Undergraduate Mathematics Programs at OSU
April 2015

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 Monday through Friday, from 9am to noon or 1 to 5pm.

As Math majors begin taking upper-division coursework in mathematics, they should transition to an advisor on the **Undergraduate Advising Committee.** The members of the Advising Committee can give you individualized advice about your program, 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.
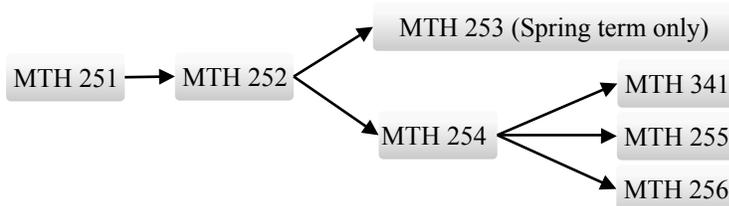
Alternately, a student arriving at OSU with some calculus credit may be able to complete the lower division requirements in one year. In this case, the student may decide to begin our "junior core" during their second year at OSU.

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.
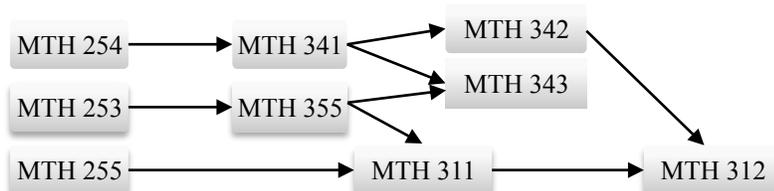
A term-by-term scheduling overview of the availability of these courses for the 2015-2016 academic year can be found on the Math Undergraduate Programs webpage. Annual changes to the schedule are usually minor and will be announced via the math majors listserve.

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 classes satisfying the area coursework requirement, two upper division electives, and also satisfy the computational requirement. The area coursework requirement is designed to ensure that Math majors gain breadth of knowledge across diverse areas in mathematics together with depth in some chosen area. 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 pages 5 and 6 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 7 and 8 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 9 and 10.

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 11.

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 12 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

Requirements for the standard BS in Mathematics were recently updated. Any student who became a Math major during or after Spring 2015 needs to satisfy the requirements given here. Students who were Math majors before Spring 2015 are subject to the old requirements (given in MyDegrees and in the archived handbook) unless they intentionally choose to switch to the new requirements. Students should visit their academic advisor to discuss pros and cons of switching to the new requirements.

The requirements for the math major portion of the Bachelor of Science in Mathematics are listed below. Students also need to satisfy the OSU and College of Science requirements. Frequent visits with your advisor are recommended.

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

Upper Division Requirements:
Part A: Junior Core
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 341 (F,W,S)   Linear Algebra I
- ❑ MTH 342 (F,W,S)   Linear Algebra II
- ❑ MTH 343 (F,W,S)   Introduction to Modern Algebra
- ❑ WIC[1] (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)

Part B: Computational Requirement
One course from the following list is required.
- ❑ _____   MTH 321 (F,S)   Introductory Applications of Math Software
                         MTH 351 (F,W,S)   Introduction to Numerical Analysis
                         MTH 440 (F)   Computational Number Theory
                         MTH 451 (F)   Numerical Linear Algebra
                         MTH 452 (W)   Numerical Solution of ODE

Part C. Area Coursework
Upper division mathematics coursework is offered in 6 distinct areas, all listed on the next page. The standard Math degree includes a Depth requirement (2 courses from one of the six areas) and a Breadth requirement (3 additional courses from each of 3 of the remaining 5 areas). Some exceptions are noted.

