

MATHEMATICAL SCIENCES

Bachelor of Science

The Mathematical Sciences curriculum is designed to be versatile. Students gain a broad knowledge of mathematical concepts and methods that are applicable in sciences, engineering, business, industry, and other professions requiring a strong mathematical background. In addition to the basic courses which provide necessary mathematical skills, the curriculum allows students to select an emphasis area or concentration, providing an introduction to a specific area where mathematics is used. These are Abstract Mathematics, Actuarial Science/Financial Mathematics, Applied and Computational Mathematics, Biology, Computer Science, Operations Research/Management Science, and Statistics.

In addition to the overall goal of preparing students to cope with a variety of mathematical problems, the curriculum seeks to provide an adequate background for students who plan to pursue graduate study or positions in business, industry, or government. Students electing the Biology Concentration will have the necessary preparation for entering medical school. More information about the degree program can be found at www.math.clemson.edu.

All mathematical sciences majors are required to complete a capstone experience which provides an opportunity to pursue research, independent study, or an approved internship under the direction of a faculty member, or the opportunity to study mathematical models in some area of the mathematical sciences. The capstone experience requires a written report (thesis, computer code, project description, intern experience, etc.) and an oral or poster presentation by each student.

Combined Bachelor's/Master's Plan

Under this plan, students may reduce the time necessary to earn both degrees by applying graduate credits to both undergraduate and graduate program requirements. Students are encouraged to obtain the specific requirements for pursuing the dual degree from the Department of Mathematical Sciences (www.math.clemson.edu) as early as possible in their undergraduate program. Enrollment guidelines and procedures can be found under *Academic Regulations* in this catalog.

Freshman Year

First Semester

3 - ECON 211 Principles of Microeconomics
3 - ENGL 103 Accelerated Composition
4 - MTHSC 106 Calculus of One Variable I
3 - Arts and Humanities (Non-Lit.) Requirement
3 - Foreign Language Requirement
16

Second Semester

4 - MTHSC 108 Calculus of One Variable II
3 - MTHSC 129 Prob. Solving in Discrete Math.
3 - PHYS 122 Physics with Calculus I
3 - Computer Science Requirement
3 - Social Science Requirement
16

Sophomore Year

First Semester

4 - MTHSC 206 Calculus of Several Variables
1 - MTHSC 250 Intro. to Mathematical Sciences
3 - MTHSC 311 Linear Algebra
3 - MTHSC 360 Intermediate Math. Computing
4 - Natural Science Requirement
15

Second Semester

4 - MTHSC 208 Intro. to Ordinary Diff. Equations
3 - MTHSC 302 Statistics for Science and Engr.
3 - Arts and Humanities (Literature) Requirement
4 - Natural Science Requirement
3 - Elective
17

Junior Year

First Semester

3 - ENGL 314 Technical Writing
3 - MTHSC 400 Theory of Probability
3 - MTHSC 440 Linear Programming
3 - MTHSC 453 Advanced Calculus I
3 - Science Requirements
15

Second Semester

3 - MTHSC 412 Introduction to Modern Algebra
3 - MTHSC 454 Advanced Calculus II
3 - Emphasis Area Requirements
3 - Science Requirements
3 - Elective
15

Senior Year

First Semester

3 - COMM 250 Public Speaking
3 - Capstone Experience⁷
6 - Emphasis Area Requirements
3 - Science and Tech. in Society Requirement¹
15

Second Semester

1 - MTHSC 492 Professional Development
3 - Capstone Experience⁷
3 - Emphasis Area Requirements
3 - Mathematical Sciences Requirements
3 - Elective
13

122 Total Semester Hours

¹See General Education Requirements. Three of these credit hours must also satisfy the Cross-Cultural Awareness Requirement.

²Three credits in any foreign language, including American Sign Language, numbered 102 or above

³CPSC 101, 111, or 120

⁴A two-semester sequence selected from BIOL 103/105 and 104/106; CH 101 and 102; PHYS 221/223 and 222/224; GEOL 101/103 and 102

⁵ECON 314 and 405; CP SC 102 and 212; CP SC 102 and 210; or any two natural science courses from General Education Natural Science Requirements (labs not required). Actuarial Science/Financial Mathematics and Operations Research Emphasis Areas require ECON 314 and 405. Computer Science Emphasis Area requires CP SC 102 and 212, or 210 and 212.

⁶Select from Abstract Mathematics, Actuarial Science/Financial Mathematics, Applied and Computational Mathematics, Computer Science, Operations Research/Management Science, or Statistics.

