AMAR SHAHEED BABA AJIT SINGH JUJHAR SINGH MEMORIAL COLLEGE BELA ROPAR PUNAJB

DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEAPRTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc. (Non-Medical/Computer Science)-I, Semester-I**

NAME OF COURSE: **Mechanics-I**

NAME OF FACULTY**: Dr. Baljit Singh**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	To formulate the mathematical concepts needed to understand physics.	Class test, quiz
CO2	To explain three dimensional angle measurements, simplifying two body problems to equivalent one body problem and derivation equation of motion.	Exam, oral test
CO3	To analyze laws and equations involved when body rotates in orbits and symmetries of space and time.	Class tests
CO4	To distinguish between the relationships different variables in two co-ordinate systems, variation in atmosphere due to revolution and rotation of earth.	Assignment, seminar
CO 5	To analyse and demonstrate the variety of physics problems using concepts of classical mechanics.	Group discussion, class test
CO6	To find elastic collision in Laboratory and C.M.system.	Assignment ,notes

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEAPRTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc. (Non-Medical/Computer Science)-I Semester-I**

NAME OF COURSE: **Electricity&Magnetism-I**

NAME OF FACULTY**: Dr. Baljit Singh**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	To formulate the mathematics and ideas of vector calculus, Gradient, divergence, curl with their physical significance and laws of electrostatics.	Class test, quiz
CO2	To demonstrate with mathematical expressions in electric field and potentials in charge distribution	Class tests
CO3	To describe coulomb's law in vector form, long uniformly charged wire, Charged disc. Stokes's theorem	Assignment-II, class test
CO4	To gain knowledge about the electrical images and mathematical expressions for electric potential in different cases.	Assignment , oral test
CO5	To explain microscopic form of Ohm's law and its failure, equation of continuity and conservation of charge in different frames of references.	Viva , seminar
CO6	To derive mathematical expression for variation of E in different frames of references and interaction between moving charges.	Group discussion, class test

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEAPRTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc. (NM/CS)-II, Semester -III**

NAME OF COURSE: **Optics-II**

NAME OF FACULTY: **Dr. Baljit Singh**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO-1	To provide a knowledge of the behaviour of light.	Laboratory work
CO-2	To discuss the interference in thin films and interferometer such as Michelson interferometer and Fabrey-Parot interferometer.	Class test and Assignment I
CO-3	To apply the properties of waves and principle of superposition to explain wave interference.	Class test
CO-4	To inspire interest for the knowledge of concepts is physical and geometrical physics.	Class test
CO-5	To describe the Coherence, interference and Fourier optics	Seminar,Viva
CO-6	STo evaluate the Diffraction through n-numbers o slits and Polarization	Assignment-II, Viva

AMAR SHAHEED BABA AJIT SINGH JUJHAR SINGH MEMORIAL COLLEGE BELA ROPAR PUNAJB

DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEAPRTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc. (Non-Medical/Computer Science)-II, Semester-III**

NAME OF COURSE: **Statistical Physics and Thermodynamics-I**

NAME OF FACULTY**: Dr. Baljit Singh**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	To explain the basic terms of probability and explanation with distribution of four particles in two compartments.	Class test, quiz
CO2	To understand terms related to probability like macrostates, microstates, thermodynamical probability, constraints, state of maximum and distribution of n particles in two compartments.	Assignment , oral test
CO3	To describe distribution of n-particles in k compartments of unequal size. Introduction of three kinds of statistics.	Class test
CO4	To illustrate the classical and quantum statistics with their basic approach in mathematical derivations for particles involved.	Viva , seminar
CO5	To formulate some mathematical concepts based upon Fermi-Dirac theory of statistics.	Assignment , viva
CO6	To explain the Derivation of Planck's law of radiation, Deduction of Wien's displacement law and Stefan's law from Planck's law.	Group discussion, class test

AMAR SHAHEED BABA AJIT SINGH JUJHAR SINGH MEMORIAL COLLEGE BELA ROPAR PUNAJB

DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEAPRTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc. (Non-Medical/Computer Science)-III, Semester-V**

NAME OF COURSE: **Nuclear and Particle Physics -I**

NAME OF FACULTY**: Dr. Baljit Singh**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	To discuss the properties of nuclear forces, Non existence of electrons in the nucleus and neutron-proton model, Liquid drop model and semi empirical mass formula, Conditions of nuclear stability, Fermi gas model, Nuclear shell model, Experimental evidence of magic numbers and its explanation**.**	Assignment, quiz
CO2	To illustrate the radioactivity, modes of decay and successive radioactivity, Alpha emission, Electron emission, Positron emission, Electron capture, Gamma-ray emission, Internal conversion.	Class test , oral test
CO3	To formulate the Geiger-Nuttal rule, Neutrino hypothesis of beta decay, qualitative discussion of alpha, beta and gamma spectra.	Assignment, Class test
CO4	To discuss the evidence of existence of neutrino qualitative discussion of alpha and beta decay theories, Nuclear reactions, Reaction cross section, Conservation laws.	Viva , seminar
CO5	To describe the kinematics of nuclear reaction, Q-value and its physical significance, Compound nucleus, Possible reaction with high energy particles.	Notes , viva
CO6	To discuss kinematics of nuclear reaction, Q-value and its physical significance, Compound nucleus, Possible reaction with high energy particles.	Group discussion, class test

AMAR SHAHEED BABA AJIT SINGH JUJHAR SINGH MEMORIAL COLLEGE BELA ROPAR PUNAJB

DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEAPRTMENT**: Physical Sciences**

NAME OF THE PROGRAMME**: B.Sc. (NM/CS)-I, Semester -I**

NAME OF COURSE: **VIBRATIONS AND WAVES**

NAME OF FACULTY: **JASPREET KAUR**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO-1	To identify the physical and mathematical concepts of oscillations.	Class test
CO-2	To describe how the frequency of oscillation depends on physical properties.	Class quiz
CO-3	To evaluate the differential equations for forced mechanical and electrical oscillations.	Assignment 1
CO-4	To determine the different damping coefficients –logarithmic decrement ,relaxation time and Q-factor.	Group discussion
CO-5	To evaluate quantitative problems of power supplied to an oscillator and its variation with frequency.	Assignment 2
CO-6	To calculate the Q-value as an amplification factor of low frequency response.	Class test

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEAPRTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc. (NM/CS)-II, Semester -III**

NAME OF COURSE: **QUANTUM MECHANICS**

NAME OF FACULTY: **JASPREET KAUR**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO-1	To describe the photoelectric effect and Compton effect experiment and its implications.	Assignment I and class test
CO-2	To recognize how the uncertainty principle limits our knowledge of the state of particles.	Discussion
CO-3	To demonstrate the time dependent and time independent schrodinger equation.	Seminar by the students on blackboard
CO-4	To identify differences between the classical and quantum models of harmonic and anharmonic oscillator.	Assignment II
CO-5	To list, define and describe the three quantum numbers for hydrogen atom wave functions.	Discussion
CO-6	To demonstrates the spin and angular momentum states.	Class quiz(oral)

