

**UWM Department of Mathematical Sciences**  
**Mission Statement**  
**Fall 2003**

The mission of the Department is to acquire, store, and disseminate knowledge of the mathematical sciences.

In pursuit of its mission, the Department will:

1. Engage in fundamental research in the mathematical sciences, and train students to do such research themselves.
2. Collaborate with researchers in other disciplines in which mathematical techniques may be useful.
3. Help maintain and strengthen the mathematical sciences community by
  - providing mathematical sciences students with expertise in and appreciation of the mathematical sciences and their applications;
  - training future teachers of mathematics at the primary, secondary, college, and university levels;
  - educating students in the logical, cultural, and historical aspects of the mathematical sciences.
4. Assist the wider community in understanding and applying the mathematical sciences by
  - providing students of engineering and the physical, life, and social sciences with the mathematical background necessary for the understanding of modern theories in their respective fields;
  - providing consulting services to researchers in academia, industry, and education;
  - increasing the awareness and appreciation of the mathematical sciences in the general community.

## **Educational Goals for All Mathematical Sciences Majors**

Upon completion of the program, a mathematical sciences major will possess:

- An understanding of
  - the breadth of the mathematical sciences and their deep interconnecting principles
  - the interplay among applications, problem-solving, and theory.
- The analytical and critical thinking skills required for efficient use, appreciation, and understanding of the mathematical sciences.
- The ability to communicate mathematical sciences in technical and non-technical terms.
- A personal motivation and enthusiasm for studying and applying the mathematical sciences.

### **Additional Area Specific Goals**

Along with the goals identified above for all mathematical sciences majors, students completing specific program option(s) have the additional goals listed below.

**Applied and Computational Math Options:** Students should be able to apply the mathematical sciences to a broad spectrum of complex problems and issues; formulate and solve problems using classical or numerical methods; appreciate the importance of theory and mathematical rigor; recognize and express mathematical ideas imbedded in other contexts; use the computer for simulation and visualization of mathematical ideas and processes; and use the process by which mathematical and scientific facts and principles are applied to serve society.

**Atmospheric Sciences Option:** Students are expected to develop a solid scientific and mathematical foundation which will prepare them for work as professional meteorologists. Students should be able to understand and apply theoretical principles to practical problems in the atmospheric sciences. Additionally, the rigorous quantitative aspect of the program insures that graduates will be in excellent position to study atmospheric sciences in any graduate program.

**Pure Mathematics Option:** Students should be able to reason rigorously in mathematical arguments; understand the interplay between conjecture and proof within mathematics; have knowledge of the fundamental results from the areas of algebra, analysis, and topology.

**Statistics Option:** Students should be able to make inferences from data which arise in part from chance, and to describe the limitations of those inferences; reason probabilistically; appreciate the importance of theory and mathematical rigor; have knowledge of general statistical theory and methods (estimation testing, confidence intervals), basic probability theory, and linear models; have familiarity with at least one statistical software package.

**Actuarial Science Option:** Students should have the ability to apply standard methods of probability, statistics, economics, and finance at the level required by the Society of Actuaries.

### **Educational Goals for Mathematical Sciences Minors**

Students completing a Mathematical Sciences Minor will achieve at least one of the following.

- Obtain the mathematical expertise required for the student's major.
- The exploration of the mathematical sciences beyond the calculus for one's intellectual interest.

### **Educational Goals for Non-Majors**

Non-majors taking GER or service courses in mathematical sciences will have attained an appreciation and basic knowledge of mathematics appropriate to their intended majors.

### **References**

Assessment Practices in Undergraduate Mathematics, MAA Notes # 49.