

# MATHEMATICS: APPLIED MATHEMATICS, BS

**Requirements for Students Matriculating in or before Academic Year 2018-2019.** Learn more about University Academic Regulation 3.1 (<http://catalog.okstate.edu/university-academic-regulations/#matriculation>).

**Minimum Overall Grade Point Average: 2.00**

**Total Hours: 120**

Code	Title	Hours
<b>General Education Requirements</b>		
<i>English Composition</i>		
See Academic Regulation 3.5 ( <a href="http://catalog.okstate.edu/university-academic-regulations/#english-composition">http://catalog.okstate.edu/university-academic-regulations/#english-composition</a> )		
ENGL 1113 or ENGL 1313	Composition I Critical Analysis and Writing I	3
Select one of the following:		3
ENGL 1213 ENGL 1413 ENGL 3323	Composition II Critical Analysis and Writing II Technical Writing	
<i>American History &amp; Government</i>		
HIST 1103 POLS 1113	Survey of American History American Government	3 3
<i>Analytical &amp; Quantitative Thought (A)</i>		
MATH 2144 CS 1113	Calculus I (A) <sup>1</sup> Computer Science I (A) <sup>1</sup>	4 3
<i>Humanities (H)</i>		
Courses designated (H)		6
<i>Natural Sciences (N)</i>		
Must include one Laboratory Science (L) course		
PHYS 2014	University Physics I (LN) <sup>1</sup>	4
Course designated (N)		2
<i>Social &amp; Behavioral Sciences (S)</i>		
ECON 2103 or AGECE 1113	Introduction to Microeconomics (S) <sup>1</sup> Introduction to Agricultural Economics (S)	3
<i>Additional General Education</i>		
Courses designated (A), (H), (N), or (S)		7
<b>Hours Subtotal</b>		<b>41</b>
<b>Diversity (D) &amp; International Dimension (I)</b>		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
<b>College/Departmental Requirements</b>		
<i>First Year Seminar</i>		
(Transfer students with 15 hours exempt)		1
<i>Arts &amp; Humanities</i>		
See note 2.a.		3
<i>Natural &amp; Mathematical Sciences</i>		
MATH 2153 PHYS 2114	Calculus II (A) University Physics II (LN)	3 4
Select 2 additional hours. See note 2.b.		2

## Foreign Language

See note 3

0-6 hours

## Upper-Division General Education

Select 6 hours outside major department

See note 2.c.

**Hours Subtotal** 13

## Major Requirements

Minimum GPA 2.00 with a minimum grade of "C" or "P" in each course in Major Requirements and each required MATH course

## Mathematics Core

MATH 2163	Calculus III	3
MATH 2233	Differential Equations	3
MATH 3013	Linear Algebra	3
MATH 3613 or MATH 4023	Introduction to Abstract Algebra Introduction to Analysis	3
Select 2-3 hours of the following:		2
CS 2133 CS 2433 ENGR 1412	Computer Science II C/C++ Programming Introductory Engineering Computer Programming	
Select 3 hours of the following:		3
STAT 4013 STAT 4033 STAT 4053	Statistical Methods I (A) Engineering Statistics Statistical Methods I for the Social Sciences (A)	
MATH 3583	Introduction to Mathematical Modeling	3
MATH 4513	Numerical Analysis	3
MATH 4263	Introduction to Partial Differential Equations	3
or MATH 4553 Linear and Nonlinear Programming		
Select 9 hours from the following, with at least 3 hours from each group and no more than 3 hours outside MATH:		9
Analysis:		
MATH 4013 MATH 4023 MATH 4083 MATH 4143 MATH 4233 MATH 4263	Calculus of Several Variables Introduction to Analysis Intermediate Analysis Advanced Calculus I Intermediate Differential Equations Introduction to Partial Differential Equations	
MATH 4283 MATH 4343 MATH 4423	Complex Variables Introduction to Topology Geometry and Algorithms in Three-Dimensional Modeling	
MATH 5213 PHYS 3513 STAT 4203	Fourier Analysis and Wavelets Mathematical Physics Mathematical Statistics I	
Applied Algebra/Discrete Math:		
MATH 4063 MATH 4453 MATH 4553 MATH 4663	Advanced Linear Algebra Mathematical Interest Theory Linear and Nonlinear Programming Combinatorics	

