

# MATHEMATICS, BA

**Banner Code:** SC-BA-MATH

## Academic Advising

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Students may select an optional concentration in mathematics education; students who do not select this concentration study traditional mathematics.

## Teacher Licensure

Students who wish to become teachers and plan to seek teacher licensure should consider the following options:

- Secondary Education – Mathematics (6-12) Undergraduate Certificate
- Mathematics, BA or BS/Curriculum and Instruction, Accelerated MEd (Secondary Education Mathematics concentration)

Interested students should attend an information session early in their undergraduate career. For more information, visit the Graduate School of Education's website (<http://gse.gmu.edu>).

## Admissions & Policies

### 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 (<https://www2.gmu.edu/admissions-aid/apply-now>).

### Policies

Students must fulfill all Requirements for Bachelor's Degrees, including the Mason Core. As outlined in the Requirements tab, students in this bachelor's program must also complete the additional College Requirements for the BA Degree.

MATH 290 Introduction to Advanced Mathematics meets the writing intensive requirement for this major.

For policies governing all undergraduate programs, see AP.5 Undergraduate Policies.

### Course Recommendations and Policies

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
MATH 351 or STAT 344	MATH 110
MATH 441	MATH 111
MATH 125	MATH 112

## Requirements

### Degree Requirements

Total credits: minimum 120

Students should refer to the Admissions & Policies tab for specific policies related to this program.

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

Students may select an optional concentration in mathematics education; students who do not select this concentration study traditional mathematics.

### Core Courses

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 290	Introduction to Advanced Mathematics <sup>1</sup>	3
MATH 322	Advanced Linear Algebra	3
Total Credits		26

<sup>1</sup> Fulfills the writing intensive requirement.

### BA without Concentration

In addition to completing the core courses above, students not selecting the concentration option must complete 12 additional traditional mathematics credits in MATH courses numbered above 300.

Select 12 credits in MATH 300-level or higher <sup>1</sup>	12
Total Credits	12

<sup>1</sup> Excluding MATH 400 History of Math (Topic Varies) (Mason Core)

## Concentration in Mathematics Education (MTHE)

Students selecting the mathematics education concentration take the following coursework. A grade of 'C' or better is required for all licensure coursework.

MATH 302 or MATH 312	Foundations of Geometry Geometry	3
MATH 315	Advanced Calculus I	3
MATH 321	Abstract Algebra	3
MATH 351	Probability	3
EDCI 372	Teaching Mathematics in the Secondary School	3
EDCI 472	Advanced Methods for Teaching Mathematics in the Secondary School	3
EDCI 490	Student Teaching in Education (Mason Core)	6
EDRD 419	Literacy in the Content Areas	3
EDUC 372	Human Development, Learning, and Teaching (Mason Core)	3
EDUC 422	Foundations of Secondary Education	3
Total Credits		33

## Mason Core and Elective Credits

In order to meet a minimum of 120 credits, this degree requires additional credits (specific credit counts by concentration are shown below), which may be applied toward any remaining Mason Core requirements (outlined below), Requirements for Bachelor's Degrees, College Requirements for the BA Degree (outlined below), and elective courses. Students are strongly encouraged to consult with their advisors to ensure that they fulfill all requirements.

- Without concentration: 82 credits
- With concentration: 61 credits

### Mason Core

Note: Some Mason Core requirements may already be fulfilled by the major requirements listed above. Students are strongly encouraged to consult their advisors to ensure they fulfill all remaining Mason Core requirements.

Code	Title	Credits
<b>Foundation Requirements</b>		
	Written Communication	6
	Oral Communication	3
	Quantitative Reasoning	3
	Information Technology	3-7
<b>Core Requirements</b>		
	Arts	3
	Global Understanding	3
	Literature	3
	Natural Science	7
	Social and Behavioral Sciences	3
	Western Civilization/World History	3
<b>Synthesis/Capstone Requirement</b> <sup>1</sup>		
	Synthesis/Capstone	3
Total Credits		40

<sup>1</sup> minimum 3 credits

## College Requirements for the BA Degree

In addition to the program requirements and the Mason Core requirements, students pursuing a BA degree must complete the coursework below. Except where expressly prohibited, a course used to fulfill this college-level requirement may also be used simultaneously to satisfy other requirements such as Mason Core requirements, other college-level requirements, or requirements for the major. In some cases, the requirements listed below may be superseded by requirements of the degree program and the Mason Core.

