MATHEMATICAL SCIENCES, BACHELOR OF SCIENCE (B.S.) WITH A CONCENTRATION IN SECONDARY TEACHER PREPARATION

The curriculum in mathematical sciences promotes understanding of the mathematical sciences and their structures, uses and relationships to other disciplines. To this end, the scholarly growth of the faculty and students in the mathematical sciences is nurtured through study, research and a high standard of teaching. The curriculum provides a sound foundation for the student seeking to enter a career with a technological orientation or for the student who wishes to pursue graduate study in applied mathematics, biomathematics, mathematics, operations research, statistics, teaching mathematics in secondary schools or related fields.

A Bachelor of Science is offered jointly by the Department of Mathematics and Applied Mathematics and the Department of Statistical Sciences and Operations Research. In the Department of Mathematics and Applied Mathematics, students pursuing the Bachelor of Science in Mathematical Sciences can choose a concentration of secondary teacher preparation, which prepares students for teaching mathematics in secondary schools when completed in conjunction with the Master of Teaching degree offered through the School of Education as part of the Extended Teacher Preparation Program.

Student learning outcomes

Upon completing this program, students will know how to do the following:

Bachelor of Science in Mathematical Sciences core outcomes

- Solve mathematical problems
- Solve and interpret mathematical problems which originate from applications outside of mathematics
- Use technology to solve and/or explore mathematics problems

Secondary teacher preparation concentration-specific outcomes

- Write mathematics (not including mathematical proofs) clearly, concisely and correctly
- Write mathematical proofs clearly, concisely and correctly
- Read and comprehend mathematical works
- Collaborate in projects
- Make effective presentations to demonstrate their understanding of mathematical ideas
- Write prose about mathematics
- Use appropriate practices to teach secondary school level mathematical ideas

Special requirements

The B.S. in Mathematical Sciences requires a minimum of 120 credits. Along with the general education requirements of the College of Humanities and Sciences and the undergraduate degree requirements, students are required to take core courses and fulfill specific requirements for the degree.

Based on the results of the Mathematics Placement Test, students may be required to take MATH 151. No more than one course in mathematics (MATH) at the 100 level can count for the general requirements toward the degree. Credit for 100-level mathematical sciences courses cannot be applied toward the mathematical sciences courses required for the major in mathematical sciences.

Double major

Students who meet the requirements for two of the concentrations within the mathematical sciences curriculum can receive a double major. To initiate a double major, students must obtain the appropriate form from the Office of Records and Registration.

Second baccalaureate degree

For students possessing a bachelor’s degree and wishing to gain undergraduate preparation in an area of mathematical sciences, second baccalaureate degrees are offered through the department. For detailed information about these programs, refer to the "Academic regulations and general degree requirement" section of this bulletin.

Degree requirements for Mathematical Sciences, Bachelor of Science (B.S.) with a concentration in secondary teacher preparation

Course | Title | Hours
--- | --- | ---
General education [http://bulletin.vcu.edu/undergraduate/undergraduate-study/general-education-curriculum/] | Select 30 credits of general education courses in consultation with an adviser. | 30

Major requirements

- Major core requirements
  - MATH 201 Calculus with Analytic Geometry II | 4
  - MATH 307 Multivariate Calculus | 4
  - MATH 310 Linear Algebra | 3
- Additional major requirements
  - MATH 255 Introduction to Computational Mathematics or CMSC 245 Introduction to Programming Using C++ or EGRE 245 Engineering Programming | 3
  - MATH 300 Introduction to Mathematical Reasoning | 3
  - MATH 407 Real Analysis | 3
  - MATH 490 Mathematical Expositions | 3
- Concentration requirements
  - MATH 324 Mathematical Problem Solving | 3
  - MATH 404 Algebraic Structures and Functions | 3
  - MATH 424 Modeling with Mathematics | 3
  - MATH 430 The History of Mathematics | 3
  - MATH 505 Modern Geometry | 3
  - Concentration electives | 0-6

Ancillary requirements

HUMS 202 Choices in a Consumer Society | 1
Mathematical Sciences, Bachelor of Science (B.S.) with a concentration in secondary teacher preparation

MATH 200 Calculus with Analytic Geometry I (satisfies general education quantitative foundations) 1

STAT 212 Concepts of Statistics

Experiential fine arts 3

Foreign language through the 102 level (by course or placement)

Natural science sequence: Select one sequence from list below (satisfies general education BOK for natural sciences and AOI for scientific and logical reasoning)

Natural science elective (different from chosen science sequence)

Open electives

Select any course.

Total Hours 120

These courses/credits require a minimum grade of C.