MATH 4713	Number Theory	
MATH 4753	Introduction to Cryptography	
MATH 4813	Groups and Representations	
CS 3653	Discrete Mathematics for Computer Science	
Select 3 hours of 4000-level courses in MATH or STAT or upper division CS		3
<i>Areas of Application</i>		
Select 9 hours from one Area of Application (p. 2) <sup>2</sup>		9
<i>Capstone</i>		
Select 3 hours from a project or internship applying mathematical methods to a problem in the area of application:		3
MATH 4973	Senior Project	
MATH 4993	Senior Honors Thesis	
MATH 4590	Professional Practice in Mathematics (with approval of advisor and internship mentor)	
<b>Hours Subtotal</b>		<b>50</b>
<b>Electives</b>		
Select 16 hours		16
May need to include 6 hours of a foreign language (see note 3)		
May need to include 6 hours upper-division general education outside major department (see note 2.c.) and 1 additional upper division hour		
<b>Hours Subtotal</b>		<b>16</b>
<b>Total Hours</b>		<b>120</b>

<sup>1</sup> College and Departmental Requirements that may be used to meet Gen Ed Requirements.

<sup>2</sup> An alternative 9 hour plan with at least 6 upper division hours may be used with Departmental approval.

## Area of Application

### Agricultural Economics

Code	Title	Hours
AGEC 3213	Quantitative Methods in Agricultural Economics	3
AGEC 3333	Agricultural Marketing and Price Analysis	3
AGEC 4213	Advanced Quantitative Methods in Agricultural Economics	3
or AGEC 4333	Commodity Futures Markets	

### Bioinformatics

Code	Title	Hours
CHEM 1515	Chemistry II (LN)	5
MICR 3033	Cell and Molecular Biology	3
MICR 4203	Bioinformatics	3

### Cognitive Sciences

Code	Title	Hours
CS 4793	Artificial Intelligence I	3
Select one of the following:		3
PHIL 4003	Mathematical Logic and Computability	
PHIL 4313	Philosophy Of Mind (H)	

PHIL 4543	Philosophy of Language	
PSYC 3173	Introduction to Cognitive Science (N)	3

### Ecology

Code	Title	Hours
BIOL 1604	Animal Biology	4
BIOL 3034	General Ecology	4
Select 3 hours of upper division BIOL		3

### Economics

Code	Title	Hours
ECON 2203	Introduction to Macroeconomics	3
ECON 3113	Intermediate Microeconomics	3
or ECON 3123	Intermediate Macroeconomics	
Select 3 hours of upper division ECON		3

### Finance

Code	Title	Hours
FIN 3113	Finance	3
Select 6 hours of the following:		6
FIN 4223	Investments	
FIN 4333	Financial Management	
FIN 4763	Financial Futures and Options Markets	

### GIS

Code	Title	Hours
GEOG 4203	Fundamentals of Geographic Information Systems	3
GEOG 4343	Geographic Information Systems: Resource Management Applications	3
or GEOG 4353	Geographic Information Systems: Socioeconomic Applications	
Select 3 hours of the following:		3
GEOG 3333	Spatial Analysis (A)	
GEOG 4333	Remote Sensing	
GEOG 4383	Introduction to GIS Programming	

### Geophysical Analysis

Code	Title	Hours
ENSC 2113	Statics	3
ENSC 3233	Fluid Mechanics	3
GEOL 4103	Introduction to Geophysical Exploration	3

### Network and Signal Analysis

Code	Title	Hours
ENSC 2613	Introduction to Electrical Science	3
ECEN 2011	Experimental Methods I	1
ECEN 3714	Network Analysis	4
ECEN 3513	Signal Analysis	3
or ECEN 3613	Electromagnetic Fields	

## Operations Research

Code	Title	Hours
IEM 4013	Operations Research	3
IEM 4713	Systems Simulation Modeling	3
Select 3 hours of the following:		3
IEM 4103	Quality Control	
IEM 4113	Industrial Experimentation	
IEM 4613	Production Planning and Control Systems	
IEM 4623	Supply Chain Management	

## Physics

Select 9 hours of upper division PHYS.

