

Curriculum of 2nd year B.Tech. Chemical Engineering

Course structure

Semester-III

Sr. No.	Course Code	Subject Title	Contact Hours			Credits
			L	T	P	
01	CH 2101	Fluid Flow Operations	3	1	-	8
02	CH 2102	Structural Mechanics	3	1	-	8
03	CH 2103	Chemical Process Calculations	4	1	-	10
04	MA 2104	Engineering Mathematics - III	4	-	-	8
05	CY 2105	Chemistry	3	-	-	6
06	CH 2106	Chemical Engineering Operations –I Laboratory	-	-	2	2
07	CY 2107	Chemistry Laboratory	-	-	2	2
08	CH 2108	Soft Skills – I	-	-	2	2
Total			17	3	6	46

Semester- IV

Sr. No.	Course Code	Subject Title	Contact Hours			Credits
			L	T	P	
01	CH 2201	Chemical Engineering Thermodynamics – I	3	1	-	8
02	CH 2202	Heat Transfer Operations	3	1	-	8
03	CH 2203	Solid Fluid Operations	3	-	-	6
04	CH 2204	Inorganic Chemical Technology	3	-	-	6
05	CH 2205	Biological Sciences	3	-	-	6
06	CH 2206	*Numerical Methods and Computer Programming	2	1	2	8
07	CH 2207	Chemical Engineering Operations –II Laboratory	-	-	2	2
08	CH 2208	Inorganic Chemical Technology Laboratory	-	-	2	2
09	CH 2209	Soft Skills – II	-	-	2	2
10	AU 2210	@Industrial Exposure (2 weeks after 4 th semester. This course will be assessed in 5 th semester)	-	-	-	-
Total			17	3	8	48

*Only intra-semester assessment. @Audit course.

Details of Topics covered in different Courses

THIRD SEMESTER

CH 2101 Fluid Flow Operations

UNIT I

Continuity equation for compressible and incompressible fluids. Bernoulli equation, Euler equation. Equation of motion.

UNIT II

Types of flow, steady and unsteady, laminar and turbulent flows, relationship between shear stress and pressure gradient, Hagen Poiseuille equation. Prandtl mixing length theory and eddy diffusivity, losses in pipes and fittings.

UNIT III

Darcy-Weisbach equation for frictional head loss, friction factor, Moody diagram. Velocity profile and boundary layer calculations for turbulent flow. Flow through packed and fluidized beds.

UNIT IV

Pumps and compressors for handling different fluids, valves, pipe fittings and their standards, power requirement for flow. Piping layout and economical pipe diameter.

UNIT V

Flow measuring devices: orificemeter, venturimeter, rotameter, pitot tube, anemometer etc. Flow through constrictions such as notches, weirs, nozzles.

UNIT VI

Mixing and agitation, calculation of power numbers and mixing indices. Liquid-liquid and liquid solid mixing. Vacuum producing devices. Introduction to non Newtonian flow and two phase flow.

Texts / References:

W. L. McCabe and J. C. Smith, P. Harriot, Unit Operations of Chemical Engineering 4th ed. McGraw Hill 1985.

S. K. Gupta, Moment Transfer Operations, Tata McGraw Hill, 1979.

J. M. Coulson and J. F. Richardson, Chemical Engineering Vol. I Pergamon Press, 1970.

A. S. Foust, L. A. Wenzel, C. W. Clump, L. B. Andersen. Principles of Unit Operations, 2nd ed. John Wiley, New York, 1980.

CH 2102 Structural Mechanics**Unit 1: Stress and Strain**

Load and its effect, Types of stresses, Types of strain, Support and free body diagram, Types of structures, Equilibrium considerations, Thermal stresses and strains

Unit 2: Trusses

Stability of trusses on application of load, redundancy, Unstable trusses, Use of different methods for analysis of trusses, Condition for perfect trusses

Unit 3: Shear Force and Bending Moment

S. F. and B. M. diagram, Cantilever, Simply Supported Beams, Concentrated and Uniformly Distributed Loads

Unit 4: Torsion

Concept of torsion, Basic Torsion equation, Slope and Deflection of Beams, Cantilevers etc. Macaulay's Method.

Unit 5: Short and Long Columns, (Struts)

Basic Theory, Crippling loads and conditions thereof, Euler's and Rankine's Approach for the same.