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEAPRTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc. (NM/CS)-II, Semester -III**

NAME OF COURSE: **OPTICS**

NAME OF FACULTY: **JASPREET KAUR**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO-1	To provide a knowledge of the behaviour of light.	Laboratory work
CO-2	To discuss the interference in thin films and interferometer such as Michelson interferometer and Fabrey-Parot interferometer.	Class test and Assignment I
CO-3	To apply the properties of waves and principle of superposition to explain wave interference.	Class test
CO-4		
CO-5		
CO-6		

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEAPRTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc. (NM/CS)-III, Semester -V**

NAME OF COURSE: **CONDENSED MATTER PHYSICS**

NAME OF FACULTY: **JASPREET KAUR**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO-1	To demonstrate knowledge of single crystal X-ray diffraction method.	Seminar by students on blackboard
CO-2	To design schematically diagram of face-centered cubic, body-centered cubic and hexagonal closed –packed unit cells.	Class test
CO-3	To familiar with Bragg's law and explain it's the relation to crystal structure and Bravias lattice in two dimension and three dimension.	Assignment I
CO-4	To discuss Brillouin zones and its derivation in two dimension.	Class test
CO-5	To distinguish between geometrical structure factor and atomic form factor and reciprocal lattice of scc, bcc, fcc.	Assignment II
CO-6	To compute Miller indices of different type of planes.	Class test

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEAPRTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc. (NM/CS)-III, Semester -V**

NAME OF COURSE: **ELECTRONICS**

NAME OF FACULTY: **JASPREET KAUR**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO-1	To identify the basic concepts of semiconductor diodes such as p-n junction diode and its characteristics and zener diode.	Class test
CO-2	To apply the basics of diode to describe the working of rectifier circuits such as full and half wave rectifier.	Assignment I
CO-3	To solve examples on rectifier for parameters such as capacitance, load regulations and circuit currents.	Laboratory work
CO-4	To recognize the configuration and characteristics of transistors.	Class test
CO-5	To distinguish between Uni -junction transistor and Bi-polar junction transistor.	Discussion
CO-6	To calculate the hybrid parameters of equivalent circuit of a transistors and photoconductive diodes.	Assignment II

AMAR SHAHEED BABA AJIT SINGH JUJHAR SINGH MEMORIAL COLLEGE BELA ROPAR PUNAJB

DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEAPRTMENT**: Physical Sciences**

NAME OF THE PROGRAMME**: B.Sc. (NM/CS)-II, Semester -III**

NAME OF COURSE: **ENVIRONMENTAL STUDIES AND ROAD SAFETY AWARENESS**

NAME OF FACULTY: **JASPREET KAUR**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO-1	To appreciate the ethical, cross-cultural and historical context of environmental and the links between human and natural systems.	Class test
CO-2	To apply system concepts and methodologies to analyze the interactions between social and environmental processes.	Class quiz
CO-3	To analyze different types of pollution, causes, effects and controls over environment.	Discussion
CO-4	To get knowledge about environmental protection laws in India.	Discussion
CO-5	To understand the road safety concepts i.e. traffic signs, traffic rules and offences.	Class quiz
CO-6	To go to the garden to know about different type of plants, insects, birds and to know the basic principle of their identification.	Class test

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEAPRTMENT**: Physical Sciences**

NAME OF THE PROGRAMME**: B.Sc. (NM/CS)-I, Semester -I**

NAME OF COURSE: **VIBRATIONS AND WAVES**

NAME OF FACULTY: **JASPREET KAUR**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO-1	To distinguish between oscillators and normal modes in a coupled oscillator system and describe a range of physical coupled oscillator systems.	Class test
CO-2	Calculate the reflection and transmission of a travelling wave at a boundary and explain impedance matching.	Assignment I
CO-3	To explain oscillation in terms of energy exchange, giving various examples.	Class test
CO-4	To relate longitudinal and transverse waves.	Group discussion
CO-5	To identify key concepts regarding the anatomy of standing wave.	Class test
CO-6	To decide Maxwell equations relates to which phenomenon.	Assignment II

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEAPRTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc. (NM/CS)-II, Semester -III**

NAME OF COURSE: **QUANTUM MECHANICS**

NAME OF FACULTY: **JASPREET KAUR**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO-1	To Describe the difference between one-electron systems and multi-electron systems.	Discussion
CO-2	To discuss the quantitative aspects of spin-orbit coupling and how to recognize Russell- Saunders coupling in an atom.	Class test
CO-3	To discuss Zeeman effect, the additional splitting of lines in a magnetic field.	Assignment I
CO-4	To apply the different types of representations of operators and ways to apply them in different problems.	Seminar on blackboard
CO-5	To discuss the rotational spectra of molecules.	Assignment II
CO-6	To discuss about rotational and vibrational energy levels of diatomic molecules and Raman spectroscopy.	Class test

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEAPRTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc. (NM/CS)-II, Semester -III**

NAME OF COURSE: **LASERS**

NAME OF FACULTY: **JASPREET KAUR**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO-1	To predict fundamentals characteristics of laser systems.	Class quiz
CO-2	To assess the three level and four level laser systems.	Class test and Assignment I
CO-3	To find the interrelations between Einstein coefficients.	Class test
CO-4		
CO-5		
CO-6		

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEAPRTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc. (NM/CS)-III, Semester -V**

NAME OF COURSE: **CONDENSED MATTER PHYSICS**

NAME OF FACULTY: **JASPREET KAUR**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO-1	To distinguish between vibration of mono-atomic and diatomic molecules.	Discussion
CO-2	To discuss the Einstein and Debye models of specific heat.	Class test
CO-3	To explain free electron gas model.	Assignment I
CO-4	To differentiate between Fermi levels in intrinsic and extrinsic semiconductors.	Class test -
CO-5	To describe thermal properties of superconductivity.	Assignment II
CO-6	To discuss BCS theory of superconductivity.	Class test

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEAPRTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc. (NM/CS)-III, Semester -V**

NAME OF COURSE: **ELECTRONICS**

NAME OF FACULTY: **JASPREET KAUR**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO-1	To recognize the construction, characteristics and operations of different Thyristors.	Class test
CO-2	To differentiate between SCR and TRIAC.	Assignment I
CO-3	To describe the application and advantages of PIN diode, Gunn diode and Tunnel diode.	Discussion
CO-4	To analyse different types of transistor biasing.	Class test
CO-5	To explain the working and analysis of CE and FET amplifier.	Discussion
CO-6	To discuss the types and advantages of feedback in amplifier.	Assignment II

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEAPRTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: : **B.Sc. (Non-Medical/Computer Science)-I, Semester-II**

