RAO PAHLAD SINGH DEGREE COLLEGE
(Approved by DGHE / Govt. of Haryana & Affiliated to Indira Gandhi University, Meerpur)
Satnali Road Balana, Mohindergarh Haryana-123029
Telephone: 01285-241432 Fax: 241431
E-mail: rpsbalana@gmail.com, Website: www.rpsdegreecollege.org

DEPARTMENT OF PHYSICS

Programme outcomes & Programme Specific Outcome

Programme outcome (PO)-:

- Physics deal s with a wide variety of systems; certain theories are used by all physicists. Each of these theories were experimentally tested numerous times and found to be an adequate approximation of nature.
- The Master of Science in Physics program provides the candidate with knowledge, general competence, and analytical skills on an advanced level, needed in industry, consultancy, education, and research.
- On completion of program, the post graduates will apply the knowledge and skill in the design and development of Electronics circuits to fulfill the needs of Electronic Industry.

Programme specific outcome (PSO) 1: M.Sc. Physics

- The students will obtain good knowledge in Physical Sciences. They will be trained to compete national level tests like UGC-CSIR NET, JEST, GATE, etc., successfully.
- Enable the students to analyze problems starting from first principles, evaluate and validate experimental results, and draw logical conclusions thereof.
- Learn to carry out experiments in basic as well as certain advanced areas of physics¬ such as nuclear physics, electronics and lasers. A research oriented learning that develops analytical and integrative problem-solving approaches.
- Prepare the students to pursue research careers, careers in academics, in industries in physical science and in allied fields.
- Inspire them in such a way that they can demonstrate and maintain the highest• standard on ethical issues in their professional lives.
- The students will learn effective communication skill to present their knowledge of physics from basic concepts to specific advanced areas in the form of preparation of laboratory note book, project work, seminar presentation, poster presentation, wall magazines, models and other modes.

Programme specific outcome (PSO) 2: B.Sc. Honors Physics

This under graduate course in Physics would provide the opportunity to the students:-

- To understand the basic laws and explore the fundamental concepts of Physics.
- To motivates the students to pursue P.G courses in reputed institutions.
- To carry out experiments to understand the laws and concepts of Physics.
- The students will obtain good knowledge in Physical Sciences. They will be trained to compete national level tests like BARC, JEST, GATE, IIT-JAM etc., successfully.

- Providing a hands –on learning experience such as in measuring the basic concepts in properties of matter, heat, optics, electronics, complex analysis and electricity.

Programme specific outcome (PSO) 3: B.Sc. Pass Course

- Understand the mathematical basis of physics and apply the knowledge toυ certain specific problems of physics.
- The students will acquire a scientific knowledge of the fundamental principles of Physics through study of Classical Mechanics, Electromagnetic Theory, Optics, Heat and Thermodynamics, Statistical Mechanics, Solid State Physics, Nuclear Physics, Modern Physics, Quantum Mechanics and other areas of Physics.
- Understand the errors in measurements and learn to calculate the error.
- Apply and verify the theoretical concepts and facts by laboratory experiments.
- Understand the fundamentals of Programming to apply it for numerical solution.

DEPARTMENT OF PHYSICS
Course Objective & Outcomes

Subject : MECHANICS **Class: B.Sc. 1st Sem.**

Course Objective

1. The students will introduce about the forces, angular momentum and knowledge about the Constraint .
2. The course will give knowledge about the general parameter like velocity, acceleration.
3. The course provide the students about the knowledge of M.I.
4. The course provide the students about the knowledge of hollow cylinder and solid cylinder.

Course Outcomes

After the completion of the course, Students will be able to

1. Get the knowledge about forces help the students in their daily life.
2. The velocity and acceleration parameter give the knowledge about how the vehicles Move.
3. The information will teach the students about the rolling concept.

DEPARTMENT OF PHYSICS
Course Objective & Outcomes

Subject : Electricity and Magnetism **Class: B.Sc. 1st Sem.**

Course Objective

1. This paper deals with the study of Electric field, Magnetic field, and Electromagnetic theory.
2. The first unit gives the mathematical idea behind the electrostatic field.
3. The second unit deals with the physics behind the Magnetostatistics.
4. Last unit deals with the electromagnetic theory.

