

# Mathematics B.S.

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Click here to view the Suggested Plan of Study (p. 3)

## General Education Foundations

Please use this link to view a list of courses that meet each GEF requirement. (<http://registrar.wvu.edu/gef/>)

NOTE: Some major requirements will fulfill specific GEF requirements. Please see the curriculum requirements listed below for details on which GEFs you will need to select.

Code	Title	Hours
<b>General Education Foundations</b>		
F1 - Composition & Rhetoric		3-6
ENGL 101 & ENGL 102 or ENGL 103	Introduction to Composition and Rhetoric and Composition, Rhetoric, and Research Accelerated Academic Writing	
F2A/F2B - Science & Technology		4-6
F3 - Math & Quantitative Reasoning		3-4
F4 - Society & Connections		3
F5 - Human Inquiry & the Past		3
F6 - The Arts & Creativity		3
F7 - Global Studies & Diversity		3
F8 - Focus (may be satisfied by completion of a minor, double major, or dual degree)		9
Total Hours		31-37

Please note that not all of the GEF courses are offered at all campuses. Students should consult with their advisor or academic department regarding the GEF course offerings available at their campus.

## Degree Requirements

Students must complete WVU General Education Foundations requirements, College B.S. requirements, major requirements, and electives to total a minimum of 120 hours. For complete details on these requirements, visit the B.S. Degrees tab on the Eberly College of Arts and Sciences (<http://catalog.wvu.edu/undergraduate/eberlycollegeofartsandsciences/#bachelorofsciencetext>).

## Departmental Requirements for the B.S. in Mathematics

- **Capstone Requirement:** The university requires the successful completion of a Capstone course. Mathematics majors must complete MATH 495.
- **Writing and Communication Skills Requirement:** Mathematics Bachelor of Arts students fulfill the Writing and Communication Skills requirement by completing ENGL 101 and ENGL 102 (or ENGL 103), and two additional **SpeakWrite Certified Courses™**: MATH 495, and one additional course from the following: COMM 302, HIST 203, HIST 204, HIST 207, HIST 221, HIST 241, HIST 242, HIST 250, HIST 264, HIST 259, PHIL 301, PHIL 302, PHIL 306, PHIL 310, PHYS 376L, RELG 219, RELG 223, RELG 230, RELG 231, WRIT 304, WRIT 305.
- **Calculation of the GPA in the Major:** A minimum GPA of 2.0 is required in all classes applied to the major requirements. If a class is repeated, all attempts will be included in the calculation of the GPA unless the course is eligible for a D/F repeat.
- **Advanced Mathematics Coursework:** Students have the option of completing 18 credits of advanced Mathematics electives, or to complete one of six Areas of Emphasis for 18 credits (please consult the AoE tab). Courses applied to an AoE or to the advanced mathematics electives may not overlap with the courses taken for the Foundation or the Mathematical programming sections.

## Curriculum Requirements

Code	Title	Hours
	University Requirements	57
	ECAS B.S. Requirements	16
	Mathematics Major Requirements	47
Total Hours		120

## University Requirements

Code	Title	Hours
General Education Foundations (GEF) 1, 2, 3, 4, 5, 6, 7, and 8 (31-37 Credits)		
Outstanding GEF Requirements 1, 4, 5, 6, and 7		22
MATH 191	First-Year Seminar	1
General Electives		34
Total Hours		57

## ECAS Bachelor of Science Requirements

Code	Title	Hours
ECAS B.S. REQUIREMENTS		16
Global Studies & Diversity Requirement		
Mathematics requirement: fulfilled by major requirements		
Science Requirement (select 2 areas) *		
Total Hours		16

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Please see the Eberly College of Arts and Sciences Bachelor of Science (<http://catalog.wvu.edu/undergraduate/eberlycollegeofartsandsciences/#bachelorofsciencetext>) catalog page.

