

Program Change Request

Date Submitted: 02/21/25 3:43 pm

Viewing: **SC-BS-MATH : Mathematics, BS**

Last approved: 03/21/24 5:33 pm

Last edit: 02/21/25 3:43 pm

Changes proposed by: jbazaz

**Catalog Pages
Using this Program**
[Mathematics, BS](#)

Anticipated

Are you completing this form on someone else's behalf?

Yes

Requestor:

In Workflow

1. **MATH Chair**
2. **SC Curriculum Committee**
3. SC Assistant Dean
4. Assoc Provost- Undergraduate
5. Registrar-Programs

Approval Path

1. 02/28/25 10:25 am
Maria Emelianenko (memelian):
Approved for MATH Chair

History

1. Nov 21, 2017 by clmig-jwehrheim
2. Nov 21, 2017 by clmig-jwehrheim
3. Jan 17, 2018 by rzachari
4. Feb 7, 2018 by rzachari
5. Mar 1, 2018 by Jennifer Bazaz Gettys (jbazaz)
6. Feb 8, 2019 by Jennifer Bazaz Gettys (jbazaz)
7. Mar 27, 2019 by Tory Sarro (vsarro)
8. Jan 16, 2020 by Jennifer Bazaz Gettys (jbazaz)

- 9. Mar 24, 2020 by Jennifer Bazaz Gettys (jbazaz)
- 10. Feb 2, 2021 by jriemen
- 11. Mar 9, 2022 by Jennifer Bazaz Gettys (jbazaz)
- 12. May 2, 2022 by Jennifer Bazaz Gettys (jbazaz)
- 13. May 4, 2023 by Jennifer Bazaz Gettys (jbazaz)
- 14. Jun 1, 2023 by Tory Sarro (vsarro)
- 15. Jan 5, 2024 by Jennifer Bazaz Gettys (jbazaz)
- 16. Mar 21, 2024 by Tory Sarro (vsarro)

Name	Extension	Email
Catherine Sausville	1460	csausvil

Effective Catalog: 2025-2026

Program Level: Undergraduate

Program Type: Bachelor's

Degree Type: Bachelor of Science

Title: Mathematics, BS

Banner Title: Mathematics, BS

Registrar/OAPI Use Only – SCHEV Status Approved

Registrar’s Office Use Only – Program Start Term

Registrar/OAPI Use Only – SCHEV Letter

Registrar/OAPI Use Only – SACSCOC Status

Concentration(s):

	Associated Concentrations	Registrar's Office Use Only: Concentration Code
1	Individualized Concentration	IND
2	Pure Mathematics	PURM
3	Actuarial Mathematics	ACTM
4	Applied Mathematics	AMT
5	Data Science	DSCI
6	Mathematical Statistics	MTHS

Registrar/IRR Use Only – Concentration CIP Code

College/School: College of Science

Department / Academic Unit: Mathematical Sciences

Jointly Owned Program? No

Justification

What: Adding BIOL 103/105 & 102 to the curriculum.

Why: To allow more options for students.

What: General catalog cleanup with wording an organizing.

Why: For student and advisor clarity.

Total Credits Required: Total credits: minimum 120

Registrar's Office Use Only - Program Code:

SC-BS-MATH

Registrar/IRR Use Only – Program CIP Code

Admission Requirements:

Admissions

University-wide admissions policies can be found in the [Undergraduate Admissions Policies](#) section of this catalog. To apply for this program, please complete the [George Mason University Admissions Application](#).

Program-Specific Policies:

Policies

Students must fulfill all [Requirements for Bachelor's Degrees](#), including the [Mason Core](#).

[MATH 300](#) Introduction to Advanced Mathematics ([Mason Core](#)) meets the writing intensive requirement for this major.

For policies governing all undergraduate programs, see [AP.5 Undergraduate Policies](#).

Graduating seniors are required to have an exit interview.

Language Proficiency Recommendation

The department recommends proficiency in French, German, or Russian.

Course Recommendations and Policies

A maximum of 6 credits of grades below 2.00 in coursework designated MATH or STAT may be applied toward the major.

Students intending to enter graduate school in mathematics are strongly advised to take [MATH 315](#) Advanced Calculus I and [MATH 321](#) Abstract Algebra.

Students may not receive credit for both [MATH 214](#) Elementary Differential Equations and [MATH 216](#) Theory of Differential Equations; both [MATH 213](#) Analytic Geometry and Calculus III and [MATH 215](#) Analytic Geometry and Calculus III (Honors); both [MATH 351](#) Probability and [STAT 344](#) Probability and Statistics for Engineers and Scientists I; and both [MATH 352](#) Statistics and [STAT 354](#) Probability and Statistics for Engineers and Scientists II.