Course Outcomes

After the completion of the course, Students will be able to

1. Explain various phenomenon like Ferromagnetism, ant ferromagnetism etc.
2. Understand the relation in between Electromagnetic theory.
3. Explain various phenomenon in light of maxwell equations.

DEPARTMENT OF PHYSICS
Course Objective & Outcomes

Subject: Properties of Matter, Kinetic Theory and Relativity Class: B.Sc. 2nd Sem.

Course Objective

This Course Enables the Student

1. To describe the concept of stress/strain and in its relation to force/displacement
2. To know the effect of forces during static conditions.
3. To determine axial forces, shear forces and bending moments
4. To express the relationship between the pressure and the average kinetic energy of gas molecules in the form of equation
5. To express the five basic assumptions of the Kinetic Molecular Theory of Gases.
6. To introduce students to the concept of special relativity and its applications to Physical Sciences

Course Outcomes

Upon successful completion of this course it is intended that a student will be able to:

1. Students will be able to identify the type of force, type of supports and the reactions on beams and plane frames.
2. The students shall be familiar with the fundamental principles of the general theory of relativity. They shall know the meaning of basic concepts like the equivalence principles, inertial frames and time dilation
3. Establish the non-existence of the hypothesized stationary aether through the null result of Michelson-Morley experiments with interferometer.
4. Explain the true nature of Newtonian mechanics and Lorentz Transformation equations.
5. Understand the concept of constant relative motion of different bodies in different frames of references

DEPARTMENT OF PHYSICS
Course Objective & Outcomes

Subject : Electromagnetic Induction & Electronic Devices Class: B.Sc. 2nd Sem.

Course Objective

1. The objective of the course is to appraise the students about the electronics industry.
2. To learn about the electronic component like Diode, transistor etc.
3. Structural analysis about the e component.
4. Knowledge about resistance inductor and capacitor.

Course Outcomes

After the completion of the course, Students will be able to :

1. Students shall learn about the significance of electric components.
2. Significance of various devices and how they will operate.
3. It will teach the students about the circuit connection.
4. About the graphical relationship of resistance, capacitor and inductor.

DEPARTMENT OF PHYSICS
Course Objective & Outcomes

Subject : Computer Programming & Thermodynamics Class: B.Sc. 3rd Sem.

Course Objective

1. Develop a greater understanding of the issues involved in programming language design and implementation.
2. Develop an in-depth understanding of functional, logic, array etc.
3. Students learn about the concepts of heat, work, and energy.
4. Student learns the different laws of thermodynamics.
5. To learn thermo-dynamical functions and there relations.

Course Outcomes

After the completion of the course, Students will be able to

1. nderstand the FORTRAN programming language.
2. Be capable of specifying the simplified syntax of programming languages (Fortran).
3. Understand the concept of thermodynamics and there laws.
4. Understand the Heat Engine and there uses.
5. Describe the thermodynamic function and there relations.

DEPARTMENT OF PHYSICS
Course Objective & Outcomes

Subject : Optics I **Class: B.Sc. 3rd Sem.**

Course Objective

1. The main objective of this subject is to aware the students about various phenomenon of waves and optics.
2. First unit of deals with the Fourier analysis and Fourier transformation.
3. The second deals with the matrix method in order to explain various phenomenon.
4. The third unit describe the Phenomenon like interference phenomenon.

Course Outcomes

After the completion of the course, Students will be able to

1. Understand the physics behind various phenomenon in wave and optics.
2. Understand various phenomenon and the cause or origin of them.
3. Explain the relationship in between various optical phenomenon with the Fourier series and matrix.

