

Semester - 1st Semester B.E Branch: AEI, Bio Tech, Chem., Civil, CSE, Elect., EEE, EI, ET&T, IT, Mech., Mining, Lateral Dip.

Subject - Applied Chemistry

Code - 300112 (11)

Total Theory Periods - 40

Total Tut Periods - 10

Total Marks in End Semester Exam 80

Minimum number of class tests to be conducted-2

Duration of end semester exam: 3 hours

Unit – I

Water: Specifications for water, analysis of water alkalinity, hardness. Water for domestic use, water softening processes - Lime - Soda process, Zeolite and ion exchange method, boiler feed water, boiler problems-scale, sludge, priming and foaming, caustic embitterment and corrosion, their causes and prevention, removal of silica, removal of dissolved gases, carbonate and phosphate conditioning, colloidal conditioning, calgon treatment, Numerical problems on Lime-Soda process, Zeolite and Ion exchange method. **[No. of Periods: 8+2]**

Unit – II

Fuels: Classification, combustion and chemical principles involved in it, calorific value: gross and net calorific values and their determination by bomb calorimeter.

Solid Fuels: Proximate and ultimate analysis of coal and their importance, High and low temperature carbonization, Coke. Its manufactures by Otto Hoffman oven.

Liquid Fuels: Petroleum: its chemical composition and fractional distillation, knocking and chemical structure, octane number and cetane number and their significance, power alcohol, Analysis of flue gases by Orsat's apparatus, Numerical on calorific value, combustion, proximate and ultimate analysis of coal.

[No. of Periods: 8+2]

Unit – III

Corrosion: Types of corrosion (dry, wet, atmospheric, galvanic and concentration corrosion), theories of corrosion, protective measures against corrosion, factors affecting corrosion, pitting corrosion, water line corrosion, underground corrosion, stress corrosion, micro biological corrosion, corrosion fatigue.

Batteries and Battery Technology: Primary cells, secondary batteries reserve batteries, fuel cells, solar cells.

[No. of Periods: 8+2]

Unit – IV

Portland Cements Introduction, types of Portland Cement, methods of manufacturing (dry and wet process), properties of cement, characterization of constitutional compounds of cement, ISI specification.

Lubricants: Classification of lubricants and mechanisms of lubrication.

Polymers: Industrial applications of thermoplastic, thermosetting, polymers, properties and applications of the major polymers viz polyethylene, Teflon, PVC, nylon, phenol formaldehyde. Elastomers, Natural Polymers.

[No. of Periods: 8+2]

Unit – V

Introduction to Important Industrial Chemicals:

Industrial Method of preparation (one each), properties and major industrial uses of following chemicals: Ammonium Chloride, Ammonium Nitrate, Ammonium Sulphate, Bromine, Calcium Phosphate (Monocalcium Phosphate, Super phosphate), Chromic Acid (Chromium trioxide, Chromic anhydride), Acrylonitrile, Benzene (Benzol), Butyl Acetate, Caprolactam, Carbon Tetrachloride, Cellulose Acetate, Cresol (Crysylic Acid), Chloroform (Trichloromethane), Ether (Ethyl Ether), Ethyl Alcohol (Ethanol, Industrial Alcohol), Glycerine (glycerol), and Melamine.

Explosives and Propellants:

Characteristics of Explosives, Oxygen Balance, Classification of Explosives: Primary or Initiating Explosives or Detonators; Low Explosives or Propellants; High Explosives, Preparation and Applications of Explosives, Rocket Propellants, Characteristics of a Good Propellant, Classification of Propellants.

[No. of Periods: 8+2]

Name of Text Books:

1. A Textbook of Engineering Chemistry by S.S. Dara (S. Chand and Company).
2. Engineering Chemistry by P.C. Jain (Dhanpat Rai publishing company)

Name of Reference Books:

1. Chemistry in Engineering and Technology (Vol-2) by J. C. Kuriacose, J. Rajaram (Tata McGraw Hill).
2. Engineering Chemistry by M.M. Uppal, Revised by S.C. Bhatia (Khanna Publishers).
3. Engineering Chemistry by B. K. Sharma(Krishna Prakashan).

Semester -1st Semester B.E Branch:AEI, Bio Tech, Chem., Civil, CSE, Elect., EEE, EI, ET&T, IT, Mech., Mining, Lateral Dip.

