

Undergraduate Mathematics Programs at OSU

September 2014

The Department of Mathematics at OSU offers a Bachelor of Science degree in mathematics, a minor in mathematics, and a minor in actuarial science. The Bachelor of Science in mathematics trains students to think logically and precisely, and exposes students to many areas of pure and applied mathematics. There is a standard degree in Mathematics in addition to transcript visible options; the Applied and Computational Mathematics Option, the Secondary Teaching Emphasis Option, and the Statistics Option. Further information about mathematics at OSU can be found under [Undergraduate Programs](#) on the Department of Mathematics website.

RESOURCES FOR STUDENTS

Mathematics Advising

For early career math majors or minors (taking 100 or 200 level MTH courses), professional advisors, **Lyn Riverstone** and **Dave Wing**, offer program and scheduling advice, and can provide signatures (change of major/minor forms, petitions, etc.) and registration PINs. To make an appointment, call 541-737-5170, email UnderGradInfo@math.oregonstate.edu, or drop in to the Math Department office in Kidder 368 M-F between 9-12 or 1-5.

Math majors who are taking 300 and 400 level MTH courses should consult with a member of the **Undergraduate Advising Committee**. These professors can help you with questions about your program, provide signatures or registration PINs, and work with you on career and graduate school planning. *You are free to consult with any advisor*, but you are nominally assigned to an advisor based on the first letter of your last name. Current members of the Advising Committee are listed on the Mathematics Department website at http://www.math.oregonstate.edu/undergrad_advising. Students pursuing the Statistics Option should also be in contact with the Statistics Advisor, Dr. Mina Ossiander. Anyone interested in actuarial courses, exams, internship and career possibilities, or the minor program should visit Actuarial Committee Chair Dr. Ed Waymire.

If you still have a question or want an advising appointment, please write from your ONID account to MathHeadAdvisor@math.oregonstate.edu and include your student ID in your email. We'll take it from there.

Mathematics Learning Center

The Mathematics Learning Center (MLC) is located on the first floor of Kidder Hall, room 108. The MLC provides free drop-in tutoring, reference books, make-up testing, and other services and resources. Refer to the Mathematics Department website under [MLC](#) for the hours of operation and additional information.

Junior and senior math majors sometimes work as tutors in the MLC, either as a work-study job or for credit. The MLC also has tables appropriate for use by study groups. Math majors are encouraged to use the MLC as a place to meet and study with each other. There is a computer lab adjoining the MLC, which math majors are free to use unless a class is scheduled.

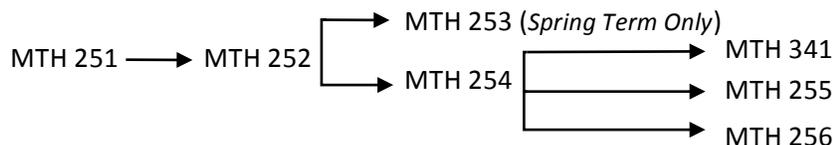
DEGREE PROGRAMS

The Department of Mathematics offers a Bachelor of Science in mathematics. Within the BS degree, students can also select options in Applied and Computational Mathematics, Statistics, or with a Secondary Teaching Emphasis. Also available are Minors in Mathematics and in Actuarial Science. The Department of Mathematics is a unit within the College of Science, which is one of eleven academic colleges at OSU. The College of Science and the university have certain requirements for a bachelor's degree. For example, a student must earn a total of at least 180 credits, at least 60 of which must be upper division courses. Each student must complete OSU's Baccalaureate Core in addition to satisfying the requirements for a major in some subject. The details of the university and college requirements are available in the OSU catalogue. All students can track their progress using the on-line MyDegrees program audit system.

The Major Degree Program in Mathematics

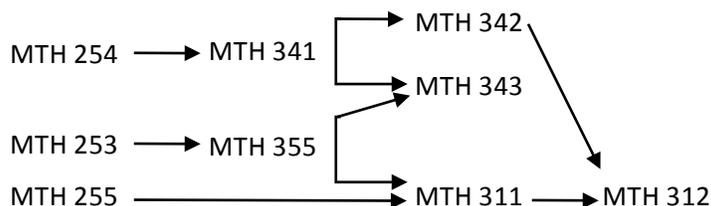
All math majors must take certain core courses in mathematics. The lower division courses (those numbered lower than 300) and MTH 341 are prerequisite to almost all 300-level courses. Since these requirements total only 27 credits, most of the university Baccalaureate Core can also be completed during the first two years of study. Some of the courses required for the math major will simultaneously satisfy requirements of the Baccalaureate Core.