DEPARTMENT OF PHYSICS
Course Objective & Outcomes

Subject : Statistical Mechanics **Class: B.Sc. 4th Sem.**

Course objectives

1. This course in statistical mechanics provides the basic idea of probability to the students. There are ways of calculating probability for various statistical system of particles.
2. Students will study basic ideology of phase space, microstate, macrostate.
3. The objective is to apply the principles of probability in distribution of particles in various systems and to calculate thermodynamic probability.
4. The course gives the insight of postulates of statistical physics.
5. Students will learn the different types of statistics distribution and particles. They will learn which particles follow which statistics and why.
6. The aim is to apply these statistical distribution in real life problems and understand their problems.
7. Many real system of particles will be dealt throughout the course to relate the theoretical knowledge to practical one.

Course outcomes

1. After taking this course students are able to determine the probability of any type of events. They are able to interpret different types of events.
2. Students have understood the concept of phase space and its volume.
3. They can easily distinguish between different types of particles and statistics and can easily distribute bosons, fermions and classical particles among energy levels.
4. After studying Fermi dirac statistics, students have learnt to deal with many electron system in real life.

DEPARTMENT OF PHYSICS
Course Objective & Outcomes

Subject : Optics II **Class: B.Sc. 4th Sem.**

Course Objective

1. The main objective of this subject is to aware the students about various phenomenon of optics.
2. The study of the paper describe the phenomenon like Interference, Diffraction and Polarization.
3. The study describe the principals behind various phenomenon as described earlier.

Course Outcomes

After the completion of the course, Students will be able to

1. Understand the physics behind various optical phenomenon.
2. Understand various natural phenomenon which is happening in their surroundings.
3. Explain the relationship in between various optical phenomenon.

DEPARTMENT OF PHYSICS
Course Objective & Outcomes

Subject: Solid State Physics **Class: B.Sc. 5th Sem.**

Course Objective

This Course Enables the Student to

1. Describe the difference between crystalline and amorphous materials.
2. Describe the arrangement of atoms and ions in crystalline structures
3. Schematically diagram face-centered cubic, body-centered cubic and hexagonal close-packed unit cells.
4. Recognize and also give the lattice parameter relationships for all seven crystal systems--i.e., cubic, hexagonal, tetragonal, rhombohedral, orthorhombic, monoclinic, and triclinic.
5. Given a unit cell and the Miller indices for a plane, draw the plane represented by these indices referenced to this unit cell.
6. Given the unit cell for some crystal structure, be able to draw the atomic packing arrangement for a specific crystallographic plane.
7. Explain the use of X-ray diffraction measurements in determining crystalline structures

Course Outcomes

Upon successful completion of this course it is intended that a student will be able to:

1. Demonstrate an understanding of the crystal lattice and how the main lattice types are described
2. formulate the theory of X-ray diffraction in the reciprocal lattice (k-space) formalism and apply this knowledge to generalize the formulation for matter waves
3. be able to perform structure determination of simple structures
4. Learn that Dulong-Petit Law is valid only at high temperature.
5. Learn that lattice specific heat of solid vary T3 at very low temperature.

DEPARTMENT OF PHYSICS
Course Objective & Outcomes

Subject : Quantum mechanics **Class: B.Sc. 5th Sem.**

Course Objective

1. To study the basic principles of quantum mechanics.
2. Explain the operator formulation of quantum mechanics.
3. Student learn the concept of wave function.
4. Student will learn Schrodinger equation and their applications.
5. To study role of uncertainty in quantum physics.

Course Outcomes

After the completion of the course, Students will be able to

1. Pinpoint the historical aspects of development of quantum mechanics.
2. Understand and explain the differences between classical and quantum mechanics.
3. Understand the idea of wave function.
4. Understand the uncertainty relations.
5. Solve Schrodinger equation for simple potentials.

DEPARTMENT OF PHYSICS
Course Objective & Outcomes

Subject : Atomic, Molecular and Laser Physics **Class: B.Sc. 6th Sem.**

Course Objective

1. Describe the atomic spectra of one and two valance electron atoms.
2. Explain the change in behaviour of atoms in external applied electric and magnetic field.
3. Explain rotational, vibrational, electronic and Raman spectra of molecules.
4. Describe electron spin and nuclear magnetic resonance spectroscopy and their applications.
5. Basic Laser principles, Laser behaviour, Properties of laser radiations, Different types of Lasers and Laser applications

Course Outcomes

After the completion of the course, Students will be able to

1. Describe theories explaining the structure of atoms and the origin of the observed spectra.
2. Identify atomic effect such as Zeeman effect and Stark effect.
3. List different types of atomic spectra.
4. Explain the observed dependence of atomic spectral lines on externally applied electric and magnetic fields.
5. Explain different Laser used and make a comparison between them.

