MATHEMATICS: APPLIED
MATHEMATICS, BS

Degree Requirements
Requirements for Students Matriculating in or before Academic Year 2021-2022. 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

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tr>
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<td></td>
<td><strong>English Composition</strong></td>
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<td>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>)</td>
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<tr>
<td>ENGL 1113</td>
<td>Composition I</td>
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<tr>
<td>or ENGL 1313</td>
<td>Critical Analysis and Writing I</td>
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<td>ENGL 1213</td>
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<td>ENGL 1413</td>
<td>Critical Analysis and Writing II</td>
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<td>ENGL 3323</td>
<td>Technical Writing</td>
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<tr>
<td></td>
<td><strong>American History &amp; Government</strong></td>
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<tr>
<td>HIST 1103</td>
<td>Survey of American History</td>
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<tr>
<td>or HIST 1483</td>
<td>American History to 1865 (H)</td>
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<tr>
<td>or HIST 1493</td>
<td>American History Since 1865 (DH)</td>
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<td>POLS 1113</td>
<td>American Government</td>
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<tr>
<td></td>
<td><strong>Analytical &amp; Quantitative Thought (A)</strong></td>
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<tr>
<td>MATH 2144</td>
<td>Calculus I (A)</td>
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<tr>
<td>CS 1113</td>
<td>Computer Science I (A)</td>
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<tr>
<td></td>
<td><strong>Humanities (H)</strong></td>
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<td></td>
<td><strong>Natural Sciences (N)</strong></td>
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<td>Must include one Laboratory Science (L) course</td>
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<td>PHYS 2014</td>
<td>University Physics I (LN)</td>
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<td>Course designated (N)</td>
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<td><strong>Social &amp; Behavioral Sciences (S)</strong></td>
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<td>ECON 2103</td>
<td>Introduction to Microeconomics (S)</td>
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<tr>
<td>or AGEC 1113</td>
<td>Introduction to Agricultural Economics (S)</td>
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<td><strong>Additional General Education</strong></td>
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<td>Courses designated (A), (H), (N), or (S)</td>
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<td>Hours Subtotal</td>
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<td><strong>Diversity (D) &amp; International Dimension (I)</strong></td>
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<td>May be completed in any part of the degree plan</td>
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<tr>
<td>Select at least one Diversity (D) course</td>
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<tr>
<td>Select at least one International Dimension (I) course</td>
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<td></td>
<td><strong>College/Departmental Requirements</strong></td>
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<td></td>
<td><strong>First Year Seminar</strong></td>
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<tr>
<td>(Transfer students with 15 hours exempt)</td>
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<td><strong>Arts &amp; Humanities</strong></td>
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<tr>
<td>See note 2.a.</td>
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**Natural & Mathematical Sciences**
MATH 2153  Calculus II (A)  3
PHYS 2114  University Physics II (LN)  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.

**Mathematics Core**
MATH 2163  Calculus III  3
MATH 2233  Differential Equations  3
MATH 3013  Linear Algebra (A)  3
MATH 3613  Introduction to Abstract Algebra  3
or MATH 4023  Introduction to Analysis  3
Select 3 hours of the following:  3
CS 1103  Computer Programming (A)  3
CS 2133  Computer Science II  3
CS 2433  C/C++ Programming  3
ENGR 1412  Introductory Engineering Computer Programming  3
STAT 4091  Sas Programming  3
STAT 4191  R Programming  3
STAT 4193  SAS and R Programming  3
Select 3 hours from the following:  3
STAT 4013  Statistical Methods I (A)  3
STAT 4033  Engineering Statistics  3
STAT 4053  Statistical Methods I for the Social Sciences (A)  3
MATH 3583  Introduction to Mathematical Modeling  3
MATH 4513  Numerical Analysis  3
or MATH 4553  Introduction to Optimization  3
MATH 4233  Intermediate Differential Equations  3
or MATH 4263  Introduction to Partial Differential Equations  3
Select 9 hours from the following, with at least 3 hours of MATH from each group:  9

**Analysis:**
MATH 4013  Calculus of Several Variables  3
MATH 4023  Introduction to Analysis  3
MATH 4083  Intermediate Analysis  3
MATH 4143  Advanced Calculus I  3
MATH 4263  Introduction to Partial Differential Equations  3
MATH 4283  Complex Variables  3
MATH 4343  Introduction to Topology  3
MATH 4423  Geometry and Algorithms in Three-Dimensional Modeling  3
MATH 5213  Fourier Analysis and Wavelets  3
### Mathematics: Applied Mathematics, BS

**Applied Algebra/Discrete Math:**
- STAT 4203 Mathematical Statistics I
- MATH 4063 Advanced Linear Algebra
- MATH 4453 Mathematical Interest Theory
- MATH 4553 Introduction to Optimization
- MATH 4663 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

**Areas of Application**
Select 9 hours from **one Area of Application** (p. 2)

**Capstone**
Select 3 hours from a project or internship applying mathematical methods to a problem in the area of application:
- MATH 4973 Senior Project
- MATH 4993 Senior Honors Thesis
- MATH 4590 Professional Practice in Mathematics (with approval of instructor and internship mentor)

<table>
<thead>
<tr>
<th>Hours Subtotal</th>
<th>51</th>
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**Electives**
Select 15 hours

- 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
- MATH 1513 and MATH 1813 required for students who do not place directly into MATH 2144.

