Balagarh Bijoy Krishna Mahavidyalaya
Department of Physics
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Program Outcomes for B.Sc. Physics (General)

1. Understand the fundamental laws of physics, including classical mechanics, electromagnetism, thermodynamics, and quantum mechanics.
2. Can apply physical principles to solve problems in a variety of fields, such as engineering, materials science, and biology.
3. Have experimental skills, including data collection, analysis, and interpretation.
4. Can think critically and creatively to address complex problems.
5. Communicate scientific ideas effectively, both orally and in writing.
6. Are prepared for careers in research, industry, education, or further study in physics or related fields.
7. Have a strong foundation in mathematical methods and computational techniques.
8. Understand the historical development and philosophical foundations of physics.
9. Can work effectively in teams and collaborate with others.
10. Are aware of the social and ethical implications of scientific discoveries and technological innovations.

Some possible career paths for graduates with a BSc in Physics include:

2. Engineer (e.g., materials, electrical, mechanical)
3. Science teacher
4. Data analyst
5. Science writer

Graduates with a BSc in Physics are also well-prepared for further study in physics or related fields, such as:

1. MSc in physics
2. Engineering
3. MCA
4. MBA
5. Science education

Course Outcomes for B.Sc. Physics (General)

Semester I	
CC- 1A: MECHANICS	1. Application of Newton's laws of motion to solve various problems related to day today life. 2. Concepts like zero work done, conservative forces, mass energy equivalence (E= mc2). 3. Effect of force on various types of materials is described and physical properties like elasticity, different moduli etc. along with their relation. 4. Understand the mechanics of rotational motion 5. Understand the general nature of waves and its characteristics

MECHANICS Lab	1. Students would perform basic experiments related to mechanics and also get familiar with various measuring instruments would learn the importance of accuracy of measurements. 2. They will proficiently utilize tools and techniques for mechanical analysis, problem-solving, and experimentation, fostering skills essential for engineering practice and innovation
Semester II	
CC-1B: ELECTRICITY AND MAGNETISM	1. Students will be able to understand the concept of the electric force, electric field and electric potential for stationary charges. They are able to calculate electric potential and electric field by using Gauss's law. 2. Student will understand the dielectric phenomenon and effect of electric field on dielectric. 3. Study the concept of magnetic field, magnetic field for steady currents using Biot-Savart's and Ampere's Circuital laws. 4. Student will learn magnetic materials and its properties.
ELECTRICITY AND MAGNETISM Lab	1. Understand the fundamental principles of electricity and magnetism: Students will be able to explain the concepts of electric charge, electric field, magnetic field, and electromagnetic induction. 2. Measure and analyze electric circuits: Students will be able to design, build, and measure the characteristics of electric circuits, including resistors, capacitors, and inductors. 3. Develop experimental skills: Students will be able to design and conduct experiments, collect and analyze data, and draw conclusions based on experimental results.
	4. 6. Use laboratory equipment and instruments: Students will be familiar with the use of oscilloscopes, mustimeters, and other laboratory equipment to measure electric and magnetic quantities. 5. 10. Communicate experimental results effectively: Students will be able to clearly present experimental results, including data, analysis, and conclusions, in a written report or oral presentation.
Semester III	
CC-1C: THERMAL PHYSICS AND STATISTICAL MECHANICS	1. To understand various thermodynamic processes like isothermal, isobaric, isochoric processes and laws of thermodynamics. 2. To understand the concept of entropy. 3. To understand Carnot's cycle, Heat engines and Refrigerators. 4. Describe the working of ideal and real heat engines. 5. Discuss Maxwell- Boltzmann, Bose – Einstein and Fermi – Dirac statistics.

