

# APPLIED MATHEMATICS (BS)

## Program Description

The BS in Applied Mathematics is a flexible, yet demanding, interdisciplinary major designed for students interested in careers involving the applications of mathematics and statistics in other fields.

In addition to completing coursework in mathematics, you must select a field of concentration in which mathematics is applied and complete coursework in both fields. Example programs of study can be found on the Mathematics Department website (<http://spu.edu/depts/math/>). Fields of concentration could include Data Science, Chemistry, Computer Science, Ecology, Economics, Engineering, Finance, Physics, or any field where mathematics and statistics are utilized. Many students majoring in Applied Mathematics also choose to complete a minor or double-major in the applied field.

Upper-division courses in the applied field will typically have lower-division prerequisites not listed in the credit total. Depending on the choice of concentration, you may have as many as 25 credits of necessary lower-division course work outside the major.

## Entering and Completing the Major

In order to earn a degree, you must complete at least one academic major. SPU encourages students to explore various academic paths, so if you change your mind about a major, or want to include an additional program, you are able to do so, as outlined below.

Note that the University encourages you to enter your chosen major(s) as soon as you have determined it and are eligible to join it, especially by the start of your junior year. Students who transfer as juniors and seniors should enter a major within their first two quarters at SPU.

- If this is your first quarter at SPU and you identified a major in this department as your first choice on your application for admission to the University, you have gained entry to the major. To change or add a major, follow these instructions (<https://spu.atlassian.net/l/cp/a3th1keb/>).
- If you are an SPU student with an SPU cumulative GPA of 2.0 or better, follow these instructions (<https://spu.atlassian.net/l/cp/a3th1keb/>) to enter a major in this department.
- The University requires a grade of C- or better in all classes that apply to a major; however, programs may require higher minimum grades in specific courses. You may repeat an SPU course only once for a higher grade.
- To advance in this program, meet with your faculty advisor regularly to discuss your grades, course progression, and other indicators of satisfactory academic progress. If your grades or other factors indicate that you may not be able to successfully complete the major or minor, your faculty advisor can work with you to explore options, which may include choosing a different major.
- You must complete the major requirements that are in effect in the SPU Undergraduate Catalog for the year you enter the major.

## Applied Mathematics (BS)

76 Credits Minimum, Including 48 Upper Division (UD)

Code	Title	Credits
<b>Core Requirements</b>		
MAT 1234	Calculus I	5
MAT 1235	Calculus II	5
MAT 1236	Calculus III	5
MAT 2360	Introduction to Statistics for the Sciences	5
MAT 2401	Linear Algebra	3
MAT 3000	Foundations of Mathematics	5
MAT 3237	Differential Equations	3
MAT 3360	Probability and Statistics	5
MAT 4899	Senior Capstone Seminar	3
MAT 4900	Independent Project/Design in Mathematics	2
Section Credits Required		41
<b>Programming</b>		
CSC 2230	Computer Programming for Engineers	
CSC 2330	Data Structures Programming	
CSC 2430	Data Structures I <sup>1</sup>	
Section Credits Required		5
<b>Upper Division Math Electives</b>		
Select 15 credits from the following:		15
MAT 3238	Vector Calculus	
MAT 3333	Statistical Modeling	
MAT 3380	Introduction to Data Science	
MAT 3724	Applied Analysis	
MAT 3730	Complex Variables	
MAT 3749	Introduction to Analysis	
MAT 4363	Mathematical Statistics	
MAT 4725	Numerical Analysis	
MAT 4830	Mathematical Modeling	
MAT 4920	Mathematical Modeling Contest	
<b>Approved Upper Division Electives in Related Field <sup>2,3</sup></b>		<b>15</b>
<b>Total Credits</b>		<b>76</b>

1

Students selecting CSC 2430 Data Structures I for the Programming requirement must also take CSC 1230 Problem Solving and Programming (5 credits) since it is a prerequisite.

2

Students must select a field of concentration in which mathematics is applied, and complete 15 credits of approved upper division electives in that field.

3

Students should submit a plan for these upper division electives to their faculty advisor for approval prior to completing the coursework.

