

Department of Physics
Sarat Centenary College

Programme Outcome :

After the completion of a degree programme, the students will be acquainted with the following:

- i) A fundamental knowledge in the academic field of physics like Astrophysics, Material Science, Nuclear physics, Particle Physics, Atomic and Molecular Physics, mathematical Physics, Analytical dynamics, Space Science and its linkages with employment and higher studies.
- ii) Generate knowledge to create the efficient professionals in the field or related area of physics
- iii) Realize the importance of modelling, simulation, computing etc.

Course Outcome :

MAJOR-PHYSICS COURSE Semester I MAJOR-I: PHYS1011: MATHEMATICAL PHYSICS-I

COURSE OBJECTIVE: The aim of this course is to equip the students with mathematical methods that are important prerequisites for physics courses.

MAJOR-I: PHYS1011: MATHEMATICALPHYSICS-I Practical: 30 Hours

COURSE OBJECTIVE: The aim of this course is to learn computer programming and numerical analysis and to emphasize its role in solving problems in Physics.

COURSE OUTCOME: On completion of this course, the student must be able to perform different mathematical operations like calculus and vector operations which are extremely essential to study theoretical and experimental physics.

MAJOR-PHYSICS COURSE Semester II MAJOR II: PHYS2011: MECHANICS

COURSE OBJECTIVE: The objective of this course is to provide an in-depth understanding of the principles of Newtonian mechanics and apply them to solve problems involving the dynamics of classical mechanical systems.

COURSE OUTCOME: This course in Mechanics serves as the foundation for further progress towards the study of physics at graduate or post-graduate level. Upon completion of the course, the student will be able to apply Newton's laws of motion to different force fields for a single particle and for a system of particles.

MINOR-PHYSICS COURSE Semester I MINOR-I: PHYS1021: MATHEMATICAL PHYSICS-I

COURSE OBJECTIVE: The aim of this course is to equip the students with mathematical methods that are important prerequisites for physics courses

MINOR-I: PHYS1021: MATHEMATICALPHYSICS-I

COURSE OBJECTIVE: The aim of this course is to learn computer programming and numerical analysis and to emphasize its role in solving problems in Physics.

COURSE OUTCOME: On completion of this course, the student must be able to perform different mathematical operations like calculus and vector operations which are extremely essential to study theoretical and experimental physics

MINOR-PHYSICS COURSE Semester II MINOR II : PHYS2021: MECHANICS

COURSE OBJECTIVE: The objectives of this course is to provide an in-depth understanding of the principles of Newtonian mechanics and apply them to solve problems involving the dynamics of classical mechanical systems.

COURSE OUTCOME: This course in Mechanics serves as the foundation for further progress towards the study of physics at graduate or post-graduate level. Upon completion of the course, the student will be able to apply Newton's laws of motion to different force fields for a single particle and for a system of particles.

SEC-1:PHYS1051: RENEWABLE ENERGY AND ENERGY HARVESTING

COURSE OBJECTIVE: To impart knowledge and hands on learning about various alternative energy sources like Wind, Solar, Mechanical, Ocean, Geothermal etc. To review the working of various energy harvesting systems which are installed worldwide.

COURSE OUTCOME: The students are expected to learn not only the theories of the renewable sources of energy, but also to have hands-on experiences on them wherever possible.

SEC-2: PHYS2051: ELECTRICAL CIRCUITS AND NETWORK SKILLS

COURSE OBJECTIVE: The aim of this course is to enable the students to understand the basics of electronic circuits. Practical design and trouble shoot of electronic instrument is also a major objective of this Course.

COURSE OUTCOME: After the completion of the course the student will acquire necessary skills/hands on experience /working knowledge on Multimeter, voltmeters, ammeters, electric circuit elements, dc power sources. With the knowledge of basic electronics a student can able to detect troubleshoot and repair some of the electronic instruments used in our daily life.