## Mathematical Major Requirements

Code	Title	Hours
<b>FOUNDATION COURSES</b>		<b>22</b>
MATH 153 & MATH 154 or MATH 155	Calculus 1a with Precalculus and Calculus 1b with Precalculus Calculus 1	
MATH 156	Calculus 2	
MATH 251	Multivariable Calculus	
MATH 261	Elementary Differential Equations	
MATH 303	Introduction to the Concepts of Mathematics	
MATH 343 or MATH 441	Introduction to Linear Algebra Applied Linear Algebra	
STAT 215	Introduction to Probability and Statistics	
<b>MATHEMATICAL PROGRAMMING</b>		<b>3</b>
MATH 322 or MATH 420	Introduction to Programming and Computational Mathematics Numerical Analysis 1	
<b>ADVANCED MATHEMATICS COURSEWORK</b>		<b>18</b>
<b>Option 1: General Mathematics Electives</b>		
MATH 451	Introduction to Real Analysis 1	
MATH 341 or MATH 381 or MATH 456	Introduction to Algebraic Structures Introduction to Analysis and Topology Complex Variables	
4 MATH courses at the 300-level or above **		
<b>Option 2: Area of Emphasis</b>		
Select one AoE from the list below:		
Actuarial Science		
Computational Mathematics		
Mathematical Biology		
Mathematics Education		
Physical Applied Mathematics		
Pure Mathematics		
<b>CAPSTONE EXPERIENCE</b>		<b>4</b>

MATH 495

Independent Study

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Total Hours 47

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With permission from a departmental adviser, students may substitute another upper-division course from another unit.

## Suggested Plan of Study

### First Year

Fall	Hours	Spring	Hours
MATH 191		1 MATH 156 (GEF 8; B.S. Second Area 1)	4
MATH 155 (GEF 3)		4 ENGL 101 (GEF 1)	3
GEF 2 (B.S. First Area 1)		4 GEF 6	3
GEF 4		3 B.S. First Area 2 (GEF 8)	4
GEF 5		3 General Elective	1
		15	15

### Second Year

Fall	Hours	Spring	Hours
MATH 251 (B.S. Second Area 2)		4 MATH 261	4
STAT 215		3 MATH 303	3
ENGL 102 (GEF 1)		3 B.S. Third Area 2	4
B.S. Third Area 1 (GEF 8)		4 GEF 7	3
General Elective		1 General Elective	1
		15	15

### Third Year

Fall	Hours	Spring	Hours
MATH 343 or 441		3 MATH 322 or 420	3
Advanced Mathematics 1st course		3 MATH 495	1
Advanced Mathematics 2nd Course		3 Advanced Mathematics 3rd course	3
SpeakWrite Course		3 Advanced Mathematics 4th course	3
General Elective		3 General Elective	3
		General Elective	2
		15	15

### Fourth Year

Fall	Hours	Spring	Hours
MATH 495		2 MATH 495	1
Advanced Mathematics 5th course		3 Advanced Mathematics 6th course	3
General Elective		4 General Elective	4
General Elective		3 General Elective	4
General Elective		3 General Elective	3
		15	15

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Total credit hours: 120

## Areas of Emphasis Offered:

- Actuarial Science (p. 4)
- Computational Mathematical Science (p. 5)
- Mathematics Biology (p. 6)
- Mathematics Education (p. 7)
- Physical Applied Mathematics (p. 8)
- Pure Mathematics (p. 10)

## Bachelor of Arts or Bachelor of Science in Mathematics: Actuarial Science Area of Emphasis

A mathematics degree with an emphasis in Actuarial Science provides the student with preparation necessary for becoming an actuary and passing the first two actuary exams. Coursework includes the study of compound interest models, valuation of financial instruments, forecasting and population trend analysis.

### Actuarial Science Emphasis Requirements:

- **Capstone Requirement:** Students completing an Actuarial Science Area of Emphasis will focus their capstone on pricing models, premium analysis, and other aspects of financial mathematics.
- **Selecting Course:** If a course is selected as an option for the AoE, the same course may not be used to fulfill another MATH B.S. requirement.

## CURRICULUM REQUIREMENTS

Code	Title	Hours
<b>CORE COURSES:</b>		<b>15</b>
MATH 363	Mathematical Foundations of Actuarial Science	
MATH 364	Mathematics of Compound Interest	
MATH 473	Actuarial Mathematics 1	
MATH 474	Actuarial Mathematics 2	
STAT 461	Introduction to Probability Theory	
<b>ELECTIVES:</b>		<b>3</b>
MATH 341	Introduction to Algebraic Structures	
MATH 378	Discrete Mathematics	
MATH 381	Introduction to Analysis and Topology	
MATH 451	Introduction to Real Analysis 1	
Total Hours		18

## SUGGESTED PLAN OF STUDY FOR THE BACHELOR OF SCIENCE IN MATHEMATICS WITH AN AREA OF EMPHASIS IN ACTUARIAL SCIENCE

### First Year

Fall	Hours	Spring	Hours
MATH 191		1 MATH 156 (GEF 8; B.S. Second Area 1)	4
MATH 155 (GEF 3)		4 ENGL 101 (GEF 1)	3
GEF 2 (B.S. First Area 1)		4 GEF 6	3
GEF 4		3 B.S. First Area 2 (GEF 8)	4
GEF 5		3 General Elective	1
		15	15