A student who does not place directly into the calculus sequence in the first year can usually still complete the lower division courses during the first two years, as some courses in the calculus sequence can be taken simultaneously. A flow chart for these prerequisites follows.



Alternately, a student arriving at OSU with some calculus credit may be able to complete the lower division requirements in one year. In this case, the student may decide to begin our "junior core" during the second year at OSU.

The **Junior Core** consists of seven courses that all math majors must complete. These include MTH 341, 342, 343, 355, 311, 312, plus one of the Writing Intensive Courses (WICs); MTH 323, 333, or 338. Students in the Applied and Computational Option must take MTH 323 and those in the Secondary Teaching Emphasis Option must take MTH 338. All these courses are listed on the checklists at the end of this pamphlet. A flowchart for these prerequisites is shown below.



A term-by-term scheduling overview of the availability of these courses for the 2013-2014 academic year can be found here: <http://www.math.oregonstate.edu/files/math/RegisterFor2013-14.pdf>. Any changes to the schedule for 2014-15 will be minor and will be announced via the math majors listserve.

Bachelor of Science in Mathematics

Math majors can pursue the standard degree or choose one of the three specialized options within the degree program. All Math majors must complete the Junior Core coursework.

The Standard Degree path

Those students pursuing the standard degree with must complete, in addition to the junior core, five 400-level directed electives plus two upper division additional electives. The directed electives ensure that Math majors gain breadth of knowledge in a diverse list of mathematical topics. The additional electives provide the opportunity to explore areas of interest more deeply. The detailed checklist of the requirements for the BS in Mathematics is on page 5 of this pamphlet.

The Applied and Computational Mathematics Option

The Option in Applied and Computational Mathematics offers a curriculum focusing on the mathematical tools and computational skills used in applying mathematics across the sciences. It is designed to allow students to concentrate much of their upper-division coursework on applied mathematics, modeling, and computation after completing core lower-division mathematics requirements. The detailed checklist of the requirements for the Applied and Computational Option is on pages 6 and 7 of this pamphlet.

The Statistics Option

The Statistics option offers Mathematics majors an opportunity to concentrate their senior level course work in the area of statistics and probability after completing core junior and lower-division mathematics requirements. This degree option is designed to allow a focus on the study of the mathematical theory underlying statistics while simultaneously developing expertise in statistical applications. This option provides excellent preparation for graduate study in Statistics. A detailed checklist for the Statistics Option is included on pages 8 and 9.

The Secondary Teaching Emphasis Option

Majors who plan to teach mathematics in middle or high school may earn a transcript visible option in education. Future teachers are also required to take two courses in math education that will help prepare them for a graduate program in education and teacher licensure. Students in this option who would like a stronger background in mathematics are encouraged to take some of the senior level core math courses as electives. A detailed checklist for this option is included on page 10.

Minor Degree Programs in Mathematics

The Department of Mathematics at Oregon State offers a minor in Mathematics and a minor in Actuarial Science. The minor in Actuarial Science allows students to take courses of interest to the financial and actuarial industries and helps students prepare for the first examination administered by the Society of Actuaries. For more information about this program is available under [Actuarial Science](#) on the departmental website. You may also send a message to ActuarialInfo@math.oregonstate.edu. A very informative website about the actuarial profession is [BeAnActuary](#) .

Requirements for both minor programs are described on page 6 of this pamphlet where a checklist for the Actuarial Science is included. Further information about both minor programs can be found under [Undergraduate Programs](#) on the Department of Mathematics website, and by writing to MathHeadAdvisor@math.oregonstate.edu.

Math Clubs and other Associations

Math Club: The purpose of the Math Club is to provide opportunities for math enthusiasts to meet and explore their common interests. The Math Club is a primarily student run club, and it facilitates both fun and helpful math-related activities throughout the year, including social events, game nights, and study sessions.

For more information about being a part of the Math Club, email the faculty advisor at mathclub@math.oregonstate.edu. We'd love to have you join the club and share in our excitement about all things math-related!

The Association for Women in Mathematics: AWM, is a collection of students who share a common interest in the advancement of women in mathematics. AWM hosts movie nights and pizza parties. They recently organized Sonia Kovalevsky Day at OSU, an event for local high-school and middle-school students which features math competitions, workshops, and lectures. If you are interested in learning more about AWM, please e-mail the current AWM officers at awm@math.oregonstate.edu.

The Society for Industrial and Applied Mathematics: SIAM is a club, advised by a faculty member, for students interested in applied mathematics and its and applications to industry. The group often hosts speakers from industry, holds tutorials, and organizes social events. If you are interested in learning more about SIAM, please e-mail the current SIAM officers at siam@math.oregonstate.edu.

