

Subject: Mathematics-I

Branch Code: 102

(ECE/CSE/EE/ME/CE/IT)

P: 3-1-0

Term

1. **Algebra of matrices:** Elementary transformation, inverse by row transformation, canonical reduction, rank, solution of simultaneous equations, characteristic equation, eigen values & eigen vectors, Caley's Hamilton theorem, similarity transformation, reduction to diagonal matrices. **Lecture: 12**
2. **Differential Calculus:** Higher order derivatives (successive differentiation) and Leibnitz theorem, tangent and normal, review of maxima and minima, concavity and convexity of a curve point of inflexion, curvature and radius of curvature (Cartesian and polar), pedal equation, asymptotes (for Cartesian curve only), Taylor's series and Maclaurin's series, partial derivatives, Euler's theorem on homogeneous functions, Taylor's expansion of several variables, maxima and minima of several variables, Lagrange's method for undetermined multipliers, **Lecture: 20**

Second Term

3. **Differential equation:** First order equation, separable, homogeneous, exact, linear and Bernoulli's form, second and higher order equation with constant coefficients, Euler's equation: methods of their solution, dependent and independent of solution, Wronskian's system of first order equation. **Lecture: 15**
4. **Integral Calculus-I:** Convergence of improper integral- comparison test, Abel's test, beta and gamma functions (definition and related problems), error function, differentiation under integral sign- Leibnitz rule. **Lecture: 15**

Text books:

1. Advanced engineering mathematics by E Kreyszig, 8th edition, John Wiley.
2. Advanced engineering mathematics by Willey & Barratt, TMH.
3. Linear algebra by K Hoffman and R Kunze, PHI.

Reference books:

1. Higher engineering mathematics by B S Grewal, Khanna pub.
2. Differential calculus by Das & Mukherjee, U N Dhar & sons.
3. Integral calculus by Das & Mukherjee.
4. U N Dhar & sons.

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Subject: Mathematics-II

Branch Code: 103

(ECE/CSE/EE/ME/CE/IT)

P: 3-1-0

Term

1. **Infinite series:** Notion of convergence and divergence of infinite series- Ratio test, comparison test, Rabbe's test, Root test, alternating series- Leibnitz test absolute and conditional convergence. Uniform convergence. **Lecture: 15**
2. **Fourier analysis:** Periodic function: functions of arbitrary period, even and odd functions, half range expansions, harmonic analysis, complex fourier series. Laplace transform: definition and properties, multiplication by t^n , division by t , evaluation of integrals by L T, Inverse transforms. **Lecture: 20**

Second Term

3. **Integral Calculus-II:** Double & triple integrals, rectification, computation of surfaces and volumes, change of variables in double integrals, Jacobians of transformations, integrals dependent on parameters- applications. **Lecture: 15**
4. **Vector Calculus:** Scalar and vector point function, differentiation of vector, velocity and acceleration, direct derivatives, concept of gradient, divergence curl, line integral, Greens theorem in plane, Gauss's & Stoke's theorem and simple applications. **Lecture: 15**

Text books:

1. Higher engineering mathematics by Wiley & Barratt, TMH.
2. Advance engineering mathematics by E Kreyszig 8th edition, John Wiley

Reference books:

1. Advance engineering mathematics by Wiley & Barratt, TMH.
2. Vector analysis 2nd edition by Chatterjee, PHI.
3. Advance engineering mathematics by R K Jain & S R K Iyengar, Narosa.