### Second Year

Fall	Hours	Spring	Hours
MATH 251		4 ENGL 102 (GEF 1)	3
B.S. Third Area 1 (GEF 8)		3 MATH 261	4
STAT 215		3 MATH 303	3
ECAS International Requirement (GEF 7)		4 STAT 461	3
General Elective		1 General Elective	2
		15	15

### Third Year

Fall	Hours	Spring	Hours
MATH 364		3 MATH 322	3
Advanced Pure Math Elective		3 MATH 363	3
B.S. Third Area 2		4 MATH 495	1
SpeakWrite Course		3 General Elective	3
General Elective		2 General Elective	2

	General Elective	3
	15	15
<b>Fourth Year</b>		
<b>Fall</b>	<b>Hours</b>	<b>Spring</b>
		<b>Hours</b>
MATH 473		3 MATH 474
MATH 495		2 MATH 495
General Elective		4 General Elective
General Elective		3 General Elective
General Elective		3 General Elective
	15	15

Total credit hours: 120

## Bachelor of Science in Mathematics: Computational Mathematical Science Area of Emphasis

A mathematics degree with an emphasis in Computational Mathematical Science provides the student with necessary preparation for interdisciplinary positions in industry and graduate school in Applied Mathematics.

### Computational Mathematical Science Emphasis Requirements:

- **Capstone Requirement:** Students completing a Computational Mathematical Science Area of Emphasis will focus their capstone on a topic that is connected or related to one of the upper-level proof courses.
- **Selecting Course:** If a course is selected as an option for the AoE, the same course may not be used to fulfill another MATH B.S. requirement.

## CURRICULUM REQUIREMENTS

Code	Title	Hours
<b>CORE COURSES:</b>		<b>6</b>
MATH 378	Discrete Mathematics	
MATH 373 or MATH 377	Introduction to Cryptography Operations Research	
<b>COMPUTATIONAL ELECTIVES:</b>		<b>12</b>
1-Select one course from the following list:		
MATH 363	Mathematical Foundations of Actuarial Science	
MATH 456	Complex Variables	
MATH 460	Introduction to Dynamical Systems and Applications	
MATH 464	Deterministic Mathematical Modeling	
MATH 465	Partial Differential Equations	
2- Select one pair of courses and one additional course from the following list		
CS 320 & CS 420	Analysis of Algorithms and Design of Algorithms	
MATH 420 & MATH 421	Numerical Analysis 1 and Numerical Analysis 2	
STAT 312 or STAT 313	Intermediate Statistical Methods Introductory Design and Analysis	
STAT 461 & STAT 462	Introduction to Probability Theory and Theoretical Introduction to Statistical Inference	
Total Hours		18

## SUGGESTED PLAN OF STUDY FOR THE BACHELOR OF SCIENCE IN MATHEMATICS WITH AN AREA OF EMPHASIS IN COMPUTATIONAL MATHEMATICAL SCIENCE

### First Year

Fall	Hours	Spring	Hours
MATH 191		1 MATH 156 (GEF 8; B.S. Second Area 1)	4
MATH 155 (GEF 3)		4 B.S. First Area 2 (GEF 8)	4

GEF 2 (B.S. First Area 1)		4 ENGL 101 (GEF 1)	3
GEF 4		3 GEF 6	3
GEF 5		3 General Elective	1
		15	15
<b>Second Year</b>			
<b>Fall</b>	<b>Hours</b>	<b>Spring</b>	<b>Hours</b>
MATH 251 (B.S. Second Area 2)		4 MATH 261	4
STAT 215		3 MATH 303	3
ENGL 102 (GEF 1)		3 B.S. Second Area 2	4
B.S. Second Area 1 (GEF 8)		4 SpeakWrite Requirement	3
General Elective		1 General Elective	1
		15	15
<b>Third Year</b>			
<b>Fall</b>	<b>Hours</b>	<b>Spring</b>	<b>Hours</b>
MATH 343		3 MATH 420	3
MATH 460		3 MATH 495	1
STAT 461		3 MATH 377 or 373	3
General Elective		3 General Elective	4
General Elective		3 General Elective	4
		15	15
<b>Fourth Year</b>			
<b>Fall</b>	<b>Hours</b>	<b>Spring</b>	<b>Hours</b>
MATH 421		3 MATH 378	3
MATH 495		2 MATH 495	1
GEF 7		3 General Elective	4
General Elective		4 General Elective	4
General Elective		3 General Elective	3
		15	15

Total credit hours: 120

## Bachelor of Science in Mathematics: Mathematics Biology Area of Emphasis

A mathematics degree with an emphasis in Mathematics Biology provides the student with necessary preparation for both graduate school and industry positions with a focus on Biology and Mathematics interdisciplinary work.