DEPARTMENT OF PHYSICS
Course Objective & Outcomes

Subject : Nuclear Physics **Class: B.Sc. 6th Sem.**

Course objectives

1. This is a basic course in Physics which deals with the phenomena taking place in the nuclear domain. Students will be given an insight into the dimensions of a nucleus.
2. The aim is to tell them about the stability of nucleus and various other properties.
3. The students will learn about various types of radiations and their interaction with matter.
4. The course is such designed to teach students about various types of nuclear reactions and their energetics.
5. Students will learn the methods to find the mass and charge of any nucleus by using some instruments.
6. Various ways will be taught to extract energy from nuclei in real life.

Course outcomes

1. After taking this course, students are able to determine the charge, mass of any nucleus by using various spectrograph.
2. They are able to understand the size of nucleus and all its properties.
3. This course has led the students to understand interaction of various types of radiation with matter which they observe in their daily life. It's easy for them now to relate the theory to practical.
4. Students now know various methods of accelerating various types of particles to perform scattering experiments.
5. Students are able to understand the detecting methods and instruments for different types of charged and neutral particles.

DEPARTMENT OF PHYSICS

Course Objective & Outcomes

Subject: Mathematical PhysicsSubject Code: Class: M.Sc. Physics 1st Sem.

Course Objective

This Course Enables the Student to

1. Understand the linear equations, vector spaces, matrices, linear transformations, determinants, eigenvalue, eigenvectors, etc.
2. Learn to use Laplace transform methods to solve differential equations.
3. Introduce the Fourier series and its application to the solution of partial differential equations

Course Outcomes

Upon successful completion of this course it is intended that a student will be able to:

1. Students will demonstrate competence with the basic ideas of linear algebra including concepts of linear systems, independence, theory of matrices, linear transformations, bases and dimension, eigenvalues, eigenvectors and Diagonalization.
2. Use the method of Laplace transforms to solve initial-value problems for linear differential equations with constant coefficients.
3. Solve a Cauchy problem for the wave or diffusion equations using the Fourier Transform.

DEPARTMENT OF PHYSICS

Course Objective & Outcomes

Subject: Classical MechanicsSubject code: MSP-102 Class: M.Sc. Physics 1st Sem.

Course Objective

This Course Enables the Student

1. To distinguish between ‘inertia frame of reference’ and ‘non-inertial frame of reference’
2. To know how to impose constraints on a system in order to simplify the methods to be used in solving physics problems
3. To know what central, conservative and central-conservative forces mathematically understand the conservative theorems of energy, linear momentum and angular Momentum.
4. To know the importance of concepts such as generalized coordinates and constrained motion
5. To establish that Kepler’s laws are just consequences Newton’s laws of gravitation and that of motion
6. understand Poisson brackets, understand canonical transformations
7. To find the linear approximation to any dynamical system near equilibrium and also know how to derive and solve the wave equation for small oscillations.

Course Outcomes

Upon successful completion of this course it is intended that a student will be able to:

1. Students learn about Lagrangian and Hamiltonian formulation of Classical Mechanics.
2. state the conservation principles involving momentum, angular momentum and energy and understand that they follow from the fundamental equations of motion
3. Have a deep understanding of Newton’s laws,
4. Students learn about motion of a particle under central force field.

DEPARTMENT OF PHYSICS

Course Objective & Outcomes

Subject: Quantum Mechanics- I **Class: M.Sc. Physics 1st Sem.**

Course objectives

1. The main objective of this course is to make students aware about the basic formulations in quantum mechanics. There are many different types of representations of state and operators that are very useful in studying the subject deeply.
2. The course takes up the responsibility to give information about hermitian operators, their eigenvalues and eigenvectors. It teaches about various commutation and uncertainty relations.
3. Students will be given knowledge about unitary transformations, dirac delta function, matrix representation of operators and their applications.
4. Main focus is on angular momentum operator and their representation in spherical coordinates. Addition of angular momenta is also taught.
5. Students will be given insight to solve Schrodinger wave equation in three dimensions.
6. Basic idea of time independent perturbation theory is provided .

