

# APPLIED MATHEMATICS - BS, BIOLOGICAL SCIENCE EMPHASIS

The curriculum in the Bachelor of Science in Applied Mathematics with a Biological Science emphasis explores the application of analytical problem-solving tools to problems in biology, medicine and the environment.

Students in the Biological Science emphasis investigate techniques in applied and pure mathematics and pursue electives in biology and other sciences that demonstrate how mathematics models phenomena in the life sciences.

A student completing this program is prepared for a career in applications of mathematics to the life sciences. Furthermore, this degree program is designed to contain the coursework required for students interested in medical school, and it is recommended for pre-med students interested in pursuing a mathematics degree. With the appropriate electives chosen, the student is also prepared to enter quantitatively oriented graduate programs, including PhD programs in applied mathematics or mathematics. A minor in biology is well suited to students in this program. All advising for this degree option is done through the Undergraduate Program Office in the Department of Mathematics.

## Program Requirements

Biological Science Emphasis: Consult with departmental advisor.

### First Year

Fall		Semester Credit Hours
BIOL 111	Introductory Biology I	4
CHEM 119	Fundamentals of Chemistry I	4
ENGL 104 or ENGL 103	Composition and Rhetoric or Introduction to Rhetoric and Composition	3
MATH 171	Calculus I	4
General Elective <sup>1,4</sup>		1
<b>Semester Credit Hours</b>		<b>16</b>
Spring		
BIOL 112	Introductory Biology II	4
CHEM 120	Fundamentals of Chemistry II	4
ENGL 203 or ENGL 210	Writing About Literature or Technical and Professional Writing	3
MATH 172	Calculus II	4
General Elective <sup>1,4</sup>		1
<b>Semester Credit Hours</b>		<b>16</b>

### Second Year

Fall		Semester Credit Hours
BIOL 200-470 ( <a href="https://catalog.tamu.edu/undergraduate/course-descriptions/biol/">https://catalog.tamu.edu/undergraduate/course-descriptions/biol/</a> )		3
CHEM 227 & CHEM 237	Organic Chemistry I and Organic Chemistry Laboratory	4
MATH 221	Several Variable Calculus	4

MATH 300	Foundations of Mathematics	3
<b>Semester Credit Hours</b>		<b>14</b>

### Spring

BIOL 200-470 ( <a href="https://catalog.tamu.edu/undergraduate/course-descriptions/biol/">https://catalog.tamu.edu/undergraduate/course-descriptions/biol/</a> )		3
CHEM 228 & CHEM 238	Organic Chemistry II and Organic Chemistry Laboratory	4
MATH 308	Differential Equations	3
MATH 323	Linear Algebra	3
University Core Curriculum ( <a href="https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>2,5</sup>		3

**Semester Credit Hours 16**

### Third Year

#### Fall

BICH 410	Comprehensive Biochemistry I	3
MATH 409	Analysis on the Real Line	3
PHYS 206 & PHYS 226	Newtonian Mechanics for Engineering and Science and Physics of Motion Laboratory for the Sciences	4
STAT 312	Statistics for Biology	3
University Core Curriculum ( <a href="https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>2</sup>		3

**Semester Credit Hours 16**

#### Spring

MATH 411	Mathematical Probability	3
MATH 469	Introduction to Mathematical Biology	3
PHYS 207 & PHYS 227	Electricity and Magnetism for Engineering and Science and Electricity and Magnetism Laboratory for the Sciences	4
University Core Curriculum ( <a href="https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>2</sup>		3

**Semester Credit Hours 13**

### Fourth Year

#### Fall

Select 6 hours from the following: <sup>3</sup>		6
MATH 325	The Mathematics of Interest	
MATH 407-499 ( <a href="https://catalog.tamu.edu/undergraduate/course-descriptions/math/">https://catalog.tamu.edu/undergraduate/course-descriptions/math/</a> )		4
Select from one of the following:		4
CSCE 110	Programming I	
CSCE 111	Introduction to Computer Science Concepts and Programming	
CSCE 206	Structured Programming in C	
University Core Curriculum ( <a href="https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>2</sup>		3
University Core Curriculum ( <a href="https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>2</sup>		3
<b>Semester Credit Hours</b>		<b>16</b>

**Spring**

MATH 442	Mathematical Modeling	3
Select 3 hours from the following:		3
MATH 325	The Mathematics of Interest	
MATH 407-499 ( <a href="https://catalog.tamu.edu/undergraduate/course-descriptions/math/">https://catalog.tamu.edu/undergraduate/course-descriptions/math/</a> )		
University Core Curriculum ( <a href="https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>2</sup>		3
University Core Curriculum ( <a href="https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>2</sup>		3
General Elective <sup>4</sup>		1
<b>Semester Credit Hours</b>		<b>13</b>
<b>Total Semester Credit Hours</b>		<b>120</b>

cultural-diversity-requirements/)s and 3 hours of Cultural Discourse (<https://catalog.tamu.edu/undergraduate/general-information/degree-information/cultural-discourse-requirements/>) courses. A course satisfying a Core category, a college/department requirement, or a general elective can be used to satisfy this requirement. See academic advisor.

<sup>1</sup> MATH 170 is highly recommended for math majors co-enrolled in MATH 150, MATH 151, MATH 152, MATH 171, or MATH 172. MATH 200 is also highly recommended for math majors co-enrolled in MATH 151, MATH 152, MATH 171, or MATH 172.

<sup>2</sup> Of the 18 hours shown as University Core Curriculum (<https://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/>), 3 must be from Language, Philosophy and Culture, 3 from Creative Arts, 6 from American History, 6 from Government/Political Science.

<sup>3</sup> Select from MATH 325, MATH 407-499 (<https://catalog.tamu.edu/undergraduate/course-descriptions/math/>). One course must be a W or C course.

<sup>4</sup> Select from any 100-499 course not used elsewhere, (except ALED 125; ASCC 102; ASTR 109/PHYS 109, ASTR 119/PHYS 119; BMEN 153; KINE 199; LAND 101; MATH 102-148, MATH 151-168 (<https://catalog.tamu.edu/undergraduate/course-descriptions/math/>), MATH 304, MATH 309, MATH 311, MATH 365, MATH 366, MATH 367, MATH 375, MATH 376; PBSI 301; PHYS 201, PHYS 202, PHYS 205; STAT 201 STAT 301 - 303 (<https://catalog.tamu.edu/undergraduate/course-descriptions/stat/>)).

<sup>5</sup> PBSI 107 or SOCI 205 is recommended for Medical School.

Maximum of 3 hours of MATH 300 or CSCE 222/ECEN 222 may be used in this degree program.

Maximum of 3 hours of MATH 411 or STAT 414 may be used in this degree program.

Maximum of 4 hours of MATH 417, MATH 437 or CSCE 442 may be used in this degree program.

If a grade of D or F is earned in any of the following courses, MATH 151/MATH 171, MATH 152/MATH 172, MATH 221/MATH 251/MATH 253, MATH 300, MATH 323 or MATH 308, this course must be immediately retaken and a grade of C or better earned. The department will allow at most two Ds in upper-level (325-499) courses. If a third D is earned, one of the three courses in which a D was earned must be retaken and a grade of C or better earned.

Students desiring teacher certification should consult the requirements for certification before registering for electives.

Graduation requirements include a requirement for 3 hours of International and Cultural Diversity course (<https://catalog.tamu.edu/undergraduate/general-information/degree-information/international->