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Subject: Engineering Chemistry Branch Code: 104 (ECF/CSE/EE/ME/CE/IT)

L-1-P: 2-1-3

First Term

- Water treatment** : Introduction , Characteristics impurities in water , Hardness of water , Unit of hardness, Estimation of hardness of water , Disadvantage of hard water , scale and sludge formation in boiler , Caustic embrittlement , boiler corrosion , priming and foaming , Softening method(soda lime process) , Numerical problem. Lec :6
- Colligative Properties** : Osmosis : osmotic pressure , Determination of Osmotic pressure , isotonic soln . Hypertonic solution , Hypotonic solution , Lowering of Vapour pressure , Determination of molecular weight , Elevation in B.P . Depression in F.P. And their uses in the determination of molecular weight , Abnormal behavior. Lec :6
- Electro Potential And Cells** :Single electrode potential - Definition , sign convention , construction of Galvanic cell - Classification - Primary , Secondary and Concentration cell . E.M.F. of a cell , definition of Galvanic cell notation and convention of Galvanic cell. Measurement of single electrode potential and standard electrode potential by Nernst equation , Numerical problems. Lec : 6
- Thermodynamics** : Introduction of 1st , 2nd and 3rd law of thermodynamics, Isothermal and adiabatic process , Carnot's cycle , Definition and application of entropy and Gibbs Free Energy Lec :9

Second Term

- Fuels** : Definition , Classification.
Analysis of coal : Proximate and Ultimate analysis of coal.
Synthesis of Petrol :Bergius process and Fischer Tropseh process.
Calorific Value : Definition, Gross and net calorific value , Determination of calorific value of solid/liquid fuel using Bomb Calorimeter.
Combustion calculation : Analysis of flue gas by Orsat's apparatus.
Numerical problems . Lec : 6
- High Polymers** : Definition , Classification , - Natural and synthetic polymers with example.
Polymerization : Definition, Types of polymerization , addition and condensation with example. Mechanism of polymerization- free radical mechanism (ethylene as an example)
Glass transition temperature , compounding of resins synthesis - property and application of Teflon , PMMPA and phenol Formaldehyde Resin. Lec :7
- Corrosion Science** : corrosion- definition , chemical corrosion and electro chemical theory of corrosion . Types of corrosion - Differential aeration corrosion , pitting corrosion , water line corrosion , stress corrosion . Factors affecting the rate of corrosion

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Protection measures against corrosion by (i) Modification of environment (ii) Protective coatings. Lee : 7

Engineering Chemistry LAB

1. TO determine relative viscosity of liquid by OSTWALD VISCOMETER.
2. TO determine The ALKALINITY of WATER.
3. TO determine The EQUIVALENT WEIGHT and BASICITY of POLYBASIC ACID.
4. Determination of SODIUM CARBONATE and SODIUM HYDROXIDE in a mixture by INDICATOR METHOD.
5. Determination of relative surface tension of liquids by STALAGMOMETER.
6. Estimation of percentage of chlorine in Bleaching powder.
7. Determination of HARDNESS of WATER by Na_2EDTA .
8. Analysis of FLUE GAS by ORSAT APPARATUS.
9. To determine electrode potential of Ag/Ag^+ or Cu/Cu^+ or Zn/Zn^{2+} .
10. Test of Organic Functional groups.
11. Determination of Chemical Oxygen Demand (COD) of value of Sewage Volumetrically.

Text Book :

1. Chemistry in Engineering and technology ; VOL-I and II , by J.C .Kuriacose and J. Rajram; Pub: TMH
2. Engineering Chemistry ; by Jain and Jain : Pub: Dhanpat Rai Publication
3. A Text book of Engineering chemistry by Shashi Chawla; Pub: Dhanpat Rai & Co.
4. Engineering Chemistry by B.K. Sharma; Pub: Krishna Prakashan Mediat(P) Ltd.
5. Essential of Experimental engineering chemistry by Shashi Chawla , Pub: Dhanpat Rai and co.
6. Lab manual of Engineering Chemistry by Dr. Sudha Rani and Dr.S.K.Basin Pub: Dhanpat Rai Publication.