⁷May be satisfied by (1) completion of six credits of MTHSC 482 or H482; (2) completion of six credits of MTHSC 491 or an approved substitution; or (3) completion of three credits of MTHSC 450 and three credits of an additional course approved by the advisor. Students in Actuarial Science/Financial Mathematics Emphasis Area must take MTHSC 441 and FIN 405.

⁸Any 400-level MTHSC course approved by advisor

Notes:

1. For graduation, a candidate for the BS degree in Mathematical Sciences will be required to have a 2.0 or higher cumulative grade-point ratio in all required MTHSC courses.

2. A grade of C or better must be earned in all prerequisite courses before enrolling in the next MTHSC course.

EMPHASIS AREAS

Abstract Mathematics¹

6 - Abstract Mathematics Requirement²
6 - Mathematical Sciences Requirements³
12

Actuarial Science/Financial Mathematics⁴

3 - FIN 312 Financial Management II
3 - MTHSC 403 Intro. to Statistical Theory
3 - MTHSC 407 Regress. and Time-Ser. Analysis
3 - MTHSC 431 Theory of Interest
12

Applied and Computational Mathematics

3 - MTHSC 434 Advanced Engineering Math.
3 - MTHSC 460 Intro. to Numerical Analysis I
6 - Applications Area⁵
12

Computer Science

3 - CP SC 215 Software Development Foundations
9 - Computer Science 300-Level Requirements⁶
12

Operations Research/Management Science

3 - I E 384 Engineering Economic Analysis *or*
4 - I E 482 Systems Modeling
3 - MGT 402 Operations Planning and Control
3 - MTHSC 407 Regress. and Time-Ser. Analysis
3 - MTHSC 441 Intro. to Stochastic Models
12-13

Statistics

- 3 - MTHSC 403 Intro. to Statistical Theory
- 3 - MTHSC 405 Statistical Theory and Meth. II
- 3 - MTHSC 406 Sampling Theory and Methods
- 3 - MTHSC 407 Regress. and Time-Ser. Analysis

12

¹See advisor.

²MTHSC 408, 410, 419, or 435

³Any 400-level MTHSC course

⁴See advisor. Students are advised to take ACCT 204, ECON 212, FIN 311, MTHSC 430, 432 as electives and FIN 405, MTHSC 441 as capstone experience.

⁵Any 300-400-level CP SC course

BIOLOGY CONCENTRATION

Freshman Year

First Semester

- 5 - BIOL 110 Principles of Biology I
- 3 - ENGL 103 Accelerated Composition
- 4 - MTHSC 106 Calculus of One Variable I
- 3 - Foreign Language Requirement¹

15

Second Semester

- 5 - BIOL 111 Principles of Biology II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - MTHSC 129 Prob. Solving in Discrete Math.
- 3 - Computer Science Requirement²

15

Sophomore Year

First Semester

- 4 - CH 101 General Chemistry
- 3 - ECON 200 Economic Concepts *or*
- 3 - ECON 211 Principles of Microeconomics
- 4 - MTHSC 206 Calculus of Several Variables
- 1 - MTHSC 250 Intro. to Mathematical Sciences
- 3 - PHYS 207 General Physics I
- 1 - PHYS 209 General Physics I Lab.

16

Second Semester

- 4 - CH 102 General Chemistry
- 4 - MTHSC 208 Intro. to Ordinary Diff. Equations
- 3 - MTHSC 311 Linear Algebra
- 3 - PHYS 208 General Physics II
- 1 - PHYS 210 General Physics II Lab.

15

Junior Year

First Semester

- 3 - CH 223 Organic Chemistry
- 1 - CH 227 Organic Chemistry Lab.
- 3 - ENGL 314 Technical Writing
- 3 - MTHSC 360 Intermediate Math. Computing
- 3 - MTHSC 440 Linear Programming
- 3 - Arts and Humanities (Literature) Requirements³

16

Second Semester

- 3 - CH 224 Organic Chemistry
- 1 - CH 228 Organic Chemistry Lab.
- 3 - COMM 250 Public Speaking³ - MTHSC 302 Statistics for Science and Engr.
- 3 - Arts and Humanities (Non-Lit.) Requirements³
- 3 - Math Science Requirement⁴

16

Senior Year

First Semester

- 3 - MTHSC 400 Theory of Probability
 - 3 - MTHSC 453 Advanced Calculus I *or*
 - 3 - MTHSC 463 Mathematical Analysis I
 - 3 - Animal or Plant Diversity Requirements
 - 3 - Capstone Experiences⁶
 - 3 - Social Science Requirements
- 15

Second Semester

- 3 - MTHSC 412 Introduction to Modern Algebra
 - 3 - MTHSC 454 Advanced Calculus II
 - 1 - MTHSC 492 Professional Development
 - 3 - Biological Sciences Requirement⁷
 - 3 - Capstone Experiences⁶
- 13

121 Total Semester Hours

¹Three credits in any foreign language, including American Sign Language, numbered 102 or above

²CP SC 101, 111, or 120

³See General Education Requirements. Six of these credit hours must also satisfy the Cross-Cultural Awareness and Science and Technology in Society Requirements.