Actuarial Science Club: The ASC tries to promote awareness of the actuarial profession, disseminate information about the actuarial preparatory track and share information regarding actuarial coursework and exams, and internship and job opportunities.

We invite speakers from the actuarial community to talk to students about various types of work they do, how they became an actuary, and what future trends they see in the profession. We meet two to three times per term. One of them tends to be a social gathering. Interested students can email actuarialclub@math.oregonstate.edu.

Pi Mu Epsilon: PME is a non-secret honor society who's purpose is the promotion and recognition of scholarly activity in the mathematical sciences among students as the academic institutions that have been chartered as Chapters of the Society. If you would like to learn more about how to become a Pi Mu Epsilon member, please email pme@math.oregonstate.edu

Checklist for the Bachelor of Science in Mathematics Standard Degree

Listed below are the requirements for the math major portion of the Bachelor of Science in Mathematics. Students also need to satisfy the requirements of the university and the College of Science. Frequent consultation with an advisor is recommended to monitor timely degree completion.

A grade of at least C– and a GPA of 2.25 are required in all upper-division mathematics courses used to fulfill degree requirements. An OSU GPA of 2.00 is required by the College of Science. No course used to fulfill requirements for your major may be taken “S/U.”

Lower Division:

- MTH 251 - 256 The Calculus Sequence (MTH 251, 252, 253, 254, 255, 256)
- Physics 211 General Physics with Calculus
- MTH 341 Linear Algebra I

Upper Division:

- MTH 355 (F,W,S) Discrete Mathematics
- MTH 311 (F,W) Advanced Calculus I
- MTH 312 (W,S) Advanced Calculus II
- MTH 342 (F,W,S) Linear Algebra II
- MTH 343 (W,S) Introduction to Modern Algebra
- WIC¹ (F,W,S) MTH 323 Mathematical Modeling (W or S) or
MTH 333 Fundamental Concepts of Topology (F) or
MTH 338 Non-Euclidean Geometry (W or S)

Directed Electives: 5 courses from the following list

- 1 _____
- 2 _____ MTH 440 (F) Computational Number Theory
- 3 _____ MTH 451 (F) Numerical Linear Algebra
- 4 _____ MTH 463 (F) Probability I
- 5 _____ MTH 430 (S) Metric Spaces and Topology
MTH 434 (W) Introduction to Differential Geometry
MTH 480 (W) Systems of Ordinary Differential Equations
MTH 483 (W,S) Complex Variables

Additional Electives: *2 more courses of upper division math, 400 level statistics or other approved courses of a mathematical nature. This includes non-blanket (not X99- or X0X numbered) upper-division MTH courses (except for MTH 390) or 400-level ST courses or other courses approved by the departmental head advisor.*

- 1 _____
- 2 _____

***Course offerings and schedules are subject to change.**

¹ Writing Intensive Course, a component of the Baccalaureate Core.

**Checklist for the Bachelor of Science in Mathematics
with the Applied and Computational Mathematics Option**

Listed below are the requirements for the math major portion of the Bachelor of Science in Mathematics with the option in Applied and Computational Mathematics. Students also need to satisfy the requirements of the university and the College of Science. Frequent consultation with an advisor is recommended to monitor timely degree completion.

A grade of at least C– and a GPA of 2.25 are required in all upper-division mathematics and statistics courses used to fulfill degree requirements. An OSU GPA of 2.00 is required by the College of Science. No course used to fulfill requirements for your major may be taken “S/U.”

Lower Division:

- MTH 251 - 256 The Calculus Sequence (MTH 251, 252, 253, 254, 255, 256)
- Physics 211 General Physics with Calculus
- MTH 341 Linear Algebra I

Upper Division: *All the following courses are required.*

- MTH 355 (F,W,S) Discrete Mathematics
- MTH 311 (F,W) Advanced Calculus I
- MTH 312 (W,S) Advanced Calculus II
- MTH 342 (F,W,S) Linear Algebra II
- MTH 343 (W,S) Introduction to Modern Algebra
- WIC (S-2015) MTH 323 Mathematical Modeling
- MTH 483 (W,S) Complex Variables (3)

RECOMMENDED (not required):

- MTH 351 (F,W,S) Introduction to Numerical Analysis (3) or another course providing an introduction to programming, computer algebra etc.

The Applied and Computational core: *5 of the following 9 courses are required.*

Either MTH 453 or MTH 482 must be included. Also note that only one of MTH 480 and MTH 481 can be used to satisfy requirements for a degree in Mathematics.

