Programme-B.Sc. (Non-Medical)

Programme Specific Outcomes

PSO1. B.Sc. Non-Medical student is able to concentrate on Chemistry, Physics, Computer and Mathematics.

PSO 2. A non-medical student will demonstrate a scientific knowledge of the core physics principles inMechanics, Electromagnetism, Modern Physics, and Optics.

PSO3. He is able to demonstrate basic manipulative skills in algebra, geometry, trigonometry, and beginning calculus.

PSO4. The student will determine the appropriate level of technology for use in: experimental design and implementation, analysis of experimental data and numerical and mathematical methods inproblem solutions.

PSO5. He will be able to apply the underlying unifying structures of mathematics (i.e. sets, relations andfunctions, logical structure) and the relationships among them.

PSO6. He can investigate and apply mathematical problems and solutions in a variety of contexts relatedto science, technology, business and industry, and illustrate these solutions using symbolic, numeric, or graphical methods.

PSO7. The student will acquire knowledge of Chemical Thermodynamics, Kinetics, Electrochemistry, Atomic Structure, Organic Chemistry, Spectroscopy and Skill in Industrial Chemistry.

PSO8. A non-medical student can join Indian Air Force, Indian Navy and can also go for other competitive exams. He can go for higher studies in Mathematics, Chemistry, and Physics.

PSO9. He can join as a scientist in research institutes of immense knowledge having a great scope for growth and development. He can prove to be an asset for the society by producing something moreinnovative.

PSO10. He can demonstrate a basic understanding of computer hardware and

software.

PSO11. Student utilizes web technology and internet related concepts.

Course Outcomes

Semester I

Course: Coordinate Geometry

CO1: Understand the graph of vertical and horizontal conic

CO2: Model real-world situations by using conics For example Architects and engineers frequently usethe shape of a parabola for support arches in bridges and buildings

C03: To graph, use the information that we can determine from its equation and add points to establish apattern for the curve.

C04: Identify the condition for them to be parallel or perpendicularCO5: Recognize line and rotational symmetries.

Course: Differential Equations

CO1: Learn and explain the concept of differential equation

CO2: Classify the differential equation with respect to their order and linearity

CO3: Recognize and solve a homogeneous, non homogeneous and an exact differential

equation

CO4: Identify ordinary and singular points

CO5: Work with ordinary differential equation and system of ODE in various situations and use correctmathematical terminology notation and symbolic processes in order to engage in work, study

Course: Calculus-I

CO1: Interpret a function from an algebraic, numerical, graphical and verbal

perspective

CO2: Compute derivatives, integrals

CO3: Analyze a function using derivatives in concavity, convexity, curvature and integrals in rectification, hyperbolic function

CO4: Recognize the appropriate tools of calculus to solve applied

problems

CO5: Use properties to definite integral to solve graphical net area

problems

Course: Electricity and Magnetism-I

CO1: Read, understand and interpret the mathematical formulation in Physics- verbal, mathematical andgraphical and solve numerical problems involving topics covered.

CO2: Differentiate vector fields and determine gradient vector fields to find out potential functions.

CO3: Evaluate line integrals, surface area, surface integrals and its applications on Stokes anddivergence theorem.

CO4: To learn the concepts of charge interaction with each other using Coulomb's Law and applies to problems in both one and two dimensions.

CO5: To learn the definition of the electric field, E and derive the electric field due to a point chargeusing Coulomb's Law.

CO6: Derive the electric field for continuous charge distributions using an integral approach. Configurations should include one dimensional configuration (ring of charge, line of charge) and atwo dimensional configuration (charged disk).

CO7: To introduce Gauss' Law and clearly understand how to apply it and its use to calculate the electricfield due to various configurations including: point charge, line of charge, uniformly charged sphere and sheet of charge.

CO8: To develop an understanding of electric potential by considers electric potential energy, equipotential surfaces and how they relate to electric field lines.

CO9: To derive a relationship between electric potential and the electric field calculate the electricpotential and its use to calculate electric potential around a single point charge.

CO10: To learn how to apply the above formula in order to calculate electric potential due to variouscharge distributions including multiple point charges and a line of continuous charge.

CO11: To understand where to use Laplace's and Poisson's equations.

CO12: To know what the electric field and electric potential in, and around, a conductor and Insulator andhow electrical energy is stored in capacitors and to learn the formula for calculating this energy.

CO13: Derivation of Uniqueness theorem and where can it use.

CO14: To learn the definition of current in terms of electron flow and learn the definition of resistance Rand Ohm's law.

CO15: To learn about electrical power and how to calculate the power dissipated by a resistor.

CO16: To learn the definitions of, and relations between, the following quantities: the current density J, the electric field, E, within the conductor, the resistivity, and the drift velocity of the electrons in theconductor.

Course: Mechanics-I

CO1: Grasped the fundamentals of Cartesian and spherical polar co-ordinate systems, area, volume,displacement, velocity and acceleration in these systems, Solid angle.