Unit 6: Thick and Thin Cylinders

Radial and Longitudinal Stresses, Behavior of thin Cylinders, Problems on thin cylinders and Spherical shells, Behavior of thick cylinders

Texts and References:

1. Timoshenko & Young, "Strength of Materials."

2. V.N. Vazirani & Ratwani, "Analysis of Structures", Vol. I Khanna Publishers.

3. R.L. Bansal, "Strength of Materials", Luxmi Publishers.

4. Popov, "Strength of Materials", Prentice Hall of India.

5. Ramamrutham, Strength of materials.

CH 2103 Chemical Process Calculations**UNIT I**

Basic Concepts - Units and Dimensions, Steady state and dynamic processes, Lumped and distributed processes, Single and multiphase systems.

Types of Variables - Intensive and extensive variables, Specific properties, State variables.

UNIT II

Types of Equations - Mass and energy conservation, equilibrium relations, Rate laws, Constitutive equations for material behaviour, Correlations for physical and transport properties.

UNIT III

Material Balances for Steady State Processes - Properties of gases, liquids and solids equations of state, phase equilibria for ideal mixtures, Reactions and stoichiometry, Non-

UNIT IV

Reacting single phase systems - Single and multiple units without recycle, Systems with recycle, bypass and purge, Non-Reacting multi-phase systems - Processes involving vaporization and condensation, Reacting systems.

UNIT V

Energy Balances for Steady State Processes - Specific heat capacity, Enthalpy, Heat of reaction, Thermochemistry, Isothermal systems, Adiabatic systems, Simultaneous material and energy balances.

UNIT VI

Unsteady State Material and Energy Balances - Reaction rate laws, Transport laws.

Introduction to Computer Aided Process Calculations - Degrees of Freedom and Specifications, Use of Spreadsheets, Tearing and Iterative techniques in Flowsheeting.

Texts / References:

D.M. Himmelblau, "Basic Principles and Calculations in Chemical Engineering", 6th Edition Prentice Hall of India, 1997.

B. I. Bhat and S. M. Vora, "Stoichiometry" Tata McGraw-Hill, New Delhi

MA 2104 Engineering Mathematics – III**UNIT I**

Power series methods for solution of ordinary differential equation legendre equations and legendre polynomials, Bessel equations Bessel functions of first and second kind; orthogonality, Sturm Liouville problems.

UNIT II

Laplace transforms, Inverse transforms shifting on the S axis, Convolutions, Partial fractions.

UNIT III

Fourier series, half – range expansions, approximation by trigonometric polynomials fourier integrals.

UNIT IV

Partial differential equations:

First and second order linear partial. differential. equations. with variable coefficients, wave equation and heat equation in one and two dimensions, Laplace equation in two and three dimensions (cartesian coordinates only)

Transforms, techniques in o. d. e and p. d. e.)

UNIT V

Infinite sequences and series of numbers, improper integrals

UNIT VI

Cauchy criterion, test of convergence, absolute and conditional convergence series of function, uniform convergence, power series, Badlus of convergence.

Text / Reference:

1. E. Kreyszig. Advanced Engineering Mathematics, Wiley eastern, 5th ed, 1985.
2. P. E. Danko, A. G. PoPov, T, Ya Koznevnikova, Higher Mathematics in problems and exercises part II. Mir publishers, Moscow, 1983.

CY 2105 Chemistry**UNIT I: Electrochemistry**

Specific, equivalent and molecular conductance, their determination, theories of electrolytic conductance, Debye Huckel theory of strong electrolytes, Galvanic cells, Reference electrodes and their potentials. Standard cell standard electrode potential determination of dissociation constants of acids and bases, solubility product, hydrolysis constant hydrogen ion concentration, Complex formation activity of electrolytes etc., theory of acid base indicators, electrolytes etc., theory of acid base indicators, electro-metric titrations.

UNIT II: Radiation Chemistry

Photochemical reactions, Laws of Photo-chemistry.

UNIT III: Macromolecules

Types of sizes of macromolecules, natural and synthetic macromolecules, molecular weights of macromolecules and their determination by osmotic pressure diffusion sedimentation and ultra centrifuge viscosity and light scattering methods.

UNIT IV**Surface Chemistry:**

Interparticle forces, adsorption isotherms, determination of the surface area of fine powders using BET theory, surface films.

Catalyst Science:

Modern theories of catalysis physicochemical investigations of catalysts, kinetics of catalytic reactions, the Langmuir Hinshelwood approach.

