sup>th</sup>/6<sup>th</sup> edition, oxford
3. Textbook of Chemistry –I, Kalyani Publisher.

### **Chemistry Laboratory**

#### **(Any ten Experiments)**

1. Determination of amount of sodium hydroxide and sodium carbonate in a mixture.

2. Determination of Total hardness of water by EDTA method.
3. Estimation of calcium present in the limestone.
4. Preparation of aspirin.
5. Standardization of  $\text{KMnO}_4$  using sodium oxalate.
6. Determination of ferrous iron in Mohr's salt by potassium permanganate.
7. Determination of Rate constant of acid catalyzed hydrolysis of ester.
8. Determination of dissolved oxygen in a sample of water.
9. Determination of Viscosity of lubricating oil by red wood Viscometer.
10. Determination of Flash point of given oil by Pensky Marten's Flash point apparatus.
11. Determination of available chlorine in bleaching powder.

**BOOK :** B.Tech practical Chemistry-Kalyani publisher

ENGLISH FOR COMMUNICATION  
(1<sup>ST</sup> Semester B.Tech & MCA)

Objectives :

This is a practice oriented, need based, and functional – communicative course. It seems to develop the student’s skill of communication in listening, speaking and writing. Though, formally not included, is still a recommended activity. The student is advised to cultivate the habit of reading newspapers, magazines and books in a free, extensive manner to consolidate the skill already achieved. A more inter-active process of teaching/learning is called for in order to achieve effective communication.

The course attempts to :

- a) Familiarize students with the sounds of English in bore outlines avoiding the use of technical terms.
- b) Provide adequate listening and speaking practice so that the learner can speak with ease, fluency and clarity in common everyday situations and on found occasions.
- c) Perform appropriate speech aches
- d) Use grammar in meaningful contexts
- e) Develop the learners sensitively to language.

Questions at the class test and semester end examination will be largely problem solving and application oriented in nature.

Module – I (7 Hours)

- 1.1 Communicative English, nature and process of communication
- 1.2 Communication and its elements: Message, sender, encoding, channel, receiver, decoding, feedback
- 1.3 Barriers to communication
- 1.4 Types of communication: Intra-personal, Interpersonal, Group, Mass  
Communication-verbal and non-verbal communication
- 1.5 Getting the message across: Audience, Subject, time and place and purpose
- 1.6 Different ways of communicating: Narrative, Description, Exposition and argument, speaking and writing.

Module – II ( 9 Hours) Communicative Grammar :

- 2.1 Time, tense and aspect
- 2.2 Verbs of state and event
- 2.3 Use of preposition
- 2.4 Expressing emotions and attitudes : Hope, anticipation of pleasure, disappointment, approval, disapproval, surprise.

### Module – III (8 Hours)

The sounds of English (it is not a course in phonetics. Technical terms will not be used except when absolutely necessary. Intensive speech practice in the Communication Lab. Is recommended).

#### 3.1 Length of vowels-long and short vowels

/i:/, /ɪ/, /e:/, /ɛ/, /a:/, /æ/, /ɔ:/, /ɑ:/, /u:/, /ʊ/, /ɒ/, /ɔ:/, /ʌ/, /o:/, /u:/

#### 3.2 Consonants : / f, v, o, o, s, z, ʒ/

#### 3.3 Stress pattern

#### 3.4 Intonation : falling and rising

### Module – IV ( 6 Hours) English in context :

#### 4.1 Functions of language : Descriptive, Expressive and Social

#### 4.2 Bias-free language

#### 4.3 Friendly communication-introductions, thanks, apologies, regrets, good wishes, congratulations, offering help and food/beverage, farewells, condolences.

#### Books prescribed :

1. Oxford Guide to writing and speaking , John Seely, O.U.P
2. A Communicative Grammar of English, Leech, G.N. and Jan Svartvik
3. Better English Pronunciation, J.O  
O' Corner, Cambridge.

#### References :

1. Effective Technical Communication, M.Asraf Rizvi, Tata McGraw Hill
2. Technical Communication Today, Bovea et al. Pearson.

