

कोर्स आउटकम

कोर्स पूर्ण करने पर विद्यार्थी कौन से कौशल प्राप्त करेंगे तथा उनका उपयोग कैसे कर पायेंगे।


विभाग का नाम— Department of Physics

प्रोग्राम का नाम— M.Sc. Semester-II

प्रश्न पत्र का नाम— High energy physics - II

Course Outcomes

- CO-01-Realize the Weak interaction, Leptons fundamentals their decay.
- CO-02-Understand the concept of Helicity, Higgs field and existence of Higgs Bosons.
- CO-03-Understand of the relativistic kinematics and its importance in calculations at relativistic energies.
- CO-04-Construct Analysis of the decay energy in various high energy reactions.
- CO-05-Understand the interaction of charge particles with matter and will be able to calculate the dynamics of high energy particles.
- CO-06-Learn the quantitative and qualitative analysis of Energy loss an Straggling mechanism.


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प्रोग्राम का नाम— M.Sc. Semester-II

प्रश्न पत्र का नाम— condensed matter physics – II

Course Outcomes

- CO -01- Explicate response of band electrons to an external electric field and their scattering, and calculate currents in bands.
- CO -02- Develop a semi-classical description of electrical and thermal transport in metals using the Boltzmann approach, and explain different thermoelectric effects.
- CO -03- Distinguish nanostructures from bulk materials and learn principle of different imaging techniques for nanostructures.
- CO -04- Calculate the electronic structure of nano-scale 1D, 0D solids in effective mass approximation, and use it to explain the electrical transport in these solids.
- CO -05- Learn the concept of screening and calculate the screened potential using the Thomas-Fermi and Lindhard approaches.
- CO- 06- Apply the second-quantized method to a degenerate homogenous electron gas for calculating the first-order ground-state energy.

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विभाग का नाम— Department of Physics

प्रोग्राम का नाम— M.Sc. Semester-II

प्रश्न पत्र का नाम— Electronic instrumentation

Course Outcomes

- CO -01- Measure various electrical parameters with accuracy, precision, resolution.
- CO -02- Design different types of amplifiers and filters.
- CO -03- Select specific instrument for specific measurement function.
- CO -04- Understand principle of operation, working of different electronic instruments like digital multi meter, vector voltmeter, and power factor meter.
- CO -05- Analyze the functioning, specification, and applications of signal generators and signal analyzing instruments.

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विभाग का नाम— Department of Physics

प्रोग्राम का नाम— M.Sc. Semester-II

प्रश्न पत्र का नाम Research methodology & computer application Basics

Course Outcomes

- CO-01- Knowledge of research process reading evaluating developing and analyzing the ideas/ thought in critical/ analytical manner.
- CO-02- literature reviews using print and online database of the subject and allied branches in perspectives of its inter -relation and so on.
- CO-03- competent use of MLA and APA format for citation of print and electronic materials available .
- CO-04- Potentials to identify explain, compare and prepare the key elements of research proposal and research report.
- CO-05- Compare and contrast qualitative and quantitative research paradigms and to explain the use of each in research.
- CO-06- The rationale for research ethics and importance of local processes for Institutional Review Board reviews for its rational improvisation.
- CO-07- How Educational research contributes to the objectives of doctoral programme and specific career in higher education
- CO-08- Competent use of information received in general social welfare and issues relevant and focused in the context of humanity as whole and its positive solutions in larger interest be devised.


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प्रोग्राम का नाम— M.Sc. Semester-II

प्रश्न पत्र का नाम— Quantum Mechanics - II

Course Outcomes

CO 01- Understand the kinematics of scattering process.

CO 02- Evaluate the partial wave analysis using Born approximation method.

CO 03- Apply time Independent perturbation theory for non-degenerate case.

CO 04- Gain knowledge on WKB approximation method to study alpha decay.

Remember time dependent perturbation theory.

CO 05- Analyze the interaction of an atom with electromagnetic radiation and the

Relativistic quantum mechanics using Klein Gordon equation, Explore

the properties of gamma matrices.