### Mathematics Biology Emphasis Requirements:

- **Capstone Requirement:** Students completing a Mathematics Biology Area of Emphasis will focus their capstone on a topic that is connected or related to one of the upper-level applied mathematics courses.
- **Selecting Course:** If a course is selected as an option for the AoE, the same course may not be used to fulfill another MATH B.S. requirement.

## CURRICULUM REQUIREMENTS

Code	Title	Hours
<b>CORE COURSES:</b>		<b>12</b>
MATH 420	Numerical Analysis 1	
MATH 460	Introduction to Dynamical Systems and Applications	
MATH 470	Introduction to Mathematical and Computational Systems Biology	
MATH 471	Mathematical Systems Biology 2: Stochastic Methods	
<b>ELECTIVES:</b>		<b>6</b>
MATH 341	Introduction to Algebraic Structures	
or MATH 378	Discrete Mathematics	
or MATH 381	Introduction to Analysis and Topology	
or MATH 451	Introduction to Real Analysis 1	
MATH 465	Partial Differential Equations	

or STAT 312	Intermediate Statistical Methods	
Total Hours		18

### SUGGESTED PLAN OF STUDY FOR THE BACHELOR OF SCIENCE IN MATHEMATICS WITH AN AREA OF EMPHASIS IN MATHEMATICS BIOLOGY

**First Year**

Fall	Hours	Spring	Hours
MATH 191		1 MATH 156 (GEF 8; B.S. Second Area 1)	4
MATH 155 (GEF 3)		4 ENGL 101 (GEF 1)	3
GEF 2 (B.S. First Area 1)		4 GEF 6	3
GEF 4		3 B.S. First Area 2 (GEF 8)	4
GEF 5		3 General Elective	1
		15	15

**Second Year**

Fall	Hours	Spring	Hours
MATH 251 (B.S. Second Area 2)		4 MATH 261	4
STAT 215		3 STAT 312	3
ENGL 102 (GEF 1)		3 B.S. Third Area 2	4
B.S. Third Area 1 (GEF 8)		4 ECAS Writing Requirement	3
General Elective		1 General Elective	1
		15	15

**Third Year**

Fall	Hours	Spring	Hours
MATH 303		3 MATH 470	3
MATH 343 or 441		3 MATH 495	1
MATH 460		3 Advanced Mathematics Elective	3
GEF 7		3 General Elective	4
General Elective		3 General Elective	4
		15	15

**Fourth Year**

Fall	Hours	Spring	Hours
MATH 471		3 MATH 420	3
MATH 495		2 MATH 495	1
General Elective		4 General Elective	4
General Elective		3 General Elective	4
General Elective		3 General Elective	3
		15	15

Total credit hours: 120

### Bachelor of Science in Mathematics: Mathematics Education Area of Emphasis

A mathematics degree with an emphasis in Mathematics Education provides the student with necessary preparation to teach mathematics in middle and high school, or graduate school with an emphasis on teaching at the community college or higher education institution.

**Mathematics Education Emphasis Requirements:**

- **Capstone Requirement:** Students completing a Mathematics Education Area of Emphasis will focus their capstone on a topic that is connected or related to one of the upper-level applied mathematics courses.
- **Selecting Course:** If a course is selected as an option for the AoE, the same course may not be used to fulfill another MATH B.S. requirement.