Course outcomes

1. After taking this course students will be able to appreciate the beauty of quantum mechanics. They will be knowing all types of representations of operators and ways to apply them in different problems.
2. The most important thing students learned form this course was how to solve the hydrogen atom problem by using quantum mechanics.
3. Students learned about time independent degenerate and non degenerate perturbations and to apply them in harmonic oscillator.
4. Students got an idea of Pauli spin matrices which are very important in nuclear and particle physics as well as atomic and molecular physics.

DEPARTMENT OF PHYSICS

Course Objective & Outcomes

Subject: Atomic and Molecular PhysicsSubject code: MSP-104

Class: M.Sc. Physics 1st Sem.

Course Objective

This Course Enables the Student to

1. study and develop the Bohr theory of the hydrogen atom
2. Observe the fine structure lines of HCl molecule and the Zeeman splitting of one or more of these lines as a function of magnetic field.
3. Outline the selection rules for rotational and vibrational spectra and rationalize the role of the molecular dipole moment in the selection rules.
4. Distinguish between the energy levels of a rigid and a non rigid rotor.

Course Outcomes

Upon successful completion of this course it is intended that a student will be able to:

1. They should be able to calculate the Zeeman effect and the Lande g-factor
2. They should be able to calculate the effects of an electric field on the energy levels of the hydrogen atom (the Stark effect).
3. They should be able to discuss the rotational spectra of molecules.
4. They should be able to apply the Simple Harmonic Oscillator to determine the vibrational spectrum of diatomic molecules.
5. You will understand how the new theory could explain the fine structure in the spectra of hydrogen and hydrogen-like ions, and how this theory can be extended to atoms which have a single electron in their outermost shell, i.e. the alkali metal atoms.
6. Students learn about fine structure of Hydrogen atoms.
7. Students learn about rotational and vibrational energy levels of diatomic molecules and Raman spectroscopy.

DEPARTMENT OF PHYSICS

Course Objective & Outcomes

Subject :Electronics Devices **Class: M.Sc. Physics 2nd Sem.**

Course Objective

1. The course will provide the students about the electronic Components diode,transistor.
2. This will provide the students the knowledge of IC fabrication.
3. It give an imp. Information about the optoelectronic devices.
4. This course offered a variety of diodes like zenerdiode .
5. It will give the knowledge of switching circuit.

Course Outcomes

After the completion of the course, Students will be able to

1. IC fabrication is very imp. For the electronic industry. This will give the knowledge of many circuits.
2. Optoectronic devices help the students for the conversion of energy,like light to electrical energy.
3. The study of semiconductor devices makes the base of student in the electronic field.
4. Zener diode study tells that it act as a voltage regulator and how to control the voltage.

DEPARTMENT OF PHYSICS

Course Objective & Outcomes

Subject: Communication Skills **Class: M.Sc. Physics 1st Sem.**

Course Objectives

1. Students will demonstrate competency in research skills related to the use of the field's professional literature and in systematic research design and implementation.
2. Students will demonstrate an understanding of multiple theoretical perspectives and diverse intellectual traditions in Communication.
3. Students will demonstrate competency in human relational interaction.
4. Students will demonstrate competency in the analysis and practice of ethical communication.
5. Students will demonstrate an understanding of the importance of free expression and the responsibilities it entails.
6. Students will demonstrate competency in effective communication with diverse others and an understanding of the impact of culture on communication

Course outcomes

After completion of the course Students will be able to

1. Demonstrate critical and innovative thinking
2. Display competence in oral, written, and visual communication.
3. Apply communication theories.
4. Show an understanding of opportunities in the field of communication.