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विभाग का नाम— Department of Physics

प्रोग्राम का नाम— M.Sc. Semester-II

प्रश्न पत्र का नाम— Atomic & Molecular Physics

Course Outcomes

- CO - 01 - Deal with problems related to Hydrogen-like atomic spectra.
- CO - 02 - Having knowledge about the rotational, vibrational and Raman spectroscopy of molecules.
- CO - 03 - Developing analytical, laboratory and computing skills through problem solving, laboratory & computer based exercises which involve the applications of atomic and molecular physics.
- CO - 04 - Carry out experimental and theoretical studies on atomic and molecular physics with focus on structure & dynamics of atoms and molecules.
- CO - 05 - Account for theoretical models, terminology & working methods used in atomic and molecular physics.
- CO - 06 - To successfully apply the theoretical techniques presented in course to practical problems.

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प्रोग्राम का नाम— M.Sc. Semester-II

प्रश्न पत्र का नाम— Electronics

Course Outcomes

- CO -01- Acquire knowledge of operational amplifier circuits and their applications.
- CO -02- Gain knowledge and evaluate the Boolean expressions, combinational logic circuits and Simplifications using Karnaugh maps.
- CO -03- Analyze the operation of decoders, encoders, multiplexers, adders and subtractors.
- CO 04- Understand the working of latches, flip-flops, designing registers, counters, a/d and d/a converters.
- CO 05- Design and Analyze synchronous and asynchronous sequential circuits.

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विभाग का नाम— Department of Physics


प्रोग्राम का नाम— M.Sc. Semester-I

प्रश्न पत्र का नाम— Mathematical Physics

Course Outcomes

After completing the course the students will able to:-

- CO-01- Familiarized with different special functions like Associated Legendre Polynomials, Laguerre's Polynomials, etc. and their solutions in solving different physical problems.
- CO-02- To obtain knowledge of Fourier and Laplace Transforms in solving different problems of Mechanics and Electronics etc.
- CO-03- Learn about the concept and uses of Tensors and Tensor algebra (Null tensor, addition, subtraction, inner product, outer product).
- CO-05- Obtain the basic knowledge of Group theory and its applications. This theory is also used to describe the crystal symmetry and electronic structure of crystals.
- CO-06- Understand the calculus of residue and evaluate some typical definite integral using the Method of contour integration
- CO-07- Apply the knowledge of matrices for solving linear algebraic equations and Learn basics of group theory and prepare group multiplication tables for understanding crystallography.


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विभाग का नाम— **Department of Physics**

प्रोग्राम का नाम— **M.Sc. Semester-I**

प्रश्न पत्र का नाम— **Classical Mechanics**

Course Outcomes

After completing the course the students will able to:

- CO-01- To apply Lagrangian and Hamiltonian for solving simple classical dynamics problems.
- CO-02- Apply Newton's laws of motion and conservation law of energy, linear and angular momentum
to solve advanced problems involving the dynamic motion of classical mechanical system
- CO-03- Solve the equations of motion for complicated mechanical systems using the Lagrangian and Hamiltonian formulations of classical mechanics.
- CO-04- Explore the application of Hamilton's equations in solving the equation of motion of a particle in a central force field, projectile motion of a body
- CO-05- Formulate the equations of rigid body dynamics and demonstrate the examples of non-inertial frames of reference
- CO-06- Develop a deep understanding to tackle the problems of small oscillations and special theory of Relativity
- CO -07- To understand rigid body dynamics and small oscillations using Lagrangian approach
- CO-08- Use Hamilton-Jacobi theory for finding the solutions of various Classical systems

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विभाग का नाम— **Department of Physics**

प्रोग्राम का नाम— **M.Sc. Semester-I**

प्रश्न पत्र का नाम— **RESEARCH METHODOLOGY & COMPUTER APPLICATION: BASICS**

Course Outcomes

- CO-01- Knowledge of research process reading evaluating developing and analyzing the ideas/ thought in critical/ analytical manner.
- CO-02- Potentials to identify explain, compare and prepare the key elements of research proposal and research report.
- CO-03- Compare and contrast qualitative and quantitative research paradigms and to explain the use of each in research.
- CO-04- How Educational research contributes to the objectives of doctoral programme and specific career in higher education
- CO-05- Competent use of information received in general social welfare and issues relevant and focused in the context of humanity as whole and its positive solutions in larger interest be devised.