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Subject: Engineering Physics

Branch Code: 105

(ECE/CSE/EE/ME/CE/IT)

-P: 2-1-3

1st Term

1. **Electrostatics and Electromagnetic theory:** Dielectrics- The three electric vectors(D,E,P), Gauss's law in dielectrics, energy stored in electrostatic field, boundary conditions and refraction of electric lines of force, displacement current, Maxwell's equations in differential and integral form and their physical significance, Maxwell's equations in free space and speed of plane electromagnetic waves travelling in vacuum. Poynting theorem and Poynting vectors, electromagnetic waves propagation in dielectrics and conductors. **Lecture: 10**
2. **Optics & LASER:** Michelson's interferometer for measurement of wave length of source and line width, Temporal coherence, spatial coherence, measurement of spatial coherence using young's interference, Fraunhofer diffraction by single slit, double slit and grating. Laser and laser light, Einstein A and B coefficient, population inversion, light amplification by optical resonator, Characteristics of Laser, Ruby laser, working principle of He-Ne laser **Lecture: 6**
3. **Polarisation:** Unpolarised light, production of plane polarized light by Polaroid technique, (principle of action should be emphasized) Brewster's law, Malu's law, Double refraction, production of plane, circular and elliptical polarized light, polarimeter, Magneto-optic effect, electro optic effect and photo elastic effect. **Lecture: 8**

2nd Term

4. **Quantum physics:** Plank's theory of black body radiation, Compton effect, photo electric effect, Einstein photo electric equation and its experimental verification. Wave particle duality, de-Broglie relation, wave and group velocity, Davision and Germer experiment, Heisenberg's uncertainty principle, application of uncertainty principle. Wave functions, physical interpretation of wave function and normalization condition, expectation values, Schrodinger's wave equation (time dependent and time independent) application of Schrodinger equation in one dimension, particle in a box, finite potential well, finite potential barrier and tunneling. **Lecture: 13**
5. **Special theory of relativity:** Michelson-Morley experiment, postulates of special theory of relativity, Galilean transformation, Lorentz transformation and its applications. (length contraction, time dilation and relativistic addition of velocities) variation of mass with velocity. **Lecture: 7**
6. **Nano physics:** Introduction and basic definition of nano technology, properties of nano particles, elementary ideas of synthesis of nano particles, application of nano technology. **Lecture: 4**

Text books:

1. Concept of modern physics by Arthur Beiser, PHI.
2. Elements of electromagnetic by Mathew N O Sadiku, Oxford.
3. Introduction to electrodynamics by David J Griffiths, Pearson.
4. Optics by Ajoy Ghatak TMH.
5. Fundamentals of physics extended volume by Resnick, Halliday and Walker, Jonh Wiley pub.

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Reference books:

1. Modern Physics by G Aruldas & P Rajagopal, PHI.
2. Quantum physics by H C Verma, Surya pub.
3. Laser and Non linear optics by B B Laud, New age pub.
4. Principles of electricity by Leigh Page and Norman Isley Adams, Eurasia pub.

Engineering Physics Lab:

1. To determine acceleration due to gravity by a bar / Kater's pendulum.
2. To determine input and output characteristics of a PNP junction transistor in CE mode of operation.
3. To determine Planck's constant.
4. To determine capacitance and permittivity.
5. To determine the numerical aperture of an optical fiber.
6. To determine the wave length of laser source using grating.
7. To obtain the particle size by laser.
8. To obtain the forbidden energy gap of semiconductor diode.
9. To obtain loss of energy from transformer and ferrites.
10. To obtain dielectric constant.
11. To obtain Curie temperature.
12. To obtain focal length by convex mirror using u-v method.

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ENGINEERING MECHANICS (CSE/EE/ME/CE/ECE/IT)

L-T-P-2-1-3

BRANCH CODE-106

FIRST TERM : STATICS

1. Force system : moments of a force about a point and an axis equivalent force and moment wrench. Lecture : 8
2. Equilibrium : Free body diagram equations of equilibrium problems in two and three dimension plane frames and trusses. Lecture : 8
3. Friction : laws of coulomb friction , impending motion problems involving large and small contact surfaces Lecture : 8
Square threaded screw principle of virtual work and stability.