CO2: Learned various forces in Nature, Centre of mass, and Equivalent one body problem.

CO3: Learned the basics of Central forces, Equation of motion under central force, Equation of orbit ininverse square, Force field and turning points, Kepler laws and their derivations.

CO4: Learned the Relationship of conservation laws and symmetries of space and time. Inertial frame ofreference. Coriolis force and its applications.

CO5: Learned the Variation of acceleration due to gravity with latitude. Focault pendulum (qualitative).

CO6: Learned the Elastic collision in Laboratory and C.M. system, velocities, angels and energies, Crosssection of elastic scattering . Rutherford scattering (qualitative).

Course: Vibration and Waves – I

CO1: The main objective of this subject is to aware the students about various phenomenon of waves andoptics.

CO2: This subject describes the Phenomenon like interference.

CO3: Under the Interference phenomenon students will study the young double slit experiment, Fresnalbiprism , double mirror , Newton rings and fabry perot interference experiments.

CO4: This subject describes the Diffraction Phenomenon.

CO5: In diffraction students will study Fresnal diffraction by half period zones experiment, Zone plate,Fraunhoffer diffraction method, diffraction with single and double slit and Resolving power of grating and telescope.

CO6: This subject provides the basic idea of Phenomenon like Polarization

CO7: In the polarization students will study the different types of Polaroid like polarization withrefraction and reflection phenomenon.

CO8: Understand various phenomenon and the cause or origin of them

Course: Organic Chemistry

CO1: The main aim of this course is to provide the ground information of the organic chemistry. Learnerswill be able to understand the structure and bonding of the organic compounds by learning the various effects such as inductive effect, resonance effect, hyperconjucation etc.

CO2: To make students capable of understanding and studying the classification of the organic compounds and impart the students a thorough knowledge about the mechanism of the reactionswhich determines the completion of the reactions

Course: Inorganic Chemistry

CO1: This would facilitate students to get the knowledge about the planck constant and describes thathow the wavelength of the particle is calculated. It describes the wave mechanical model of the atom. It helps to know that how many electrons are present in the particular space

CO2: students will make understanding with the periodic table and the terms related with that and alsodescribes the trends that how they vary with along the period and down the group.

CO3: This will provide the knowledge of the noble gas family and their compound formation as well asreactivity

CO4: It intends the chemical bonding.

Course: Physical Chemistry

CO1: The main outcome of this course is to provide information about Mathematical concepts so thatmedical students would not face any difficulty in derivations and Students learn to solve differentiation, Integration of different functions which enhance their problem solving ability

CO2: Students learn to find out errors in their Practical and how to correct them .Moreover, Students learn to find out errors in their Practical and how to correct them .This course aims at knowledge ofproblems related to standard deviation and applicability of F-test and Q-test

CO3: This course facilitates how to differentiate between different states of matter. Students also developan idea of liquid and gaseous states in which they learn the structural differences in solids, liquids and gases.

CO4: This course aims at knowledge of gases and the most important vander waals equation. The most interesting and useful topic 'Joule-Thomson effect' of this course tells the liquefaction of gases andthe concept of Inversion Temperature.

CO5: This course facilitates the learners to grab knowledge about structure of molecules and theirmagnetic properties.

Semester-II

Course: Analytic Geometry

CO1: Learn that Use geometrical result to determine unknown angles and radius, centre and use ofexample of ball and knife as sphere and cut the plane in 3D form of sphere, cone

CO2: Identify the condition for the plane and the straight line to be parallel or perpendicular andparameterize curves

CO3: Applying model real-world situations by using conics For example Architects and engineersfrequently use the shape of a conic for support arches in bridges and buildings

CO4: Recognize line and rotational symmetries

Course: Partial Differential Equation

CO1: Classify partial differential equations and transform into

canonical form

CO2: Solve linear partial differential equations of both first and second

order

CO3: Apply specific methodologies, techniques and resources to conduct research and produceinnovative results in the area of specialization

CO4: Extract information from partial derivative models in order to interpret

reality

CO5: Identify real phenomena as models of partial derivative equations.

Course: Algebra-I

CO1: Understand and express a complex numbers both in rectangular form and in terms of its modulusand argument.

CO2: As the result of studying topics, students will be able to understand in different ways the meaning of multiplications of whole numbers and use this to make sense of complex number multiplicationand expansion.

CO3: Recognize a number on an argand diagram in terms of its modulus and argument

CO4: Develop the insight that when numbers are multiplied their moduli are multiplied and theirarguments are added together

CO5: Use this to discover that when a number is raised to a power its modulus is raised to that power.

Course: Electricity and Magnetism-II

CO1: In this subject students will describe the behavior of various substances in magnetic field.

CO2: Students will be able to define B, M and H .also explain their relation to free and bound

currents.

CO3: Students will learn to explain the Permeability and susceptibilities and their inter-

relationship.

CO4: Students will discuss orbital motion of electrons, diamagnetism, electron spin, and paramagnetism.