After receiving a grade of 'C' or better in one of the courses listed below on the left, students may not receive credit for the corresponding course on the right:

Course	May Not Receive Credit for
MATH 113 or MATH 123	MATH 105 or MATH 108

Course May Not Receive Credit for

[MATH 351](#) or [STAT 344](#) [MATH 110](#)

[MATH 441](#) [MATH 111](#)

[MATH 125](#) [MATH 112](#)

Degree

Requirements:

Students should refer to the [Admissions & Policies](#) tab for specific policies related to this program.

In addition to the Mathematics Core, Science, and Computational Skills requirements, students must select one concentration and complete the requirements therein.

Mathematics Core

MATH 113	Analytic Geometry and Calculus I (Mason Core)	4
MATH 114	Analytic Geometry and Calculus II	4
MATH 125	Discrete Mathematics I (Mason Core)	3
MATH 203	Linear Algebra	3
MATH 213	Analytic Geometry and Calculus III	3
or MATH 215	Analytic Geometry and Calculus III (Honors)	
MATH 214	Elementary Differential Equations	3
or MATH 216	Theory of Differential Equations	
MATH 300	Introduction to Advanced Mathematics (Mason Core) ¹	3
MATH 322	Advanced Linear Algebra	3
Total Credits		26

¹

Fulfills the writing intensive requirement.

Science

Select a one-year sequence of a laboratory science from the following courses: 8-9

Biology Sequence:

Select two from the following:

[BIOL 102](#) [Introductory Biology I-Survey of Biodiversity and Ecology \(Mason Core\)](#)

[BIOL 103](#) [Introductory Biology II-Survey of Cell and Molecular Biology \(Mason Core\)](#)

[& BIOL 105](#) [and Introductory Biology II Laboratory \(Mason Core\)](#)

[BIOL 213](#) Cell Structure and Function

Choose one from the following:

BIOL-300 **BioDiversity**

BIOL-308 **Foundations of Ecology and Evolution (Mason Core)**

BIOL-311 **General Genetics**

Chemistry Sequence:

CHEM 211 General Chemistry I (**Mason Core**)
& **CHEM 213** and General Chemistry Laboratory I (**Mason Core**)

CHEM 212 General Chemistry II (**Mason Core**)
& **CHEM 214** and General Chemistry Laboratory II (**Mason Core**)

Geology Sequence:

GEOL 101 Physical Geology (**Mason Core**)
& **GEOL 103** and Physical Geology Lab (**Mason Core**)

GEOL 102 Historical Geology (**Mason Core**)
& **GEOL 104** and Historical Geology Laboratory (**Mason Core**)

Physics Sequence:

PHYS 160 University Physics I (**Mason Core**)
& **PHYS 161** and University Physics I Laboratory (**Mason Core**)

PHYS 260 University Physics II (**Mason Core**)
& **PHYS 261** and University Physics II Laboratory (**Mason Core**)

Total Credits

8-9

Computational Skills

CS 112 Introduction to Computer Programming (**Mason Core**)

4

Total Credits

4

Individualized Concentration (IND)

Students who are looking for a flexible concentration option are able to customize their degree with the Individualized Concentration. The Individualized Concentration allows students to take coursework in a variety of fields. Students should work closely with a mathematics advisor and have their individual degree plan approved no later than their junior year.

Required Courses

MATH 315 Advanced Calculus I

3

Select two courses from the following:

6

MATH 316	Advanced Calculus II
MATH 321	Abstract Algebra
MATH 421	Abstract Algebra II
MATH 431	Topology
MATH 432	Differential Geometry
MATH 433	Algebraic Geometry
MATH 464	Linear Algebra with Data Applications
MATH 465	Mathematics of Data Science

Electives

Select 12 additional upper-level MATH-prefixed credits (not previously taken).¹

12

Additional Science

Select one option from the following:

4-9

Option One

A second sequence from the choices under "Science" above

~~2. 6 credits from more advanced courses in biology, chemistry, geology, or physics²~~

~~3. The 4-credit option of PHYS 262 and PHYS 263~~

~~4. Select two courses from the following:~~

Option Two²

Select 6 credits from more advanced courses in biology, chemistry, geology, or physics

Option Three

The 4-credit option of PHYS 262 and PHYS 263

Option Four

Select two courses from the following:

CDS 230	Modeling and Simulation I
CDS 301	Scientific Information and Data Visualization
CS 211	Object-Oriented Programming
CS 310	Data Structures
CS 330	Formal Methods and Models

CS 483

Analysis of Algorithms

Total Credits

25-30

¹ Excluding [MATH 400](#) History of Math (Topic Varies) ([Mason Core](#)).

