

Mathematics Major Student Learning Outcomes
Salve Regina University
Department of Mathematical Sciences
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The Mathematics Major supports the following learning outcomes.

Outcome 1

Demonstrate depth of knowledge in calculus, linear algebra, differential equations, scientific programming.

Indicators of Achievement - Graduates will be able to:

- Demonstrate knowledge of important definitions and theorems;
- Demonstrate the ability to solve standard problems in these content areas;
- Utilize information resources as aids to understanding and solving of standard problems;
- Communicate solutions clearly

Methodology: Create specific homework and exam questions, based on particular student learning outcomes for each of the core content areas, to provide students the opportunity to demonstrate achievement of this outcome. Partner with library personnel to provide workshops on information literacy in mathematical sciences.

Outcome 2

Apply content knowledge to solve complex mathematical problems (e.g., generalization, abstraction, modeling, apply mathematics in new context).

Indicators of Achievement - Graduates will be able to:

- Identify the nature of the problem, organize relevant information and mathematical tools;
- Identify and utilize appropriate information resources as aids to understanding and solving of complex problems;
- Devise a strategy to develop a solution to the problem; implement the strategy, performing relevant actions and computations, keeping an accurate record of work;
- Reflect on whether a strategy was successful, checking for correctness and plausibility of the solution;
- Communicates solutions clearly.

Methodology: Create specific mini-projects in courses, encourage SRYou presentations, or provide direction to the Capstone, to provide students the opportunity to demonstrate achievement of this outcome. See attached problem solving rubric.

Outcome 3

Demonstrate the ability to construct rigorous logical arguments.

Indicators of Achievement - Graduates will be able to:

- Employ a variety of proof techniques (including direct proof, proof by contradiction and proof by induction).
- Adequately construct proofs using relevant definitions and foundational results.
- Write and present complete, coherent, concise and rigorous proofs.

Methodology: Provide LATEX workshops to students. Provide opportunity for students to draft, receive feedback, and finalize proofs in theory-oriented courses (discrete mathematics, geometry, abstract algebra, analysis and statistical theory) so students can create a proof portfolio for this outcome. See attached proof writing rubric and presentation rubric.

Outcome 4

Communicate mathematics effectively.

Indicators of Achievement - Graduates will be able to:

- Demonstrate the ability to understand professional mathematical writing;
- Locate, evaluate, and use appropriate information resources wisely;
- Communicate mathematical ideas verbally and in writing.

Methodology: Provide students the opportunity throughout the four years in courses and through SRYou Day to develop speaking and writing (LATEX) skills. The Capstone experience will provide students the opportunity to demonstrate achievement of this outcome.