Subject - Applied Mathematics - I

Code - 300114 (14)

Total Theory Periods - 48

Total Tut Periods - 12

Total Marks in End Semester Exam 80

Minimum number of class tests to be conducted-2

Duration of end semester exam: 3 hours

Unit – I

Matrices

Rank & inverse by elementary transformation; system of linear equations; eigen values & eigen vectors; Caley-Hamilton Theorem.

[No. of Periods: 9+2]

Unit – II

Differential Calculus

Successive differentiation, Leibnitz's theorem; expansion of functions in Taylor's & Maclaurin's series; tracing of simple curves.

[No. of Periods: 9+2]

Unit – III

Integral Calculus

Reduction formula, application of integration to rectification, quadrature, volume of revolution, centre of gravity & moment of inertia.

[No. of Periods: 10+2]

Unit – IV

Partial Differentiation

Partial derivatives, Euler's theorem on homogeneous functions, maxima & minima of functions of two variables, Lagrange's method of undetermined multipliers, Jacobians; differentiation under the integral sign.

[No. of Periods: 10+3]

Unit – V

Ordinary Differential Equations & Applications

Exact differential equations, reducible to exact form; first order differential equations (non-linear); application to simple electrical circuits & heat flow.

[No. of Periods: 10+3]

Name of the Text Books:

1. Higher Engg. Mathematics by B. S. Grewal (38th edition)- Khanna Publishers.
2. Advanced Engg. Mathematics by Erwin Kreyszig (8th edition)- John Wiley & Sons.

Name of the Reference Books:

1. Differential Calculus by Gorakh Prasad - Pothishala Private Limited.
2. Integral Calculus by Gorakh Prasad - Pothishala Private Limited.
3. Advanced Engg. Mathematics by R. K. Jain & S. R. K. Iyengar Narosa Publishing House.
4. Applied Mathematics by P. N. Wartikar & J. N. Wartikar, Vol. (I&II) - Pune Vidyarthi Griha Prakashan, Pune.
5. Applied Mathematics for Engineers & Physicists by Louis A. Pipes - McGraw Hill.

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Semester – 2nd Semester B.E

Branch: AEI, Bio Tech, Chem., Civil, CSE, Elect., EEE, EI, ET&T, IT, Mech., Mining, Lateral Dip.

Subject – Applied Mathematics - II

Code – 300214 (14)

Total Theory Periods – 48

Total Tut Periods - 12

Total Marks in End Semester Exam 80

Minimum number of class tests to be conducted-2

Duration of end semester exam: 3 hours

UNIT – I

Complex Numbers: De Moivre's theorem, roots of complex numbers; separation into real & imaginary parts of circular, hyperbolic, logarithmic & exponential function; summation of trigonometric series by C+iS method.

[Pds. 8+2]

UNIT – II

Differential Equations of higher order: Linear differential equations of higher order with constant coefficients, method of variation of parameters; Cauchy's & Legendre's linear equations; simultaneous linear equations with constant coefficients.

[Pds. 10+2]

UNIT – III

Multiple Integrals: Double & triple integrals, change of order of integration; Beta & Gamma functions; application to area & volume.

[Pds. 10-3]

UNIT – IV

Vector Calculus: Vector operator ∇ ; directional derivative, gradient, divergence & curl; line, surface & volume integrals, Green's, Gauss's & Stoke's theorem (without proof) & applications.

[Pds. 10+3]

UNIT – V

Theory of Equations: Roots of polynomial equations, relations between roots and coefficients; transformation of equations, removal of terms; solution of cubic & biquadratic equations-Cardon's & Ferrari's methods.

[Pds. 10+3]

TEXT BOOKS:

1. Higher Engg. Mathematics by B.S. Grewal (38th edition)-Khanna Publishers.
2. Advanced Engg. Mathematics by Erwin Kreyszig (8th edition) – John Wiley & Sons.

REFERNECE BOOKS:

1. Higher algebra by H.S. Hall & S.R. Knight – A.I.T.B.S. Publishers.
2. Integral Calculus by Gorakh Prasad – Pothishala Private Limited.
3. Advanced Engg. Mathematics by R.K. Jain & S.R.K. Iyengar – Narosa Publishing House.
4. Applied Mathematics by P.N. Wartikar & J.N. Wartikar Vol. (I&II) – Pune Vidhyarthi Griha Prakashan, Pune.
5. Applied mathematics for Engineers & Physicists by Louis A. Pipes – Mc Graw Hill.