- 1 _____ MTH 420 (S) Models and Methods of Applied Mathematics (3)
- 2 _____ MTH 440 (F) Computational Number Theory (3)
- 3 _____ MTH 441 (W) Applied and Computational Algebra (3)
- 4 _____ MTH 451 (F) Numerical Linear Algebra (3)
- 5 _____ MTH 452 (W) Numerical Solution of Ordinary Differential Equations (3)
- MTH 453 (S) Numerical Solution of Partial Differential Equations (3)
- MTH 480 (W) Systems of Ordinary Differential Equations (3)
- MTH 481 (F) Applied Ordinary Differential Equations (3)
- MTH 482 (W) Applied Partial Differential Equations (3)

Probability or Statistics

□ 1 _____

1 class from the following 4 is required:

MTH 361 (F,S) Introduction to Probability (3)

MTH 463 (F) Probability I (3)

ST 351 (F,W,S,Su) Introduction to Statistical Methods (4)

ST 421 (F,Su) Introduction to Mathematical Statistics (4)

Additional Requirements:

□ 1 _____

1 of the following 2 options is required.

□ 2 _____

Two additional 400-level non-blanket courses in mathematics

OR a two-term thesis project ** with a graduate faculty member

** The faculty member supervising the thesis and the Head Mathematics Advisor must approve a thesis project in advance.

***Course offerings and schedules are subject to change.**

¹ Writing Intensive Course, a component of the Baccalaureate Core.

Checklist for the Bachelor of Science in Mathematics with the Statistics Option

Listed below are the requirements for the math major portion of the Bachelor of Science in Mathematics with the option in Statistics. Students also need to satisfy the requirements of the university and the College of Science. Frequent consultations with advisors from the Department of Mathematics and the Department of Statistics are recommended to monitor timely degree completion.

A grade of at least C– and a GPA of 2.25 are required in all upper-division mathematics and statistics courses used to fulfill degree requirements. An OSU GPA of 2.00 is required by the College of Science. No course used to fulfill requirements for your major may be taken “S/U.”

Lower Division:

- MTH 251 - 256 The Calculus Sequence (MTH 251, 252, 253, 254, 255, 256)
- Physics 211 General Physics with Calculus
- MTH 341 Linear Algebra I
- Recommended: ST 201 Principles of Statistics or
ST 351 Intro to Statistical Methods

Upper Division:

Part A: required Mathematics core, all the following courses

- MTH 355 (F,W,S) Discrete Mathematics
- MTH 311 (F,W) Advanced Calculus I
- MTH 312 (W,S) Advanced Calculus II
- MTH 342 (F,W,S) Linear Algebra II
- MTH 343 (W,S) Introduction to Modern Algebra
- WIC¹ MTH 323 (W) Mathematical Modeling (preferred) or
MTH 333 (F) Fundamental Concepts of Topology or
MTH 338 (S) Non-Euclidean Geometry

Part B: the Mathematics and Statistics advanced core, all the following courses

- MTH 463 (F) Probability I (3)
- MTH 464 (W) Probability II (3)
- ST 411 (F,W, Su) Methods of Data Analysis (4)
- ST 412 (W,S) Methods of Data Analysis (4)
- ST 421 (F,Su) Introduction to Mathematical Statistics (4)
- ST 422 (W,Su) Introduction to Mathematical Statistics (4)

Part C: depth in Option; 1 of the following courses is required:

- 1 _____ MTH 465 (S) Probability III (3)
MTH 467 (W) Actuarial Mathematics (3)
ST 413 (S) Methods of Data Analysis (4)
ST 415 (S) Design and Analysis of Planned Experiments (3)
ST 431 (F) Sampling Methods (3)
ST 439 (Su) Survey Methods (3)
ST 441 (F) Probability, Computing, and Simulation in
Statistics (4)
ST 443 (S) Applied Stochastic Models (3)

Part D: breadth in Mathematics; 2 of the following courses are required:

- 1 _____ MTH 351 (F,W,S) Intro to Numerical Analysis or
- 2 _____ MTH 451 (F) Numerical Linear Algebra
- MTH 411 (F) Real Analysis
- MTH 440 (F) Computational Number Theory
- MTH 443 (F) Abstract Linear Algebra
- MTH 430 (S) Metric Spaces and Topology
- MTH 434 (W) Introduction to Differential Geometry
- MTH 480 (W) Systems of Ordinary Differential Equations or
- MTH 481 (F) Applied Ordinary Differential Equations
- MTH 483 (W,S) Complex Variables
- MTH 420 (S) Models and Methods of Applied Mathematics

***Course offerings and schedules are subject to change.** Please consult the Department of Statistics for a listing of yearly courses (<http://www.stat.oregonstate.edu/content/yearly-courses>) and alternate year courses (<http://www.stat.oregonstate.edu/content/alternate-year-courses>).