DEPARTMENT OF PHYSICS

Course Objective & Outcomes

Subject: Statistical MechanicsSubject code: MSP-201 Class: M.Sc. Physics 2nd Sem.

Course Objective

1. This course provides an introduction to the microscopic formulation of thermal physics, generally known as statistical mechanics.
2. We explore the general principles, from which emerge an understanding of the microscopic significance of entropy and temperature.
3. We develop the machinery needed to form a practical tool linking microscopic models of many-particle systems with measurable quantities.
4. We consider a range of applications to simple models of crystalline solids, classical gases, quantum gases and blackbody radiation.

Course Outcomes

On completion of this course a student should be able to:

1. define and discuss the concepts of microstate and macrostate of a model system
2. define and discuss the concepts and roles of entropy and free energy from the view point of statistical mechanics
3. apply the machinery of statistical mechanics to the calculation of macroscopic properties
   resulting from microscopic models of magnetic and crystalline systems
4. define the Fermi-Dirac and Bose-Einstein distributions; state where they are applicable;
   understand how they differ and show when they reduce to the Boltzmann distribution
5. apply the Fermi-Dirac distribution to the calculation of thermal properties of electrons in
   metals
6. apply the Bose-Einstein distribution to the calculation of properties of black body radiation

DEPARTMENT OF PHYSICS

Course Objective & Outcomes

Subject : Nuclear and particle physics **Class: M.Sc. Physics 2nd Sem.**

Course Objective

1. The objective of the course is to appraise the students about the particles .
2. To learn about the decay phenomenon and the process how they will occur.
3. Knowledge of various model compare to nucleus.
4. Knowledge of scattering process.

Course Outcomes

After the completion of the course, Students will be able to

1. Students shall learn about the knowledge of particles.
2. Significance of various decays tells the students about the nuclear process..
3. It will teach the students about the spin parity concept &magic no. Related to shell.
4. About the scattering process how it will occur.

DEPARTMENT OF PHYSICS

Course Objective & Outcomes

Subject : Quantum Mechanics- II **Class: M.Sc. Physics 2nd Sem.**

Course objectives

1. This is an advanced level course in Quantum mechanics which objects to teach about various approximation methods in physics to calculate the approximate values of energy for various systems.
2. Students will be able to learn the methods to find transition probability for absorption and emission.
3. The objective is to give them ideas about laboratory and center of mass frame and study the scattering phenomena in both these frames.
4. This course will let students appreciate the beauty of quantum mechanics in the form of the Born approximation and its validity.
5. Students will be able to study the wave functions of system of identical particles.

Course outcomes

1. After studying this course, students can calculate the ground state and excited state energies of various real life systems by using Principle , WKB method and perturbation methods.
2. Students will be knowing about the Einstein's coefficients and relating them to lasers.
3. They know about scattering in two different frames and can easily calculate scattering amplitude and scattering cross section.
4. Students can write total energy and wave function as slater determinant for system of identical fermions.

DEPARTMENT OF PHYSICS

Course Objective & Outcomes

Subject : Atomic and Molecular Physics-II **Class: M.Sc. Physics 2nd Sem.**

Course Objective

1. This course will provides an introduction to the knowledge of the different spectroscopy methods.
2. To study Raman spectroscopy: principle, instrumentation and their applications.
3. To study the electronic spectra of diatomic molecules.
4. Explain the IR and Raman spectroscopy in the structure determination of simple molecules.
5. Describe the origin of X-ray and their emission and absorption spectra.

Course Outcomes

After the completion of the course, Students will be able to

1. Understand the difference between Stokes and anti-Stokes lines in a Raman spectrum.
2. Student will be able to select molecular spectroscopy methods suitable for solving given scientific problem.
3. Student will know basic information on molecular methods (IR, Raman, UV etc.)
4. Student will be able to analyze results of measurements using molecular spectroscopy methods.
5. Understand the concept of origin of X-rays.