NAME OF COURSE: **Mechanics-II**

NAME OF FACULTY**: Dr. Baljit Singh**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	To discuss Rotational motion of Earth, gyroscope and moment of inertia tensor.	Class test, quiz
CO2	To describe Relative motion of atmosphere and Earth	Class test
CO3	To assess the relative motion, inertial and non-inertial reference frames.	Assignment , oral test
CO4	To find the variation of length, mass and time when moving with high speed comparable to light	Viva , seminar
CO5	To illustrate the conversion of mass into energy relation, elastic and in-elastic collisions	Group discussion, class test
CO6	To formulate the relativistic momentum and energy, their transformation, concepts of Minkowski space, four vector formulation.	Assignment , viva

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEAPRTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: : **B.Sc. (Non-Medical/Computer Science)-I, Semester-II**

NAME OF COURSE: **Electricity&Magnetism-II**

NAME OF FACULTY**: Dr. Baljit Singh**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	To discuss production of magnetic field due to orbital motion of elections, diamagnetism.	Class test, quiz
CO2	To assess the production of magnetic field in space due to current flowing in a wire.	Class test
CO3	To illustrate the hysteresis loss in power due to magnetization and demagnetization.	Assignment , oral test
CO4	To discuss relative variations in E and B for one frame to another frame of reference.	Viva , seminar
CO5	To find faraday's law and EM induction, Maxwell's equations, mutual induction.	Group discussion, class test
CO6	To describe the self induction, coupling of electrical circuits and analysis of LCR series and parallel resvonant circuits	Assignment , viva

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEAPRTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc. (Non-Medical/Computer Science)-II, Semester-IV**

NAME OF COURSE: **Statistical Physics and Thermodynamics-II**

NAME OF FACULTY**: Dr. Baljit Singh**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	To describe Statistical definition of entropy, change in entropy during different Process, Change in Entropy in PV diagram & heat death of universe	Class test, quiz
CO2	To discuss the use Carnot Cycle in different engines and entropy variations	Class test
CO3	To evaluate the applications of thermodynamics to thermoelectric effect	Assignment , oral test
CO4	To formulate the Mathematical expressions of Maxwell's thermo dynamical relations & applications	Viva , seminar
CO5	To explain the Joule-Thomson effect and its applications.	Group discussion, class test
CO6	To describe the expression for Cp –Cv and the changes of state and Clayperon equation,	Assignment , viva

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEAPRTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc. (Non-Medical/Computer Science)-II, Semester-IV**

NAME OF COURSE**: Lasers**

NAME OF FACULTY**: Dr. Baljit Singh**

C.O.No.	Description of Course Outcome	Method/s of Assessment
CO-1	To predict fundamentals characteristics of laser systems.	Class quiz
CO-2	To assess the three level and four level laser systems.	Class test, Assignment I
CO-3	To find the interrelations between Einstein coefficients.	Class test
CO-4	To describe concrete major example laser systems in detail and understand their technological aspects.	Seminar
CO-5	To Discuss the different types Lasers, stimulated emission, spontaneous emission population inversion, level laser schemes.	Assignment-II, Viva
CO-6	To illustrate the mode of creating population inversion and output characteristics, Semiconductor lasers, Dye lasers, Q-switching, Mode locking and also Applications of lasers–a general outline, Basics of holography.	Group discussion, class test

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEAPRTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc(Non-Medical/Computer Science)-III, Semester-VI**

NAME OF COURSE: **Nuclear and Particle Physics-III**

NAME OF FACULTY**: Dr. Baljit Singh**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	To illustrate Bethe's formula for energy loss by ionization, Interaction of radiation with matter, Stopping power of materials, De-acceleration of electrons	Class test, quiz
CO2	To discuss Principle, theory, construction ,working, applications of Cyclotron, Betatron Acceleration of charged particle	Class test
CO3	To evaluate the Qualitative learning of Synchrotron, Collider machines and linear accelerator	Assignment , oral test
CO4	To Detect the of radiation by Ionization chamber, Proportional counter, GM counter, Scintillation counter, Solid state detectors	Viva , seminar
CO5	To describe the conservation laws and quantum numbers, Concepts of isospin.	Group discussion, class test
CO6	To Study the elementary particles , antiparticles, Gell-man method, quark and qualitative discussion of the quark model.	Assignment , viva

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc-I (N.M.) Sem-I**

NAME OF COURSE: **Inorganic Chemistry**

NAME OF FACULTY**: A.P.Ramanjeet Kaur**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	Learn the de Broglie matter waves, Heisenberg uncertainty principle, atomic orbital, quantum numbers, aufbau and pauli exclusion principle.	Class test, Assignment-1
CO 2	Derive the Schrodinger wave equation, radial and angular wave functions, probability distribution curve, shapes of orbitals and electronic configuration of the elements and ions.	Class test, PPT
CO 3	Discuss the various periodic properties of elements along periods and groups.	Group discussion, Test
CO4	Know the chemistry of Noble gases, also discuss its preparation methods and chemical properties.	Oral test, Assignment-2
CO 5	Describe the covalent Bond- valance bond theory, types of hybridization and shapes of simple inorganic molecules and ions.	Group discussion, Assignment-3
CO6	Explain VSEPR theory and MO theory, homonuclear and heteronuclear, diatomic molecules, multicentre bonding in electro deficient molecule and electro negativity difference.	Board test, Notes

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc.-I (N.M.) Sem-I**

NAME OF COURSE: **Organic Chemistry**

NAME OF FACULTY**: Dr.Satwant Kaur Shahi**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	Describe the various types of hybridization and chemical bonds; compare electromeric effect, resonance effect, field effect and inductive effect.	Class test, quiz
CO 2	Explain different types of reagents in organic reactions and methods of determination of reaction mechanism. Describe Reactive intermediates-carbocations, carbanions, free radicals, carbenes, arynes and nitrenes (with examples).	Assignment
CO 3	Discuss isomerism, preparation methods, physical properties and elaborate mechanism of various chemical reactions of alkanes.	Assignment
CO4	Study nomenclature, structure and chemical reactions of cycloalkanes. Explain Baeyer's strain theory and its limitations and evaluate ring strain.	Oral test, problem solving
CO 5	Formulate the preparation methods, physical properties and elaborate chemical reactions with mechanism.	Group discussion, class test
CO6	Appraise the methods of formation, structure, nomenclature of dienes and alkynes. Formulate the mechanism of electrophilic and nucleophilic reactions of alkynes.	Board test, exam

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc.-I (N.M.) Sem-I**

NAME OF COURSE: **Physical Chemistry**

NAME OF FACULTY**: A.P.Himani Saini**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	Know the basic mathematical concepts like differentiation, integration ,curve sketching ,probability ,permutation ,combination. Evaluation of slopes of curves.	Class test, quiz
CO 2	Evaluation of analytical data, different types of errors (determinate and non determinate errors)	oral test, problem solving
CO 3	Discuss about liquid state and the different types of liquid crystals, thermography and seven segment cell.).Know the structural differences between solid, liquid and liquid crystals.	Assignment ,notes, PPT
CO4	Explain about gaseous state and the postulates of kinetic theory, different molecular speeds and Maxwells distribution of molecular speeds.	Group discussion , seminar
CO 5	Formulate the various gaseous laws, ideal gas equation, vander waals equation of real gases and law of corresponding states.	Assignment, class test
CO6	Describe the various physical properties, optical activity, dipole moment, structure of molecules. Explain magnetic properties of molecules.	Viva, Seminar,test