CO5: In this subject students will discuss ferromagnetism along with Domain theory of

Ferromagnetism

CO6: Students will be able to state Biot Savart’s law, Ampere’s Circuital law, Faraday's Law and

EM induction. Discuss their applications.

CO7: Students will be able to define and explain divergence, curl of B, Hall effect and vector

potential.

CO8: Students will be able to define and drive current density, Displacement current, Mutual

inductance, reciprocity theorem and Self inductance L along with use of current density in calculation of change in magnetic field at a current sheet.

CO9: Students will list transformation equations for E and B from one frame to another.

CO10: In this subject students will learn to derive the Maxwell's equations.

CO11: In this subject students will discuss the Analysis of LCR series and parallel resonant circuits alongwith Q-factor. Power consumed

Course: Mechanics-II

CO1: Describe rigid body motion .Explain Rotational motion, principle moments and axes.

CO2: State and explain Euler's equations for precession and elementary gyroscope.

CO3: Describe Galilean transformation and invariance and Illustrate Non-Inertial frames.

CO4: Outline the concept of stationary universal frame of reference and ether.

CO5: Explain the concept of Michelson-Morley Experiment and its result.

CO6: List the Postulates of special theory of relativity.

CO7: Describe the Lorentz transformations, Observer and viewer in relativity, Relativity of simultaneityalong with Length, Time and Velocities.

CO8: Discuss the Relativistic Doppler effect. Variation of mass with velocity, mass-energy equivalence,rest mass in an inelastic collision

CO9: Describe the Relativistic momentum and energy, their transformation.

CO10: Explain the concepts of Minkowski space, four vector formulation.

Course: Vibration and waves-II

CO1: In this part of subject students will be able to define Stiffness coupled oscillators along with normalco-ordinates and normal modes of vibration.

CO2: Students will learn how to explain the inductance coupling of electrical oscillators.

CO3: Students will be able to list the types of waves and derive the solution of wave

equation.

CO4: They will study how to illustrate the string as forced oscillator and find characteristic impedanceand impedance matching condition.

CO5: They will study how to illustrate the string as forced oscillator and find characteristic impedanceand impedance matching condition

CO6: Students will discuss Reflection and transmission energy, standing waves, wave and group velocityin case of vibrating string.

CO7: Students will be able to state the Physical interpretation of Maxwell's equations.

CO8: Discuss the electromagnetic waves and wave equation in a medium having finite permeability andpermittivity but with conductivity equal to zero

CO9: Students will discuss the response of a conducting medium of EM waves and define pointingvector.

CO10: Students will be able to explain the Reflection and transmission of EM waves at a boundary of twodielectric media and for the surface of a conductor at normal incidence.

CO11: In this part of subject students will learn way to describe behavior of EM waves in a conductingmedium, skin depth and EM waves velocity in a conductor an anomalous dispersion

Course: Organic Chemistry

CO1: To make students capable of understanding and studying the classification of the organic compounds. To impart the students a thorough knowledge about the mechanism of the reactionswhich determines the completion of the reactions.

CO2: It provides the description of the allyl and aryl halides and their uses in various fields. These properties helps to describes the melting and boiling points of many compounds and their reactivitytowards various reactions.

CO3: It intends the naming reactions with different functional groups. The Concept of isomerism deals with the nature of organic compounds. It gives the knowledge about the Chirality which is the necessary condition for the chirality of the molecules, It deals with the different orientations of the compounds and with different names of the compounds. By using these configurations we can findthe nature of compounds

Course: Inorganic Chemistry

CO1: Students will understand concept of close packing, ionic structures and factors affecting ionic solidswhich help them to identify and distinguish between different crystals.

CO2: students will develop understanding about the properties of alkali and alkaline earth metals.

CO3: it would enable the learner to learn about the structure of diborane, lewis acid nature of borontrihalides, preparation of carbides, nitrides & other relevant block compounds.

CO4: This course helps in understanding preparations and applications of fullerene, fluorocarbons, silicate compounds.

CO5: It makes the students to learn and understand about types of oxides and oxyacids, their structure andreactivity in s block & p block elements, interhalogen compounds, polyhalides compounds.

Course: Physical Chemistry

CO1: The main outcome of this course is to enable the students to understand about solutions used indaily life and methods of expressing their concentration.

CO2: By studying this course learners will be able to think about the nature of solutions and theirstability which would be help them about the advantages and applications of various types of solutions.

CO3: This course aims at knowledge of different factors affecting rate of reaction and role of acid andbase as a catalyst

Semester III

Course: Analysis-I

CO1: Describe fundamental properties of the real numbers that lead to the formal development ofanalysis.

CO2: Analysis the process of examining information in order to make conclusions regarding limit andcontinuity

CO3: Identify the area when break the number of interval

CO4: Recognize the major things to do question on suppositions such as: uniformly, uniqueness

limit

CO5: Use uniformly and apply it to appropriate depth of required critical thinking

Course: Statics

CO1: An ability to construct free-body diagrams and to calculate the reactions necessary to ensure staticequilibrium.

