

Program Change Request

Date Submitted: 03/31/22 11:11 am

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

Last approved: 03/09/22 1:37 pm

Last edit: 03/31/22 11:11 am

Changes proposed by: jbazaz

Catalog Pages
Using this Program

[Mathematics, BS](#)

No Longer
Anticipated closure

Rationale for

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

Yes

Requestor:

In Workflow

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

Approval Path

1. 03/31/22 12:23 pm
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
 Johanna Riemen
 (jriemen)
 11. Mar 9, 2022 by
 Jennifer Bazaz
 Gettys (jbazaz)

Name	Extension	Email
Catherine Sausville	31461	csausvil@gmu.edu

Effective Catalog: 2022-2023
Program Level: Undergraduate
Program Type: Bachelor's
Degree Type: Bachelor of Science
Title: Mathematics, BS

- 1. What was the process used to develop this badge?
- 2. What evidence was used to confirm the badge's value?
- 3. Have you ensured there are no conflicts of interest?
- 4. Has CDE confirmed the proposed badge's value?
- 5. Has the instructor(s) for this badge expressed interest in the badge?
- 6. Is there a contact hour minimum?
- 7. Does this badge provide a benefit for current students?
- 8. Is this badge co-sponsored with another program?
- 9. What is the organization, program, or department sponsoring the badge?

- Earning Criteria**
- Courses:
- Badges:
- Participants:
- Requirements:
- Portfolio:
- Prerequisites:
- Assessment:
- Credential:
- Education
- Other:
- Project:
- Professional
- Schedule/Registration:
- Volunteer:

- Skills Tag**
- Skills Tag
- Badge Attributes**
- Please select one from each category:
- Achievement Type:**
- Mastery Level:**
- Time Commitment:**
- Cost:**
- Industry Standards:**
- Recommendations:**
- Issuance information and Pricing**

Estimated Number of Badges Expected to be Issued:

Notes:

- All badge requests will be routed to CDE for review and approval. Please allow
- A Mason Digital Credentials Advisory Group may be developed to review badge

Banner Title: Mathematics, BS

Is this a retitling of an existing program?

Existing Program

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	Actuarial Mathematics	ACTM
2	Applied Mathematics	AMT
3	Mathematical Statistics	MTHS
4	Data Science	DSCI

INTO Major(s):

Registrar/IRR Use Only – Concentration CIP Code

College/School: College of Science

Department / Academic Unit: Mathematical Sciences

Jointly Owned Program? No

Participating

Justification

What: Specifying how many credits of MATH 490 and 491 can be used toward elective credits.
 Why: Capping how many of these courses majors can take.

Catalog Published Information

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 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
[MATH 351](#) or [STAT 344](#)
[MATH 441](#)
[MATH 125](#)

May Not Receive Credit for
[MATH 110](#)
[MATH 111](#)
[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 may select an optional concentration in Actuarial Mathematics (ACTM), Applied Mathematics (AMT), Data Science (DSCI), or Mathematical Statistics (MTHS).

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 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:

[BIOL 213](#) Cell Structure and Function ([Mason Core](#))

Choose one from the following:

[BIOL 300](#) BioDiversity

[BIOL 308](#) Foundations of Ecology and Evolution

[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

[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 4
Total Credits 4

BS without Concentration

In addition to the mathematics core, science, and computational skills requirements listed above, students who are not choosing a concentration must complete the following coursework:

Traditional Mathematics

[MATH 315](#) Advanced Calculus I 3
[MATH 316](#) Advanced Calculus II 3
[MATH 321](#) Abstract Algebra 3
or [MATH 431](#) Topology
[Select 12 additional credits of MATH courses numbered above 300](#) 1,3 12

Additional Science

Select additional science credits from one of the following options: 4-9

1. A second sequence from the choices under "Science" above
2. 6 credits from more advanced courses in biology, chemistry, geology, or physics 2
3. The 4-credit option of [PHYS 262](#) and [PHYS 263](#)
4. Choose 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 from the following: BIOL 300-499, CHEM 300-499, GEOL 300-499, PHYS 300-499.

3 Up to 3 credits in [MATH 490](#) Internship and 6 credits in [MATH 491](#) Reading and Undergraduate Research in Mathematics can be applied to this requirement.

A total of 12 credits between [MATH 490](#) Internship and [MATH 491](#) Reading and Undergraduate Research in Mathematics can be applied to this degree via this concentration option and any elective credits.

