NEUROSCIENCE, BS

Banner Code: SC-BS-NEUR

Academic Advising

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The Bachelor of Science in Neuroscience is an interdisciplinary program emphasizing the relationship between the biology and chemistry of the nervous system and the behavior of an organism. The BS prepares students for graduate level study in both medical school and doctoral and master's level programs in neuroscience and other health-related fields, and work in the neuroscience field.

Admissions & Policies

Admissions

University-wide admissions policies can be found in the Undergraduate Admissions Policies (https://catalog.gmu.edu/admissions/undergraduate-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 (https://catalog.gmu.edu/policies/academic/undergraduate-policies/#ap-5-3-2), including the Mason Core (https://catalog.gmu.edu/mason-core/).

NEUR 411 Seminar in Neuroscience (Mason Core) (https://catalog.gmu.edu/mason-core/) fulfills the writing intensive requirement.

For policies governing all undergraduate programs, see AP.5 Undergraduate Policies (https://catalog.gmu.edu/policies/academic/undergraduate-policies/).

Requirements

Degree Requirements

Total credits: minimum 120

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

Students must complete the Foundation Courses, then they have the option of choosing a concentration. The remaining credits are fulfilled via Mason Core requirements and electives.

Foundation Courses

Code	Title	Credits
Biology		
BIOL 213 & BIOL 215	Cell Structure and Function and Cell Structure and Function Laboratory	4
Select one from the following: [1]		3-4
BIOL 311 & BIOL 313	General Genetics and General Genetics Laboratory	
BIOL 322	Developmental Biology	
BIOL 326	Animal Physiology	
BIOL 425	Human Physiology	
BIOL 430	Advanced Human Anatomy and Physiology I	
Chemistry		
CHEM 211 & CHEM 213	General Chemistry I (Mason Core) (https://catalog.gmu.edu/mason-core/) and General Chemistry Laboratory I (Mason Core) (https://catalog.gmu.edu/mason-core/)	4
CHEM 212 & CHEM 214	General Chemistry II (Mason Core) (https://catalog.gmu.edu/mason-core/) and General Chemistry Laboratory II (Mason Core) (https://catalog.gmu.edu/mason-core/)	4
Mathematics		
Select one option (4 or 6 credits) from the following:		4-6
MATH 113	Analytic Geometry and Calculus I (Mason Core) (https://catalog.gmu.edu/mason-core/)	
MATH 123 & MATH 124	Calculus with Algebra/Trigonometry, Part A and Calculus with Algebra/Trigonometry, Part B (Mason Core) (https://catalog.gmu.edu/mason-core/)	
Statistics		
Select one course (3 or 4 credits) from the following:		3-4
BIOL 214	Biostatistics for Biology Majors	
STAT 250	Introductory Statistics I (Mason Core) (https://catalog.gmu.edu/mason-core/)	
PSYC 300	Statistics in Psychology	
MATH 352	Statistics	
Physics		
Select one of the following sequences:		8

PHYS 243 & PHYS 244 & PHYS 245 & PHYS 246	College Physics I (Mason Core) (https://catalog.gmu.edu/mason-core/) and College Physics I Lab (Mason Core) (https://catalog.gmu.edu/mason-core/) and College Physics II (Mason Core) (https://catalog.gmu.edu/mason-core/) and College Physics II Lab (Mason Core) (https://catalog.gmu.edu/mason-core/)	
PHYS 160 & PHYS 161 & PHYS 260 & PHYS 261	University Physics I (Mason Core) (https://catalog.gmu.edu/mason-core/) and University Physics I Laboratory (Mason Core) (https://catalog.gmu.edu/mason-core/) and University Physics II (Mason Core) (https://catalog.gmu.edu/mason-core/) and University Physics II Laboratory (Mason Core) (https://catalog.gmu.edu/mason-core/)	
Psychology [2]		
PSYC 100	Introduction to Psychology (Mason Core) (https://catalog.gmu.edu/mason-core/)	3
PSYC 375	Brain and Sensory Processes	3
PSYC 376	Brain and Behavior	3
Computer Science		
CDS 130	Computing for Scientists (Mason Core) (https://catalog.gmu.edu/mason-core/)	3
Core Courses in Neuroscience		
NEUR 327 & NEUR 328	Cellular Neuroscience and Cellular Neuroscience Lab	5
NEUR 335	Developmental and Systems Neuroscience	3
Technical Writing [1,3]		
NEUR 411	Seminar in Neuroscience (Mason Core) (https://catalog.gmu.edu/mason-core/)	3
Required Psychology Lab Course		
PSYC 373	Biopsychology Laboratory	2
Total Credits		**55-59**

1 The course chosen to fulfill this requirement cannot be applied as a Major Elective.

2 Transfer students who have earned transfer credit for PSYC 372 Biopsychology may substitute this course for PSYC 375 Brain and Sensory Processes.

3 This course fulfills the writing intensive requirement.

Concentration in Computational Neuroscience (CMPU)

Code	Title	Credits
Required Courses		
NEUR 430	Introduction to Computational Neuroscience	3
NEUR 431	Neuroinformatics Methods	3
Elective Courses		
Select six credits from the following:		6
NEUR 432 or BENG 350	Neural Systems Design Neural System Designs	
NEUR 440	Independent Study in Neuroscience	
NEUR 450	Honors Thesis Proposal [1]	
NEUR 451	Honors Thesis [1]	
NEUR 461	Special Topics in Neuroscience (when the topic is "Computational and Social Neuroscience")	
BENG 360	Biomedical Imaging (Mason Core) (https://catalog.gmu.edu/mason-core/)	
BENG 434	Computational Modelling of Neurons and Networks	
BINF 450	Bioinformatics for Life Sciences	
CDS 301	Scientific Information and Data Visualization	
CDS 303	Scientific Data Mining	
Students seeking to take elective courses not listed above must first obtain approval from their academic advisor.		
Total Credits		**12**

1 Must be in neuroinformatics and approved by undergrad director or chair.

Major Electives

Students should consult with an advisor to choose elective courses. The list below includes pre-approved courses. Elective courses not on the list must be approved by an advisor. