

# Mathematics (MS)

Master's degree programs are available to suit the needs of students with various objectives. There are programs for students who intend to enter a doctoral program and for those who plan to conclude their formal study of pure or applied mathematics at the master's level.

In addition to general Division of Graduate Studies requirements, the specific graduate program courses and conditions listed below must be fulfilled. More details can be found in the Department of Mathematics *Graduate Student Handbook*, available in the department office and online (<https://math.uoregon.edu/wp-content/uploads/2022/11/Handbook-22-23.pdf>). All mathematics courses applied to degree requirements, including associated reading courses, must be taken for letter grades. A final written or oral examination or both is required for master's degrees except under the pre-PhD option. This examination is waived under circumstances outlined in the departmental *Graduate Student Handbook*.

## Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Upon successful completion of this program, students will be able to demonstrate mastery of subject knowledge in three core areas. The core subject areas taught in our graduate program are algebra, topology/geometry, analysis/probability, and applied mathematics. Students are expected to attain a mastery of this material at an intermediate level for two of these core areas, and at an advanced level for a third area. Mastery is demonstrated by completion of a full-year course sequence in each area, 500-level for intermediate and 600-level for advanced.

## Explanation:

Demonstrate mastery of subject knowledge in three core areas.

Explanation: The three core subject areas taught in our department are algebra, topology/geometry, and analysis/probability. Graduate students are expected to attain a mastery of this material at an advanced level for two of the three core areas, and at an intermediate level for the third area.

Demonstrate ability to learn from non-expository sources.

Explanation: Learning material from research papers is different from learning from courses and textbooks. Graduate students are expected to demonstrate the ability to learn material from non-expository sources, including at least one source that is written in French, German, or Russian.

Conduct original and substantive research.

Explanation: The most important requirement completing a Ph.D. in mathematics is producing a dissertation containing original and substantive mathematical work.

The learning outcomes and assessments for students who earn a master's degree consist of a modified version of Learning Outcome #1 for Ph.D. students. To earn a master's degree, a student must complete full-year course sequences in each of the three core areas, one at the 600-level and two at the 500-level, with an average grade of B+ or better and a minimum grade of B or better in each sequence. In addition, the student is required to complete at least 45 graduate credit hours, at least 30 of which are completed in the Department of Mathematics.

## Mathematics Major Requirements

| Code                                                                                                                                              | Title                                                                                                                                                                                         | Credits     |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>Three of the following sequences below with at least one at 600-level <sup>1</sup></b>                                                         |                                                                                                                                                                                               | <b>30</b>   |
| <b>500-Level Sequences</b>                                                                                                                        |                                                                                                                                                                                               |             |
| MATH 513<br>& MATH 514<br>& MATH 515                                                                                                              | Introduction to Analysis I<br>and Introduction to Analysis II<br>and Introduction to Analysis III                                                                                             |             |
| MATH 531<br>& MATH 532<br>& MATH 533<br>or MATH 53: Introduction to Topology I<br>and Introduction to Topology II<br>& MATH 532 and<br>& MATH 534 | Introduction to Topology I<br>and Introduction to Topology II<br>and Introduction to Differential Geometry<br>and Introduction to Topology I<br>and Introduction to Topology II<br>and<br>and |             |
| MATH 544<br>& MATH 545<br>& MATH 546                                                                                                              | Introduction to Abstract Algebra I<br>and Introduction to Abstract Algebra II<br>and Introduction to Abstract Algebra III                                                                     |             |
| <b>600-Level Sequences</b>                                                                                                                        |                                                                                                                                                                                               |             |
| MATH 647<br>& MATH 648<br>& MATH 649                                                                                                              | Abstract Algebra<br>and Abstract Algebra<br>and Abstract Algebra                                                                                                                              |             |
| MATH 634<br>& MATH 635<br>& MATH 636                                                                                                              | Algebraic Topology<br>and Algebraic Topology<br>and Algebraic Topology                                                                                                                        |             |
| MATH 637<br>& MATH 638<br>& MATH 639                                                                                                              | Differential Geometry<br>and Differential Geometry<br>and Differential Geometry                                                                                                               |             |
| MATH 616<br>& MATH 617<br>& MATH 618                                                                                                              | Real Analysis<br>and Real Analysis<br>and Real Analysis                                                                                                                                       |             |
| MATH 616<br>& MATH 672<br>& MATH 673                                                                                                              | Real Analysis<br>and Theory of Probability<br>and Theory of Probability                                                                                                                       |             |
| MATH 607<br>& 607<br>& 607                                                                                                                        | Seminar: [Topic]<br>and Seminar: [Topic] <sup>2</sup><br>and Seminar: [Topic] <sup>2</sup>                                                                                                    |             |
| <b>Electives <sup>3</sup></b>                                                                                                                     |                                                                                                                                                                                               | <b>9-15</b> |
| <b>Total Credit Requirement:</b>                                                                                                                  |                                                                                                                                                                                               | <b>45</b>   |

<sup>1</sup> At least 9 credits of 600-level mathematics courses. Excluding Reading and Conference: [Topic] (MATH 605).

<sup>2</sup> Only MATH 607 courses in the "applied math" sequence count toward this requirement.

<sup>3</sup> Up to 15 credits can be taken outside of mathematics.