² Only refers to courses acceptable for credit toward a natural science major. Consider courses (previously taken) from the following: [BIOL 213](#) Cell Structure and Function, BIOL 300-499, CHEM 300-499, GEOL 300-499, PHYS 300-499.

Concentration in Pure Mathematics (PURM)

Pure mathematics is the study of ideas and structures that underlie all of mathematics. This concentration provides exciting opportunities for students interested in advanced coursework in the fields traditionally referred to as "pure mathematics". The concentration prepares students for a wide variety of careers involving mathematical thinking or graduate studies in pure mathematics.

Breadth Requirements

MATH 315	Advanced Calculus I	3
MATH 321	Abstract Algebra	3
MATH 411	Functions of a Complex Variable	3

Select one course from the following: 3

[MATH 312](#) Geometry

[MATH 431](#) Topology

Depth Requirements

Select two courses (not previously taken) from the following: 6

[MATH 312](#) Geometry

[MATH 316](#) Advanced Calculus II

[MATH 325](#) Discrete Mathematics II

[MATH 421](#) Abstract Algebra II

[MATH 431](#) Topology (if not chosen above)

[MATH 432](#) Differential Geometry

[MATH 433](#) Algebraic Geometry

Additional Mathematics

Select 3 credits of upper level MATH-prefixed credits (not previously taken). ¹ 3

Additional Science

Select one option from the following:

4-9

Option One

A second sequence from the choices under "Science" above

~~2. 6 credits from more advanced courses in biology, chemistry, geology, or physics²~~

Option Two²

Select 6 credits from more advanced courses in biology, chemistry, geology, or physics

~~4. Select two courses from the following:~~

Option Three

The 4-credit option of PHYS 262 and PHYS 263

Option Four

Select two courses from the following:

<u>CDS 230</u>	Modeling and Simulation I
<u>CDS 301</u>	Scientific Information and Data Visualization
<u>CS 211</u>	Object-Oriented Programming
<u>CS 310</u>	Data Structures
<u>CS 330</u>	Formal Methods and Models
<u>CS 483</u>	Analysis of Algorithms

Total Credits

25-30

¹ Excluding MATH 400 History of Math (Topic Varies) (Mason Core).

² Only refers to courses acceptable for credit toward a natural science major. Consider courses (not previously taken) from the following: BIOL 213 Cell Structure and Function, BIOL 300-499, CHEM 300-499, GEOL 300-499, PHYS 300-499.

Concentration in Actuarial Mathematics (ACTM)

This concentration provides exciting opportunities for students interested in studying actuarial mathematics. Expertise in this field leads directly into a career as a practicing actuary with an insurance company, consulting firm, or in government employment.

Actuarial Mathematics Courses

<u>MATH 351</u>	Probability	3
<u>MATH 352</u>	Statistics	3

MATH 551	Regression and Time Series	3
MATH 554	Financial Mathematics	3
MATH 555	Actuarial Modeling I	3
MATH 557	Financial Derivatives	3
ACCT 203	Survey of Accounting	3
ECON 103	Contemporary Microeconomic Principles (Mason Core)	3
ECON 306	Intermediate Microeconomics ¹	3
or ECON 310	Money and Banking	
or FNAN 321	Financial Institutions	
STAT 362	Introduction to Computer Statistical Packages	3
Select two courses from the following:		6
MATH 441	Deterministic Optimization	
MATH 442	Stochastic Models	
MATH 446	Numerical Analysis I	
MATH 453	Advanced Mathematical Statistics	
Total Credits		36

1

For mathematics majors, the Department of Economics has agreed to waive the [ECON 104](#) prerequisite.

Concentration in Applied Mathematics (AMT)

This concentration provides exciting opportunities for students interested in taking additional classes in applied mathematics. The concentration prepares students to deal with real-world applications in science and engineering, or to pursue graduate studies in applied mathematics.