UNIT V**Spectroscopy:**

Electronic rotational and vibrational spectra, instrumentations involved in recording these spectra TR and NNMR spectroscopy their applications.

Instrumental Methods of Chemical Analysis:

Principles and working of flame photometer UV-VIS spectrophotometer gas chromatograph, conductivity meter, dissolved oxygen meter, pH meter atomic absorption spectrophotometer polarimeter, potentiometer Karl Fischer titrator.

UNIT VI: Colligative Properties and their Experimental Determination

Boiling Point Elevation, Freezing Point depression, Osmotic Pressure

Text/References:

1. Barrow G. M., Physical Chemistry, 5th ed, McGraw Hill, 1988.
2. Maron S. H. and Prutoon C. F., Principles of Physical Chemistry 4th ed, Oxford and IBH, 1972.
3. Ewing G. M. Instrumental Methods of Chemical Analysis, 5th ed, McGraw Hill, 1985.
4. Glasstone S. A. Text book of Physical Chemistry, 2nd ed. McMillan 1986.
5. Moore W. J. Physical Chemistry, 5th ed., Orient Longman, 1972.

CH 2106 Chemical Engineering Operations –I Laboratory**LIST OF PRACTICALS:**

1. Determination of flow regimes -Reynolds' apparatus
2. Verification of Bernoullis equation
3. Determination of Fanning friction factor for smooth and rough pipes
4. Determination of equivalent length of pipe fittings
5. Determination of viscosity with capillary tube viscometer.
6. Determination of friction factor for flow through packed bed.

CH 2107 Chemistry Laboratory**LIST OF PRACTICALS:**

1. To identify alkali and alkaline earth metals by flame-photometry
2. To estimate Fe (III) ions using salicylic acid by colorimetric method
3. Volumetric analysis
4. To determine normality and strength of given acids conductometrically
5. To determine normality in normal terms and strength in gm/l and dissociation constant of acetic acid using Henderson's equation pH-metrically
6. Estimation of iodine
7. Determination of the Na₂CO₃ content in washing soda
8. Orsat analysis of gases
9. Estimation of percentage sugar by polarimeter
10. Experiments on UV-VIS spectrophotometer
11. Experiment on thin layer chromatography

CH 2108 Soft Skills

This course is mainly intended to improve the different soft skills of the students. The following aspects will be covered in this course.

1. Report writing skills
2. Preparing report as per the given format using computer (MS word)
3. Preparing documents in MS Word & EXCEL formats.
4. Preparing slides for power point presentation
5. Public speaking skills

FOURTH SEMESTER**2201 Chemical Engineering Thermodynamics I****Unit 1**

1. **INTRODUCTION** : The Scope of thermodynamics; Dimensions and units; Measures of Amount or size; Force; Temperature; Pressure; Work; Energy; Heat.
2. **THE FIRST LAW OF THERMODYNAMICS**: Joule's Experiments; Internal Energy; The First Law of Thermodynamics; Energy balance for closed systems; Thermodynamic state and state functions; Equilibrium; The phase rule; The reversible process; Constant V and constant P processes; Enthalpy; Heat capacity; Mass and energy balances for open systems.

UNIT 2

3. **VOLUMETRIC PROPERTIES OF PURE FLUIDS** : PVT Behaviour of pure substances; the Virial Equation; The Ideal Gas; Application of the Virial Equation; Cubic Equations of State; Generalised Correlation's for gases; Generalised correlation's for Liquids

Unit 3

4. **HEAT EFFECTS**: Sensible Heat Effects, Heat Effects Accompanying Phase Changes of Pure Substances, The Standard Heat of Reaction, The Standard Heat of Formation, The Standard Heat of Combustion, Effect of Temperature on the standard Heat of Reaction.

UNIT 4

5. **THE SECOND LAW OF THERMODYNAMICS** : Statement of the Second law : The Heat Engine; Thermodynamic Temperature Scales; Entropy; Entropy changes of an ideal gas; Mathematical statement of the Second Law; Entropy balance for open systems; Calculation of ideal work; Lost work; The Third Law of Thermodynamics; Entropy from the Microscopic view point.

UNIT 5

6. **THERMODYNAMIC PROPERTIES OF FLUIDS**: Property Relations for Homogeneous phase; Residual Properties; Residual properties by equations of state; Two phase systems, Thermodynamic diagrams; Tables of Thermodynamic properties; Generalised property correlations for gases.

