

School of Physical Sciences PLOs

Mathematics –M.S./Ph.D.

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

- Demonstrate a general knowledge of mathematics consistent with that of a faculty member at a research university. IN particular, students should be proficient at the graduate level in the core areas of Real Analysis, Complex Analysis and Algebra.
- Demonstrate specialized knowledge of mathematics 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 mathematics sub-field. This can range from theoretical analysis techniques in pure mathematics to modeling and numerical simulation in applied mathematics.
- Read, synthesize and critically evaluate research in their subfield of mathematics.
- Understand how their research tools, and results, fit in their subfield and understand their significance in a broader context of mathematics or science.
- Identify, formulate and investigate an independent, advanced research project guided by prior research in theory and applications, in appropriate.
- 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).
- Design high-quality undergraduate and graduate courses in mathematics, including appropriate goals, reading or audiovisual materials, assignments, and sequencing.
- 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 mathematical argument.
- Review and cogently discuss relevant literature and their significance.
- Write in a level and style consistent with that found in leading mathematics journals.
- Understand and properly use styles of citing, referencing, and formatting found in journals in mathematics and related fields.

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

- Select appropriate conference venues for their mathematics research (as well as application areas)
- Write compelling abstracts describing their research for consideration at research conferences in mathematics, 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 mathematics 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 theoretical and methodological rigor with lasting impact.
- Produce scholarship that is comparable in scope and format to articles that appear in leading peer-reviewed journals in mathematics, as well as application areas.
- Supervise junior researchers (e.g., high school students, undergraduates, beginning graduate students) effectively.