Program Offered

M.Sc. (Physics) Program outcome

Department of Physics

2023-2024

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| **Sr.**  **No.** | **Program** | **Program Objectives** | **Program Specific Outcomes** |
| 1 | M.Sc. (Physics) (Pattern-2023) | 1) Physics Education through Master Texts: It helps in understanding the theoretical and mathematical development of the subject and to create interest in the subject. 2) Physics Education through Experimentation: It helps in general to improve scientific attitude. So emphasis is given on the development of experimental skills, data analysis, calculations, and also on the limitations of the experimental method and data and, results obtained. 3) Physics Education through Problem Solving: It helps in understanding the concepts of physics. It underline the strength of equations, formulae, graphs, mathematical tools to tackle the problems. So accordingly, we have introduced compulsory problem part in the question paper. 4) Physics Education through History and Philosophy: It helps in understanding the conceptual development of the subject and thereby increase the interest in the subject. A topic on this is introduced in the Physics Course. 5) Physics Education through Awareness of Misconceptions: It improves the scientific awareness among the students. A discussion on different subjects are encouraged. 6) Physics Education through Proto-research: It creates interest in the subject and improves technological aspect. Accordingly, mini projects, hands-on activities, projects, models and demonstrations etc. is included in the syllabi. 7) Physics Education through Qualitative Overview: It creates interest in the subject to continue to work in the field of science in general and physics in particular. Accordingly future directions and frontiers of the subject are included in the syllabi. | 1. After completion of program, students will be able to have in-depth knowledge of basic concepts in Physics. 2. Students will be able to apply the laws of Physics in real life situations to solve the problems. 3. Students develop aptitude of doing research through undertaking research projects. 4. Student will have set his foundation to pursue higher education in Physics and to clear competitive examinations like SET NET GATE. 5. After completing the program student will have developed interdisciplinary approach and can pursue higher studies in subjects other than Physics 6. Ability Enhancement |

Courses Offered: (Executed last year: M.Sc. Physics)

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| **Sr. No.** | **Course** | **Course Outcome** |
| **M. Sc.** | | |
| **Semester 1** | PHY 501 MJ Mathematical Methods for Physics | A) Course Objectives: This course aims to 1) To introduce students to methods of mathematical physics and to develop required mathematical skills to solve problems in quantum mechanics, electrodynamics and other fields of theoretical physics. 2) To impart knowledge about various mathematical tools employed to study physics problems  B) Learning Course Outcomes (CO) :On completion of the course, the student will be able to, ● Understanding the mathematics in Physics ● Solve and understand complex problems. ● Apply the knowledge to solve problems in various branches of Physics and Electronics. |
| PHY 502 MJ Statistical Physics | A) Course Objectives: This course aims to ● To introduce students to methods of mathematical physics and to develop required mathematical skills to solve problems in statistical mechanics and other fields of theoretical physics. ● To impart knowledge about various statistical tools employed to study physics problems  B) Learning Course Outcomes (CO) : On completion of the course, the student will be able to, 1) Understanding the Statistical in Physics 2) Solve and understand problems. 3) Apply the knowledge to solve problems in various branches of Physics. |
| PHY 503 MJ Classical Physics | A) Course Objectives: This course aims to introduce 1. To understand the Newtonian mechanics applications of Newton’s laws of motion 2. To know the Lagrangian approach in classical mechanics and applications of Lagrangian formulation 3. To understand the Hamiltonian approach in classical mechanics and applications 4. To know about Variational principle and its applications  B) Learning Course Outcomes (CO) : After completion of the course, the student should be able to: 1. The students will introduce about the newton’s laws of motion and knowledge about the applications of newton’s laws of motion. 2. This paper enables the students to understand the Lagrangian approach in classical mechanics. 3. The students should be able to understand Hamiltonian formulation with applications 4. The paper also enables the students to know about Variational principle with applications. |
|  | PHY 504 MJ Quantum Physics | A) Course Objectives: This course aims to introduce the fundamentals of Quantum Mechanics and awareness about the use of Quantum Mechanics to the students. The primary objectives of the study are, 1) Utilize the postulates of quantum mechanics to describe quantum systems and determine their properties, including the results of measurements. 2) Use operator techniques to solve relevant problems. 3) Use the properties of angular momentum and spin to describe quantum systems such as the hydrogen atom and an electron in a magnetic field. 4) Use perturbation theory to find approximate solutions to more complex quantum mechanical systems. B) Learning Course Outcomes (CO): Upon completion of the course, the student will be able to, 1) Understand various quantum mechanical features by solving various potentials: example, Finite and infinite well, Harmonic oscillator. 2) Learn Eigen values and Eigen functions of operators and computation of Clebsch–Gordan coefficients. 3) Application of Time-independent and time Dependent perturbation theory. 4) Apply the knowledge of Variational Methods for particle in box, Harmonic oscillator and Delta Function along with WKB approximation for classical Region and Tunneling. 5) Familiarizing students with the theoretical framework of non-relativistic quantum mechanics and its applications to simple problems. |
|  | PHY 511 MJ Computational Physics | A) Course Objectives: This course aims to familiarize the students with the numerical methods used in computation and programming using FORTRAN language to solve physics problems. The primary objectives of the course are • To impart basic knowledge of computational physics in solving the physics problems. • To use computer programming language for simulation and data analysis.  B) Learning Course Outcomes (CO) : Upon completion of the course, the student will be able to, • Apply basic knowledge of computational physics in solving the physics problems. • Demonstrate concepts related to variables, I/O, arrays, procedures, modules, pointers in FORTRAN. • Programme with the FORTRAN or any other high level language. • Use various numerical methods in solving physics problems. • Analyze the outcome of the algorithm/program graphically. |
|  | PHY 541 MN Research Methodology | A) Course Objectives: This course aims to introduce fundamentals of Research in Science and Physics • To study the basic concepts regarding research • To impart knowledge about research  B) Learning Course Outcomes (CO) : Upon completion of the course, the student will be able to, • Understand Research. • Identify research problems. • Understanding the research to solve research problems |