Breadth courses: Area: _____   Depth courses in area:
- ☐ 1_____   ☐ 1_____
- ☐ 2_____   ☐ 2_____
- ☐ 3_____

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

Areas and courses:

Algebra and Number Theory
(MTH 443 cannot be used in a pair to satisfy (a).)
MTH 440 (F)   Computational Number Theory (3)
MTH 441 (W)   Applied and Computational Algebra (3)
MTH 442 (S)   Applied and Computational Algebra (3)
MTH 443 (F)   Abstract Linear Algebra (3)

- 231 or 343 or 355 → 440
- 343 → 441 → 442
- 342 or 440 → 441
- 342 or 343 → 443
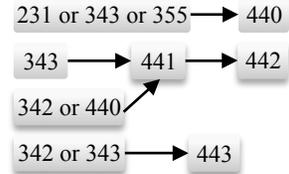
Analysis
(MTH 483 cannot be used in a pair to satisfy (a).)
MTH 411 (F, W, Su)   Real Analysis (3)
MTH 412 (W, S)   Real Analysis (3)
MTH 413 (S)   Real Analysis (3)
MTH 483 (W, S)   Complex Variables (3)

- 312, 341 → 411 → 412 → 413
- 253, 256 → 483
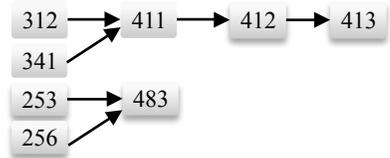
Applied Mathematics
(MTH 480 and MTH 481 cannot both be used to satisfy program requirements.)
MTH 420 (S)   Models and Methods of Applied Mathematics (3)
MTH 427 (F)   Introduction to Mathematical Biology (3)
MTH 480 (W)   Systems of Ordinary Differential Equations (3)
MTH 481 (F)   Applied Ordinary Differential Equations (3)
MTH 482 (W)   Applied Partial Differential Equations (3)

- 256, 341 → 420, 427, 480
- 256 → 481 → 482
- 306 or (253 and 341) → 481
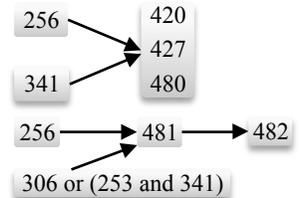
Geometry and Topology
MTH 430 (S)   Metric Spaces and Topology (3)
MTH 434 (W)   Introduction to Differential Geometry (3)
MTH 435 (S) Alternate Yrs.   Differential Geometry (3)
MTH 437 (S) Alternate Yrs.   General Relativity (3)

- 255, 342 → 434 → 435, 437
- 311 ⇢ 434, 437
- 311 ⇢ 430
- 342 or 355 → 430
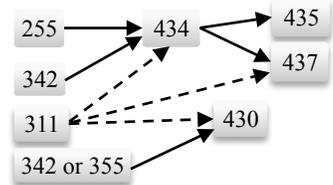
Numerical Analysis
MTH 451 (F)   Numerical Linear Algebra (3)
MTH 452 (W)   Numerical Solution of Ordinary Differential Equations (3)
MTH 453 (S)   Numerical Solution of Partial Differential Equations (3)

- Programming Experience, 341, 342, 351 → 451
- Programming Experience, 256, 306 or 341, 351 or 451 → 452 → 453
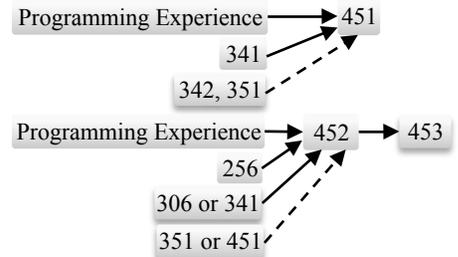
Probability
MTH 463 (F)   Probability I (3)
MTH 464 (W)   Probability II (3)
MTH 465 (S)   Probability III (3)
MTH 467 (W)   Actuarial Mathematics (3)
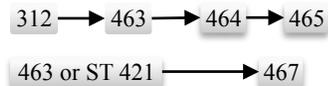
- 312 → 463 → 464 → 465
- 463 or ST 421 → 467

Part D: Electives
Two additional upper division elective courses of a mathematical nature are required. These can be upper division courses in Mathematics and Statistics (except for MTH 390 or blanket courses) or other courses of a mathematical nature approved by the departmental head advisor.

- ❑ 1 _____
- ❑ 2 _____

   *Course offerings and schedules are subject to change.