CO2: Understand the flexible cables in contact with smooth curve, Analyze equilibrium of a particle,systems of particles and their properties

CO3: Recognize friction as a force and differentiate statics friction and sliding

friction

CO4: Understand of the analysis of distributed loads.

CO5: Demonstrate and understand of two force and three force members and analyze moments due to acouple.

Course: Advanced Calculus

CO1: Learn about the basic principles of multi-variable calculus with proofs.

CO2: To have full knowledge of calculus involving the fundamental tools such as continuity and differentiability.

CO3: Reason rigorously in mathematical arguments. They can follow abstract mathematical argumentsand write their own proofs.

CO4: Effectively communicate mathematics: reading, writing , listening, and speaking. Students makeeffective use of the library, conduct research and make oral and written presentation of their findings.

CO5: To know relationship between the increasing and decreasing behavior of function.

Course: Optics

CO1: The main objective of this subject is to aware the students about various phenomenon of waves andoptics.

CO2: This subject describes the Phenomenon like interference.

CO3: Under the Interference phenomenon students will study the young double slit experiment, Fresnalbiprism , double mirror , Newton rings and fabry perot interference experiments.

CO4: This subject describe the Diffraction Phenomenon .

CO5: In diffraction students will study Fresnal diffraction by half period zones experiment, Zone plate, Fraunhoffer diffraction method, diffraction with single and double slit and Resolving power of grating and telescope.

CO6: This subject provides the basic idea of Phenomenon like Polarization

CO7: In the polarization students will study the different types of Polaroid like polarization withrefraction and reflection phenomenon.

CO8: Understand various phenomenon and the cause or origin of them

Course: Quantum Mechanics-I

CO1: To study the basics and principles of quantum mechanics.

CO2: The student will understand the uncertainty relations and

applications.

CO3: Student will learn Schrodinger equation and their applications

CO4: Student will understand the concept of wave

function.

CO5: Explain the operator formulation of quantum

mechanics.

CO6: Solve Schrodinger equation for simple potentials (Potential Step, Linear Harmonic Oscillator etc.)

CO7: Student will study about Hydrogen atom (Energy levels, eigen functions, degeneracy, AngularMomentum)

Course: Statistical physics and thermodynamics-I

CO1: This subject basically provides the basic idea of probability to the students. There are ways ofcalculating probability for various statistical systems of particles.

CO2: The objective is to apply the principles of probability in distribution of particles in various systemsand to calculate thermodynamic probability.

CO3: This subject provides the detailed information about the distribution of n distinguishable particles innumber of compartments of (i) equal sizes and (ii) unequal sizes

CO4: In this subject Students will basic ideology of phase space, microstate, macro state.

CO5: The course gives the insight of postulates and applications of statistical physics.

CO6: Students will learn the main three types of statistics distribution (Maxwell Boltzmann, Bose Einstein and Fermi Dirac statistics). Student will learn which particles follow which statistics andwhy.

CO7: The aim is to apply these statistical distributions in real life problems and understand theirproblems.

CO8: Students will learn How the many real system are related through such theoretical knowledge topractical one (Example tossing the coins, throwing dice etc.)

Course: Inorganic Chemistry

CO1: Develop the knowledge of transition metals to understand the trends in properties and reactivity ofthe first series of d-block elements and to know the typical physical and chemical properties of the transition metals.

CO2: To study the lanthanide elements to understand the trends in properties and reactivity and to develop the understanding of the typical physical and chemical properties of the transition metals.

CO3: To explain the typical physical and chemical properties of the transition metals especially from second and third transistion series. To identify simple compound classes for transition metals anddescribe their chemical properties

CO4: In order to study transition metals to understand the trends in properties and reactivity of theactinides and its typical physical and chemical properties to understand its applications

Course: Organic Chemistry

CO1: This course will facilitate the learners to classify the types of these functional

groups bynomenclature.

CO2: Through the structure and classification of the compounds containing these functional groups, theywould be able to make comparison between the reactivity of these compounds.

CO3: This course allows the students to outline the mechanism of various reactions of organic moleculescontaining the above mentioned functional groups.

CO4: It would help in research work and to develop new chemical reaction with different methods.

CO5: They would be able to grab the knowledge about various naming reactions and they will learnabout their applications in field of chemistry.

Course: Physical Chemistry

CO1: They will grab knowledge of the basic concept of

thermodynamics

CO2: They will learn how to solve exact and inexact functions

CO3: Students will get information regarding thermo chemistry in daily life

activities

CO4: Students will be able to get knowledge of the conversant processes of steam

dryness

CO5: They will learn about uses of thermodynamics in daily life like in window A.C and refrigerators.

Semester IV

Course: Analysis-II

CO1: Memorize definition of directional derivatives and gradient and illustrate geometric meanings withthe aid of sketches.

CO2: Memorize theorem relating directional derivatives to gradient and

reproduce proof.