DEPARTMENT OF PHYSICS

Course Objective & Outcomes

Subject : Condensed Matter Physics **Class: M.Sc. Physics 2nd Sem.**

Course Objective

1. The objective of the paper is to aware the students about the field of Condensed matter physics
2. This paper enable the students to understand about the crystal structure, interaction with X-ray, lattice vibrations, defects, electronic properties and the magnetic properties etc.
3. It also helps the students to understand various properties about crystals.
4. This paper deals with the study of structural properties of solids.

Course Outcomes

After the completion of the course, Students will be able to

1. 1. Understand the physics behind structural properties of the solids.
2. 2. Tailor the properties of solids with proper understanding.
3. 3. Pursue the research work in the field of material science and nanotechnology.

DEPARTMENT OF PHYSICS

Course Objective & Outcomes

Subject: Condensed Matter Physics **Class: M.Sc. Physics 3rd Sem.**

Course Objective

1. The objective of the paper is to aware the students about the field of Condensed matter physics.
2. This paper enable the students to understand about the crystal structure, interaction with X-ray, lattice vibrations, defects, electronic properties and the magnetic properties etc.
3. It also helps the students to understand various properties about crystals.
4. This paper deals with the study of structural properties of solids.

Course Outcomes

After the completion of the course, Students will be able to

1. Understand the physics behind structural properties of the solids.
2. Tailor the properties of solids with proper understanding.
3. Pursue the research work in the field of material science and nanotechnology.

DEPARTMENT OF PHYSICS

Course Objective & Outcomes

Subject: Electrodynamics and Wave propagation Class: M.Sc. Physics 3rd Sem.

Course objectives

1. One of the objectives of this course is to introduce students with the formulation of four vectors. They are to be introduced by the Lorentz transformations and the invariance of various quantities in four dimensions.
2. Main aim is to feed student's mind by fields and radiations from various types of dipoles and localized sources. They will be taught to calculate power radiated in each case.
3. Students will be introduced by the formation and characteristics of ionosphere and how waves propagate through it.
4. The objective is to introduce them about wave guides and their applications.
5. They will be taught about the transmission lines and propagation of waves through them.

Course outcomes

1. After taking this course, students are able to appreciate the need and necessity of four vector notation. They have applied it for Lorentz transformation and written the dual field tensor which is one of the major aspects of theoretical physics.
2. They have understood the difference between covariance and invariance of various quantities and applied it.
3. One of the major advantages of this course is that it is very much related to the real life where the ionosphere is playing very important part.
4. Students now know the basics of scattering and absorption and relate them to real life phenomena.
5. They have learnt about wave guides and transmission lines and propagation of waves through them.

DEPARTMENT OF PHYSICS

Course Objective & Outcomes

Subject: Electronics-1 **Class: M.Sc. Physics 3rd Sem.**

Course Objective

1. To learn Number System, Binary Codes and Boolean Algebra.
2. Student will learn Boolean function representation and minimization techniques.
3. To learn about Combinational Logic Circuits and Sequential Logic Circuits.
4. Student learn about Counters and their applications.
5. To learn Shift registers and their applications.

Course Outcomes

After the completion of the course, Students will be able to

1. Understand the fundamentals of converting from one number system to another.
2. Represent signed decimal numbers in 2's complement form, and vice versa.
3. Explain the basic logic operations of NOT, AND, OR, NAND, NOR, and XOR.
4. Apply the laws of Boolean algebra and K-map to simplify circuits and Boolean algebra expressions.
5. Understand the basic electronics of logic circuits, counters, registers and be able to use integrated circuit packages.

DEPARTMENT OF PHYSICS

Course Objective & Outcomes

Subject: Computational Methods & Programming-I Class: M.Sc. Physics 3rd Sem.

Course Objective

1. The course will also develop an understanding of the elements of error analysis for numerical methods and certain proofs.
2. The main objective of this course is to provide students with an introduction to the field of numerical analysis.
3. Derive appropriate numerical methods to solve interpolation based problems.
4. Derive appropriate numerical methods to solve probability based problems.
5. Problem solution using FORTRAN language.