## Other Requirements

- See the College of Arts and Sciences Requirements.
- **Upper-Division Credit:** Total hours must include at least 40 hours in courses numbered 3000 or above.
- **Hours in One Department:** Hours in one department in excess of 54 will be added to the minimum total of 120 required for graduation.

## College of Arts and Sciences Requirements

### 1. General Education Requirements

No more than two courses (or eight hours) from the major department may be used to meet General Education and College and Departmental Requirements. The General Education required English Composition, required U.S. History, required American Government, one required MATH or STAT course, and required foreign language for B.A. degrees do not count against the two-course maximum.

### 2. A&S College/Departmental Requirements

- Arts and Humanities are defined as any course carrying an (H) designation or courses from AMST, ART, DANC, ENGL (except ENGL 3323 Technical Writing) HIST, MUSI, PHIL (except PHIL 1313 Logic and Critical Thinking (A), PHIL 3003 Symbolic Logic (A) and PHIL 4003 Mathematical Logic and Computability), REL, TH, and foreign languages.
- Natural and Mathematical Sciences are defined as any course from the following prefixes: ASTR, BIOC, BIOL, CHEM, CS (except CS 4883 Social Issues in Computing), GEOL, MATH, MICR, PBIO, PHYS, and STAT; or courses from other departments that carry an (A) or (N) general education designation.
- The required six hours of upper-division General Education may not include courses from the student's major department. This requirement may be satisfied by courses also used to satisfy any part of a student's degree program (i.e., in General Education, College Departmental Requirements, Major Requirements or Electives).
- Non-Western Studies Requirement for B.A. and B.F.A.; One 3-hour course in Non-Western Studies (N.W.). This requirement may be satisfied by courses also used to satisfy any part of a student's degree program (i.e., in General Education, College Departmental Requirements, Major Requirements or Electives).
- The College of Arts & Sciences requires a minimum 2.0 GPA in all major requirements and a minimum 2.0 GPA in all major-prefix courses.

### 3. Foreign Language Proficiency

- The foreign language requirement for the B.A. may be satisfied by 9 hours college credit in the same language, which must include 3 hours at the 2000-level, or equivalent proficiency (e.g., passing an advanced standing examination; TOEFL exam; presenting a high school transcript which demonstrates the high school was primarily conducted in a language other than English; etc.). Computer Science courses may not be used to satisfy this requirement. Currently Arabic and Mvskoke are not offered at the 2000-level at OSU.
- The foreign language requirement for the B.S., B.M. and B.F.A. may be satisfied by presenting a high school transcript which demonstrates two years of study of a single foreign language (passing grades at second-year level of study). It may also be satisfied by 6 hours college credit in the same language, which must include language courses 1713 and 1813, or equivalent proficiency (e.g., passing an advanced standing examination; TOEFL exam; presenting a high school transcript which demonstrates the high school was primarily conducted in a language other than English; etc.). Computer Science courses may not be used to satisfy this requirement.
- In addition to a. and b., students pursuing teacher certification must meet novice-high foreign language proficiency by presenting a high school transcript which demonstrates two years of study of a single foreign language with no grade below B. Or, students may complete 3 hours college credit in a single language with no grade below C (or pass an advanced standing examination, College Level Examination Program (CLEP) exam, or Oral Proficiency Interview developed by the American Council on the Teaching of Foreign Languages, equivalent to 3 hours of college credit.) Or, students may meet the requirement by transfer of documentation of meeting the foreign language competency from one of the teacher education programs in the State of Oklahoma approved by the Oklahoma State Regents for Higher Education.

### 4. Exclusions

- Courses used to satisfy the General Education English Composition, U.S. History, American Government, and Mathematics or Statistics requirements will not count toward the 54-hour maximum allowed from one department.
- Courses with ATHL or LEIS prefixes and leisure activity courses may not be used for degree credit.

### 5. Teacher Certification

Students can satisfy the requirements for secondary schools teaching certification while earning a B.A. or B.S. in the College of Arts & Sciences. Those interested should see their Arts and Sciences advisor and the OSU Professional Education Unit in room 325 Willard.

## Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.

- Degrees that follow this plan must be completed by the end of Summer 2024.