Semester – 2nd Semester B.E Branch: Bio Technology, Lateral Dip.

Subject – Applied Physics

Code – 300217 (15)

Total Theory Periods – 40 Total Tut Periods - 10

Total Marks in End Semester Exam 80

Minimum number of class tests to be conducted-2

Duration of end semester exam: 3 hours

Unit – I

Geometrical Optics and Wave Optics:

- (i) Geometrical Optics: Combination of thin lenses, Cardinal points of coaxial system of thin lenses, location and properties of Cardinal points, Newton's formula.
- (ii) Wave Optics: Interference by division of amplitude:- Newton's rings-Interference by division of wave front: Fresnel's biprism, Diffraction at single slit, diffraction grating. Resolving power of prism and of grating. Visible and Ultra Violet Spectroscopy.

[No. of Periods: 8+2]

Unit – II

Quantum Physics

De Broglie's wave length, Davisson and Germer's experiment, Compton Effect, Heisenberg's Uncertainty Principle its elementary proof and applications. Duane-hunt limit for continuous X-rays, Moseley law of characteristics X-rays. Bragg's law of X-ray diffraction. Bragg's X-ray spectrometer. Electron optics: Bethe's law, Electric and magnetic focusing Devices: CRT, Electron-Microscope.

[No. of Periods: 8+2]

Unit – III

Digital Electronics

Number system used in digital electronics: decimal, binary, octal, hexadecimal. Conversion of decimal, binary, octal & hexadecimal to one another and vice versa. Addition, subtraction, multiplication, division, 1's, 2's complement and use in subtraction, AND, OR, NOT, NAND, NOR, EX-OR gates & their representation. Logic symbols, Equivalent simplified switching circuits & truth table. Law of Boolean algebra. De Morgan's theorems & De Morganization, implementations of Boolean expressions using gates, NAND Gate and NOR Gate as universal gates, AND, OR, NOT, EX-NOR logic operation using NAND gates or NOR gates.

[No. of Periods: 8+2]

Unit – IV

Lasers & Fiber Optics:

- (i) Lasers: Temporal and spatial coherence of light wave, Principle of laser, Laser characteristics, components of laser, Principle of ruby, He-Ne & semiconductor lasers, applications Basic concepts of Holography.
- (ii) Fiber Optics: Optical fibers; introduction & advantages, structure & classification, Principle of propagation in fibers, attenuation & distortion, acceptance angle and cone, numerical aperture, basic concept of optical computing.

[No. of Periods: 8+2]

Unit – V

Solid State Physics & Devices

Crystalline and amorphous solids, co-ordination number, atomic radius, density of packing, Miller indices, Separation between lattice planes, Symmetry elements. Structural features of nano particles. Formation of energy bands in solids (Energy level approach), Classification of Solids, Conduction mechanism in semiconductor, Hall effect, Photo conductivity; Photoconductors, P-N junction, solar cells. Transistors, Operation of PNP and NPN, C-B & C-E Configurations.

[No. of Periods: 8+2]

Name of the Text Books:

1. Gaur and Gupta "Engineering Physics"
2. Beiser, "Modern Physics", McGraw-Hill Inc., New Delhi.
3. Avadhanulu and Kshirsagar "Engineering Physics".

Name of the Reference Books:

1. Jenkins and White: "Optics", McGraw-Hill Book Company.
2. Singh R. B.: "Physics of Oscillations and Waves"
3. Ghatak A.K.: "Optics"
4. Mani and Mehta: "Modern Physics", Affiliated East-West Press Pvt. Ltd., 1998.
5. Sanjeev Puri: Modern Physics, Narosa Pub.Co. 2004.
6. Azroff: Solid State Physics, Tata McGraw-Hill, 2004.
7. Kaplan: Nuclear Physics, Narosa Publishing, 1987.
8. Theraja: B. L., Basic Electronics, S. Chand, 2002.
9. Puri: Digital Electronics, Tata McGraw-Hill, 2002.
10. Millman, J and Halkias: Integrated Electronics, Tata McGraw-Hill, 2004.
11. Tyagrajan and Ghatak: Lasers, Macmillan, 2001.
12. Keiser: G Optical fiber Communication, McGraw-Hill, 2000.