7. **APPLICATIONS OF THERMODYNAMICS TO FLOW PROCESSES:** Duct flow of compressible fluids; Turbines (expanders); Compression processes.

UNIT 6

8. **REFRIGERATION AND LIQUEFACTION :** The Carnot Refrigerator; the vapour-compression cycle; The Choice of refrigerant; Absorption Refrigeration; The heat pump; Liquefaction Processes.

TEXT BOOK :

1. Smith J.M, Van Ness H.C and Abbott M.M. - Introduction to Chemical Engineering Thermodynamics - 6th Edition, Mc Graw Hill International (2001).

REFERENCE BOOK :

1. Rao, Y.V.C. - Chemical Engineering Thermodynamics - Universities Press (India) Ltd., 1997.
2. Narayanan, K.V. - Chemical Engineering Thermodynamics - Prentice Hall of India Pvt. Ltd. – 2001
3. Hougen O.A, Watson. K.M and Ragatz R.A - Chemical Process Principles (Part - II) - 2nd edn., Asia Publishing House.

2202 Heat Transfer Operations

UNIT I

Conduction through a single homogeneous solid, thermal conductivity of solids, liquids and gases. Conduction through several bodies in series. Contact resistances.

Unsteady state heat conduction, lumped heat capacity system, transient heat flow in a semi-infinite solid.

UNIT II

Heat transfer by Convection: Forced convection, Laminar heat transfer on a flat plate Laminar and turbulent flow heat transfer inside and outside tubes. Film and overall heat transfer coefficients. Resistance concept, Coefficients for scale deposits, L.M.T.D. in heat exchangers with co and counter current flow. Heat exchanger design, Effectiveness – N T U method in finned tube heat exchangers.

UNIT III

Natural convection: Heat transfer from plates and cylinders in verticals and horizontal configuration, natural convection to spheres.

Heat transfer with phase change, i. e. heat transfer in Boiling and condensation, Single and multiple effect evaporators.

UNIT IV

Heat Transfer by Radiation: Black and gray body radiations, view factor, luminous and non-luminous gases. Combined heat transfer, i.e. conduction, convection and radiation together.

Concept of critical insulation thickness.

UNIT V

Combined natural and forced convection: Fluid flow and heat transfer across cylinders and spheres. Combined natural and forced convection heat transfer in horizontal circular conduits. Heat transfer in extended surfaces such as fins, conduction convection heat transfer, forced convection heat transfer in circular conduits with longitudinal fins.

Heat transfer in non Newtonian fluids.

UNIT VI

Heat exchanger design: Design of single and multi pass shell and tube type exchangers using LMTD and effectiveness – NTU methods.

Spiral coil and plate type heat exchangers.

Single and multi phase condenser. Design of Reboilers vapourisers.

Kettle type and Thermosiphon reboilers, forced circulation vaporizers.

Heat transfer in agitated vessels both, jacketed and with coil, Determination of overall heat transfer coefficient, transient heating or cooling,

Heat transfer in packed and fluidized beds.

Texts / References:

J. M. Coulson and J. F. Richardson, "Chemical Engineering", Vol. 1 ELBS, Pergamon press, 1970

J. M. Coulson and J. F. Richardson, "Chemical Engineering" Vol. 2 ELBS, Pergamon press, 1970

W. L. McCabe J. C. Smith and P. Harriot, "Unit Operations of Chemical Engineering", 4th ed. McGraw Hill 1985.

D. Q. Kern, "Process Heat Transfer", McGraw Hill, 1950.

2203 Solid-Fluid Operations**UNIT I**

Particulate Solids - Particle Characterization, Particulate Solids in Bulk, Blending of Solid Particle, Classification of Solid Particles

Size Reduction of Solids - Mechanism of Size Reduction. Energy for Size Reduction, Methods of Operating Crushers, Nature of Material to be Crushed, Types of Crushing Equipments

UNIT II

Sedimentation - Gravitational Sedimentation, Centrifugal Separation, Flocculation.

UNIT III

Flow through Packed Columns - Flow of a Single Fluid through a Granular Bed, Dispersion, Packed Columns

Fluidization - Characteristics of Fluidized Systems, Liquid-Solid and Gas-Solid Systems, Applications of the Fluidized Solids Technique.