### Philosophy or Religious Studies

Code	Title	Credits
Select 3 credits from the following:		
PHIL <sup>1</sup>		3
RELI		

<sup>1</sup> PHIL 323 Classical Western Political Theory and PHIL 324 Modern Western Political Theory may not be used to fulfill this requirement.

### Social and Behavioral Sciences

Choose one approved Mason Core: Social and Behavioral Sciences course in addition to the Mason Core-required course for a total of 6 credits. The two courses used to fulfill the combined college-level and university requirements must be from different disciplines.

This requirement may be fulfilled by completing any course in ANTH, CRIM, ECON, GOVT, HIST<sup>1</sup>, LING, PSYC, or SOCI, and the following GGS courses:

Code	Title	Credits
Select any course from the disciplines above or select from the following GGS courses:		
GGG 101	Major World Regions (Mason Core)	
GGG 103	Human Geography (Mason Core)	
GGG 110	Introduction to Geoinformation Technologies	
GGG 301	Political Geography	
GGG 303	Geography of Resource Conservation (Mason Core)	
GGG 304	Population Geography (Mason Core)	
GGG 305	Economic Geography	
GGG 306	Urban Geography	
GGG 315	Geography of the United States	
GGG 316	Geography of Latin America	
GGG 320	Geography of Europe	
GGG 325	Geography of North Africa and the Middle East	
GGG 330	Geography of the Soviet Succession States	
GGG 357	Structures in Urban Governance and Planning	
GGG 380	Geography of Virginia	

Total Credits 3

<sup>1</sup> HIST 100 History of Western Civilization (Mason Core) and HIST 125 Introduction to World History (Mason Core) may not be used to fulfill this requirement.

**Natural Science**

Choose one credit in addition to the Mason Core: Natural Science requirement for a total of 8 credits. This combined college-level and university requirement must be fulfilled by completing two of any approved Mason Core: Natural Science courses that include a laboratory experience<sup>1</sup>.

Code	Title	Credits
Select an additional Mason Core Natural Science course		1

<sup>1</sup> BIOL 124 Human Anatomy and Physiology and BIOL 125 Human Anatomy and Physiology may not be used to fulfill this requirement.

**Foreign Language**

Intermediate-level proficiency in one foreign language is required<sup>1</sup>. This requirement may be fulfilled by completing a course in a foreign language numbered 202, 209, or 210 (or higher-level courses taught in the language).

Code	Title	Credits
Select a foreign language course numbered 202, 209, 210, or higher if a waiver isn't applicable		0-3

<sup>1</sup> Students may be eligible for a waiver of this requirement if they are already proficient in a second language or if they have received a satisfactory score on an approved proficiency test. Additional information on waivers can be found via the college's Office of Academic and Student Affairs (<https://cos.gmu.edu/uaa>).

**Non-Western Culture**

Choose one approved Non-Western Culture Requirement<sup>1</sup> course in addition to the course used to fulfill the Mason Core: Global Understanding requirement. A course used to fulfill the Mason Core: Global Understanding requirement may not be simultaneously used to satisfy this college-level requirement. However, a course used to fulfill this requirement may be used simultaneously to fulfill any *other* requirements (Mason Core requirements, college-level requirements, or requirements for the major).

Code	Title	Credits
Select 3 credits from approved Non-Western Culture courses if a waiver isn't applicable:		0-3

ANTH 114	Introduction to Cultural Anthropology (Mason Core)	3
ANTH 300	Civilizations	3
ANTH 301	Native North Americans	3
ANTH 302	Peoples and Cultures of Latin America (Mason Core)	3
ANTH 303	Peoples and Cultures of the Andes	3
ANTH 306	Peoples and Cultures of Island Asia (Mason Core)	3
ANTH 307	Ancient Mesoamerica (Mason Core)	3
ANTH 308	Peoples and Cultures of the Middle East (Mason Core)	3
ANTH 309	Peoples and Cultures of India (Mason Core)	3
ANTH 313	Myth, Magic, and Mind (Mason Core)	3