## BUSINESS COMMUNICATION IN ENGLISH (2<sup>nd</sup> Semester B.Tech & MCA)

#### OBJECTIVES :

The objectives are to prepare the students to

- a) Produce written communication of different forms such as paragraph, report, letter etc.
- b) Make notes from a given passage.
- c) Organize meetings, prepare agenda, draft motions, resolutions and write minutes.
- d) Write CVs, Job applications and face interviews.
- e) Make presentations and participate in group discussion

#### Module – I (5 Hours)

- 1.1 Facing an interview
- 1.2 Group discussion

#### Module – II (8 Hours)

- 2.1 Paragraph writing – Topic sentence, cohesion and coherence- sentences liners (so, but, however etc)
- 2.2 Preparation of a business report-writing a business proposal-format, length, structure.

#### Module – III (10 Hours)

- 3.1 Preparing notes – writing business letters and E-mail messages
- 3.2 Organizing a meeting, preparing an agenda, chairing a meeting, drafting motions and resolutions, writing minutes.

#### Module – IV (7 Hours)

- 4.1 Writing a curriculum vitae (both chronological & functional) along with an application for a job
- 4.2 Public relation – Concept and relevance – PR in a business organization-handling the media.

The students will be asked to work out problems relating to various topics. For examples they will be asked to write a paragraph developing the idea in a given sentence, draft a resolution on a specific subject, write the introduction/recommendation part of a report, and so on.

Mid-term assessment may be made on the basis of various relevant activities in the Language Lab. And not on the basis of written examination as in other subjects.

#### Books Prescribed :

1. Business Communication, P.D Chaturbedi and Mukesh Chaturbedi, Pearson Education.
2. Developing Communication skills, Krishna Mohan and Mira Banerjee, Orient Longmen.
3. Oxford Guide to writing and speaking English, John Seely, OUP

Reference :

1. Basic Business Communication, Lesikar & Flatley, Tata Mcgro Hill.
2. Technical Communication today, Bovee et al. Pearson

**LANGUAGE LAB – I & II**  
(1<sup>st</sup>/2<sup>nd</sup> Semester B.Tech. & MCA)

Work out the following problems/ tasks in the Eng/Communication Lab. The teacher can create similar problems if he/she thinks it necessary.

1. (a) Some people touch their elder's feet and how their heads. What do they communicate ?
  - (b) What do the colours, red, amber and green suggest in the traffic signal ?
  - (c) Make a list of similar non-verbal communication.
2. What language functions do the following have ?
  - (a) India is a large country
  - (b) If you can't do it, go to hell
  - (c) Thanks very much

Give some more examples of descriptive, expressive and social functions of language.

3. Do you find the following acceptable ?
  - i) Amrita Pritam is a fine poetess
  - ii) Smita Patil was a fine actor
  - iii) Has every body brought his book ?
  - iv) His only daughter is mentally retarded

These are examples of biased language. Give some more similar examples.

4. Identify the time and tense in the following sentences.
  - i) Then president is arriving tomorrow. It shows that there is no one for one correspondence between time and tense.(a) Give sentences with the following tense and time.
  - i) Present Tense expressing future time
  - ii) Past Tense expressing future time

- iii) Present Tense expressing past time
- b) Do you find the following grammatical ?
- i) Are you understanding what you say ?  
 ii) I am living in Burla since two years
- c) Make a list of verbs which do not take the progressive form.
5. How do the vowels contrast in the following pairs of words :
- a) i) feel, fill (ii) pull, pool (iii) cart, cat (iv) cot , caught
- Practice pronunciation of these words
- Say the following pairs of words
- i) bag, beg (ii) foot, food (iii) sit, seat (iv) same, shame (v) judge, jazz (vi) major, measure
- Say the following words as noun and verb
- Progress, object, record, supplement
- Say the following words with correct stress :
- Teacher, college, village, building, ago, above, apart, accuse, advice, education, engineer
6. Develop the idea in the following sentences into a paragraph.
- Cricket now is the opium of masses.
7. As the person in-charge of customer care department of a Cable Service, write a letter of reply to a customer who has complained about poor service.
8. As the Secretary of a society propose a vote of thanks at the end of a meeting
9. Draft a resolution urging the Govt. to enforce the ban on smoking in public places
10. As the leader of a Group discussing team sum up the main points of a discussion on the following topics :
- i) People above the age of sixty should not be allowed in politics  
 ii) Imagine that in a job interview you are asked an uncomfortable question about a short break in your professional career (were you thrown out of

your job-did you quarrel with your employer-did you leave it in a huff)  
How would you handle the question ?

- iii) The teacher will regularly conduct interviews and group discussions.
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11. Write the recommendation part of a report on creating more jobs for engineers
  12. Make a brief presentation on the benefits of two insurance policies that your company has introduced.