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विभाग का नाम— Department of Physics

प्रोग्राम का नाम— M.Sc. Semester-I

प्रश्न पत्र का नाम— Electronic Devices and Applications

Course Outcomes

After completing the course the students will able to:

- CO-01- Understanding the physics of the devices their characteristics and applications, to be able to use them in electronic circuits.
- CO-02- Students would develop an insight into the technologies that go into an IC chip that they would be extensively using during and after the course.
- CO-03- In depth understanding would enable the students to appreciate the beauty of the subject and design amplifiers that are technically sound.
- CO-04- Students would develop a comprehensive understanding of contemporary integrated circuit amplifier design.
- CO-05- Understand the working of latches, flip-flops, designing registers, counters, a/d and d/a converters.

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विभाग का नाम— **Department of Physics**

प्रोग्राम का नाम— **M.Sc. Semester-I**

प्रश्न पत्र का नाम— **Quantum Mechanics-I**

Course Outcomes

After completing the course the students will able to: -

- CO-01- Understand and explain the differences between classical and quantum mechanics Learn operator formalism for observables and basic commutation relations.
- CO-02- Solve Schrödinger equation for simple potentials like linear Harmonic oscillator and Hydrogen atoms.
- CO-03- Understand the space, time and displacement symmetries.
- CO-04- Formulate the Heisenberg & Dirac formulation of quantum mechanics-explain various types of imperfections in crystals.
- CO-05- Explain scattering theory, formulate and solve scattering equation-classify polymers and composites based on their properties and applications.
- CO-06- Apply the Variational principle and WKB Approximation to solve the real problems-Classify nanomaterials, their fabrication techniques and co relate the effects of confinement to nanoscale on their properties.

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विभाग का नाम – भौतिक शास्त्र (एम0एससी0)

PROGRAMME SPECIFIC OUTCOMES (PSOS)

After successful completion of M. Sc. Physics program, the students will

PSO1	Be capable of applying the core physical laws to unravel a multitude of physical properties, processes, and effects involving radiation, nuclei, atoms, molecules, and bulk forms of matter.
PSO2	Develop hands-on skills for carrying out elementary as well as advanced experiments in different sub-fields of Physics viz. condensed matter physics, nuclear physics. particle physics, materials science, computational physics & electronics, along with enhancing their understanding of physical concepts and theories.
PSO3	Attain abilities of critical thinking, problem mapping & solving using fundamental principles of Physics, systematic analysis & interpretation of results, and unambiguous oral & writing/presentation skills.
PSO4	Have robust foundation in basic and practical aspects of Physics enabling them to venture into research in front-line areas of physical sciences, and career as Physics teachers and scientists.

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विभाग का नाम- भौतिक शास्त्र (एम0एससी0)

प्रोग्राम आउटकम

(प्रोग्राम पूरा करने पर नया कौशल प्राप्त करेंगे उसका कैसे उपयोग कर पायेंगे)

PO1	Knowledge	Capable of demonstrating comprehensive disciplinary knowledge gained during course of study
PO2	Research Aptitude	Capability to ask relevant/appropriate questions for identifying, formulating and analyzing the research problems and to draw conclusion from the analysis
PO3	Problem Solving	Capability of applying knowledge to solve scientific and other problems
PO4	Individual and Team Work	Capable to learn and work effectively as an individual, and as a member or leader in diverse teams, in multidisciplinary settings.
PO5	Modern Tool usage	Ability to use and learn techniques, skills and modern tools for scientific practices
PO6	Science and Society	Ability to apply reasoning to assess the different issues related to society and the consequent responsibilities
PO7	Life-Long Learning	Aptitude to apply knowledge and skills that are necessary for participating in learning activities throughout life
PO8	Project Management	Ability to demonstrate knowledge and understanding of the scientific principles and apply these to manage projects



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