B.E. 301 - ENGINEERING MATHEMATICS II

Unit I

Fourier Series: Introduction of Fourier series , Fourier series for Discontinuous functions, Fourier series for even and odd function, Half range series   Fourier Transform: Definition and properties of Fourier transform, Sine and Cosine transform.

Unit II

Laplace Transform: Introduction of Laplace Transform, Laplace Transform of elementary functions, properties of Laplace Transform, Change of scale property, second shifting property, Laplace transform of the derivative, Inverse Laplace transform & its properties, Convolution theorem, Applications of L.T. to solve the ordinary differential equations

Unit III

Second Order linear differential equation with variable coefficients : Methods one integral is known, removal of first derivative, changing of independent variable and variation of parameter, Solution by Series Method

Unit IV

Linear and Non Linear partial differential equation of first order: Formulation of partial differential equations, solution of equation by direct integration, Lagrange's Linear equation, charpit's method. Linear partial differential equation of second and higher order: Linear homogeneous and Non homogeneous partial diff. equation of nth order with constant coefficients. Separation of variable method for the solution of wave and heat equations

Unit V

 Vector Calculus: Differentiation of vectors, scalar and vector point function, geometrical meaning of Gradient, unit normal vector and directional derivative, physical interpretation of divergence and Curl. Line integral, surface integral and volume integral, Green's, Stoke's and Gauss divergence theorem

References

   (i)   Advanced Engineering Mathematics by Erwin Kreyszig, Wiley India
   (ii)   Higher Engineering Mathematics by BS Grewal, Khanna Publication
   (iii)   Advance Engineering Mathematics by D.G.Guffy
   (iv)   Mathematics for Engineers by S.Arumungam, SCITECH Publuication
   (v)   Engineering Mathematics by S S Sastri. P.H.I.

CM 302 Chemical Engg Thermodynamics

UNIT-1 Basic concepts of work & heat system, properties and state of systems; first law of thermodynamics; application, batch flow processes; steady & unsteady state flow.

UNIT-2 Critical properties corresponding state compressibility, PVT behavior of pure fluids virial equation, cubic equation, generalized correlation & eccentric factor, behaviour of liquid, second law of T.D, & its application.

UNIT-3 Carnot cycle, carnot theorem, thermodynamics temp scales, concept of entropy, calculation of entropy for varions systems, entropy for real system .

UNIT-4 Effect of pressure on specific heat, Joule Thompson effect, third law of thermodynamics & its applications.

UNIT-5 Compression & expansion of fluids; single stage, multiple stage requirements & efficiency along with effect & engineering along with effects clearance, compression of real gas.

References:
1. Smith J.M and Van Ness- Introuction to Chemical Engg Thermodynamics – 6th edition
2. Daubert; chemical engg thermodynamic; TMH
3. Rathakrishnan E; Fundamentals of Engg Thermodynamics; PHI
4. Dodge B.F. Chemcail Engineering –Thermodynamics –McGraw Hill
5. Balzhiser Samules and Eliassen-Chemical Engg- Thermodynaics Prentic Hall
6. Sandler S.I Chemical Engg-Thermodynamics-John Wiley and son
7. Rastogi and Mishra-Chemical Engg Thermodynaics

CM 303 Chemical Instrumentation

UNIT-1 Introduction to chemical process instrumentation, process variables, static and dynamic characteristics of instruments & their general classification

UNIT-2 Elements of measuring systems & their functions, principles, construction and operation of instruments for measurement

UNIT-3 Control/ indication/ recording of process variables like pressure, flow, level, humidity and composition.

UNIT-4 Principles of transducers electro pneumatic, pneumatic, electrical & multi-pressure.

UNIT-5 Process instrumentation diagram and symbols, process instrumentation for process equipments such as distillation column, Heat exchanger, fluid storage vessel

References:
1. Albert D. Cooper- Modern Electronic Instrumentation, PHI
2. Eckman-Industrial Instrumentation
3. H.S. Kalsi- Electronic Instrumentation
4. Curties Johnson- Process Control Instrumentation Technique, IV Edn, PHI
5. Harriot; Process control; TMH
6. Patranabis; Principles of process control; TMH
7. Jaggi, Mathur; Engineering Mathematics; Khanna Publisher.
8. B.G. Liptak- Instrument Engineering 'Handbook, Volume 1 : Process Measurement
9. Austin E. Fribance- Industrial Instrumentation Fundamentals, new York: Mcgraw-Hill 1962
10. Ernest Doebelin- Measurement Systems: Application and Design, McGraw-Hill

List of Experiments (Pl. expand it):
1. Time constant of pH-meter
2. Study of Bourden tube pressure gauge
3. Bellow tube pressure gauge
4. Calibration of different instruments used in chemical processes
5. Study of electro-pneumatic transducers for pressure, flow, level
6. Measurement of water level using differential pressure meter
7. Measurement of flow using electromagnetic flow meter
8. Measurement of flow using differential pressure cell across orifice/ venturimeter

CM 304 Material & Energy Balance

Unit 1 Mathematical and Engineering calculation- Units, different unit systems, conversion of unit from one system to other dimensions dimensional analysis dimensional group fundamental of conservation of mass conservation of energy Basic of calculation.