Pneumatic and Hydraulic Conveying - Theory and Industrial Applications.

UNIT IV

Filtration - The Theory of Filtration. Filtration Practices, Filtration Equipments, Filtration in a Centrifuge and Filtration Calculations

UNIT V

Gas Cleaning - Gas Cleaning Equipments such as Gravity Separators, Centrifugal Separators, Electrostatic Precipitators etc.

UNIT VI

Flow of particulate matter - Flow of solids through silos and hoppers. Storage and transport of powders.

Size Enlargement - Principles of agglomeration palletizing (cone and disk), press and tabulating machines and extrusion and granulating machines.

Texts / References:

J. M. Coulson and J. F. Richardson, Chemical Engineering, Vol. 2, 4th ed. Pergamon Press

W. L. McCabe, J. C. Smith and P. Harriot, Unit Operations of Chemical Engineering, 4th ed. McGraw Hill, 1985

S. K. Gupta, Momentum Transfer Operations, Tata McGraw Hill, 1979.

A. S. Foust, L. A. Wenzel, C. W. Clump, L. B. Andersen, "Principles of Unit Operations", 2nd ed. Wiley, New York, 1980.

CH 2204 Inorganic Chemical Technology

Unit1

Water: Source: Impurities, Polluted, contaminated palatable waters, water pollutants and their effects. Treatment - Sedimentation, coagulation, filtration softening, aeration, ion exchange reverse osmosis.

Gaseous fuels: Classification, manufacture and use of LPG, wood gas, coal gas, producer gas, water gas, synthesis gas, carburetor water gas. Industrial Gases: Manufacture and uses of hydrogen, carbon dioxide, acetylene, oxygen, nitrogen, inert gases.

Unit 2

Phosphorous Industries: Phosphate rock; super phosphate; wet process phosphoric acid; electric furnace phosphorous and phosphoric acid; phosphates; baking powders; fire retardant chemicals.

Nitrogen Industries: Synthetic ammonia; ammonium nitrate; ammonium sulphate; ammonium phosphates; urea; nitric acid; sodium nitrate; potassium nitrate; Cyanamid

Unit 3

Fertilizers: Status of industry, grading and classification of fertilizers, raw materials, hydrogen production, fixation of nitrogen, synthesis, ammonia based fertilizers, manufacture of phosphatic fertilizers and phosphoric acid, potash fertilizers, N-P-K values. Corrosion problems and materials of construction.

Unit 4

Soda Ash: Manufacturing special materials of construction, solvay and modified solvay process environmental considerations, corrosion problems and material of construction.

Phosphorous Industries: Phosphate rock; super phosphate; wet process phosphoric acid; electric furnace phosphorous and phosphoric acid; phosphates; baking powders; fire retardant chemicals.

Unit 5

Chlor Alkali Industry: Electrochemistry of brine electrolysis, current efficiency, energy efficiency, diaphragm cells, mercury cells, mercury pollution and control, caustic soda, chlorine, hydrochloric acid; corrosion problems and materials of construction.

Potassium Industries: Potassium; potassium chloride; potassium sulphate; potassium bisulphate; potassium hydroxide; potassium carbonate; potassium bromide; potassium iodide; potassium nitrate; potassium acid tartrate; potassium permanganate; potassium dichromate

Unit 6

Soap and Detergents: Detergents; soap; glycerin.

Sulfur and Sulfuric Acid: Mining and manufacture of sulfur; sulfuric acid; sulfur trioxide; recovery of used sulfuric acid; sulfur pollution; concentration

Cement and Glass.

Books Recommended:

1. Shrye R.N. and Brink J.A., Chemical Process Industries, McGraw Hill
2. Chemical Technology, I,II,III and IV Indian Institute of Technology, Madras
3. Dryden, Charles E., Outlines of Chemical Technology, affiliated East-West Press Pvt. Ltd. New Delhi.

CH 2205 Biological Sciences**Unit 1**

Introduction to biological science, biological system as a complex chemical factory, role of chemical engineers in biotechnology, structure and function microbial, plant and animal cells and cellular organelles, structure and function of chemicals of life like lipids, carbohydrates, DNA, RNA and proteins.

Unit 2

Metabolism, central metabolic pathways, regulation of metabolic pathways, nucleic acid metabolism and protein synthesis, principles of bioenergetics, stoichiometry of biochemical reactions.