Applied Mathematics Courses

MATH 313	Introduction to Applied Analysis	3
MATH 315	Advanced Calculus I	3
MATH 351	Probability	3
MATH 413	Modern Applied Mathematics I	3
MATH 446	Numerical Analysis I	3
Select 3 credits of MATH courses numbered above 300 (not previously taken). ¹		3

Select two courses from the following:

6

MATH 314	Advanced Differential Equations
MATH 414	Modern Applied Mathematics II
MATH 478	Introduction to Partial Differential Equations with Numerical Methods

Additional Science Courses

Select additional science credits from one of the following options:

4-9

Option One

A second sequence from the choices under "Science" above

~~2. Select 6 credits from more advanced courses in biology, chemistry, geology, or physics²~~

Option Two²

Select 6 credits from more advanced courses in biology, chemistry, geology, or physics

Option Three

The 4-credit option of [PHYS 262](#) and [PHYS 263](#)

Option Four

Select two courses from the following:

CDS 230	Modeling and Simulation I
CDS 301	Scientific Information and Data Visualization
CS 211	Object-Oriented Programming
CS 310	Data Structures
CS 330	Formal Methods and Models
CS 483	Analysis of Algorithms

Total Credits

28-33

¹ Excluding [MATH 400](#) History of Math (Topic Varies) ([Mason Core](#)).

² Only refers to courses acceptable for credit toward a natural science major. Consider courses (not previously taken) from the following: [BIOL 213](#) Cell Structure and Function, BIOL 300-499, CHEM 300-499, GEOL 300-499, PHYS 300-499.

Concentration in Data Science (DSCI)

The data science concentration prepares math majors for careers in industry and academia with a focus on the rapidly developing area of mathematics of data science. Students in this program will develop analytical and computational skills that will provide a deeper understanding of machine learning and data science concepts. By mastering the theoretical foundation underlying practical algorithms and uncovering inherent connections

with several branches of modern mathematics, students will hone their creativity and independent thinking skills necessary to lead the data science revolution.

Data Science Courses

MATH 315	Advanced Calculus I	3
MATH 351	Probability	3
MATH 446	Numerical Analysis I	3
MATH 464	Linear Algebra with Data Applications	3

Select two from the following: 6-7

MATH 447	Numerical Analysis II	
MATH 462 & MATH 463	Mathematics of Machine Learning and Industrial Applications I and Mathematics of Machine Learning and Industrial Applications II	
MATH 465	Mathematics of Data Science	

Select one course from the following: 3

MATH 352	Statistics	
STAT 350	Introductory Statistics II	
STAT 360	Introduction to Statistical Practice II	
STAT 356	Statistical Theory	

Select one course from the following: 3

CDS 301	Scientific Information and Data Visualization	
CDS 302	Scientific Data and Databases (Mason Core)	
CS 310	Data Structures	

Additional Science Courses

Select additional science credits from one of the following options: 3-4

Option One

Select one course from the following:

BIOL 213	Cell Structure and Function	
CHEM 211 & CHEM 213	General Chemistry I (Mason Core) and General Chemistry Laboratory I (Mason Core)	
GEOL 101 & GEOL 103	Physical Geology (Mason Core) and Physical Geology Lab (Mason Core)	

[PHYS 160](#) University Physics I ([Mason Core](#))
& [PHYS 161](#) and University Physics I Laboratory ([Mason Core](#))

~~2. 3 credits from more advanced courses in biology, chemistry, geology, or physics¹~~

~~3. The 4 credit option of PHYS 262 and PHYS 263~~

Option Two

Select 3 credits from more advanced courses in biology, chemistry, geology, or physics¹

Option Three

The 4-credit option of PHYS 262 and PHYS 263

Total Credits

27-29

¹

Only refers to courses acceptable for credit toward a natural science major. Consider courses (not previously taken) from the following: [BIOL 213](#) Cell Structure and Function, BIOL 300-499, CHEM 300-499, GEOL 300-499, PHYS 300-499.

Concentration in Mathematical Statistics (MTHS)

This concentration provides exciting opportunities for students interested in taking additional classes on statistics and data analysis. The concentration prepares data analysts able to deal with real world applications in science and engineering.

Mathematical Statistics Courses

MATH 315	Advanced Calculus I	3
MATH 351	Probability	3
MATH 352	Statistics	3
MATH 453	Advanced Mathematical Statistics	3
MATH 551	Regression and Time Series	3
STAT 362	Introduction to Computer Statistical Packages	3

Select one from the following:

3

[STAT 260](#) Introduction to Statistical Practice I

[STAT 350](#) Introductory Statistics II

[STAT 360](#) Introduction to Statistical Practice II

Select two from the following:

6

[STAT 455](#) Experimental Design

[STAT 460](#) Introduction to Biostatistics

STAT 462	Applied Multivariate Statistics
STAT 463	Introduction to Exploratory Data Analysis
STAT 465	Nonparametric Statistics and Categorical Data Analysis
STAT 472	Introduction to Statistical Learning
STAT 474	Introduction to Survey Sampling