ANTH 314	Zombies	3
ANTH 316	Peoples and Cultures of the Caribbean (Mason Core)	3
ANTH 323	Digging and Dealing in the Dead: Ethics in Archaeology	3
ANTH 330	Peoples and Cultures of Selected Regions: Non-Western	3
ANTH 332	Cross-Cultural Perspectives on Globalization (Mason Core)	3
ANTH 381	Medical Anthropology	3
ANTH 383	Cities of the Global South	3
ANTH 396	Issues in Anthropology: Social Sciences (Mason Core)	3
ARAB 360	Topics in Arabic Cultural Production	3
ARAB 420	Survey of Arabic Literature	3
ARAB 440	Topics in Arabic Religious Thought and Texts (Mason Core)	3
ARTH 203	Survey of Asian Art (Mason Core)	3
ARTH 204	Survey of Latin American Art (Mason Core)	3
ARTH 206	Survey of African Art (Mason Core)	3
ARTH 318	Art and Archaeology of Ancient Egypt	3
ARTH 319	Art and Archaeology of the Ancient Near East (Mason Core)	3
ARTH 320	Art of the Islamic World (Mason Core)	3
ARTH 382	Arts of India (Mason Core)	3
ARTH 383	Arts of Southeast Asia (Mason Core)	3
ARTH 384	Arts of China (Mason Core)	3
ARTH 385	Arts of Japan (Mason Core)	3
ARTH 386	The Silk Road (Mason Core)	3
ARTH 482	RS: Advanced Studies in Asian Art	3
CHIN 318	Introduction to Classical Chinese (Mason Core)	3
CHIN 320	Contemporary Chinese Film	3
CHIN 325	Major Chinese Writers (Mason Core)	3
DANC 118	World Dance (Mason Core)	3
ECON 361	Economic Development of Latin America (Mason Core)	3
ECON 362	African Economic Development (Mason Core)	3
FREN 451	Topics in Sub-Saharan Francophone Literature and Culture	3
FREN 454	Topics in Caribbean Francophone Literature and Culture	3
GGG 101	Major World Regions (Mason Core)	3
GGG 316	Geography of Latin America	3
GGG 325	Geography of North Africa and the Middle East	3
GGG 330	Geography of the Soviet Succession States	3
GGG 399	Select Topics in GGS	3
GOVT 328	Non-Western Political Theory	3
GOVT 332	Government and Politics of the Middle East and North Africa	3
GOVT 333	Government and Politics of Asia	3

GOVT 340	Central Asian Politics	3
GOVT 341	Chinese Foreign Policy	3
GOVT 345	Islam and Politics	3
GOVT 432	Political Change and Social Development in Sub-Saharan Africa	3
GOVT 433	Political Economy of East Asia	3
HIST 251	Survey of East Asian History (Mason Core)	3
HIST 252	Survey of East Asian History (Mason Core)	3
HIST 261	Survey of African History (Mason Core)	3
HIST 262	Survey of African History (Mason Core)	3
HIST 271	Survey of Latin American History (Mason Core)	3
HIST 272	Survey of Latin American History (Mason Core)	3
HIST 281	Survey of Middle Eastern Civilization (Mason Core)	3
HIST 282	Survey of Middle Eastern Civilization (Mason Core)	3
HIST 326	Stalinism	3
HIST 327	The Soviet Union and Russia Since World War II	3
HIST 328	Rise of Russia (Mason Core)	3
HIST 329	Modern Russia and the Soviet Union (Mason Core)	3
HIST 353	History of Traditional China	3
HIST 354	Modern China	3
HIST 356	Modern Japan (Mason Core)	3
HIST 357	Postwar Japan (Mason Core)	3
HIST 358	Post-1949 China (Mason Core)	3
HIST 360	History of South Africa (Mason Core)	3
HIST 364	Revolution and Radical Politics in Latin America (Mason Core)	3
HIST 365	Conquest and Colonization in Latin America (Mason Core)	3
HIST 366	Comparative Slavery	3
HIST 367	History, Fiction, and Film in Latin America	3
HIST 387	Topics in Global History (Mason Core)	3-6
HIST 426	The Russian Revolution	3
HIST 460	Modern Iran (Mason Core)	3
HIST 461	Arab-Israeli Conflict	3
HIST 462	Women in Islamic Society (Mason Core)	3
HIST 465	The Middle East in the 20th Century	3
JAPA 310	Japanese Culture in a Global World (Mason Core)	3
JAPA 340	Topics in Japanese Literature (Mason Core)	3
KORE 320	Korean Popular Culture in a Global World	3
MUSI 103	Musics of the World (Mason Core)	3
RELI 211	Religions of the West (Mason Core)	3
RELI 212	Religions of Asia (Mason Core)	3
RELI 240	Death and the Afterlife in World Religions	3
RELI 272	Islam	3
RELI 313	Hinduism (Mason Core)	3
RELI 314	Chinese Philosophies and Religious Traditions	3
RELI 315	Buddhism (Mason Core)	3
RELI 337	Mysticism: East and West	3
RELI 365	Muhammad: Life and Legacy	3
RELI 374	Islamic Thought (Mason Core)	3
RELI 375	Qur'an and Hadith	3
RELI 379	Islamic Law, Society, and Ethics	3
RELI 387	Islam, Democracy, and Human Rights	3
RELI 490	Comparative Study of Religions (Mason Core)	3
RUSS 353	Russian Civilization (Mason Core)	3
RUSS 354	Contemporary Post-Soviet Life (Mason Core)	3

<sup>1</sup> Students who can document attendance at a native school in a non-western country for at least four years may request a waiver from this requirement through the CHSS Undergraduate Academic Affairs Office (<http://chssundergrad.gmu.edu>).