Unit 3

Microbial growth kinetics, introduction to unstructured and structured models, models of mixed cultures

Unit 4

Structure and function of enzymes, enzyme kinetics, immobilized enzymes, manufacture of enzymes

Unit 5

Biochemical process development and bioreactors using biocatalysts, bioreactor design, fermentation technology and downstream processing

Unit 6

Introduction of genetic engineering, recombinant DNA technology, application of biotechnology such as bioremediation, biosensors, enzyme therapy, artificial organs, biofuels, biofertilizers.

Books

- 1) Bailey and Ollis, "Biochemical Engineering fundamentals", McGraw Hill publications
- 2) Shuler and Kargi, "Bioprocess engineering: Basic concepts".

CH2206 Numerical Methods and Computer Programming

Periodic tests: 2 (40 marks) Practical tests: 2 (20 marks) Term Work: 20 marks
Lab. Report: 10 marks Viva-voce: 10 marks

UNIT I

Solutions of Linear Algebraic Equations - Gauss elimination and LU decomposition, Gauss-Jordan Elimination, Gauss-Seidel and relaxation methods.

UNIT II

Eigen values and Eigen Vectors of Matrices - Faddeev-Leverrier method, Power method, Householder's and Given's method

UNIT III

Nonlinear Algebraic Equations - Fixed point method, Multivariable successive substitutions, Single variable Newton-Raphson Technique, Multivariable Newton-Raphson Technique

UNIT IV

Function Evaluation - Least-squares curve fit, Newton's Interpolation formulae, Newton's divided difference interpolation polynomial, Lagrangian interpolation, Pade approximations, Cubic spline approximations

UNIT V

Ordinary Differential Equations (Initial value problems) - Runge Kutta Methods, Semi-implicit Runge Kutta Techniques, Step size control and estimates of error

UNIT VI

Ordinary Differential Equations (Boundary value problems) - Finite difference technique, Orthogonal collocation technique, Orthogonal collocation on finite elements

Partial Differential Equations – Introduction to finite difference technique

Texts / References:

S.K. Gupta, "Numerical Methods for Engineers", Wiley Eastern, 1995.

M.E. Davis, "Numerical Methods & Modeling for Chemical Engineers", Wiley, 1984.

LIST OF PRACTICALS:

To write and execute the following programs

1. Simple gauss elimination method
2. Partial pivoting
3. LU decomposition method
4. Newton Raphson method.
5. Bisection method
6. Successive substitution method

7. Least square method
8. Runge-Kutta method
9. Function approximation method

CH 2207 Chemical Engineering Operations –II Laboratory

List of Practicals

1. Study of venturimeter
2. Study of orifice meter
3. Study of characteristics of centrifugal pump
4. Study of Rota meter
5. Determination of screen effectiveness
6. Dry screen analysis
7. Wet screen analysis
8. Study of sedimentation
9. Study of air elutriation
10. Study of cyclone separator
11. Study of froth flotation
12. To determine thermal conductivity of given metal rod

CH 2208 Inorganic Chemical Technology Laboratory

List of Practicals

1. Proximate analysis of coal
2. Preparation of Na_2CO_3 and percentage purity of Na_2CO_3
3. Determination of Cu in CuSO_4 solution by electrolytic analyzer.
4. Determination of acid value of an oil
5. Determination of saponification value of an oil
6. Determination of iodine value of oil
7. Preparation of soap and analysis of soap

CH 2209 Soft Skills – II

Reading: Reading Comprehension, Note Making, Reading Journal Articles, Reading and Interpreting Graphic communication.

Writing: Paragraphs, Letters, Writing Research Articles, Report Writing, Process Writing.

Speaking: Classroom Talk, Social Conversation, Group Discussions, Facing Interviews, Making seminar Presentations, Speaking on Telephone.

Listening: Listening Comprehension, Note Taking, Listening for academic and career needs.

Soft Skills: Etiquettes, Grooming, Professional code of conduct.

AU 2210 Industrial Exposure

This is an Audit course. Students who would like to spend their part of the vacation in industry will have to request the Training Co-ordinator of the Department for providing request letters to the industries. With the request letters, the students will approach the industry of their interest for getting necessary permission to have Industrial Exposure for a period of four weeks. On completion of exposure the concerned student will prepare a report and submit the same to the Training Co-ordinator of the department. The student earns Audit for this Exposure course and the same will be indicated in his/her 5th semester grade report.