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 the University Registrar.

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 (https://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 [1]	4
MATH 307	Multivariate Calculus [1]	4
MATH 310	Linear Algebra [1]	3
• Additional major requirements		
MATH 255	Introduction to Computational Mathematics	3
or CMSC 210	Computers and Programming	
MATH 300	Introduction to Mathematical Reasoning [1]	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 [2]		0-6
Ancillary requirements		
HUMS 202	Choices in a Consumer Society	1

MATH 200	Calculus with Analytic Geometry I (satisfies general education quantitative foundations) [1]	4
STAT 212	Concepts of Statistics	3
Experiential fine arts [3]		1-3
Foreign language through the 102 level (by course or placement)		0-6
Natural science sequence: Select one sequence from list below (satisfies general education BOK for natural sciences and AOI for scientific and logical reasoning)		8-10
Natural science elective (different from chosen science sequence)		3-5
Open electives		
Select any course.		21-39
Total Hours		**120**

1 These courses/credits require a minimum grade of C.

2 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).

3 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
BIOZ 151	Introduction to Biological Science Laboratory I	1
BIOL 152	Introduction to Biological Sciences II	3
BIOZ 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	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.

Recommended course sequence/plan of study

Freshman year		
Fall semester		**Hours**
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 Introduction to Focused Inquiry: Investigation and Communication	Introduction to Focused Inquiry: Investigation and Communication (satisfies general education UNIV foundations)	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 [2]	1
MATH 201	Calculus with Analytic Geometry II	4
STAT 212	Concepts of Statistics	3
UNIV 112 Play course video for Focused Inquiry II	Focused Inquiry II (satisfies general education UNIV foundations)	3
Experiential fine arts [2]		1-3
General education course (select AOI in consultation with adviser)		3
	Term Hours:	**15-17**
Sophomore year		
Fall semester		
MATH 255 or CMSC 210	Introduction to Computational Mathematics or Computers and Programming	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 [2]		3
	Term Hours:	**16**
Spring semester		
MATH 310	Linear Algebra	3

MATH 324	Mathematical Problem Solving	3
Foreign language 102 [2]		3
General education course (select BOK to complete breadth of knowledge requirement)		3
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) (satisfies general education BOK for natural sciences and AOI for scientific and logical reasoning)		4-5
BIOL 151 & BIOZ 151	Introduction to Biological Sciences I and Introduction to Biological Science Laboratory I	4
CHEM 101 & CHEZ 101	General Chemistry I and General Chemistry Laboratory I	4
PHYS 201	General Physics I	4
PHYS 207	University Physics I	5
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 & BIOZ 152	Introduction to Biological Sciences II and Introduction to Biological Science Laboratory II	4
CHEM 102 & CHEZ 102	General Chemistry II and General Chemistry Laboratory II	4
PHYS 202	General Physics II	4
PHYS 208	University Physics II	5
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 [1,2]		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.

[2] Not required for students who declare a double major of (1) Mathematical Sciences — Teacher Preparation Track and (2) Secondary Education

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