Course Outcomes

After the completion of the course, Students will be able to

1. Understand the theoretical and practical aspects of the use of numerical analysis.
2. Proficient in implementing numerical methods for a variety of multidisciplinary applications.
3. Establish the limitations, advantages, and disadvantages of numerical analysis.
4. Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and the solution of differential equations.
5. Understand the syntax of FORTRAN language and to develop the programme using it for the solution of a problem.

DEPARTMENT OF PHYSICS

Course Objective & Outcomes

Subject: Nuclear and Particle PhysicsSubject code: 17PHY24C1

Class: M.Sc. Physics 4th Sem.

Course Objective

This Course Enables the Student to

1. introduce students to the fundamental principles and concepts governing nuclear and particle physics
2. observational aspects of nuclei, including their binding energy, size, spin and parity
3. nuclear models: liquid drop and shell models
4. the semi-empirical mass formula and deductions from it concerning nuclear stability
5. The classification of fundamental particles and their interactions according to the Standard Model quark structure of mesons and baryons.
6. To find out properties of the strong and weak interactions - scattering Theory

Course Outcomes

Upon successful completion of this course, the student will be able to:

1. Determine nuclear properties such as binding energy, spin and parity in the framework of the liquid drop model and the shell model of the nucleus.
2. Use the liquid drop model and the law of radioactive decay to describe alpha-decay, beta-decay, fission and fusion, predict decay reactions and calculate the energy release in nuclear decays
3. Explain the experimental evidence for quarks, gluons, quark confinement, asymptotic freedom, sea quarks, the running coupling constant and colour charge

DEPARTMENT OF PHYSICS

Course Objective & Outcomes

Subject :Physics of Nano-materials **Class: M.Sc. Physics 4th Sem.**

Course Objective

1. This paper deals with the study of various phenomenons of Nano science and Nano technology.
2. First unit describes the free electron theory which can describe various phenomenons.
3. The second unit describes the physics in quantum well, quantum wire and quantum dot.
4. Third unit gives idea about various characterizations like XRD, PL spectra and Raman spectroscopy.
5. The last unit describes various synthesis techniques like cluster beam deposition, ion beam deposition, chemical bath deposition techniques etc.

Course Outcomes

After the completion of the course, Students will be able to

1. Explain the nano science and technology in light of quantum confinement.
2. Understand various phenomenons like quantum dot, quantum wire in light of Schrödinger equation.
3. Synthesis various nonmaterial with various techniques with proper understanding.
4. They can analysis the nano crystal with Structural and opto electrical properties,.
5. The understanding of the subject leads the students in their research work.

DEPARTMENT OF PHYSICS

Course Objective & Outcomes

Subject : Electronics II **Class: M.Sc. Physics 4th Sem.**

Course Objective

1. The objective of the course is to appraise the students about the process which help In communication.
2. About the various devices which are optoelectronic.
3. Circuit analysis of operational amplifier and IC.
4. Knowledge about digital electronics and digital technique.

Course Outcomes

After the completion of the course, Students will be able to

1. Students shall learn about the significance of communication process which are very useful in daily life.
2. Significance of various devices which are which are beneficial to understand how they will operate and use.
3. Due to circuit analysis of Ic and opamp, it will help in performing the mathematical operation.
4. The modern world is digital world.It is very useful in this time.

DEPARTMENT OF PHYSICS

Course Objective & Outcomes

Subject : Computational Methods and Programming-II Class: M.Sc. Physics 4th Sem.

Course Objective

1. Develop a greater understanding of the issues involved in programming language design and implementation.
2. Develop an in-depth understanding of functional, logic, structure, union, array and object-oriented programming paradigms.
3. Implement several programs in languages and develop an in-depth understanding of inheritance and polymorphism in object-oriented programming paradigms.
4. Understand design/implementation issues involved with variable allocation and binding, control flow, types, subroutines, parameter passing.
5. Develop an understanding of web development technology.

Course Outcomes

After the completion of the course, Students will be able to

1. Be capable of specifying the simplified syntax of programming languages (C/C++).
2. Student able to solve problem related to function, array, structure and OOP's etc.
3. Using C++, software complexity can be easily managed.
4. Massage passing techniques for communication between objects makes the interface description with external system much simpler.
5. To design a systems with open interfaces.