

School of Physical Sciences PLOs

Physics and Astronomy –M.S./Ph.D.

PLO 1 – Core Knowledge (CK) students will be able to:

- Master a broad set of physics knowledge concerning the fundamentals in the basic areas of the discipline. In particular, students should be proficient at the graduate level in the core areas of Classical Mechanics, Electromagnetism, Statistical Mechanics, and Quantum Mechanics.
- Demonstrate specialized knowledge of physics sufficient to carry out substantive independent research.

PLO 2 – Research Methods and Analysis (RM&A) students should be able to:

- Understand the range of tools appropriate for research in their physics and astronomy sub-field. This can range from theoretical analyses to numerical simulation, and experimental/observational techniques.
- Read, synthesize and critically evaluate research in their subfield of physics and astronomy.
- Understand how their research tools, and results, fit in their subfield and understand their significance in a broader context of physics, science or engineering.
- Identify, formulate and investigate an independent, advanced research project guided by prior research in theory and applications.
- Understand and follow research ethics.

PLO 3 – Pedagogy (PED) Students will be able to:

- Communicate effectively to large and small groups in pedagogical settings such as discussions formats (and also in lecture formats).
- Identify and effectively deploy suitable technologies for use in all aspects of instruction.
- Assess students effectively, including developing and using appropriate measures and rubrics.

PLO 4 – Scholarly Communication (SC) Students will be able to:

- Structure a coherent and convincing physics argument.
- Review and cogently discuss relevant literature and their significance.
- Write in a level and style consistent with that found in leading physics or astronomy journals.
- Understand and properly use styles of citing, referencing, and formatting found in journals in physics and related fields.

PLO 5 – Professionalism (PROF) Students will be able to:

- Select appropriate conference venues for their physics or astronomy research (as well as application areas)
- Write compelling abstracts describing their research for consideration at research conferences in physics or astronomy, or appropriate application areas.
- Prepare talks (both short and long) suitable for presentation at a research conference.

- Prepare manuscripts that meet the standards of specific physics or astronomy journals and respond appropriately to recommendations for revisions.
- Select appropriate fellowship or grant opportunities and prepare competitive proposals for themselves.
- Make effective contributions to research teams and learning seminars.
- Make effective contributions to department, university, community, and professional service.
- Mentor junior Researchers (e.g., undergraduates, beginning graduate students)

PLO 6 – Independent Research (IR) Students should be able to:

- Develop their own research projects that meet high standards of methodological and theoretical/experimental rigor with lasting impact.
- Produce scholarship that is comparable in scope and format to articles that appear in leading peer-reviewed journals in physics or astronomy, as well as application areas.
- Supervise junior researchers (e.g., high school students, undergraduates, beginning graduate students) effectively.