CO3: Calculate directional derivate and gradients.

CO4: Apply gradient to solve problems involving normal vectors to level

surfaces.

CO5: Explain the concept of vector integration a plane and in space.

Course: Dynamics

CO1: Ability to construct free-body diagrams.

CO2: Solve mechanics problems in one dimension that involve one or more of the forces of gravity,friction and air resistance

CO3: Understand of the analysis of distributed loads.

CO4: knowledge of internal forces and moments in

members.

CO5: Apply Newton's law to solve the problems.

Course: Numerical Methods

CO1: Learn an algebraic or transcendental equation using an appropriate numerical method.

CO2: Proficient in implementing numerical methods for a variety of multidisciplinary

applications.

CO3: Perform an error analysis for a given numerical method.

CO4: Derive numerical method for various mathematical operations and tasks, such as interpolation ,differentiation , integration , the solution of linear and nonlinear equations and the solutions of differential equations.

CO5: Understand of common numerical analysis and how they are used to obtain approximate solutionsto otherwise intractable mathematical problems.

Course: Lasers

CO1: The students will learn to define and derive Einstein's relations and basics of laser

CO2: The Student can discuss Broadening of spectral lines and identify natural, collision and Dopplerbroadening

CO3: In this subject Students will able to express the line width, line profile, absorption and amplificationof parallel beams of light passing through medium.

CO4: Students will able to explain elementary theory of optical cavity, three and four level laser andproperties of laser.

CO5: This subject will describe the ruby laser and Nd Yag laser

CO6: Students will able to explain types of gas lasers like helium neon and CO2 laser.

CO7: In this subject Students will able to express liquid laser like Dye laser, semiconductor laser, Q-switching and different types of shutters.

CO8: Students will able to explain mode locking, Holography, and applications of laser.

Course: Quantum Mechanics-II

CO1: This subject describes the interaction of radiation with matter and transition probability.

CO2: This subject explains the fine and hyperfine structure of hydrogen atom.

CO3: This subject states and illustrates the Normal Zeeman Effect and Anomalous Zeeman Effect.

CO4: In this subject Students will learn to define spin orbit interaction and spin orbit coupling.

CO5: The subject helps to identify symmetric and antisymmetric wave functions, state Pauli Exclusion Principle and electronic structure of an atom.

CO6: This subject describes and explains the various spectra like Absorption spectra, Molecular Spectra,Rotational Spectra and Raman spectra.

CO7: This subject briefly explains the Mosley law and Auger effect

CO8: The subject explains the coupling schemes and selection rules.

CO9: This subject describes and explains the various spectra like Absorption spectra, Molecular Spectra,Rotational Spectra and Raman spectra

CO10: The student will describe and explain the frank hertz experiment and stern gerlach experiment.

Course: Statistical Mechanics and Thermodynamics-II

CO1: The students will learn to define entropy and explain its laws.

CO2: This subject explains the reversible and irreversible process

CO3: This subject describes and explains the laws of thermodynamics and their applications.

CO4: The students learn to state and explain Carnot cycle and its working

CO5: The students learn to express Maxwell thermo dynamical relations.

CO6: The students can define and illustrate adiabatic stretching, adiabatic compression and adiabaticdemagnetization.

CO7: The subject provides outline details of Thermo dynamical treatment of Joule-Thomson effect andits use.

Course: Inorganic Chemistry

CO1: Students will be able to understand the applications of various types of complex and their properties

CO2: Develop the knowledge of various processes which proceed through the oxidation and reduction and they will able to know the applications of these reactions

CO3: It will develop the understanding of all type of acid and bases and explain the behaviour of these

CO4: Students will be able to understand the applications of various non aqueous solvents and their properties with chemical behavior

Course: Organic Chemistry

CO1: Students will learn about the method of preparation, properties and uses of carboxylic acid alongwith their characteristic test

CO2: Students will learn about the method of preparation, properties and uses of derivatives of carboxylicacid along with their characteristic test

CO3: Students will learn about the method of preparation, properties and uses of ether along with epoxides.

CO4: Students will learn about the method of preparation, properties and uses of fats along with theircommercial application.

CO5: Students will learn about the method of preparation, properties and uses of Organic compoundscontaining Nitrogen along with their distinguishable test

Course: Physical Chemistry

CO1: Phase diagrams are useful because they allow us to understand in what state matter exists under certain conditions. Phase equilibrium has wide range of applications in industries including production of different allotropes of carbon, lowering of freezing point of water by dissolving salt,purification of components by distillation, usage of emulsions in food

production, pharmaceutical industry

CO2: Conductivity measurements are used routinely in many industrial and environmental applications asa fast, inexpensive and reliable way of measuring the ionic content in a solution.

CO3: These articles are depends on the movement of the boundary between two adjacent electrolytes under the influence of an electric field and the speed of the moving boundary can be measured andused to determine the ion transference numbers.