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.

ACTM Courses

MATH 351	Probability	3
MATH 352	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 from the following: 6

MATH 441	Deterministic Operations Research
MATH 442	Stochastic Operations Research
MATH 446	Numerical Analysis I
MATH 453	Advanced Mathematical Statistics

Total Credits 36

1For mathematics majors, the Department of Economics has agreed to waive the [ECON 104](#) Contemporary Macroeconomic Principles ([Mason Core](#)) prerequisite.

Concentration in Applied Mathematics (AMT)

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

AMT 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 1		3

Choose two courses from the following: 6

MATH 314	Introduction to Applied Mathematics
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

1. A second sequence from the choices under "Science" above

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

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

4. Choose 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 from the following: 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 the 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 options from the following: 6-7

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

Choose 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

Choose one course from the following: 3

CDS 301	Scientific Information and Data Visualization
CDS 302	Scientific Data and Databases
CS 310	Data Structures

Additional Science Courses

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

1. Choose one from the following:

BIOL 213	Cell Structure and Function (Mason Core)
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
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 physics 1

3. Choose the 4 credit option of [PHYS 262](#) and [PHYS 263](#)

Total Credits

27-29

1Only refers to courses acceptable for credit toward a natural science major. Consider courses from the following: 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.

MTHS 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:		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

1. Choose one from the following different lab sciences:

[BIOL 213](#) Cell Structure and Function ([Mason Core](#))

[CHEM 211](#) General Chemistry I ([Mason Core](#))

& [CHEM 213](#) and General Chemistry Laboratory I ([Mason Core](#))

[GEOL 101](#) Physical Geology ([Mason Core](#))

& [GEOL 103](#) and Physical Geology Lab

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

2. Choose 3 credits from more advanced courses in biology, chemistry, geology, or physics 1

3. Choose the 4 credit option of **[PHYS 262](#)** and **[PHYS 263](#)**

4. Choose 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

1Only refers to courses acceptable for credit toward a natural science major. Consider courses from the following: 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 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/Dual
Degree
Description:**

**INTO-Mason
Requirements:**

**College
Requirements &
Policies:**

**Department /
Academic Unit
Requirements &
Policies:**

Program Outcomes

Additional Program Information

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

Courses offered via distance (if applicable):

Indicate whether students are able

What is the primary delivery format for the program?
Face-to-Face Only

Does any portion of this program occur off-campus?

No

Off-campus details:

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

No

Please explain:

Related Departments

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

No

Please explain:

Are you adding or removing a licensure component?

No

Please explain:

Additional SCHEV & SACSCOC Information

Is the content of the new program closely related to that of an existing approved program at the same instructional level (i.e., baccalaureate, master's, doctoral)?

Which existing approved program(s)?

Is this new program considered to be "advancing the degree level of a currently approved program" (i.e. existing content is at lower degree level, new content is at the higher degree level)?

Which existing approved program(s)?

Is this new program considered to be "lowering the degree level of a currently approved program" (i.e. existing content is at higher degree level, new content is at the lower degree level)?

Which existing approved program(s)?

Is this a re-opening of a program that was closed to admission within the last five years?

Date of Program Closure

What are the methods of delivery for the program?

Does this program include a course/credit-based competency-based education delivery option?

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

Which existing approved program(s)?

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

What is the new method of delivery?

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

Description of institutional impact:

Will any additional faculty be required?

No

Description of institutional impact:

Will any additional financial resources be needed?

No

Description of institutional impact:

Additional library/learning resources needed?

No

Description of institutional impact:

OAPI Use Only – Determination of SACSCOC Impact

Comments or Notes

Green Leaf Program Designation

Is this a Green Leaf program? No

Green Leaf Designation

Sustainability-focused academic programs require at least one green leaf course. Either that course is itself sustainability-focused or else the program requires a set of sustainability-related courses with aggregated substance equivalent to a sustainability-focused course.

Relationship to Existing Courses

Relationship to Existing Programs

List sustainability-focused courses currently required in the degree

*Sustainability-related academic programs either require at least one sustainability-related course or else offer any green leaf course as an option or elective **

List sustainability-related courses currently required in the degree

Does this program cover material which crosses into another department?

No

Impacted Departments

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%](#)

Attached Document

[%attach_document.eshtml%](#)