Six additional upper-level credits in the mathematical sciences (MATH, STAT, OPER, CMSC) or the completion of a minor or a double major (which could be in education).

Course offered by the School of the Arts

The minimum number of credit hours required for this degree is 120.

Natural science sequence

Course Title Hours
Select one of the following sequences: 8-10

Sequence 1
BIOL 151 Introduction to Biological Sciences I (satisfies general education BOK for natural sciences and AOI for scientific and logical reasoning) 3
BIOL 152 Introduction to Biological Sciences II 3
BIOS 151 Introduction to Biological Science Laboratory I 1
BIOS 152 Introduction to Biological Science Laboratory II 1

Sequence 2
CHEM 101 General Chemistry I (satisfies general education BOK for natural sciences and AOI for scientific and logical reasoning) 3
CHEZ 101 General Chemistry Laboratory I (satisfies general education AOI for scientific and logical reasoning) 1
CHEM 102 General Chemistry II 3
CHEZ 102 General Chemistry Laboratory II 1

Sequence 3
PHYS 201 General Physics I (satisfies general education BOK for natural sciences and AOI for scientific and logical reasoning) 4
PHYS 202 General Physics II 4

Sequence 4
PHYS 207 University Physics I (satisfies general education BOK for natural sciences and AOI for scientific and logical reasoning) 5
PHYS 208 University Physics II 5

What follows is a sample plan that meets the prescribed requirements within a four-year course of study at VCU. Please contact your adviser before beginning course work toward a degree.

Freshman year

Fall semester
MATH 200 Calculus with Analytic Geometry I (satisfies general education quantitative foundations) 4

UNIV 101 Introduction to the University 1
UNIV 111 Play course video for Focused Inquiry I 3

General education course (select AOI in consultation with adviser) 3

General education course 3

Term Hours: 14

Spring semester
HUMS 202 Choices in a Consumer Society 1
MATH 201 Calculus with Analytic Geometry II 4
STAT 212 Concepts of Statistics 3
UNIV 112 Play course video for Focused Inquiry II 3

General education course (select AOI in consultation with adviser) 3

General education course 3

Term Hours: 15-17

Sophomore year

Fall semester
MATH 255 Introduction to Computational Mathematics 3
MATH 300 Introduction to Mathematical Reasoning 3
MATH 307 Multivariate Calculus 4
UNIV 200 Advanced Focused Inquiry: Literacies, Research and Communication (satisfies general education UNIV foundations) 3

Foreign language 101 3

Term Hours: 16

Spring semester
MATH 310 Linear Algebra 3
MATH 324 Mathematical Problem Solving 3

Foreign language 102 3

General education course (select BOK to complete breadth of knowledge requirement) 3

Term Hours: 16
Mathematical Sciences, Bachelor of Science (B.S.) with a concentration in secondary teacher preparation

General education course (select BOK to complete breadth of knowledge requirement) 3

| Term Hours: | 15 |

Junior year

Fall semester

- MATH 407 Real Analysis 3
- MATH 430 The History of Mathematics 3
- Natural sciences sequence (select one of the following) 4-5
  (satisfies general education BOK for natural sciences and AOI for scientific and logical reasoning)
- BIOL 151 Introduction to Biological Sciences I -
- & BIOZ 151 and Introduction to Biological Science Laboratory I -
- CHEM 101 General Chemistry I -
- & CHEZ 101 and General Chemistry Laboratory I -
- PHYS 201 General Physics I -
- PHYS 207 University Physics I -
- Open electives 4-6

| Term Hours: | 14-17 |

Spring semester

- MATH 404 Algebraic Structures and Functions 3
- Concentration elective (upper level) 3
- Natural sciences sequence (Select one of the following with appropriate matching course.) 4-5
- BIOL 152 Introduction to Biological Sciences II -
- & BIOZ 152 and Introduction to Biological Science Laboratory II -
- CHEM 102 General Chemistry II -
- & CHEZ 102 and General Chemistry Laboratory II -
- PHYS 202 General Physics II -
- PHYS 208 University Physics II -
- Open electives 6

| Term Hours: | 16-17 |

Senior year

Fall semester

- MATH 424 Modeling with Mathematics 3
- MATH 505 Modern Geometry 3
- Natural sciences elective 1 3-5
- Open electives 6

| Term Hours: | 15-17 |

Spring semester

- MATH 490 Mathematical Expositions 3
- Concentration elective (upper-level) 3
- Open electives 9

| Term Hours: | 15 |

| Total Hours: | 120-128 |

1 Different science than chosen for sequence.

The minimum number of credit hours required for this degree is 120.