### CURRICULUM REQUIREMENTS

Code	Title	Hours
<b>CORE COURSES:</b>		
MATH 218	History of Mathematics	9

or MATH 318	Perspectives on Mathematics and Science	
MATH 338	Geometry for Teachers	
MATH 341	Introduction to Algebraic Structures	
<b>ELECTIVES:</b>		<b>9</b>
MATH 322	Introduction to Programming and Computational Mathematics	
MATH 376	Foundations, Functions and Regression Models	
or MATH 378	Discrete Mathematics	
MATH 381	Introduction to Analysis and Topology	
or MATH 451	Introduction to Real Analysis 1	
or MATH 456	Complex Variables	
Total Hours		18

## SUGGESTED PLAN OF STUDY FOR THE BACHELOR OF SCIENCE IN MATHEMATICS WITH AN AREA OF EMPHASIS IN MATHEMATICS EDUCATION

### First Year

Fall	Hours	Spring	Hours
MATH 191		1 MATH 156 (GEF 8; B.S. Second Area 1)	4
MATH 155 (GEF 3)		4 MATH 218 (GEF 5)	3
GEF 2 (B.S. First Area 1)		4 ENGL 101 (GEF 1)	3
GEF 4		3 B.S. First Area 2 (GEF 8)	4
GEF 6		3 General Elective	1
		15	15

### Second Year

Fall	Hours	Spring	Hours
MATH 251 (B.S. Second Area 2)		4 MATH 261	4
STAT 215		3 MATH 303	3
ENGL 102 (GEF 1)		3 MATH 338	3
B.S. Second Area 1 (GEF 8)		4 B.S. Second Area 2	4
General Elective		1 General Elective	1
		15	15

### Third Year

Fall	Hours	Spring	Hours
MATH 341		3 MATH 495 (Capstone)	1
ECAS Writing Requirement		3 MATH 343	3
GEF 7		3 Advanced Mathematics Course	3
General Elective		3 General Elective	4
General Elective		3 General Elective	4
		15	15

### Fourth Year

Fall	Hours	Spring	Hours
MATH 322		3 MATH 495	1
MATH 378		3 General Elective	4
MATH 495		2 General Elective	4
General Elective		4 General Elective	3
General Elective		3 General Elective	3
		15	15

Total credit hours: 120

## Bachelor of Science in Mathematics: Physical Applied Mathematics Area of Emphasis

A mathematics degree with an emphasis in Physical Applied Mathematics provides the student with necessary preparation for interdisciplinary positions in industry or preparation for graduate school in Applied Mathematics.



**Physical Applied Mathematics Area Emphasis Requirements:**

- **Capstone Requirement:** Students completing a Physical Applied Mathematics Area of Emphasis will focus their capstone on a topic that is connected or related to one of the upper-level applied mathematics courses.
- **Selecting Course:** If a course is selected as an option for the AoE, the same course may not be used to fulfill another MATH B.S. requirement.

**CURRICULUM REQUIREMENTS**

Code	Title	Hours
<b>CORE COURSES:</b>		<b>15</b>
MATH 420	Numerical Analysis 1	
MATH 460	Introduction to Dynamical Systems and Applications	
MATH 456	Complex Variables	
MATH 464	Deterministic Mathematical Modeling	
MATH 465	Partial Differential Equations	
<b>ELECTIVE:</b>		<b>3</b>
Select one course from the list:		
MATH 341	Introduction to Algebraic Structures	
MATH 378	Discrete Mathematics	
MATH 381	Introduction to Analysis and Topology	
MATH 451	Introduction to Real Analysis 1	
Total Hours		18

**SUGGESTED PLAN OF STUDY FOR THE BACHELOR OF SCIENCE IN MATHEMATICS WITH AN AREA OF EMPHASIS IN PHYSICAL APPLIED MATHEMATICS**

**First Year**

Fall	Hours	Spring	Hours
MATH 191		1 MATH 156 (GEF 8; B.S. Second Area 1)	4
MATH 155 (GEF 3)		4 B.S. First Area 2 (GEF 8)	4
GEF 2 (B.S. First Area 1)		4 ENGL 101 (GEF 1)	3
GEF 4		3 GEF 6	3
GEF 5		3 General Elective	1
		15	15

**Second Year**

Fall	Hours	Spring	Hours
MATH 251 (B.S. Second Area 2)		4 MATH 261	4
STAT 215		3 MATH 343	3
ENGL 102 (GEF 1)		3 B.S. Second Area 2	4
B.S. Second Area 1 (GEF 8)		4 GEF 7	3
General Elective		1 General Elective	1
		15	15

**Third Year**

Fall	Hours	Spring	Hours
MATH 460		3 MATH 456	3
MATH 465		3 MATH 420	3
MATH 303		3 MATH 495	1
SpeakWrite Course		3 General Elective	4
General Elective		3 General Elective	4
		15	15

**Fourth Year**

Fall	Hours	Spring	Hours
MATH 464		3 MATH 495	1
MATH 495		2 General Elective	4

Advanced Mathematics Elective	3 General Elective	4
General Elective	4 General Elective	3
General Elective	3 General Elective	3
15		15

Total credit hours: 120

## Bachelor of Science in Mathematics: Pure Mathematics Area of Emphasis

A mathematics degree with an emphasis in Pure Mathematics provides the student with necessary preparation for graduate school in Mathematics for students that was to pursue a Masters or Doctoral degree in Mathematics. Coursework includes four or more upper-level proof classes in Real Analysis, Algebraic Structures, Topology, Discrete Mathematics, and Complex Variables.