SECOND TERM : DYNAMICS

4. Kinematics and kinetics of particles dynamics in rectangular coordinates cylindrical coordinates and in terms of path variables. Lecture : 8
5. Properties of areas : center of mass; moments of inertia; Kinematics of rigid bodies ; kinetics of rigid bodies, concept of fixed vector ; velocity and acceleration of particles in different frames of references. Lecture : 8
6. Work & Energy and impulse and momentum : methods for particles and rigid bodies : conservation (vector approach to mechanics will be followed for all the topics) Lecture : 8

Text book :

1. Engineering mechanics by shames , Pearson's education
2. Mechanics for engineers. Beer , F. P and Johnston. Tata McGraw hill. New Delhi

Reference Books :

1. Engineering mechanics. Timoshenko. McGraw hill Inc.

Practical :

Minimum of 8 Journals (Including experiments and assignment) Based on theory.

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BASIC ELECTRICAL ENGINEERING (CSE/EE/EE/ECE/ME/CE/IT)

L-T-P:2-1-3

Subject code -107

First term

1. Introduction :Electrical elements and their Classification , KCL,KVL equation and node voltage method ,DC circuits steady state analysis with independent and dependent sources . series and parallel circuits ,star delta conversion ,superposition theorem, Thevenin's theorem ,Norton ,dc circuits steady states analysis with independent and dependent sources , series and parallel circuits ,star delta conversion ,superposition theorem , theorem , Thevenin's theorem Norton's theorem ,maximum power transfer theorem . lecture:12
2. A.C circuits : common signals and their waveform ,R.M.S AND average value ,form factor and peak factor of sinusoidal wave ,impedance of series and parallel circuits, Phasor diagram , power, power factor power transfer theorem for A.C circuits. lecture:12

SECOND TERM

3. A .C circuits : Line and phase rotation in star -delta connection, phase sequence, analysis of balance and unbalanced 3-phase circuits lecture:08
4. Magnetic circuits: Introduction , series & parallel magnetic circuits. Analysis of linear and non linear magnetic circuits. Energy storage A.C excitation. Eddy current and hysteresis losses. lecture:08
5. Transformer: Construction, principle of operation e.m.f equation, voltage regulation, auto - transformer, three phase transformer lecture:08

Text book:

- 1 Basic electrical engineering by Fitzgerald, et al, Tata McGraw hill.

Reference books: Tata Fitzgerald

- 1 Fundamental of Electrical Engg. By Leonard S. Bobrow, Ooxford.
- 2 Fundamentals of Electrical Engg. By R. Prasad, PHI Publication.

Practical :

Minimum of 5 to 8 Journals (Including experiments and assignment) Based on theory.

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FUNDAMENTAL OF INFORMATION TECHNOLOGY

BRANCH CODE-110

L.T-P:0-0-3

FIRST TERM

1. **COMPUTER BASICS** - Evolution of computers, generation of computers and classification of computers, application of computers and etc.
2. **INFORMATION TECHNOLOGY AND STORAGE**
Information technology, role of information technology, information technology and internet and etc
3. **COMPUTER MEMORY AND STORAGE**
Memory hierarchy, RAM, ROM, types of secondary storage and devices and etc.
4. **THE INTERNET AND ITS TOOLS:**
Introduction, evolution of internet, basic internet terms, getting connected to internet, internet applications data over internet, web browser, browsing internet using internet explorer, e-mail, search engines, instant messaging
5. **EMERGING TRENDS IN IT**
E-commerce electronic data interchange, smart cards, mobile communication and etc

SECOND TERM

6. **COMPUTER PROGRAMMING AND LANGUAGES**
Algorithms, flow charts, pseudo code, program control, structure programming languages, generation of programming languages and etc
7. **C LANGUAGES:**
Basics, constants, variables and data types, operators and expressions, input & output operations
8. **CONTROL STRUCTURES:**
Decision making & branching, decision making & looping
9. **ARRAYS**
One dimensional and two dimensional arrays
10. **FUNCTION**
User defined functions, concepts of recursion

TEXT BOOKS:

1. INTRODUCTORY OF INFORMATION TECHNOLOGY BY ITL EDUCATION SOLUTION LTD.
2. PROGRAMMING IN ANSI-C

IT LAB
PRACTICAL BASED ON SYLLABUS

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