THERMAL PHYSICS AND STATISTICAL MECHANICS Lab	1. Students will be able to understand and experimentally verify the ideal gas law, including the relationships between pressure, volume, and temperature. 2. 5. Students will be able to analyze and interpret data from experiments, including calculating quantities such as thermal expansion, heat transfer, and statistical distributions. 3. Students will be able to clearly present experimental results, including data, analysis, and conclusions, in a written report or oral presentation. 4. Students will have a deep understanding of the principles of thermal and statistical physics, as well as the experimental skills to investigate and apply these principles in real-world situations.
SEC-1: RENEWABLE ENERGY AND ENERGY HARVESTING	1. students will exhibit a deep understanding of renewable energy technologies, policies, and their environmental impacts 2. They will proficiently analyze renewable energy systems, assess feasibility, and propose sustainable solutions for energy challenges, fostering innovation in the renewable energy sector. 3. understanding of solar energy principles, technologies, and applications 4. analyze solar resource data, design solar energy systems, and evaluate their economic and environmental impacts, contributing to the advancement and adoption of solar energy solutions
Semester IV	
CC- 1D: WAVES AND OPTICS	1. Students will understand superposition principles, applying them
	to analyze wave interactions and predict resultant wave behaviors accurately. 2. Concept of viscosity of fluids, Bernoulli's Equation and its applications and Poiseuille's formula 3. Examples of surface tension in nature and its applications in our day to day life. 4. Construction and working of Simple Microscope, Compound Microscope, Ramsden's Eyepiece and Huygens's Eyepiece 5. Interference and diffraction of light, Formation of fringes, Resolution 6. Concept of Polarization, Double refraction, Construction and working of Nicol Prism

WAVES AND OPTICS Lab	1. Students will be able to measure and analyze the properties of waves, including wavelength, frequency, speed, and amplitude. 2. Students will be able to understand and experimentally verify the principles of optics, including reflection, refraction, diffraction, and interference. 3. Students will be able to design and conduct experiments, including the use of oscilloscopes, spectrometers, and other laboratory equipment.
SEC-2: WEATHER FORECASTING	1. At the culmination of this course, students will demonstrate a comprehensive understanding of weather forecasting methodologies, including data analysis, modeling techniques, and meteorological principles. 2. Analysis atmospheric data, utilize forecasting tools and communicate accurate weather predictions for informed decision-making in various sectors.
Semester V	
DSE-1A: ELEMENTS OF MODERN PHYSICS	1. Students would know about the basic principles in the development of modern physics. 2. The topics covered in the course build a basic foundation of undergraduate physics students to study the advance branches 3. quantum physics, nuclear physics, particle physics and high energy physics. 4. The course contains the study of Planck's hypothesis, photoelectric effect, Compton effect, matter waves, atomic models, Schrodinger wave equations, and brief idea of nuclear physics.
ELEMENTS OF MODERN PHYSICS Lab	1. Students will be able to analyze and interpret data from experiments, including calculating quantities such as wavelength, frequency, and energy. 2. Students will be able to explain how the principles of modern physics are used in everyday life, technology, and engineering.
	3. Students will be able to apply mathematical and scientific concepts to solve problems in modern physics.
SEC-3: COMPUTATIONAL PHYSICS	1. This course would introduce students with the basic knowledge of computers their applications in solving common and scientific problems 2. the course include scientific programming languages, scientific word processing and graphical analysis.
Semester VI	

DSE- 1B: QUANTUM MECHANICS	1. Quantum mechanics provides a platform for the physicists to describe the behavior of matter and energy at atomic and subatomic level. 2. The course plays a fundamental role in explaining how things happen beyond our normal observations. 3. The course includes the study of Schrodinger equations, particle in one dimension potential, quantum theory of H like atoms, atoms/molecules in electric and magnetic fields.
QUANTUM MECHANICS Lab	1. Students will be familiar with the laboratory equipment and techniques used to measure and analyze quantum phenomena. 2. students will be able to clearly present experimental results, including data, analysis, and conclusions, in a written report or oral presentation.
DSE-1B: DIGITAL AND ANALOG CIRCUITS AND INSTRUMENTATION	1. Compare Digital and analog systems. 2. Understand various number systems and their conversions 3. Compare operators, logic symbols and truth tables of different logic gates 4. Compute Boolean expressions using sum of product method and product of sum method. 5. Special Purpose diodes like LED, photodiode. 6. Understanding of Cathode Ray Oscilloscope (CRO) operation, calibration, and applications.