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc. -I (N.M.) Sem-II**

NAME OF COURSE: **Inorganic Chemistry**

NAME OF FACULTY**: A.P.Ramanjeet Kaur**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	Predict the structure and bonding in molecules / ions.	Class test, notes
CO 2	Explains the atomic, physical and chemical properties of alkali metals and alkaline earth metals	Assignment-1 , Discussion
CO 3	Recognizes the anomalous properties of Li and compares the properties Li with those other alkali metals preparation, properties and uses of compounds of sodium like sodium carbonate, sodium chloride, sodium hydroxide, sodium hydrogen carbonate, biological importance of sodium and potassium	Assignment-2 , PPT
CO4	Determine atomic, physical, chemical properties of group 13 elements	Group discussion, Viva
CO 5	Compare the group 14-17 elements and study the compounds like hydrides , oxides, oxyacids and halides of group 14-17.	Seminar by students, Test
CO6	Study the fullerenes, carbides, fluorocarbons, silicates, interhalogens compounds.	Class test, Assignment-3

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc.-I (N.M.) Sem-II**

NAME OF COURSE: **Organic Chemistry**

NAME OF FACULTY**: Dr.Satwant Kaur Shahi**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	Describe the various types of Isomerism, Relative and absolute configuration, , chiral and achiral molecules, enantiomers, inversion, retention and racemization.	Class test, quiz
CO 2	Explain Conformational isomerism-conformational analysis of ethane and n-butane; conformations of cyclohexane, axial and equatorial bonds, conformation of mono substituted cyclohexane derivatives. Newman projection and Sawhorse formulae, Distinguish between configuration and conformation.	PPT, assignment
CO 3	Discuss Nomenclature of benzene derivatives, aryl group. Structure of benzene: molecular formula and Kekule structure. stability, carbon-carbon bond lengths of benzene, resonance structure, MO picture.	Assignment
CO4	Study Mechanism of nitration, halogenation, sulphonation, mercuration and Friedel-Crafts reaction of arenes. Energy profile diagrams. Activating and deactivating substituents of benzene derivatives.	Oral test, Seminar, assignment
CO 5	Explain Nomenclature and classification of alkyl halides, methods of formation, Mechanism of S_N2 and S_N1 reactions with energy profile diagrams.	Group discussion, class test
CO6	Appraise the Methods of formation of aryl halides, nuclear and side chain reactions. Elaborate the mechanism of nucleophilic aromatic substitution reactions with examples. Compare the Relative	Board test, Viva, Assignment

	reactivities of alkyl halides vs allyl, vinyl vs aryl halides.	

AMAR SHAHEED BABA AJIT SINGH JUJHAR SINGH MEMORIAL COLLEGE BELA ROPAR PUNAJB

DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT: Physical Sciences

NAME OF THE PROGRAMME: **B.Sc.-I (N.M.) Sem-II**

NAME OF COURSE: **Physical Chemistry**

NAME OF FACULTY**: A.P.Himani Saini**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	Discuss the Ideal and non ideal solutions, various methods of expressing concentration of solution, activity and activity coefficients, Raoult's Law.	Class test, quiz
CO 2	Explain dilute solutions. Elaborate the various Colligative properties of dilute solutions with their experimental methods for determination.	Assignment , oral test
CO 3	Describe colloidal state, classification of colloids, stability of colloids and various applications of colloids. Discuss Emulsions and its properties.	Notes,Discussion.ppt
CO4	Know the basic concept of Chemical kinetics, various factors affecting the rate of reaction. Discuss reactions of first, second, higher order and rate law expression for them.	Group discussion , seminar, test
CO 5	Discuss various theories of chemical kinetics, Arrhenius equation, effect of temperature on rate of reaction, Collision theory and its thermodynamic aspects.	Assignment, class test
CO6	Illustrate the general characteristics of Catalytic reactions, Enzyme Catalysis and Michaelis Menten equation for enzyme catalysis and its mechanism.	Viva, test, seminar

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc-II (N.M.) Sem-III**

NAME OF COURSE: **Inorganic Chemistry**

NAME OF FACULTY**: A.P.Ramanjeet Kaur**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	Learn the chemistry of first transition series including: Characteristic and Properties of the elements of the first transition series	Class test, Notes
CO 2	Knowledge of simple compounds and complexes illustrating relative stability of their oxidation states and coordination number and geometry	Class test Group discussion
CO 3	Discuss about the chemistry of lanthanides(preparation methods, physical properties and its chemical properties).	Oral test
CO4	Describe the Chemistry of Elements of Second and Third Transition Series including: - General characteristics - comparative treatment with their 3d-analogues in respect of ionic radii	Assignment-1, Seminar by students
CO 5	Illustrate the chemistry of actinides with special reference to its chemical properties.	Group discussion, class test
CO6	Know how the isolation of lanthanides and actinides will be done.	Assignment-2

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc.-II (N.M.) Sem-III**

NAME OF COURSE: **Organic Chemistry**

NAME OF FACULTY**: Dr. Satwant Kaur Shahi**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	Discuss the various types of alcohols (monohydric, dihydric and trihydric), nomenclature, their methods of preparation and physical properties. Formulate the mechanism of their chemical reactions	Class test, quiz
CO2	Study nomenclature, structure, preparation methods and physical properties of phenols. Elaborate its chemical reactions with mechanism.	oral test, Seminar
CO3	Compare and contrast the acidic strength of alcohols, phenols and acids. Also explain the stability of phenoxide ion in phenols.	Assignment, notes, Class test
CO4	Describe the isomerism, nomenclature, preparation methods and physical properties of aldehydes. Also discuss their chemical reactions.	Assignment, seminar
CO5	Explain nomenclature, preparation methods and physical properties of ketones. Discuss its chemical reactions with mechanism.	Group discussion, class test
CO6	Distinguish between aldehydes and ketones on the basis of chemical tests.Illustrate the use of acetals as a protecting group.	Viva, Assignment

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc.-II (N.M.) Sem-III**

NAME OF COURSE: **Physical Chemistry**

NAME OF FACULTY**: A.P.Himani Saini**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	Know the basic concept of thermodynamics terms: system, surroundings. First Law of Thermodynamics: statement, definition of internal energy and enthalpy.	Assignment , quiz
CO 2	Derive the expression for the work done in various thermodynamic processes. Explain Joules law, Joule Thomson coefficient and inversion temperature of different gases.	oral test,Seminar
CO 3	Illustrate the importance of 2nd law of thermodynamics need for the law, different statements of the law.	Class test ,notes, PPT
CO4	Appraise Carnot cycle and its efficiency, Carnot theorem and thermodynamic scale of temperature.	Group discussion , seminar
CO 5	Explain third law of thermodynamics, Nernst heat theorem, various criteria for equilibrium, spontaneity and concept of residual entropy.	Assignment, class test
CO6	Discuss Chemical Equilibrium, Equilibrium constant and free energy, Thermodynamic derivation of law of mass action, Le Chatelier's principle.	Viva, Notes

