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 (h undergraduate-study	ttps://bulletin.vcu.edu/undergraduate/ //general-education-curriculum/)	
Select 30 credits of g with an adviser.	general education courses in consultation	30
Major requirements		
 Major core requirer 	nents	
MATH 201	Calculus with Analytic Geometry II ¹	4
MATH 307	Multivariate Calculus ¹	4
MATH 310	Linear Algebra ¹	3
 Additional major re 	quirements	
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

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

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These courses/credits require a minimum grade of C.

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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).

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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 foll	owing 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 yea	r	
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 Communicatio	Introduction to Focused Inquiry: Investigation and Communication (satisfies general education UNIV foundations)	3
General educa adviser)	ation course (select AOI in consultation with	3
General educa	ation course	3
	Term Hours:	14
Spring semes	ter	
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 fi	ne arts ²	1-3
General educa adviser)	ation course (select AOI in consultation with	3
	Term Hours:	15-17
Sophomore ye	ear	
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 semes	ter	
MATH 310	Linear Algebra	3

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	Total Hours:	120-128
	Term Hours:	15
Open electives 9		
Concentration	n elective (upper-level)	3
MATH 490	Mathematical Expositions	3
Spring semester		
	Term Hours:	15-17
Open electives 6		6
Natural scien	ces elective ^{1,2}	3-5
MATH 505	Modern Geometry	3
MATH 424	Modeling with Mathematics	3
Fall semester		
Senior year		
	Term Hours:	16-17
Open elective	S	6
PHYS 208	University Physics II	5
PHYS 202	General Physics II	4
CHEM 102 & CHEZ 102	General Chemistry II and General Chemistry Laboratory II	4
CHEM 102	Laboratory II	Α
BIOL 152 & BIOZ 152	Introduction to Biological Sciences II and Introduction to Biological Science	4
Natural sciences sequence (Select one of the following 4-s		4-5
Concentration	n elective (upper level)	3
MATH 404	Algebraic Structures and Functions	3
Spring semes	ter	
	Term Hours:	14-17
Open elective	S	4-6
PHYS 207	University Physics I	5
PHYS 201	General Physics I	4
CHEM 101 & CHEZ 101	General Chemistry I and General Chemistry Laboratory I	4
BIOL 151 & BIOZ 151	Introduction to Biological Sciences I and Introduction to Biological Science Laboratory I	4
Natural sciences sequence (select one of the following)4-(satisfies general education BOK for natural sciences and4-AOI for scientific and logical reasoning)4-		4-5
MATH 430	The History of Mathematics	3
MATH 407	Real Analysis	3
Fall semester		
Junior year		
breadth of this	Term Hours:	15
General educa	ation course (select BOK to complete	3
General education course (select BOK to complete breadth of knowledge requirement)		3
Foreign langu	age 102 ²	3
MATH 324	Mathematical Problem Solving	3

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.

Different science than chosen for sequence.

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