### Pure Mathematics Emphasis Requirements:

- **Capstone Requirement:** Students completing a Pure Mathematics Area of Emphasis will focus their capstone on a topic that is connected or related to one of the upper-level proof courses.
- **Selecting Course:** If a course is selected as an option for the AoE, the same course may not be used to fulfill another MATH B.S. requirement.

## CURRICULUM REQUIREMENTS

Code	Title	Hours
<b>CORE COURSES:</b>		<b>12</b>
MATH 341	Introduction to Algebraic Structures	
MATH 381	Introduction to Analysis and Topology	
MATH 451	Introduction to Real Analysis 1	
MATH 456	Complex Variables	
<b>ELECTIVES:</b>		<b>6</b>
MATH 322	Introduction to Programming and Computational Mathematics	
or MATH 420	Numerical Analysis 1	
or STAT 312	Intermediate Statistical Methods	
or STAT 461	Introduction to Probability Theory	
MATH 378	Discrete Mathematics	
or MATH 442	Advanced Algebraic Structures	
or MATH 452	Introduction to Real Analysis 2	
Total Hours		18

## SUGGESTED PLAN OF STUDY FOR THE BACHELOR OF SCIENCE IN MATHEMATICS WITH AN AREA OF EMPHASIS IN PURE MATHEMATICS

### First Year

Fall	Hours	Spring	Hours
MATH 191		1 MATH 156 (GEF 8; B.S. Second Area 1)	4
MATH 155 (GEF 3)		4 ENGL 101 (GEF 1)	3
GEF 2 (B.S. First Area 1)		4 B.S. First Area 2 (GEF 8)	4
GEF 4		3 GEF 6	3
GEF 5		3 General Elective	1
		15	15

### Second Year

Fall	Hours	Spring	Hours
MATH 251 (B.S. Second Area 2)		4 MATH 261	4
STAT 215		3 MATH 303	3
ENGL 102 (GEF 1)		3 GEF 7	3
B.S. Third Area 1 (GEF 8)		4 B.S. Third Area 2	4
General Elective		1 General Elective	1
		15	15

**Third Year**

<b>Fall</b>	<b>Hours</b>	<b>Spring</b>	<b>Hours</b>
MATH 343		3 MATH 381	3
MATH 451		3 MATH 495	1
SpeakWrite Course		3 General Elective	4
General Elective		3 General Elective	4
General Elective		3 General Elective	3
		15	15

**Fourth Year**

<b>Fall</b>	<b>Hours</b>	<b>Spring</b>	<b>Hours</b>
MATH 341		3 MATH 456	3
MATH 495		2 MATH 495	1
Additional Mathematics or Statistics Elective		3 Advanced Mathematics Electives Course	3
General Elective		4 General Elective	4
General Elective		3 General Elective	4
		15	15

Total credit hours: 120

## Major Learning Outcomes

### MATHEMATICS

Upon successful completion of the B.A. or B.S. degree, **Mathematics** majors will demonstrate the following competencies:

1. Students will communicate mathematics in both written and oral forms.
  - Students will construct valid proofs.
  - Students will demonstrate their ability to comprehend and to synthesize professional mathematical discourse (such as upper level textbooks, monographs, journal articles, unpublished faculty research, technical reports, etc.).
  - Students will prepare a clear and concise written project and orally present advanced mathematical concepts effectively and professionally.
2. Students will have a clear understanding of fundamental concepts and general understanding in a breadth of advanced topics in mathematics.
  - Students will demonstrate basic skills in specific mathematics topics (Algebra, Trigonometry, Calculus, Differential Equations, and Linear Algebra).
  - Students will demonstrate a breadth of knowledge of upper level mathematics topics.
  - Students will be exposed to the use of mathematics in various applications and professions.
3. Students will apply mathematical knowledge.
  - Students will demonstrate their ability to understand and construct mathematical models to solve problems.
  - Students will apply mathematics they have learned to new and different areas.