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc-II (N.M.) Sem-IV**

NAME OF COURSE: **Inorganic Chemistry**

NAME OF FACULTY**: A.P.Ramanjeet Kaur**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	Know the key features of coordination compounds, including: - the variety of structures - oxidation numbers and electronic configurations - coordination numbers - ligands, chelates - bonding, stability of complexes - shape and structure	Class test, notes
CO 2	Knowledge about properties of oxidation and reduction.	assignment-1,Test
CO 3	Define Acids and Bases and distinguish between strong and weak acids and bases.	PPT
CO4	Illustrate the preparation of buffer solution and discuss its properties.	Notes, Discussion
CO 5	Describe the types of solvent and their general characteristics.	Group discussion, class test
CO6	Explain the reaction in non aqueous solvents with reference to liquid ammonia and liquid sulphur dioxide.	Assignment-2, Viva

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc.-II (N.M.) Sem-IV**

NAME OF COURSE: **Organic Chemistry**

NAME OF FACULTY**: Dr. Satwant Kaur Shahi**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	Describe various types of carboxylic acids such as monocarboxylic, dicarboxylic and substituted carboxylic acids, their preparation methods, physical properties. Formulate various chemical properties with mechanism.	Class test, quiz, Discussion
CO2	Explain nomenclature, structure, preparation methods and chemical properties of carboxylic derivatives: acid chlorides, esters, amides and acid anhydrides. Elaborate mechanism of esterfication and hydrolysis reactions.	Assignment, Seminar
CO3	Discuss nomenclature, structure, methods of formation, physical and Chemical reactions of ethers and epoxides.	Assignment ,notes, Viva
CO4	Explain natural fats, edible and industrial oils of vegetable origin, common fatty acids, their use in soaps and detergents.	Assignment, PPT, Class test
CO5	Illustrate nomenclature, preparation, mechanism and properties of compounds of nitrogen and their reactions in acidic, neutral and alkaline media.	Group discussion, class test
CO6	Formulate structure, nomenclature, physical properties and chemical properties of amines. Discuss Stereochemistry of amines and Separation of primary, secondary and tertiary amines.	Viva, Class test

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc.-II (N.M.) Sem-IV**

NAME OF COURSE: **Physical Chemistry**

NAME OF FACULTY**: A.P.Himani Saini**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	Explain the meaning of term phase, component and degree of freedom. Discuss Phase equilibria of two component systems -solid liquid equilibria, Nernst distribution law and its applications.	Class test , quiz
CO 2	Discuss Freezing mixtures, Partially miscible liquids, Nernst distribution law, thermodynamic derivation and its application**.**	oral test, problem solving
CO 3	Understand some basic terms related to electrochemistry, Kohlrausch law, Arrhenius theory of electrolyte dissociation and its limitations, different theories of dissociation of electrolytes, dilution law, its uses and limitations.	Class test, notes
CO4	Study transport number, application of conductance measurements and conductometric titrations.	Group discussion, seminar
CO 5	Explain different types of reversible electrodes, EMF of cell and its measurements, definition of pH, Buffer, Henderson-Hazel equation, Corrosion and its different theories.	Assignment, class test
CO6	Describe various Concentration cell with and without transport, liquid junction potential, application of concentration cells, valency of ions, solubility product and activity coefficient potentiometric titrations. Debye-Huckel-Onsagar's equation for strong electrolytes.	Viva, Notes, test

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc.-III (N.M.) Sem -V**

NAME OF COURSE: **Inorganic Chemistry**

NAME OF FACULTY**: Dr.Satwant Kaur Shahi**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	Discuss the concept of crystal field theory and crystal field splitting in tetrahedral and octahedral complexes. Illustrate the various factors affecting crystal field splitting.	Class test, quiz, Seminar
CO2	Gain the knowledge about the thermodynamic and kinetic stability of metal complexes and factors affecting the stability of complexes.	oral test, notes, Assignment
CO3	Elaborate the different substitution reactions of square planar complexes with examples.	PPT, Assignment
CO4	Discuss magnetic properties of different substances, methods of determining magnetic susceptibility and applications of magnetic moment data for 3d-metal complexes.	Assignment, seminar, Class test
CO5	Evaluate spin only magnetic moment for transition metal complexes.	Problem solving
CO6	Discuss types of electronic transitions, selection rules for d-d transitions and various applications of magnetic moment data for 3d-metal complexes.	Group discussion, viva, assignment

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc.-III (N.M.) Sem-V**

NAME OF COURS: O**rganic Chemistry**

NAME OF FACULTY**: A.P.Ramanjeet Kaur**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	Knowledge about Nuclear magnetic resonance (NMR) spectroscopy.	Notes, Class test
CO 2	Understand the concept of Electromagnetic spectrum: Absorption Spectra	PPT
CO 3	Learn about the Infrared (IR) absorption spectroscopy	Notes and black board test
CO4	Evaluate the problem related to NMR,UV, IR.	problem solving, Assignment-1, Viva
CO 5	Describe the nomenclature, preparation, physical and chemical properties of Organometallic Compounds.	Group discussion, class test
CO6	Explain the nomenclature, preparation, physical and chemical properties of Organosulphur Compounds.	Assignment-2, Viva

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc.-III (N.M.) Sem-V**

NAME OF COURSE: **Physical Chemistry**

NAME OF FACULTY**: A.P.Himani Saini**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	Discuss the basic concepts of quantum mechanics (black body radiations, photoelectric effect and Planck Radiation Law).	Assignment , quiz
CO 2	Derive Schrodinger wave equation for H atom and particle in 1 dimensional box. Also obtain expression for various physical quantities.	Exam, oral test
CO 3	Illustrate the importance of wave function and quantum numbers. Explain the various characteristics of wave function.	Class test, notes
CO4	Explain the rotational spectra of diatomic molecules and the effect of isotope on the rotational spectrum.	Group discussion , assignment
CO 5	Discuss infrared spectrum ,energy levels of harmonic oscillator and the concept of vibration frequencies of different functional groups	seminar, class test
CO6	Describe the Rotational-Vibrational spectra of molecules and the selection rules for the spectra.	Viva, exam

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc.-III (N.M.) Sem -VI**

NAME OF COURSE: **Inorganic Chemistry**

NAME OF FACULTY**: Dr.Satwant Kaur Shahi**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	Understand concept of hard and soft acids- bases, the relation of hardness and softness with electronegativity.	Class test, quiz
CO2	Illustrate the importance of elements and metal ions in biological system, structure and functions of haemoglobin and myoglobin.	oral test, Seminar
CO3	Elaborate the biological role of alkali and alkaline earth metal ions with special reference to Ca^{+2}.	Assignment ,notes,PPT
CO4	Describe Silicones and Phosphazenes as examples of inorganic polymers and also discuss bonding in triphosphazenes.	Assignment, seminar, Discussion
CO5	Discuss nomenclature, classification, Preparation method, properties, bonding and applications of organometallic compounds.	Group discussion, class test
CO6	Understand the compounds of metal carbonyls, metal-ethylene complexes with suitable examples and the nature of bonding in metal carbonyls.	Viva, PPT