Unit 2 Ideal Gases & Vapor pressure-Introduction of ideal gas, behavior of ideal gases, real gas, Vander Wal n , compressibility factor method to solve cubic equation vapour pressure Raoult's law Humidity relative humidity humid heat humid volume dew point humidity chart and its use.

Unit 3 Material balance-Introduction of component balance solving material balance, with and without simultaneous equ at steady state material balance, with and without simultaneous at unsteady stat recycle by pass and purge calculations.

Unit 4 Energy balance- Heat capacity calculation of enthalpy changes energy balances with chemical reaction Heat of vaporization heat of mixing heat of combustion.

Unit 5 Stochiometry & unit operations-Introduction of unit operation, Distillation Crystallization Drying, Evaporation, Psychometry and its application

References:
1. O.A. Hougen, K.M. Watson, R.A. Ragatz; Chemical Process Principles Part I –CBS pub.
2. David M. Himmelblau- Basic Principles and calculations in chemical Engineering – PHI
3. B.I Bhatt, S.M. Vora; Stoichiometry; TMH.

List of Experiments (Pl. expand it)
1. Determination of boiling point relation wrt concentration of caustic soda and verify Dehring' rule.
2. Application of dry and wet bulb thermometer to find out atmospheric humidity
3. Use of humidity chart to find enthalpy dew point humid heat and saturation.
4. Solubility at room temperature and boiling point of urea in water and verify the material balance.
5. Crystallization of copper sulfate in saturated solution by cooling and finding out the crystal yield.
6. To find out the heating value of coal using a calorimeter
7. Combustion of coal & performing the material balance
8. Proximate analysis of coal sample
9. Measurement of flame temp and compare actual & theoretical temp (Business- Burner, Sprit-Lamp, Kerosene Lamp.
10. To find the heat of reaction using calcium oxide and water.

CM 305 Advanced Engineering Chemistry

Unit I Electronic Effect: Chemical properties of molecules, hyper conjugation and steric effects, studies on formation and stability of carbonation and Carbonium ions (with Inductive effects, conjugation & resonance and their effects on physical & simple examples of SN and SN_2 reactions)

Unit II Properties of simple monomers: Production, properties & industrial applications of following monomers- Ethylene Styrene, Vinyl Chloride, Vinyl alcohol, Acrylic acid, Methyl Acrylate, Ethyl Acrylate & Methyl Methacrylate.

Unit III Oils and Fats: Vegetable oils by solvent extraction, processing of animal fats, hydrogenation and esterification of oils; Soaps and Detergents Bathing & laundry soaps, cationic and anionic detergents; Specially cleaning, polishing and sanitation proportions, surface active agents, sulphonate oils.

Unit IV Chemical Kinetics: Rate constant, order and molecularity of a reaction, zero, 1_{st}, 2_{nd} and 3_{rd} order reactions; Kinetics of opposing reactions, methods of determination of order of reactions; Reaction rate theories, Arrhenius, parameters, Catalysis (including enzyme catalysis), effect of catalysis on reaction rate.

Unit V Electrochemistry: Galvanic cell, EMF and its determination, free energy concept, Nernst equation of electrode potential, standard electrode potential; PH value, its measurement and pH metric titration, Conductance, its measurement in polar and non polar solvents; Debye & Huckel theory and its modifications in case of strong electrotypes, conducto-metric titration.

Unit VI Phase Rule: Phases, Degrees of freedom, component definition and derivation of phase rule, phase diagram study of Pb-Ag & Zn-Mg systems.

References:
1. B.S.Bahl & G. D. Tuli- Essentials of physical Chemistry. S. Chand & Publishers.
2. Glasstone – Textbook on Physical Chemistry – Prentice Hall, India, New Delhi.
3. Dryden CE- Outlines of Chemical Technology- Prentice Hall, India, New Delhi
4. Levine; Physical Cheistry; TMH.
5. Sivasamkar; Engg Chemistry; TMH
6. Jain & Jain- Engineering Chemisry – Dhanpat Rai Publishing Company, Delhi.
7. Austin G.T, Shreeves; Chemical Process Industry – McGraw Hill – Kogmina

List of Experiments
1. To determine the viscosity of a viscous liquid by falling sphere method
2. Determination of saponification value of oil sample
3. Application of pH meter to find acidity and alkalinity of a solution.
4. To study the hydrolysis of cane sugar solution in the presence of an acid by Fehling's solution method and to find out the reaction constant.
5. To study the adsorption of benzoic acid on animal charcoal and room temperature and to determine the Freundlich constants k,n.
6. Determination of the strength of unknown hydrochloric acid (app. 0.1N) by titrating it against caustic soda by conducto-metric method.
7. To determine the % composition of a given binary liquid solution by polarimeter.
8. To determine the solubility of a sparingly soluble salt in water by conductance measurement.
9. Determination of pH of mixture of CH_3COOH and CH_3COONa and the dissociation constant of the acid.
10. Preparation of laundry soap and to determine its yield.