CO4: Nernest equation can be used to find the cell potential at any moment in during a reaction or at conditions other than standard-state, by knowing these students can determine the equilibrium constant or Gibbs free energy .In Concentration Cell students can know about how we can select anode or cathode. Nernest equation can be used to find the cell potential at any moment in during areaction or at conditions other than standard-state, by knowing these students can determine the equilibrium constant or Gibbs free energy. In Concentration Cell students can know about how wecan select anode or cathode and also how e.m.f be calculated from those. Students will also learn about that how we can prevents our metallic things from corrosion.

Semester-V

Course: Algebra-I

CO1: Recognize the mathematical objects called groups, matrix, quaternions, symmetric, cyclic groups,even and odd permutations

CO2: Extend group structure to finite permutation groups

CO3: Explain the significance of the notions of cosets, normal subgroups, and factor groups, Homomorphisms, Isomorphism and Cayley's Theorem

CO4: Analyze consequences of Lagrange's theorem including Fermat's Little theorem

CO5: Familiarize with the concept of Rings, Sub-rings, Homomorphism, ideals and Quotient Rings,Field of Quotient of Integral domain, division rings

Course: Number Theory-I

CO1: Understand about divisibility, g.c.d, Fundamental Theorem of arithmetic, congruences, residue andreduced residue classes

CO2: Recognize about Euler-Fermat, Wilsons's, Chinese Remainder theorem

CO3: learn the definition of congruences, primitive roots, indices, quadratic residues, Legendre

Symbol

CO4: Familiarize with Euler's criterion, Gauss Lemma., Quadratic reciprocity Law, Jacobi

Symbol

CO5: Apply Arithmetic functions and Mobius inversion Formula

Course: Discrete Mathematics-I

CO1: Understand the concept of Pigeonhole principle, Basic counting principles, permutations andcombinations of sets and multisets, Binomial and multinomial theorems

CO2: Analyze the concept of inclusion and exclusion principle

CO3: Applying the concept of Graph Theory, Eulerian and Hamiltonian trails and cycles. Bipartite multigraphs.

CO4: Familiarize with Trees, Algorithms for BFS and DFS trees weighted Graphs, Greedy and Prim'sAlgorithm

CO5: Determine the concept of Digraphs, Planar graphs, Euler formula and Chromatic numbers

Course: Condensed Matter Physics-I

CO1: Distinguish between various types of crystal structures and crystal systems for their best use invarious technological applications.

CO2: Relationship between atomic radius (R) and lattice parameter (a) that helps to study the structure ofvarious crystal systems.

CO3: Calculation of Atomic Packing Factor (APF) and Volume density (ρ) that interpreted as a measureof the stability of the nucleus.

CO: 4Determination the Indices for 'Directions' and 'Planes' in a crystal structure.

CO5: Study of Bragg's Law of Diffraction to find the interplaner spacing (d-spacing) of a crystal thatused for identification and characterization purposes.

CO6: Determination of Reciprocal lattice to understand the important properties and behavior of thevarious crystal systems.

CO7: Study of the Brillion Zones for the theoretical understanding of the elementary ideas of electronicenergy bands in solids.

CO8: Study of structure factor and form factor which is a mathematical description of how a materialscatters incident radiation.

Course: Electronics-I (Electronics and Solid State Devices)

CO1: Distinguish between P-N junction and Zener diode and Practical applications of theses diode indaily life.

CO2: Distinguish between half and full wave rectifier and where they can be used or using in presenttime in electronics industry.

CO3: Study of different configuration of transistor and their characteristics.

CO4: Practical utilization of transistor for development of various other electronics

equipment.

CO5:Study of the JFET and MOSFET and how they are different from BJT.

CO6: Study of various photoconductive devices like LED, Photo diode and Solar cell and theirapplications.

Course: Nuclear and Radiation Physics

CO1: This is a branch of Physics which deals with the phenomena taking place in the nuclear domain.
Students will be given an insight into the invention and dimensions of a nucleus.

CO2: Students are able to determine the charge, mass of any nucleus by using various Spectrographs.

CO3: Students will learn the methods to find the mass and charge of any nucleus. The aim is to tell themabout the stability of nucleus and various other properties.

CO4: In this subject students will study various nuclear models (Shell model, Liquid drop

model etc.).

CO5: The students will learn about various types of radiations and their interaction with

matter.

CO6: The subject is able to teach students about various types of nuclear reactions, properties and theirenergetic.

CO7: In this subject students will be able to study artificial

radioactivity

CO8: They will study various ways to calculate different kinds of

decay.

CO9: This course has led the students to understand interaction of various types of radiation with matterwhich they observe in their daily life. It's easy for them now to relate the theory to practical.