⁴Any 400-level MTHSC course approved by advisor

⁵BIO SC 302, 303, 304, or 305

⁶May be satisfied by (1) completion of six credits of MTHSC 482 or H482; (2) completion of six credits of MTHSC 491 or an approved substitution; or (3) completion of three credits of MTHSC 450 and three credits of an additional course approved by advisor.

⁷BIOCH 301, GEN 302/303, MICRO 305, or any 300-400-level BIO SC course

Notes:

1. For graduation, a candidate for the BS degree in Mathematical Sciences will be required to have a 2.0 or higher cumulative grade-point ratio in all required MTHSC courses.
2. A grade of C or better must be earned in all prerequisite courses before enrolling in the next MTHSC course.

MATHEMATICAL SCIENCES

Bachelor of Arts

Freshman Year

First Semester

- 3 - ECON 200 Economic Concepts *or*
 - 3 - ECON 211 Principles of Microeconomics
 - 3 - ENGL 103 Accelerated Composition
 - 4 - MTHSC 106 Calculus of One Variable I
 - 3 - Foreign Language Requirement¹
 - 1 - Elective
- 14

Second Semester

- 4 - MTHSC 108 Calculus of One Variable II
 - 3 - MTHSC 129 Prob. Solving in Discrete Math.
 - 3 - Computer Science Requirement²
 - 3 - Foreign Language Requirement¹
 - 3 - Social Science Requirement³
- 16

Sophomore Year

First Semester

- 4 - MTHSC 206 Calculus of Several Variables
 - 1 - MTHSC 250 Intro. to Mathematical Sciences
 - 3 - MTHSC 360 Intermed. Math. Computing *or*
 - 3 - EDSEC 437 Technology in Sec. Math.
 - 3 - Arts and Humanities (Literature) Requirements
 - 3 - Elective
- 14

Second Semester

- 4 - MTHSC 208 Intro. to Ordinary Diff. Equations
 - 3 - MTHSC 302 Statistics for Science and Engr.
 - 3 - MTHSC 311 Linear Algebra
 - 3 - Arts and Humanities (Non-Lit.) Requirements
 - 3 - Minor Requirement⁴ *or*
 - 3 - Second Major Requirement
- 16

Junior Year

First Semester

3 - ENGL 314 Technical Writing
3 - MTHSC 412 Introduction to Modern Algebra
3 - Math Science Requirements
4 - Natural Science Requirements
3 - Elective
16

Second Semester

3 - COMM 250 Public Speaking
3 - Math Science Requirements
3 - Minor Requirement⁴ or
3 - Second Major Requirement
4 - Natural Science Requirements
3 - Elective
16

Senior Year

First Semester

3 - MTHSC 453 Advanced Calculus I
3 - Arts and Humanities Requirements³ or 3 - Education Requirements
3 - Capstone Experience⁷
3 - Minor Requirement⁴ or
3 - Second Major Requirement
3 - Science and Tech. in Society Requirements
15

Second Semester

1 - MTHSC 492 Professional Development
3 - Capstone Experience⁷
3 - Math Science Requirements
6 - Minor Requirement⁴ or
6 - Second Major Requirement
2 - Elective
15

122 Total Semester Hours

¹Six credits in any foreign language, including American Sign Language, numbered 200 or above

²CP SC 101, 111, or 120

³See General Education Requirements. Three of these credit hours must also satisfy the Cross-Cultural Awareness Requirement.

⁴See page 104 for approved minors.

⁵MTHSC 308 or any 400-level MTHSC course

⁶See advisor.

⁷May be satisfied by (1) completion of six credits of MTHSC 482 or H482; (2) completion of six credits of MTHSC 491 or an approved substitution; (3) completion of three credits of MTHSC 450 and three credits of an additional course approved by advisor; or (4) EDSEC 446 for students seeking a double major in Secondary Education-Mathematics.

Notes:

1. For graduation, a candidate for the BA degree in Mathematical Sciences will be required to have a 2.0 or higher cumulative grade-point ratio in all required MTHSC courses.

2. A grade of C or better must be earned in all prerequisite courses before enrolling in the next MTHSC course.