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

Upper Division
Part A: Junior Core
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 341 (F, W, S)   Linear Algebra I
- MTH 342 (F,W,S)   Linear Algebra II
- MTH 343 (F,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.

Part B: 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)

Part C: Probability or Statistics requirement
One of the following four courses is required:
❑   1_____   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)

Part D: Electives
Two additional upper division elective courses of a mathematical nature are required. These can be upper division courses in Mathematics and Statistics (except for MTH 390 or blanket courses) or other courses of a mathematical nature approved by the departmental head advisor. Students may also satisfy this requirement by completing a two-term thesis project with a graduate faculty member. (The thesis project must be approved in advance by the supervising faculty member and the departmental head advisor.)
❑   1_____
❑   2_____

*Course offerings and schedules are subject to change.

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[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
- ❑ Recommended: ST 201 Principles of Statistics or
                               ST 351 Intro to Statistical Methods

Upper Division:
Part A: Junior core.
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 341 (F, W, S)   Linear Algebra I
- ❑ MTH 342 (F,W,S)   Linear Algebra II
- ❑ MTH 343 (F,W,S)   Introduction to Modern Algebra
- ❑ WIC[1]   MTH 323 (W) Mathematical Modeling (preferred) or
                               MTH 333 (F) Fundamental Concepts of Topology or
                               MTH 338 (S) Non-Euclidean Geometry

Part B: Mathematics and Statistics advanced core.
All the following courses are required.
- ❑ 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.
One 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
One course from each of 2 of the following 5 areas is required.
- ❑   1_____
- ❑   2_____

MTH 321 (F, S), Introductory Applications of Mathematical Software, can be substituted for one of the breadth courses.

Algebra and Number Theory:
MTH 440 (F)   Computational Number Theory (3)
MTH 441 (W)   Applied and Computational Algebra (3)

 Analysis:
MTH 411 (F, W, Su)   Real Analysis (3)
MTH 483 (W, S)   Complex Variables (3)

Applied Mathematics:
MTH 420 (S)   Models and Methods of Applied Mathematics (3)
MTH 427 (F)   Introduction to Mathematical Biology (3)
MTH 480 (W)   Systems of Ordinary Differential Equations (3)
MTH 481 (F)   Applied Ordinary Differential Equations (3)

Geometry and Topology
MTH 430 (S)   Metric Spaces and Topology (3)
MTH 434 (W)   Introduction to Differential Geometry (3)

Numerical Analysis
MTH 351 (F, W, S)   Introduction to Numerical Analysis (3)
MTH 451 (F)   Numerical Linear Algebra (3)
MTH 452 (W)   Numerical Solution of Ordinary Differential Equations (3)

*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).

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

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

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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:

- MTH 251 – 256   The Calculus Sequence (MTH 251, 252, 253, 254, 255, 256)
- Physics 211   General Physics with Calculus

Upper Division[1]

- MTH 355 (F,W,S)   Discrete Mathematics
- MTH 311 (F,W)   Advanced Calculus I
- MTH 312 (W,S)   Advanced Calculus II
- MTH 341 (F, W, S)   Linear Algebra I
- MTH 342 (F,W,S)   Linear Algebra II
- MTH 343 (W,S)   Introduction to Modern Algebra
- MTH 338 (W or S)   Non Euclidean Geometry, a WIC[2]
- TCE 309 (F,W,S)   Field Practicum (3 credits)

- SED 414 (W)   Inquiry in Mathematics and Mathematics Education
- MTH 361 (F,S)   Introduction to Probability (MTH 463 can be substituted)
- ST 351 (F,W,S)   Introduction to Statistical Methods (ST 421 can be substituted)
- MTH 491 (F)   Algebraic and Geometric Transformations
- MTH 492 (W)   Algebraic and Geometric Transformations
- MTH 493 (S)   Algebraic and Geometric Transformations

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*Course offerings and schedules are subject to change.

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[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.

<div align="center">**Checklists for the Minor Programs in Mathematics**</div>

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 Sequences[1]
- ❑ 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

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