## Suggested Course Sequence

A typical student planning to get a B.S. in Applied Mathematics would follow the schedule below. In addition to the completing coursework in mathematics, students must select a field of concentration in which mathematics is applied and complete coursework in both fields. A total of 15 credits of upper-division math electives and 15 credits of upper-division credits in the applied field are required. Example programs of study can be found on the Mathematics Department website (<http://spu.edu/academics/college-of-arts-sciences/mathematics/>). Note that

upper-division courses in the applied field will typically have lower-division prerequisites, which are not listed in the credit total. Depending on the choice of concentration, there could be as many as 25 credits of necessary lower division coursework outside the major.

Students majoring in Applied Mathematics must submit an individual plan specifying the upper-division elective courses they intend to take. This plan should be submitted to their faculty advisor in the Mathematics Department and approved before the student has completed more than two of the upper-division elective courses in either mathematics or the applied field (most likely early in the sophomore year). When submitting the plan, the student should explain why the courses in the applied field are chosen. At least three upper-division courses in the applied field should be mathematically oriented.

Because many upper-division courses are only offered alternating years, all students are strongly encouraged to consult with an advisor from the faculty in the Mathematics Department to carefully plan their schedule.

Course	Title	Credits
<b>Freshman</b>		
<b>Autumn</b>		
MAT 1234	Calculus I	5
MAT 2360	Introduction to Statistics for the Sciences <sup>1</sup>	5
<b>Credits</b>		<b>10</b>
<b>Winter</b>		
MAT 1235	Calculus II	5
CSC 2230	Computer Programming for Engineers <sup>2</sup>	5
<b>Credits</b>		<b>10</b>
<b>Spring</b>		
MAT 1236	Calculus III	5
<b>Credits</b>		<b>5</b>
<b>Sophomore</b>		
<b>Autumn</b>		
MAT 2401	Linear Algebra	3
MAT 3238	Vector Calculus <sup>3</sup>	3
<b>Credits</b>		<b>6</b>
<b>Winter</b>		
MAT 3237	Differential Equations	3
MAT 3360	Probability and Statistics (alternate years)	5
<b>Credits</b>		<b>8</b>
<b>Spring</b>		
Coursework in math and the applied field which may include:		5
MAT 3333	Statistical Modeling <sup>3</sup>	
<b>Credits</b>		<b>5</b>
<b>Junior</b>		
<b>Autumn</b>		
Additional coursework in math and the applied field which may include:		5-10
MAT 3000	Foundations of Mathematics (alternate years)	
MAT 3380	Introduction to Data Science <sup>3</sup>	
<b>Credits</b>		<b>5-10</b>
<b>Winter</b>		
Additional coursework in math and the applied field which may include:		5
MAT 3360	Probability and Statistics (alternate years)	
MAT 3380	Introduction to Data Science <sup>3</sup>	
MAT 4830	Mathematical Modeling (alternate years) <sup>3</sup>	
<b>Credits</b>		<b>5</b>
<b>Spring</b>		
Additional coursework in math and the applied field which may include:		5
MAT 3333	Statistical Modeling <sup>3</sup>	
<b>Credits</b>		<b>5</b>

**Senior****Autumn**

MAT 4899	Senior Capstone Seminar	3
Additional coursework in math and the applied field which may include:		
MAT 3000	Foundations of Mathematics (alternate years)	
<b>Credits</b>		<b>3</b>

**Winter**

MAT 4900	Independent Project/Design in Mathematics	1-2
Additional coursework in math and the applied field which may include:		
MAT 4830	Mathematical Modeling (alternate years)	
<b>Credits</b>		<b>1-2</b>

**Spring**

MAT 4900	Independent Project/Design in Mathematics	1-2
Additional coursework in math and the applied field		
<b>Credits</b>		<b>1-2</b>
<b>Total Credits</b>		<b>64-71</b>

**1**

MAT 2360 Introduction to Statistics for the Sciences can be taken any quarter in the first two years but must be taken before MAT 3360 Probability and Statistics, and MAT 3333 Statistical Modeling, and MAT 3380 Introduction to Data Science.

**2**

CSC 2430 Data Structures I may replace CSC 2230 Computer Programming for Engineers for students emphasizing computing in their applied field.

**3**

Upper division MAT elective course. Consult with your faculty advisor to determine appropriate elective courses for your degree plan.