

# Bachelor of Science in Mathematics

The Bachelor of Science in Mathematics program is designed for the student who, upon graduation, plans to pursue graduate studies in mathematics, begin a career in mathematics or closely related field, or pursue teaching. We offer three distinct concentrations. Students are encouraged to speak to a mathematics faculty advisor to select the appropriate concentration and elective courses that will best fit their career goals.

The General Mathematics Concentration provides a deep level of study in mathematics and includes advanced topics in real analysis and algebra, which are prerequisites for many graduate programs. This concentration requires a total of 64-67 units of coursework; of those, up to 13 units may be selected from courses that count towards the University's General Education requirements in categories A3, B1 or B2, B3, B4, and the requirement for an upper-division writing-intensive course.

The Applied Mathematics Concentration combines mathematics coursework with coursework options in actuarial science, biology, chemistry, computer science, economics, geography, and physics. This concentration requires a total of 67-74 units of coursework; of those, up to 16 units may be selected from courses that count towards the University's General Education requirements in categories A3, B1, B2, B3, B4, and the requirement for an upper-division writing-intensive course.

The Teaching Mathematics Concentration is the best option for prospective secondary mathematics teachers and includes courses designed to help build the specialized content knowledge necessary for successful teaching. This concentration requires a total of 63-64 units of coursework; of those, up to 9 units count towards the University's General Education requirements in categories A3, B4, and the requirement for an upper-division writing-intensive course.

## Requirements (63-74 units)

**Total units required for graduation: 120**

## Requirements for the B.S. in Mathematics

### Lower-division requirements (22-23)

MATH 2210	Calculus I	4
MATH 2220	Calculus II	4
MATH 2265	Statistics with Applications	3
MATH 2310	Applied Linear Algebra	4
MATH 2320	Multivariable Calculus	4
Select one of the following CSE courses:		3-4
CSE 1100	Critical Thinking Through Computer Programming <small>Satisfies GE category A3</small>	
CSE 1250	Programming Basics	
CSE 2010	Computer Science I	

### Upper-division requirements (15)

MATH 3100	Mathematical Thinking: Communication and Proof	4
MATH 3329	Euclidean Geometry with Transformations	3
MATH 4300	Real Analysis	4

MATH 4600	Theory of Rings and Fields	4
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Note: MATH 3100 satisfies the GE upper-division Writing Intensive (WI) requirement.

### Concentration (26-36)

Students must complete one of the three concentrations listed below: 26-36

**Total Units 63-74**

## Concentrations (26-36 Units)

### General Mathematics Concentration

(Program Code: MATH)

#### Lower-division requirements (6-8)

MATH 2270	Differential Equations with Dynamical Systems I	3
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In addition to the lower-division CSE requirement, select one 2000-level course from the following: BIOL 2010\*, BIOL 2160, BIOL 2170, BIOL 2180, CHEM 2050, CHEM 2070, CHEM 2100, CSE 2010\*, ECON 2201, ECON 2202, GEOL 2040, GEOG 2040, GEOG 2249, GEOG 2250, PHIL 2100, PHYS 2000, or PHYS 2500. \*Note course has prerequisite(s).

#### Upper-division requirements (6)

MATH 5300	Advanced Real Analysis	3
MATH 5600	Group Theory	3

#### Electives (15)

Five courses (15 units) selected from the following with at least one course from each of Group A, Group B, and Group C. 15

Group A:

MATH 3345	Number Theory
MATH 3372	Combinatorics
MATH 3770	Introduction to Graph Theory

Group B:

MATH 4270	Differential Equations with Dynamical Systems II
MATH 4455	Partial Differential Equations & Fourier Analysis

Group C:

MATH 4485	Differential Geometry
MATH 5170	Complex Analysis
MATH 5310	Advanced Linear Algebra
MATH 5529	Advanced Topics in Geometry
MATH 5550	Introduction to Topology

Group D:

MATH 3320	Mathematical Interest Theory
MATH 3460	Probability Theory
MATH 3480	Topics in History of Mathematics
MATH 4320	Introduction to Actuarial Modeling
MATH 4360	Linear Statistical Models
MATH 5510	Topics in Advanced Mathematics
MATH 5565	Mathematical Statistics
MATH 5953	Independent Study