<table>
<thead>
<tr>
<th>Hours Subtotal</th>
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**Total Hours**
120

1. College and Departmental Requirements that may be used to meet General Education Requirements.
2. An alternative 9 hour plan with at least 6 upper division hours may be used with Departmental approval.
3. If Bioinformatics is selected, additional required courses BIOL 1114, CHEM 1314, and MIRC 2132 may be used to meet Additional General Education, Natural and Mathematical Sciences, or Elective requirements.

### Bioinformatics
- MICR 2133 Introduction to Microbiology
- MICR 3033 Cell and Molecular Biology
- MICR 4203 Bioinformatics

### Cognitive Sciences
- CS 4793 Artificial Intelligence I
- Select one of the following:
  - PHIL 4003 Mathematical Logic and Computability
  - PHIL 4313 Philosophy of Mind (H)
  - PHIL 4543 Philosophy of Language
  - PSYC 3173 Introduction to Cognitive Science (N)

### Data Science
- MSIS 2103 Business Data Science Technologies
- MSIS 3223 Principles of Data Analytics
- MSIS 3103 End User Database Systems Design and Management
  or MSIS 3333 Database Systems Development

### Economics
- ECON 2203 Introduction to Macroeconomics
- ECON 3113 Intermediate Microeconomics
  or ECON 3123 Intermediate Macroeconomics
- Select 3 hours of upper division ECON

### Energy Finance
- ACCT 2003 Survey of Accounting
- FIN 3113 Finance
- Select 3 hours from the following:
  - FIN 4003 Introduction to Energy Business
  - FIN 4363 Energy Finance

### Finance
- ACCT 2003 Survey of Accounting
- FIN 3113 Finance
- Select 3 hours from the following:
  - FIN 4223 Investments
  - FIN 4333 Financial Management
  - FIN 4763 Financial Futures and Options Markets
  - FIN 4843 Risk Management

### Geographic Information Science
- GEOG 4203 Fundamentals of Geographic Information Systems
Requirements
College of Arts and Sciences
Other Requirements
Physics
Operations Research
Geophysical Analysis
Select 3 hours of the following:

GEOG 3333 Spatial Analysis (A)
GEOG 4333 Remote Sensing
GEOG 4383 Introduction to GIS Programming

GEOG 4343 Geographic Information Systems: Resource Management Applications
or GEOG 4353 Geographic Information Systems: Socioeconomic Applications

Select 3 hours of the following:

PHYS 2203 University Physics III

Upper-Division Credit:
Select 6 hours of upper-division PHYS

Mathematics: Applied Mathematics, BS
3

Phys, and STAT, or courses from other departments that carry an (A) or (N) general education designation.

GEOG 4343 Geographic Information Systems: Resource Management Applications
or GEOG 4353 Geographic Information Systems: Socioeconomic Applications

Select 3 hours of the following:

GEOG 3333 Spatial Analysis (A)
GEOG 4333 Remote Sensing
GEOG 4383 Introduction to GIS Programming

Geophysical Analysis

Code
ENSC 2113
ENSC 3233
GEOL 4103

Title
Statistics
Fluid Mechanics
Introduction to Geophysical Exploration

Hours
3
3
3

Operations Research

Code
IEM 3103
IEM 3703
IEM 4013

Title
Probability and Statistics for Engineers I
Probability and Statistics for Engineers II
Operations Research

Hours
3
3
3

Physics

Code
PHYS 2203

Title
University Physics III

Hours
3

Select 6 hours of upper-division PHYS

3

Other Requirements

• See the College of Arts and Sciences Requirements.
• Minimum grade of "C" or "P" in all required MATH courses.
• Upper-Division Credit: Total hours must include at least 40 hours in courses numbered 3000 or above.
• Hours in One Department: For B.A. and B.S. degrees, no more than 54 hours in one department may be applied to degree requirements.

College of Arts and Sciences Requirements

1. General Education Requirements
No more than two courses (or eight hours) from the major department (http://catalog.okstate.edu/college-arts-sciences-major-departments/) may be used to meet General Education and College 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
a. 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.
b. Natural and Mathematical Sciences are defined as any course from the following prefixes: ASTR, BIOL, BIOL, CHEM, CS (except CS 4883 Social Issues in Computing), GEOL, MATH, MICR, PBIO,
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 2027.

### Example Plan of Study

#### Finish in Four Plan of Study

The plan below is an example of how students can successfully complete degree requirements in four years. This suggested class schedule plan may be used as a guide and can be adjusted based on individual needs. Students are required to meet with an academic advisor prior to enrollment each semester to plan their class schedule, and students are ultimately responsible for completing all degree requirements.

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<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
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<tr>
<td><strong>Freshman Fall</strong></td>
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<td>ENGL 1113 or ENGL 1313</td>
<td>Composition I or Critical Analysis and Writing I</td>
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<td>MATH 2144</td>
<td>Calculus I (A)</td>
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<td><strong>Spring</strong></td>
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<tr>
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<td>Composition II or Critical Analysis and Writing II</td>
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<td>MATH 2153</td>
<td>Calculus II (A)</td>
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<td><strong>Sophomore Fall</strong></td>
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<td>College Physics I (LN) or University Physics I (LN)</td>
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<tr>
<td>MATH 2233</td>
<td>Differential Equations</td>
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<td>MATH 3013</td>
<td>Linear Algebra (A)</td>
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<td><strong>Junior Fall</strong></td>
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