Applied and Pure Mathematics (BS)

The Applied and Pure Mathematics Concentration is the most "traditional" concentration and students pursuing it will have a solid foundation for various math careers ahead of them. Students interested in going to graduate school in fields like mathematics or physics or working on mathematical modeling in industry or research laboratories, might want to consider the Applied and Pure Mathematics Concentration.

Common Requirements

All students pursuing a Math BS Degree must complete the Core Requirement, Capstone Requirement, Grade Requirement, and Science Requirement.

Core Requirement

The following eleven courses are required by all concentrations.

- MATH 140 - Calculus I
- MATH 141 - Calculus II
- MATH 242 - Multivariable and Vector Calculus
- MATH 260 - Linear Algebra I
- MATH 265 - Discrete Structures in Mathematics
- MATH 270/310 - Applied Ordinary Differential Equations
- MATH 291 Mathematical Software
- MATH 280/314 - Introduction to Proofs
- MATH 345 - Probability and Statistics
- PHYSIC 113 - Fundamentals of Physics I
- CS 110 - Introduction to Computer Programming

Capstone Requirement

The capstone allows a student to demonstrate the ability to use the knowledge, concepts, and methods acquired in the mathematics major. The capstone requirement may be met through any of the courses with numbers between 420-499.

Grade Requirement

No courses taken pass/fail may be applied toward the major, and a cumulative GPA of 2.0 or higher (C average) is required.

Science Requirement

Students have to take 4 science courses according to the following rules:

- PHYSIC 114 – Fundamentals of Physics II
- Three science courses (excluding Physics 113 and 114 and CS 110) offered by Biology, Chemistry, Computer Science, Engineering or Physics Department. These courses have to be required courses for a major in a program offered by the respective department; one of these three courses can be a lab.

Concentration Requirement

In addition, students declaring the Applied and Pure Math concentration must take the following courses:

- MATH 358 - Complex Analysis
- MATH 360 - Abstract Algebra I
- MATH 361 - Abstract Algebra II
- MATH 450 - Real Analysis
- Two (2) other math courses numbered 300 or higher

Sample Schedule for Graduation in 4 Years

	Fall Semester	Spring Semester
First Year	• MATH140 - Calculus I • CS 110 - Introduction to Computing	• MATH141 - Calculus II • MATH260 - Linear Algebra • PHYSIC113 - Fundamentals of Physics I
Second Year	• MATH242 - Multivariable and Vector Calculus • MATH291 - Mathematical Software • PHYSIC114 - Fundamentals of Physics II	• MATH265 - Discrete Structures in Mathematics • MATH270/310 - Applied Ordinary Diff. Eqs. • Science elective 1
Third Year	• MATH314/280 - Introduction to Proofs • MATH360 - Abstract Algebra I • Science elective 2	• MATH345 - Probability and Statistics • MATH361 - Abstract Algebra II • Science elective 3
Fourth Year	• MATH358 - Complex Analysis • Math elective 1	• MATH450 - Introduction to Real Analysis • Math elective 2

Learning Outcomes

After completion of this concentration, the student should be able to:

- Demonstrate analytical skills and extensive experience with the tactics of problem solving and logical thinking.
- Demonstrate the ability to ask pertinent questions and perform suitable quantitative analysis.
- Demonstrate the understanding of rigorous mathematical proof.
- Demonstrate deep understanding of at least one more area of specialization within mathematics or its applications.
- Use logical deduction to decide when an argument is true or false.
- Write clear, well-organized and logical mathematical arguments.
- Identify, formulate, abstract, and solve mathematical problems that use tools from a variety of mathematical areas, including algebra, analysis, probability and differential equations.
- Use basic computer technology, software, and algorithmic processes necessary in quantitative analysis and mathematical modeling.