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc. -III (N.M.) Sem-VI**

NAME OF COURS: O**rganic Chemistry**

NAME OF FACULTY**: A.P.Ramanjeet Kaur**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	Learn the key features of heterocyclic compounds, its molecular orbital structure, methods of synthesis and chemical reaction with mechanism of electrophilic substitution and special reactions	Notes, Test, PPT
CO 2	Discuss the synthesis of polymers, its properties and uses.	Assignment-1, Viva
CO 3	Appraise the organic synthesis via enolates.	Demonstrate by experiment, Notes
CO4	Describe the classification, nomenclature, preparation, physical and chemical properties of Carbohydrates.	Assignment-2, Discussion, Viva
CO 5	Formulate the structure of ribose and deoxyribose.	PPT, Test
CO6	Explain the classification, structure and stereochemistry of amino acids, proteins, peptides and nucleic acids.	Seminar by Students, Test

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**: Physical Sciences**

NAME OF THE PROGRAMME: **B.Sc.-III (N.M.) Sem-VI**

NAME OF COURSE: **Physical Chemistry**

NAME OF FACULTY**: A.P.Himani Saini**

C.O. No.	Description of Course Outcome	Method/s of Assessment
CO1	Understand thl concept of polarizability, pure rotational and pure vibrational Raman spectra of diatomic molecules, selections rules.	Assignment , quiz
CO 2	Discuss the concept of potential energy curves, qualitative description of selection rules and Franck-Condon principle.	oral test, Seminar
CO 3	Explain space lattice and unit cell. Laws of crystallography-(i) Law of constancy of interfacial angles. (ii) Law of rationality of indices (iii) Law of symmetry elements in crystals.	Class test, notes, PPT
CO4	Know about the space lattice and unit cell, X ray diffraction of various crystals, Derivation of Bragg's equation.Explain the band structure of solids and determine the electrical properties.	Group discussion , assignment
CO 5	Discuss the interaction of radiations with matter, various Laws of photochemistry: Grothus- Drapper law, Stark-Einstein law, photosensitized reactions and energy transfer processes.	seminar, class test
CO6	Describe Jablonski diagram (radiative and non radiative processes),the basic concept of Laser and Maser. Photochemistry of vision and colour	Test , ppt

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**:** Physical Sciences

NAME OF THE PROGRAMME: B.Sc. I (SEM-1)

NAME OF COURSE : Differential Equations

NAME OF FACULTY : AP Rajinder Kaur

C.O. No.	Description of Course Outcome	Methods of Assessment
CO-1	Distinguish between linear, nonlinear, partial and ordinary differential equations.	Class Tests/ Class Assignments
CO-2	Recognize and solve a homogenous differential equations, exact differential equations.	Class Assignment/ Home Assignment/Authentic problem solving
CO-3	Construct a second solution to a second order differential equation reduction.	Group discussion
CO-4	Demonstrate an understanding of basic application problems described by first order differential equations.	Authentic problem Solving/ Group Discussion
CO-5	Develop solutions to differential equations by superposition of known solutions, complete solutions of nonlinear homogenous equations by combination of complementary solution and particular integral.	Class Assignment/ Seminar/ Group Discussion
CO-6	Explore the properties of all type of differential equation.	Class Assignment/ Group Discussion/ Authentic problem solving

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**:** Physical sciences

NAME OF THE PROGRAMME: B.Sc. – I(SEM-1)

NAME OF COURSE : Calculus - I

NAME OF FACULTY : AP Kirandeep Kaur

C.O. No.	Description of Course Outcome	Methods of Assessment
CO-1	Assimilate the notions of limit of a sequence and convergence of a series.	Authentic problem solving, revision, assignments.
CO-2	Calculate the limit and examine the continuity of a function at a point.	Authentic problem solving, assignments, class tests.
CO-3	Understand the consequences of various mean value theorems for Differentiable functions.	Authentic problem solving, black board test, assignments.
CO-4	Sketch curves in Cartesian and polar coordinate systems.	Authentic problem solving, assignments, class tests.
CO-5	Apply derivative tests in optimization problems appearing in social sciences, Physical sciences, life sciences and a host of other disciplines.	Authentic problem solving, class test, assignments.
CO-6	Ability to Write detailed solutions using appropriate mathematical language.	Authentic problem solving, assignments, class tests.

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**:** Physical Sciences

NAME OF THE PROGRAMME: B.Sc. I(SEM-2)

NAME OF COURSE : Partial differential equation

NAME OF FACULTY : AP Kirandeep Kaur

C.O. No.	Description of Course Outcome	Methods of Assessment
CO-1	classify partial differential equations , transform into canonical form and Solve simultaneous differential equations.	Authentic problem solving, revision, assignments.
CO-2	solve linear partial differential equations of both first and second order	Authentic problem solving, assignments, class tests.
CO-3	Apply partial derivative equation techniques to predict the behaviour of certain phenomena.	Authentic problem solving, black board test, assignments.
CO-4	Extract information from partial derivative models in order to interpret reality.	Authentic problem solving, assignments, class tests.
CO-5	Study calculus of variation by various equations.	Authentic problem solving, class test, assignments.
CO-6	Identify real phenomena as models of partial derivative equations	Authentic problem solving, assignments, class tests.

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**:** Physical Sciences

NAME OF THE PROGRAMME: B.Sc. III(SEM-5)

NAME OF COURSE : Algebra-I

NAME OF FACULTY : AP Rajinder Kaur

C.O. No.	Description of Course Outcome	Methods of Assessment
CO-1	Effectively write abstract mathematical proofs in a clear and logical manner.	Class Tests/ Class Assignments
CO-2	Locate and use theorems to solve problems in theory of polynomials over field.	Class Assignment/ Home Assignment/Authentic problem solving
CO-3	Demonstrate ability to think critically by interpreting theorems and relating results to problems in other mathematical disciplines.	Group discussion
CO-4	Demonstrate ability to think critically by recognizing patterns and principles of algebra.	Authentic problem Solving/ Group Discussion
CO-5	Develop a deeper and rigorous understanding of fundamental theorems, homomorphism and isomorphism theorems	Class Assignment/ Seminar/ Group Discussion
CO-6	Explore the properties of groups, rings, ideals.	Class Assignment/ Group Discussion/ Authentic problem solving

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**:** Physical Sciences

NAME OF THE PROGRAMME: B.Sc. I(SEM-1)