Course: Inorganic Chemistry

CO1: Students will be able to use Crystal Field Theory to understand the magnetic properties (and in simple terms the colour) of coordination compounds which facilitate them to describe the shapesand structures of coordination complexes with coordination numbers 6 and 4

Co2: Learner will develop the understanding of the stability of metal complexes by the use of formationconstants and to calculate thermodynamic parameters from them. They will be able to describe rate of reactions of complexes and type of reactions in complexes

CO3: Student will be able to describe magnetic properties of complexes, various kind of

magnetic materials and effect of temp on magnetic characters. They will also able to describe methods ofdetermining magnetic magnetic moments

CO4: Student will be able to describe quantum numbers, orbital and spin angular momenta of electrons.
And To understand electronic transition, term symbol and concept of spectra.

Course: Organic Chemistry

CO1: It will make the learner to develop interest about the Synthesis, Properties and applications of Organo-metallic compounds

CO2: Students will learn about the Synthesis and Properties Organo-Sulphur compounds and theircomparison with analogous compounds

CO3: Students will learn about the Principle, working and application of UV-Vis spectroscopy whichwill help them study the conjugation in organic compounds

CO4: Students will learn about the Principle, working and application of IR spectroscopy which willenable them to detect the various Functional group in organic compounds

CO5: Students will get knowledge about Principle, working and application of NMR spectroscopywhich will help them in structure elucidation through C13-NMR & PMR

Course: Physical Chemistry

CO1: The main outcome of this course is to provide information about Quantum Mechanics and Spectroscopy .and Quantum Chemistry enables them to know about Schrodinger equation and itsapplication

CO2: Students learn about rotation & vibration spectroscopy and the electromagnetic radiations used in these spectra. And Through rotational spectroscopy they will learn the energy level diagrams of rigid & non rigid rotors. This course aims at applications of rotational and vibrational spectroscopy

Semester VI

Course: Algebra-II

CO1: Analyze vector spaces and subspaces over a field and their

properties

CO2: Understand span of a set and its properties

CO3: Analyze linear dependence and independence odd sets

CO4: Determine matrix associated with a linear map and analyze linear transformations

CO5: Understand factorization, associates elements, irreducible elements, euclidean domain, principalideal domain, unique factorization domain, polynomial rings and their properties.

Course: Number Theory-II

CO1: Understand the concept of Diophantine equations, Farey sequences, continued Fractions, Approximation of reals by rationals, Pell's equations

CO2: Analyze the concept of Minkowski's theorem in Geometry of Numbers and its application toDiophantine inequalities

CO3: Familiarize with Hermite's theorem on minima of positive definite quadratic forms and its applications to representation of a number

CO4: Apply the euler summation formula, abel's Identity, elementary results on distribution of primes.

Course: Discrete Mathematics-II

CO1: Write and interpret mathematical notation and mathematical definitions

CO2: Analyze the concept of Generating function solution of recurrence relations using differenceequations and generating functions

CO3: Recognize Boolean AIgebras-Lattices and Algebraic Structures. Duality. Distributive andComplemented Lattices

CO4: Computing Boolean Functions and Expressions. Prepositional Calculus

CO5: Gain an historical perspective of the development of modern discrete mathematics.

Course: Nuclear and Particle Physics

CO1:-Students can list out some Energy loss Phenomenon due to ionization (Bethe's formula), Energyloss of electrons, Bremsstrahlung

CO2:-Student can explain Interactions of gamma rays with matter.

CO3:-The students are expected to learn about the principles and basic constructions of particle accelerators such as the Van-de-Graff generator, cyclotron, betatron and synchrotron. They shouldknow about the accelerator facilities in India.

CO4:-Students can illustrate detectors of nuclear radiations- the Geiger-Mueller counter, the scintillationcounter, the photo-multiplier tube, the solid state and semiconductor detectors

CO5:-Gain knowledge on the basic aspects of particle Physics – the fundamental interactions, elementaryand composite particles.

CO6:-Students can list out Categories of particles: leptons, hadrons (baryons and mesons), quarks, gaugebosons.

CO7:-The students should know about the quantum numbers of particles: energy, linear momentum,angular momentum, isospin, electric charge, colour charge

CO8:-Learn about the strangeness, lepton numbers, baryon number and the conservation laws associatedwith them

Course: Condensed Matter Physics-II

CO1: In this subject, students come to know How to define harmonic nature of Lattice vibrations. Latticevibrations has a basic concept of understanding the momentum transfer in lattice.

CO2: In this subject, students come to know about the Concepts of phonons, Scattering of protons byphonons.

CO3: In this Subject students can understand the phenomenon of Vibration of mono-atomic, di-atomic,linear chains. In this subject students can easily describe the concept of Density of modes.

CO4: This chapter deals with the specific heat capacity of solid, Einstein and Debye models of specificheat.

CO5: This chapter deals with movement of electrons in solid, free electron model of metals. Freeelectron, they will be able to state Fermi gas and Fermi energy.

CO6: In this chapter students identify about Metals and insulators, Conductivity and its variation withtemperature in semiconductors with the help of Kronig-Penney Model.

CO7: This chapter discuss about the Fermi levels in intrinsic and extrinsic semiconductors, Qualitativediscussion of band gap in semiconductors.