CM 306 Java Technology

UNIT-I
Basic Java Features - C++ Vs JAVA, JAVA virtual machine, Constant & Variables, Data Types, Class, Methods, Objects, Strings and Arrays, Type Casting, Operators, Precedence relations, Control Statements, Exception Handling, File and Streams, Visibility, Constructors, Operator and Methods Overloading, Static Members, Inheritance: Polymorphism, Abstract methods and Classes

UNIT–II
Java Collective Frame Work - Data Structures: Introduction, Type-Wrapper Classes for Primitive Types, Dynamic Memory Allocation, Linked List, Stack, Queues, Trees, Generics: Introduction, Overloading Generic Methods, Generic Classes, Collections: Interface Collection and Class Collections, Lists, Array List and Iterator, Linked List, Vector. Collections Algorithms: Algorithm sorts, Algorithm shuffle, Algorithms reverse, fill, copy, max and min Algorithm binary Search, Algorithms add All, Stack Class of Package java. Util, Class Priority Queue and Interface Queue, Maps, Properties Class, Un-modifiable Collections.

UNIT–III
Advance Java Features - Multithreading: Thread States, Priorities and Thread Scheduling, Life Cycle of a Thread, Thread Synchronization, Creating and Executing Threads, Multithreading with GUI, Monitors and Monitor Locks. Networking: Manipulating URLs, Reading a file on a Web Server, Socket programming, Security and the Network, RMI, Networking, Accessing Databases with JDBC: Relational Database, SQL, MySQL, Oracle

UNIT–IV
Advance Java Technologies - Servlets: Overview and Architecture, Setting Up the Apache Tomcat Server, Handling HTTP get Requests, Deploying a web Application, Multitier Applications, Using JDBC from a Servlet, Java Server Pages (JSP): Overview, First JSP Example, Implicit Objects, Scripting, Standard Actions, Directives, Multimedia: Applets and Application: Loading, Displaying and Scaling Images, Animating a Series of Images, Loading and playing Audio clips

UNIT–V
Advance Web/Internet Programming (Overview): J2ME, J2EE, EJB, XML.

References:
1. Deitel & Deitel, ”JAVA, How to Program”; PHI, Pearson.
2. E. Balaguruswamy, "Programming In Java"; TMH Publications
3. The Complete Reference: Herbert Schildt, TMH
4. Peter Norton, "Peter Norton Guide To Java Programming", Techmedia.
5. Merlin Hughes, et al; Java Network Programming , Manning Publications/Prentice Hall
6. Cay Horstmann, Big JAVA, Wiely India.

List of Program to be perform (Expandable)
1. Installation of J2SDK
2. Write a program to show Scope of Variables
3. Write a program to show Concept of CLASS in JAVA
4. Write a program to show Type Casting in JAVA
5. Write a program to show How Exception Handling is in JAVA
6. Write a Program to show Inheritance
7. Write a program to show Polymorphism
8. Write a program to show Access Specifiers (Public, Private, Protected) in JAVA
9. Write a program to show use and Advantages of CONTRUCTOR

10. Write a program to show Interfacing between two classes
11. Write a program to Add a Class to a Package
12. Write a program to show Life Cycle of a Thread
13. Write a program to demonstrate AWT.
14. Write a program to Hide a Class
15. Write a Program to show Data Base Connectivity Using JAVA
16. Write a Program to show "HELLO JAVA " in Explorer using Applet
17. Write a Program to show Connectivity using JDBC
18. Write a program to demonstrate multithreading using Java.
19. Write a program to demonstrate applet life cycle.
20. Write a program to demonstrate concept of servlet.

CM-307 Self Study (Internal Assessment)

Objective of Self Study: is to induce the student to explore and read technical aspects of his area of interest / hobby or new topics suggested by faculty.

Evaluation will be done by assigned faculty based on report/seminar presentation and viva.

CM-308 Seminar / Group Discussion(Internal Assessment)

Objective of GD and seminar is to improve the MASS COMMUNICATION and CONVINCING/ understanding skills of students and it is to give student an opportunity to exercise their rights to express themselves.

Evaluation will be done by assigned faculty based on group discussion and power point presentation.