MAJOR-PHYSICS COURSE Semester III MAJOR-III: PHYS3011: Electricity and Magnetism

Course Objective: The objective of this paper is to give the basic concept as well as an indepth understanding of the principles of electricity and magnetism and apply them to solve the problems related.

Course Outcome: At the end of this course, students will be able to comprehend the concept of electric field, electric flux, magnetic field and their origin. They will learn to apply the Gauss's theorem to find the electric fields for different types of charge distribution. The students will develop a sound perception about Electrostatics, Magneto-statics, Electric current and electromagnetic induction.

MAJOR-PHYSICS COURSE Semester III MAJOR-III: PHYS3012: Waves and Optics

Course Objective: The objective of this course is to provide an in-depth understanding of the nature of waves in general, sound wave as an example of mechanical wave and light as an electromagnetic wave. It is also intended to provide a comprehensive idea of some phenomena like interference, diffraction and polarisation and their physical explanation in terms of the wave theory of light.

Course Outcome: The outcome of the paper includes the knowledge of vibrations, propagation of waves, vibrations of air column, and harmonics of the strings. The paper has another outcome of offering knowledge of wave properties of light & corresponding phenomena.

SEC-PHYSICS Semester-III SEC-3:PHYS3051: Basic Instruments and their Usage

Course Objective: This course is designed to give the students an exposure with various aspects of electrical and optical instruments and their applications in experimental physics.

Course Outcome After completion of this course, the students will gain knowledge the in setting up electrical and optical experiments.

MAJOR-PHYSICS COURSE Semester IV MAJOR-IV: PHYS4011: Heat and Thermodynamics

Course Objectives: The objective of the course is to infuse ideas of thermodynamic systems, thermodynamic variables, thermodynamic processes, and allied phenomena. It is designed to familiarize students with thermodynamic potentials, the kinetic theory of gases, and the theory of radiation.

Course Outcome: On completion of this course, the students will learn the kinetic theory of gases, the basic laws of thermodynamics, the applications of the well-known Maxwell's relations, the underlying Physics behind the Joule Thompson effect and the spectral distribution of the blackbody radiation.

MAJOR PHYSICS COURSE Semester IV MAJOR IV: PHYS4012: Mathematical Physics-II

Course Objectives: The emphasis of this course is on applications of mathematical techniques in solving problems of interest to physicists. Students are to be examined on the basis of problems, seen and unseen.

Course Outcome: After successful completion of this course, students will be able to formulate problems of Physics in the language of Mathematics.

MAJOR IV: PHYS4012: Mathematical Physics-II

Course Objective: The aim of this Lab is to use the computational methods to solve physical problems. Course will consist of lectures (both theory and practical) in the Lab. Evaluation done not on the programming but on the basis of formulating the problem

Course Outcome: The emphasis of the course is on applications in solving problems of interest to physicists. Students are to be examined on the basis of problems, seen and unseen.

MAJOR-PHYSICS COURSE Semester IV MAJOR-IV:PHYS4013: Classical Mechanics and Special Theory of Relativity

Course Objectives: This course covers the Lagrangian and the Hamiltonian formulation of mechanics in systems with constraints, rigid body dynamics, Generating functions for canonical transformations, invariants. The course also covers the Special theory of relativity.

Course Objectives: On successful completion of this course the students will have in-depth understanding of Lagrangian and the Hamiltonian formulation of mechanics rigid body dynamics, and Special theory of relativity.

MINOR-PHYSICS COURSE Semester IV MINOR IV: PHYS4021: Thermal Physics

Course Objective: The objective of the first part of the course is to infuse ideas of the Kinetic theory of gases, Thermodynamic laws, Thermodynamic potentials, and the Theory of radiation. The second part is devoted to giving a basic introduction to Statistical Mechanics.

Course Outcome: Upon completion of this course, the students will grasp the idea of laws of thermodynamics, the Blackbody the basics of Statistical mechanics.