Program Outcomes (PO'S) and Course Outcomes (CO'S)

PHYSICS

JANUARY 1, 2024

L.N.D. COLLEGE, MOTIHARI, EAST CHAMPARAN, BIHAR

PHYSICS

Upon successful completion of the undergraduate course in Physics, covering a diverse syllabus including Mathematical Physics, Classical Mechanics, Oscillations and Waves, Electricity and Magnetism, Optics, Modern Physics, Statistical Mechanics, Quantum Mechanics, Electronics, Solid State Physics, and Spectroscopy, students can expect to achieve the following learning outcomes:

1. **Mathematical Physics Proficiency:** Develop advanced mathematical skills and techniques applicable to physics, including vector calculus, differential equations, and complex analysis.
2. **Classical Mechanics Understanding:** Gain a comprehensive understanding of classical mechanics, including the principles of Newtonian mechanics, Lagrangian mechanics, and Hamiltonian mechanics. Apply these principles to solve complex problems in classical physics.
3. **Oscillations and Waves Mastery:** Understand the concepts of oscillations and waves, including harmonic motion, wave propagation, and interference. Apply these principles to analyse mechanical and electromagnetic waves.
4. **Electricity and Magnetism Knowledge:** Acquire a deep understanding of electricity and magnetism, including electrostatics, magnetostatics, and electromagnetism. Apply Maxwell's equations to analyse electromagnetic phenomena.
5. **Optics Competence:** Gain proficiency in the principles of optics, including geometric optics, wave optics, and modern optics. Understand the behaviour of light and its interaction with matter.
6. **Modern Physics Expertise:** Explore the principles of modern physics, including special relativity, quantum mechanics, and the theory of relativity. Understand the foundations of quantum theory and its applications.
7. **Statistical Mechanics Understanding:** Acquire knowledge of statistical mechanics, including the concepts of entropy, probability distributions, and the statistical interpretation of thermodynamics.
8. **Quantum Mechanics Mastery:** Develop a deep understanding of quantum mechanics, including wave-particle duality, the Schrödinger equation, and quantum states. Apply quantum principles to analyse atomic, molecular, and subatomic systems.
9. **Electronics Skills:** Gain skills in electronics, including the principles of electronic circuits, semiconductor devices, and electronic instrumentation. Apply these skills to design and analyse electronic systems.
10. **Solid State Physics Knowledge:** Understand the principles of solid-state physics, including crystal structure, electrical properties of materials, and semiconductor physics. Explore the behaviour of matter in condensed phases.
11. **Spectroscopy Expertise:** Acquire expertise in spectroscopic techniques, including the principles of atomic and molecular spectroscopy. Understand the use of spectroscopy in analysing the structure and composition of matter.
12. **Laboratory Techniques:** Develop practical skills in experimental physics, including laboratory techniques, data acquisition, and analysis. Conduct experiments to validate theoretical concepts.
13. **Problem-Solving and Critical Thinking Skills:** Hone problem-solving skills and critical thinking abilities to analyse complex physical phenomena, formulate hypotheses, and derive solutions.

14. **Communication Skills:** Enhance written and oral communication skills to effectively convey scientific concepts, experimental results, and theoretical analyses to both specialized and non-specialized audiences.
15. **Research and Innovation Capability:** Gain skills in scientific research, including literature review, experimental design, data analysis, and the ability to contribute to the advancement of physics knowledge.
16. **Ethical and Professional Conduct:** Understand and adhere to ethical standards in scientific research and professional practice. Cultivate a sense of responsibility and integrity in the practice of physics.
17. **Preparation for Further Studies and Careers:** Prepare for advanced studies in physics or related fields, or enter the workforce with a solid foundation in theoretical and experimental physics applicable to various professions, including academia, industry, and research.

These learning outcomes aim to provide students with a comprehensive education in physics, covering foundational and advanced topics, and preparing them for both advanced studies and diverse career opportunities in the field.

DR. PINAKI LAHA
H.O.D., PHYSICS
L. N. D. COLLEGE, MOTIHAR
B.R.A. BIHAR UNIVERSITY
MUZAFFARPUR