¹ Writing Intensive Course, a component of the Baccalaureate Core.

Checklist for the Bachelor of Science in Mathematics with Secondary Teaching Emphasis Option

Listed below are the requirements for Secondary Teaching Emphasis option of the Bachelor of Science in Mathematics. Students also need to satisfy the requirements of the university and the College of Science. Frequent consultation with an advisor is recommended to monitor timely degree completion.

A grade of at least C– and a GPA of 2.25 are required in all upper-division mathematics courses used to fulfill degree requirements. An OSU GPA of 2.00 is required by the College of Science. No course used to fulfill requirements for your major may be taken “S/U.”

Lower Division:

- | | |
|--|--|
| <input type="checkbox"/> MTH 251 – 256 | The Calculus Sequence (MTH 251, 252, 253, 254, 255, 256) |
| <input type="checkbox"/> Physics 211 | General Physics with Calculus |
| <input type="checkbox"/> MTH 341 | Linear Algebra I |

Upper Division¹

- | | |
|---|---|
| <input type="checkbox"/> MTH 311 (F,W) | Advanced Calculus I |
| <input type="checkbox"/> MTH 355 (F,W,S) | Discrete Mathematics |
| <input type="checkbox"/> MTH 312 (W,S) | Advanced Calculus II |
| <input type="checkbox"/> MTH 342 (F,W,S) | Linear Algebra II |
| <input type="checkbox"/> MTH 343 (W,S) | Introduction to Modern Algebra |
| <input type="checkbox"/> MTH 338 (W or S) | Non Euclidean Geometry, a WIC ² |
| <input type="checkbox"/> TCE 309 (F,W,S) | Field Practicum (3 credits) |
| | |
| <input type="checkbox"/> SED 414 (W) | Inquiry in Mathematics and Mathematics Education |
| <input type="checkbox"/> MTH 361 (F,S) | Introduction to Probability (MTH 463 can be substituted) |
| <input type="checkbox"/> ST 351 (F,W,S) | Introduction to Statistical Methods (ST 421 can be substituted) |
| <input type="checkbox"/> MTH 491 (F) | Algebraic and Geometric Transformations |
| <input type="checkbox"/> MTH 492 (W) | Algebraic and Geometric Transformations |
| <input type="checkbox"/> MTH 493 (S) | Algebraic and Geometric Transformations |

***Course offerings and schedules are subject to change.**

¹ Students who want a stronger background in mathematics should choose some courses from the seven senior directed electives listed in the mathematics major.

² Writing Intensive Course, a component of the Baccalaureate Core.

Checklists for the Minor Programs in Mathematics

Minor in Mathematics

The requirements for a minor in mathematics are 30 credits of MTH courses numbered 231 or higher, including 15 credits numbered 311 or higher. Either MTH 311 or MTH 341 must be included. MTH 390 may not be used for credit in the mathematics minor. MTH 251, MTH 252 and MTH 254 are strongly recommended for students pursuing a minor in mathematics. No course used to fulfill requirements for the minor in mathematics may be taken "S/U." A minimum GPA of 2.0 is required in this minor.

Minor in Actuarial Science

28 credits are required for the minor in actuarial science. These credits are fulfilled by the courses in the checklist below. A minimum GPA of 2.0 is required in this minor. No course used to fulfill requirements for the minor in actuarial science may be taken "S/U."

The following restriction applies to courses used for the minor in Actuarial Science: No upper-division courses other than MTH 306 and MTH 341 used to satisfy requirements in a student's major may also be used to satisfy the requirements of the actuarial science minor.

- MTH 251 Differential Calculus
- MTH 252 Integral Calculus
- MTH 253 Infinite Series and Sequences¹
- MTH 254 Vector Calculus I
- MTH 341 Linear Algebra
- MTH 361 Introduction to Probability

2 (or more) courses from the following list

- 1 _____ MTH 351 Introduction to Numerical Analysis
- 2 _____ MTH 463 Probability I
- MTH 464 Probability II
- MTH 465 Probability III
- MTH 467 Actuarial Mathematics
- ST 411 Methods of Data Analysis
- ST 412 Methods of Data Analysis
- ST 413 Methods of Data Analysis
- ST 421 Introduction to Mathematical Statistics
- ST 422 Introduction to Mathematical Statistics
- ST 441 Probability, Computing, and Simulation in Statistics
- ST 443 Applied Stochastic Models

¹ MTH 306 (Matrix and Power Series Methods) may be substituted for MTH 253.