Additional Science Courses

Select additional science credits from one of the following options:

3-4

Option One

Select one from the following:

BIOL 213	Cell Structure and Function
CHEM 211 & CHEM 213	General Chemistry I (Mason Core) and General Chemistry Laboratory I (Mason Core)
GEOL 101 & GEOL 103	Physical Geology (Mason Core) and Physical Geology Lab (Mason Core)
PHYS 160 & PHYS 161	University Physics I (Mason Core) and University Physics I Laboratory (Mason Core)

~~2. Choose 3 credits from more advanced courses in biology, chemistry, geology, or physics¹~~

Option Two¹

Select 3 credits from more advanced courses in biology, chemistry, geology, or physics

Option Three

Select the 4-credit option of [PHYS 262](#) and [PHYS 263](#)

Option Four

Select one course from the following:

CDS 230	Modeling and Simulation I
CDS 301	Scientific Information and Data Visualization
CS 211	Object-Oriented Programming
CS 310	Data Structures
CS 330	Formal Methods and Models
CS 483	Analysis of Algorithms

Total Credits

30-31

1

Only refers to courses acceptable for credit toward a natural science major. Consider courses (not previously taken) from the following: [BIOL 213](#) Cell Structure and Function, BIOL 300-499, CHEM 300-499, GEOL 300-499, PHYS 300-499.

**Retroactive
Requirements
Updates:**

Plan of Study:

**Honors
Information:**

Honors in the Major

Eligibility

Mathematics majors who have maintained a GPA of at least 3.50 in mathematics courses and a GPA of 3.50 in all courses taken at George Mason University may apply to the departmental honors program upon completion of two MATH courses at the 300+ level (excluding [MATH 400](#) History of Math (Topic Varies) ([Mason Core](#))), at least one of which has [MATH 300](#) Introduction to Advanced Mathematics ([Mason Core](#)) as a prerequisite. Admission to the program will be monitored by the undergraduate committee.

Honors Requirements

To graduate with honors in mathematics, a student is required to maintain a minimum GPA of 3.50 in mathematics courses and successfully complete [MATH 405](#) Honors Thesis in Mathematics I and [MATH 406](#) RS: Honors Thesis in Mathematics II with an average GPA of at least 3.50 in these two courses.

Accelerated
Description/D
INTO-Mason
Requirements

College
Requirements
Policies
Department /
Academic Unit
Requirements

Program Outcomes

Additional Program Information

This information is required by the Office of Accreditation and Program Integrity.

**Courses offered via
distance (if
applicable):**

What is the primary delivery format for the program?

Face-to-Face Only

Does any portion of this program occur off-campus?

No

Are you working with a vendor / other collaborators to offer your program?

No

Related Departments

Could this program prepare students for any type of professional licensure, in Virginia or elsewhere?

No

Are you adding or removing a licensure component?

No

Additional SCHEV & SACSCOC Information

Is this change a simple retitling of an existing program, with no other changes, to any existing program content, curriculum requirements, etc?

No

Does this change represent a repackaging of content in an existing approved degree/certificate program at the same instructional level (i.e., baccalaureate, master's, or doctoral)?

No

Percentage of total credits containing new course content. ("New course content" is defined by SACSCOC as content that is not currently included in an existing approved degree/certificate program at the same instructional level. Do not exclude gen ed credits in calculations for undergraduate programs.)

0%-24%

Does this change include the addition of a distance education or face-to-face method of delivery for this program?

No

Does this change include the addition of a course/credit-based competency-based education delivery option?

No

Will any additional equipment/facilities be needed?

No

Will any additional faculty be required?

No

Will any additional financial resources be needed?

No

Additional library/learning resources needed?

No

Have you reached out to the Libraries to determine whether there are adequate resources to support your program? If not, please email Meg Meiman, Associate University Librarian for Learning, Research, and Engagement at mmeiman2@gmu.edu.

OAPI Use Only – Determination of SACSCOC Impact

Comments or Notes

Green Leaf Program Designation

Is this a Green Leaf program? No

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List sustainabi
List sustainabi

Does this program cover material which crosses into another department?

No

Additional Attachments [UGC-COS-Program Mod BS Math.pdf](#)
[UGC-COS-Program-Mod-bsmath_001.pdf](#)

[BS_in_math_modification_ProgramApprovalForm_COSCC-2_ACTUARIAL.pdf](#)

SCHEV Proposal

Executive Summary

**Reviewer
Comments**

**Additional
Comments**

Is this course required of all students in this degree program?

%wi_required.eshtml%

Key: 587