CO8: Nowadays superconductivity has the great importance in many physical areas. In this chapter students can state the Magnetic field effect in superconductors, BCS theory, and Thermal properties ofsuperconductors

Course: Electronics-II

CO1: Student can discuss various power electronics devices like Thyristor, SCR, TRIAC, DIAC.

CO2: In this chapter students comes to learn about Construction, Characteristics and Operation;Comparison between transistors and thyristors; Difference between SCR and TRIAC.

CO3: Student can describe UJT: its construction, Equivalent circuit, Characteristics and

parameters, uses.

CO4: Students can outline some properties about Thermistor: Types, Construction,

Characteristics, Uses,
Advantages over other temperature sensing devices

CO5: By completing this chapter students can learn about IMPATT and TRAPATT devices, PIN diode:Construction, Charatersitics, Applications.

CO6: Study of Gunn effect and diodes: Mechanism, Characteristic, Negative differential resistivity andDomain formation

CO7: Tunnel diode is a topic of great importance, students learn about Tunneling Phenomenon,Operation, and Applications. Merits and Drawbacks

CO8: The primary need of all electronic devices is Transistor. Here students can list out some

importantuses of transistor. In this, students can learn about Transistor biasing: Stabilization of operating point, fixed bias, Collector to base bias, Bias circuit with emitter resistor, Voltage divider biasing circuit.

CO9: Describe CE amplifier: Working and analysis using h-parameters, Equivalent circuits, Determination of current gain, Power gain, Input impedance, FET amplifier: Voltage, Current andPower gain

Course: Nuclear and Particle Physics

CO1: Students can list out some Energy loss Phenomenon due to ionization (Bethe's formula), Energyloss of electrons, Bremsstrahlung

CO2: Student can explain Interactions of gamma rays with matter.

CO3: The students are expected to learn about the principles and basic constructions of particle accelerators such as the Van-de-Graff generator, cyclotron, betatron and synchrotron. They shouldknow about the accelerator facilities in India.

CO4: Students can illustrate detectors of nuclear radiations- the Geiger-Mueller counter, the scintillationcounter, the photo-multiplier tube, the solid state and semiconductor detectors

CO5: Gain knowledge on the basic aspects of particle Physics – the fundamental interactions, elementaryand composite particles.

CO6: Students can list out Categories of particles: leptons, hadrons (baryons and mesons), quarks, gaugebosons.

CO7: The students should know about the quantum numbers of particles: energy, linear momentum,angular momentum, isospin, electric charge, colour charge

CO8: Learn about the strangeness, lepton numbers, baryon number and the conservation laws associatedwith them

Course: Inorganic Chemistry

CO1: On the completion of course the student will have knowledge of Pearson's HSAB concept, acid-base strength and hardness and softness. Symbiosis, theoretical basis of hardness and softness.

CO2: The aim of the course is the teaching and understanding of the basic principles of Biological Inorganic Chemistry - Bioinorganic Chemistry that are considered necessary for the completion ofpostgraduate students' education. Also, the aim of this course is to present and describe bioinorganic systems through the correlation of the function, structure and activity of inorganic elements within the organisms. In particular, this course will include: a) a systematic study of traceelement biosystems; b) the effect of the concentration of trace elements on health and the environment;

CO3: On the completion of course the student have knowledge of Silicones and Phosphazenes asexamples of inorganic polymers,nature of bonding in triphosphazenes.

CO4: The focus of this course is on the synthesis, structure and bonding, properties and reactivity of maingroup organometallics (including Grignard reagents, organolithium reagents, organotin compounds,etc), organotransition metal chemistry and organometallic catalysis. And On the completion of course the student have knowledge of metal-ethylene complexes and homogeneous hydrogenation, mononuclear carbonyls and the nature of bonding in metal carbonyls.

Course: Organic Chemistry

CO1: Students would have knowledge about the structure, preparation and properties of heterocycliccompounds after completion of this course.

CO2: The main focus of this course is to make theStudents familiar with the classification, synthesis andapplication of various polymers

CO3: Students will learn the importance of enolates as starting material in organic synthesis

CO4: Students will get knowledge about the classification, conversion and application of carbohydrates

CO5: Students will learn about the classification, conversion and application of protein

Course: Physical Chemistry

CO1: To make them familiar in the study of surfaces and of heterinterfaces between constituents layers

CO2: On completion of this course they will know about the orbital concept

CO3: Helpful in determination of the geometrical structure of molecules in triplet state

CO4: Study is helpful for structure identification

CO5: Student able to know how laser and masers are work which are used in wide range of field

CO6: Student would be able to study the structure using X-rays

CO7: Complete study about structure for the compounds used in daily life.

CO8: Students would be able to know the reactions occurrence in which state

CO9: laws study helpful in research work

CO10: Mechanism of different processes is

studying

CO11: Daily used light applications

CO12: Students able to know how the energy transfers in different processes

CO13: Student able to know how laser and masers are work which are used in wide range of field