## Honors

### 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 290 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 Master's

### Mathematics, BA or BS/Mathematics, Accelerated MS

#### Overview

This degree program allows academically strong Mathematics, BA and Mathematics, BS students to obtain their bachelor's and a Mathematics, MS by successfully completing 144 credits. Well-prepared students may be admitted to this program after the completion of 90 undergraduate credits. Upon completion and conferral of the bachelor's degree and with satisfactory graduate-level performance (3.00 GPA) in graduate courses, students are given advanced standing in the Mathematics, MS program and complete an additional 24 credits to receive the master's degree.

For more detailed information, see AP.6.7 Bachelor's/Accelerated Master's Degrees. For policies governing all graduate degrees, see AP.6 Graduate Policies.

## Application Requirements

Applicants to all graduate programs at George Mason University must meet the admission standards and application requirements for graduate study as specified in Graduate Admission Policies. Application information for this accelerated master's program can be found on the Department of Mathematical Sciences website (<http://math.gmu.edu>).

Successful applicants will have an overall undergraduate GPA of at least 3.00. Additionally, they will have completed the following courses with a GPA of 3.00 or higher: MATH 315 Advanced Calculus I, MATH 321 Abstract Algebra, and MATH 322 Advanced Linear Algebra.

## Accelerated Option Requirements

At the beginning of the student's final undergraduate semester, students must submit a bachelor's/accelerated master's transition form (available from the Office of the University Registrar (<http://registrar.gmu.edu>)) to the College of Science's Office of Academic and Student Affairs (<https://cos.gmu.edu/about/contact-us>). Students must begin their master's program in the semester immediately following conferral of the bachelor's degree.

Students must maintain an overall GPA of 3.00 or higher in graduate coursework.

## Reserve Graduate Credit

While still in undergraduate status, a maximum of 6 additional graduate credits may be taken as reserve graduate credit and applied to the master's program. Reserve graduate credits do not apply to the undergraduate degree. See AP.1.4.4 Graduate Course Enrollment by Undergraduates.

# Mathematics, BA or BS/Curriculum and Instruction, Accelerated MEd, (Secondary Education Mathematics concentration)

## Overview

Highly-qualified undergraduates may be admitted to the bachelor's/accelerated master's program and obtain a BA or BS in Mathematics and an MEd in Curriculum and Instruction (concentration in secondary education mathematics) in an accelerated time-frame after satisfactory completion of 149 credits. See AP.6.7 Bachelor's/Accelerated Master's Degree for policies related to this program.

This accelerated option is offered jointly by the Department of Mathematical Sciences and the Graduate School of Education.

Students in an accelerated degree program must fulfill all university requirements for the master's degree. For policies governing all graduate degrees, see AP.6 Graduate Policies.

## Application Requirements

Applicants to all graduate programs at George Mason University must meet the admission standards and application requirements for graduate study as specified in Graduate Admissions Policies. For information specific to this accelerated master's program, see Application Requirements and Deadlines (<https://cehd.gmu.edu/bachelors-accelerated-masters-program>).

## Accelerated Option Requirements

Students complete the following courses in their senior year:

Senior			
Fall Semester	Credits	Spring Semester	Credits
EDCI 572	3	EDCI 672	3
EDUC 672	3	EDRD 619	3
		6	6

Total Credits 12

Alternative course options are available for students who begin their program in the spring. Students should contact the coordinator for the Bachelor's/Accelerated Master's Degree program in the College of Education and Human Development.

While undergraduate students, accelerated master's students are able to apply two of the courses listed above to both the bachelor's and master's degrees. These courses are considered advanced standing for the MEd. A minimum grade of B must be earned to be eligible to count as advanced standing. The other two courses are taken as reserve graduate credit and do not apply to the undergraduate degree. Early in their final undergraduate semester, students must submit the Bachelor's/Accelerated Master's Transition Form to the CEHD Admissions Office and specify which of the four courses are to be designated as advanced standing and reserve graduate credit.