PHIL 3560	Philosophy of Logic and Mathematics	
<b>Total Units</b>		<b>27-29</b>

## Applied Mathematics Concentration

(Program Code: MAAM)

### Lower-division requirements (9-13)

MATH 2270	Differential Equations with Dynamical Systems I	3
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In addition to the lower-division CSE requirement, select one 2000-level course from Group I below and one additional course from either Group I or Group II : 6-10

Group I: BIOL 2010\*, BIOL 2160, BIOL 2170, BIOL 2180, CHEM 2050, CHEM 2070, CHEM 2100, ECON 2202, GEOL 2040, GEOG 2040, PHIL 2100, PHYS 2000, PHYS 2500. Each course in Group I satisfies one of the following GE categories: A3, B1, B2, or D2. \*Note course has prerequisite(s).

Group II: BIOL 2020\*, CHEM 2060\*, CHEM 2200\*, CSE 2010\*, CSE 2020\*, ECON 2201, GEOG 2249, GEOG 2250, PHYS 2010\*, PHYS 2510\*, PHYS 2700\*. \*Note course has prerequisite(s).

### Upper-division requirements (3)

MATH 5310	Advanced Linear Algebra	3
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### Electives (18-20)

Six courses (18-20 units) selected from the following with four courses from Group A and two courses from Group B. At least three elective courses must be chosen from the 4000-level or above. 18-20

Group A:

MATH 3320	Mathematical Interest Theory
MATH 3372	Combinatorics
MATH 3460	Probability Theory
MATH 3770	Introduction to Graph Theory
MATH 4270	Differential Equations with Dynamical Systems II
MATH 4320	Introduction to Actuarial Modeling
MATH 4360	Linear Statistical Models
MATH 4455	Partial Differential Equations & Fourier Analysis
MATH 5565	Mathematical Statistics

In addition to the two courses already taken from Group I and/or Group II above, select at most one additional course from the following in consultation with an advisor: BIOL 2020, BIOL 3100, BIOL 3300, BIOL 3700, BIOL 3800, CHEM 2300, CHEM 2400, CHEM 3200, CSE 2020, CSE 2130, CSE 4200, CSE 4310, CSE 5000, CSE 5120, CSE 5350, CSE 5500, ECON 3103, ECON 3314, ECON 3318, ECON 3400, ECON 3780, GEOG 3710, GEOG 4860, GEOG 4880, PHYS 2700, PHYS 3100, PHYS 3200, or PHYS 3300.

Group B:

MATH 3345	Number Theory
MATH 3480	Topics in History of Mathematics
MATH 4485	Differential Geometry
MATH 5170	Complex Analysis

MATH 5300	Advanced Real Analysis
MATH 5510	Topics in Advanced Mathematics
MATH 5529	Advanced Topics in Geometry
MATH 5550	Introduction to Topology
MATH 5600	Group Theory
MATH 5953	Independent Study

<b>Total Units</b>	<b>30-36</b>
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## Teaching Mathematics Concentration

(Program Code: MATM)

### Lower-division requirements (4)

MATH 2900	Problem Solving and Mathematical Reasoning for Teachers I	4
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### Upper-division requirements (16)

MATH 3345	Number Theory	3
MATH 3460	Probability Theory	3
MATH 3480	Topics in History of Mathematics	3
MATH 4900	Problem Solving and Mathematical Reasoning for Teachers II	4
MATH 5900	Senior Seminar for Future Mathematics Educators	3

### Electives (6)

Two courses (6 units) selected from the following with at least one course from Group A. 6

Group A:

MATH 5170	Complex Analysis
MATH 5300	Advanced Real Analysis
MATH 5310	Advanced Linear Algebra
MATH 5529	Advanced Topics in Geometry
MATH 5550	Introduction to Topology
MATH 5565	Mathematical Statistics
MATH 5600	Group Theory

Group B:

MATH 2270	Differential Equations with Dynamical Systems I
MATH 3140	Introduction to Systems Modeling
MATH 3320	Mathematical Interest Theory
MATH 3372	Combinatorics
MATH 3770	Introduction to Graph Theory
MATH 4320	Introduction to Actuarial Modeling
MATH 4360	Linear Statistical Models
MATH 4485	Differential Geometry
MATH 5510	Topics in Advanced Mathematics
MATH 5953	Independent Study

<b>Total Units</b>	<b>26</b>
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