NAME OF COURSE : Coordinate Geometry

NAME OF FACULTY : AP Rajinder Kaur

C.O. No.	Description of Course Outcome	Methods of Assessment
CO-1	Find a relationship between the gradients of parallel lines and perpendicular lines.	Class Tests/ Class Assignments
CO-2	Use the strategies introduced for equations of lines, circle, parabola, ellipse, hyperbola.	Class Assignment/ Home Assignment/Authentic problem solving
CO-3	Comprehend rigorous arguments developing the understanding of the properties such as the perpendicular from the centre of a circle to a chord bisects the chord.	Group discussion
CO-4	Demonstrate an understanding of points of intersection of a line and a circle, intersection of two curves.	Authentic problem Solving/ Group Discussion
CO-5	Develop a deeper and rigorous understanding of Cartesian , parametric forms of equations .	Class Assignment/ Seminar/ Group Discussion
CO-6	Explore the tangency properties of circle, parabola, ellipse.	Class Assignment/ Group Discussion/ Authentic problem solving

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**:** Physical Sciences

NAME OF THE PROGRAMME: B.Sc. II(SEM-3)

NAME OF COURSE : Analysis-I

NAME OF FACULTY : AP Rupinder Kaur

C.O. No.	Description of Course Outcome	Methods of Assessment
CO-1	Find a rational and irrational number between any two distinct real numbers.	Class Tests/ Class Assignments
CO-2	Use the strategies introduced for determining least upper bounds and greatest lower bounds.	Class Assignment/ Home Assignment/Authentic problem solving
CO-3	Comprehend rigorous arguments developing the theory underpinning real analysis.	Group discussion
CO-4	Demonstrate an understanding of functions of bounded variation.	Authentic problem Solving/ Group Discussion
CO-5	Develop a deeper and rigorous understanding of fundamental concepts viz. Riemann integration.	Class Assignment/ Seminar/ Group Discussion
CO-6	Explore the properties of sequences.	Class Assignment/ Group Discussion/ Authentic problem solving

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**:** Physical Sciences

NAME OF THE PROGRAMME: B.Sc. III(SEM-5)

NAME OF COURSE : Discrete Mathematics-I

NAME OF FACULTY : AP Rupinder Kaur

C.O. No.	Description of Course Outcome	Methods of Assessment
CO-1	Determine when a function is one-one and onto.	Group discussion
CO-2	Demonstrate different traversal methods for trees.	Class Assignment/Authentic problem solving
CO-3	Model Problems in Computer Science using graphs.	Group discussion/ Class Assignment
CO-4	Apply Counting Principle to determine Probability.	Authentic problem Solving/ Seminar
CO-5	Work in a group to understand finite state machine language.	Class Assignment/Group Discussion
CO-6	Discriminate between an Eulerian Graph from a Hamiltonian graph for use in solving mathematical problems.	Class Assignment/ Group Discussion/ Authentic problem solving

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**:** Physical Sciences

NAME OF THE PROGRAMME: B.Sc. II(SEM-3)

NAME OF COURSE : Statics

NAME OF FACULTY : AP Sanjivani

C.O. No.	Description of Course Outcome	Methods of Assessment
CO-1	Define resultant component of a force, coplanar forces like unlike parallel forces, moment of force and couple with example.	Class Assignment/Group discussion
CO-2	Prove the parallelogram of forces, Triangle law of forces, Converse of triangle law of forces, Polygon of forces, Lami's theorem, Varignon theorem.	Authentic problem solving
CO-3	Find the resultant of coplanar Couples equilibrium of couples and the equation of line of action of resultant.	Group discussion/ Class Assignment/ Seminar
CO-4	Discuss friction, Force of friction and laws of friction.	Authentic problem Solving/ Seminar/ Group discussion
CO-5	Develop the knowledge about motion.	Class Assignment/Group Discussion/Home Assignment
CO-6	Explore Knowledge about triangular law of forces.	Class Assignment/ Group Discussion/ Authentic problem solving

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**:** Physical Sciences

NAME OF THE PROGRAMME: B.Sc. - III

NAME OF COURSE : Mathematical methods-I

NAME OF FACULTY : AP Raveena Saini

C.O. No.	Description of Course Outcome	Methods of Assessment
CO-1	Make use of Fourier series to analyze wave forms of periodic functions	Class Tests/ Class Assignments
CO-2	Understand the concept of Fourier and Z – transform to evaluate engineering problems	Class Assignment/ Home Assignment/Authentic problem solving
CO-3	Understand the importance of Fourier Series.	Group discussion
CO-4	Able to use Fourier series for even and odd functions, Half range Fourier series, Other forms of Fourier series	Authentic problem Solving/ Group Discussion
CO-5	Use the Laplace transforms techniques for solving ODE's	Class Assignment/ Seminar/ Group Discussion
CO-6	Know the basic concepts of Beta function and Gamma functions.	Class Assignment/ Group Discussion/ Authentic problem solving

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**:** Physical sciences

NAME OF THE PROGRAMME: B.Sc. – I (SEM-2)

NAME OF COURSE : Algebra - I

NAME OF FACULTY : AP Kirandeep Kaur

C.O. No.	Description of Course Outcome	Methods of Assessment
CO-1	Acquire the knowledge of a matrix, basic operations, rank and determinant of a matrix	Authentic problem solving, revision, assignments.
CO-2	Recognize the concepts of the terms span, linear independence, basis, dimension, and apply these concepts to various vector spaces and subspaces.	Authentic problem solving, assignments, class tests.
CO-3	Understand the concept of linear transformations and their properties and Use the definition and properties of linear transformations and matrices of linear transformations and change of basis, including kernel, range and isomorphism	Authentic problem solving, black board test, assignments.
CO-4	Introduce the new terms Basis and Dimension. Acquire the knowledge of ordered basis	Authentic problem solving, assignments, class tests.
CO-5	Determine Eigen spaces, as well as the geometric and the algebraic multiplicities of an Eigen value and apply the basic diagonalization result	Authentic problem solving, class test, assignments.
CO-6	Apply Clayey-Hamilton Theorem to problems for finding the inverse of a matrix and higher powers of matrices without using routine methods	Authentic problem solving, assignments, class tests.

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**:** Physical Sciences

NAME OF THE PROGRAMME: B.Sc. II(SEM-3)

NAME OF COURSE : Advanced Calculus

NAME OF FACULTY : AP Raveena Saini

C.O. No.	Description of Course Outcome	Methods of Assessment
CO-1	Analyse Continuity and discontinuity of several variables.	Class Assignment/Group discussion
CO-2	Develop the Knowledge to Solve derivatives.	Authentic problem solving/ Group discussion
CO-3	Demonstrate an understanding about Maxima and Minima.	Group discussion/ Class Assignment/ Seminar/ Authentic problem solving
CO-4	Use the Strategies to introduce for determining Limit and continuity.	Authentic problem Solving/Group discussion
CO-5	Explore the properties of Young's theorem.	Authentic problem solving
CO-6	Model problems for solving Schwarz's theorem.	Authentic problem solving

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**:** Physical Sciences

NAME OF THE PROGRAMME: B.Sc. III(SEM-6)

NAME OF COURSE : Discrete Mathematics-II

NAME OF FACULTY : AP Rupinder Kaur

C.O. No.	Description of Course Outcome	Methods of Assessment
CO-1	To Understand Logical concepts and to Show logical equivalences by using truth tables and rules in logics.	Class Assignment/Group discussion
CO-2	Learn concept related to counting.	Authentic problem solving/ Group discussion
CO-3	Introduction to Advanced Counting.	Group discussion/ Class Assignment/ Seminar/ Authentic problem solving
CO-4	Comprehended Rigorous arguments developing theory of sets.	Authentic problem Solving/Group discussion
CO-5	Demonstrate an understanding of logical operations and truth tables.	Authentic problem solving
CO-6	Explore the properties of relation and functions.	Authentic problem solving

AMAR SHAHEED BABA AJIT SINGH JUJHAR SINGH MEMORIAL COLLEGE BELA ROPAR PUNJAB

DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**:** Physical Sciences

NAME OF THE PROGRAMME: B.Sc. II(SEM-4)

NAME OF COURSE : Numerical Methods

NAME OF FACULTY : AP Raveena Saini

C.O. No.	Description of Course Outcome	Methods of Assessment
CO-1	Apply Appropriate Numerical Methods to solve the problem with most accuracy.	Class Assignment/Group discussion
CO-2	Using Appropriate numerical determine approximate solution ODE and system of linear equation.	Authentic problem solving/ Group discussion
CO-3	Solve problem using Newton forward formula and Newton Backward formula.	Group discussion/ Class Assignment/ Seminar/ Authentic problem solving
CO-4	Demonstrate the concept of maxima and minima for differential difference equation.	Authentic problem Solving/Group discussion
CO-5	Develop deeper and rigorous understanding of summation of series finite difference techniques.	Authentic problem solving
CO-6	Explore the properties of polynomials.	Authentic problem solving

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**:** Physical Sciences

NAME OF THE PROGRAMME: B.Sc. III(SEM-6)

NAME OF COURSE : Mathematical Methods-II

NAME OF FACULTY : AP Sanjivani

C.O. No.	Description of Course Outcome	Methods of Assessment
CO-1	Apply Laplace transform to solve differential equations.	Class Assignment/Group discussion
CO-2	Obtain Fourier Series expansions for the given functions.	Authentic problem solving/ Group discussion
CO-3	Compute cosine and sine series expansions for given functions.	Group discussion/ Class Assignment/ Seminar/ Authentic problem solving
CO-4	Use the strategies introduced for determining drichlet Conditions, Fourier and inverse Fourier transformations.	Authentic problem Solving/Group discussion
CO-5	Explore the properties of Parseval identity, Modulation theorem, Convolution theorem,	Authentic problem solving
CO-6	Demonstrate an understanding about simultaneous and second order partial differential equations.	Authentic problem solving

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**:** Physical Sciences

NAME OF THE PROGRAMME: B.Sc. II(SEM-4)

NAME OF COURSE : Analysis-II

NAME OF FACULTY : AP Raveena Saini

C.O. No.	Description of Course Outcome	Methods of Assessment
CO-1	Comprehended rigorous arguments developing the point wise and uniform convergence of sequence of function and series.	Class Assignment/Group discussion
CO-2	Demonstrate an understanding of convergence of Power series and term by term integration.	Authentic problem solving/ Group discussion
CO-3	Explore the Applications of Green's Stoke and divergence theorem.	Group discussion/ Class Assignment/ Seminar/ Authentic problem solving
CO-4	Use the strategies introduced for determining radius of convergence of power series.	Authentic problem Solving/Group discussion
CO-5	Develop the deeper and rigorous understanding of fundamental concept viz. del, gradient, divergence and curl.	Authentic problem solving
CO-6	Compute statement of weirstrass , M-tests for uniform convergence of sequence of functions.	Authentic problem solving

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**:** Physical Sciences

NAME OF THE PROGRAMME: B.Sc. – I(SEM-2)

NAME OF COURSE : Analytic Geometry

NAME OF FACULTY : AP Rajinder Kaur

C.O. No.	Description of Course Outcome	Methods of Assessment
CO-1	Analyse characteristics and properties of two and three dimensional geometric shapes and develop mathematical arguments about geometric relationships.	Class Tests/ Class Assignments
CO-2	Relate and integrate geometry into real life contexts as well as into other disciplines.	Class Assignment/ Home Assignment/Authentic problem solving
CO-3	Demonstrate appropriate technique, tools, and formulas to determine measurements.	Group discussion
CO-4	Select and use units of appropriate size and type to measure angles, parameters, surface area and volume.	Authentic problem Solving/ Group Discussion
CO-5	Use visualization, spatial reasoning and geometric modelling to solve problems.	Class Assignment/ Seminar/ Group Discussion
CO-6	Explore the properties of three dimensional figures sphere, ellipsoid, parrabolloid.	Class Assignment/ Group Discussion/ Authentic problem solving

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**:** Physical Sciences

NAME OF THE PROGRAMME: B.Sc. – III(SEM-6)

NAME OF COURSE : Algebra-II

NAME OF FACULTY : AP Rajinder Kaur

C.O. No.	Description of Course Outcome	Methods of Assessment
CO-1	Describe the relationship between the dimensions of the null space and row space of matrix.	Class Tests/ Class Assignments
CO-2	Explain what conditions must be satisfied for unique solutions, infinite solutions and no solution.	Class Assignment/ Home Assignment/Authentic problem solving
CO-3	Demonstrate the concepts of Eigen values, equations and diagonalization of matrix.	Group discussion
CO-4	Recognize various characterizations of non-singular matrices, rank nullity theorem, characteristic polynomial.	Authentic problem Solving/ Group Discussion
CO-5	Compute the product of matrix, determinant of matrix, basis of vector spaces.	Class Assignment/ Seminar/ Group Discussion
CO-6	Explore the properties of basis, vector spaces, orthogonility of matrix.	Class Assignment/ Group Discussion/ Authentic problem solving

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DESCRIPTION OF COURSE OUTCOMES

NAME OF THE DEPARTMENT**:** Physical Sciences

NAME OF THE PROGRAMME: B.Sc. – II(SEM-4)

NAME OF COURSE : Dynamics

NAME OF FACULTY : AP Sanjivani

C.O. No.	Description of Course Outcome	Methods of Assessment
CO-1	Make use of techniques for understanding of velocity, acceleration and momentum.	Class Tests/ Class Assignments
CO-2	Understand the notion of the force as a vector.	Class Assignment/ Home Assignment/Authentic problem solving
CO-3	Solve Newton's equations of motion, use principles derived from Newton's second law of motion.	Group discussion
CO-4	Able to use principles for derivation of velocity, acceleration, momentum, work, energy.	Authentic problem Solving/ Group Discussion
CO-5	Demonstrate the methods to understand definitions of motion along a smooth inclined plane, simple harmonic motion etc.	Class Assignment/ Seminar/ Group Discussion
CO-6	Explore the properties of relative motion, relative displacement, linear momentum, impulsive forces.	Class Assignment/ Group Discussion/ Authentic problem solving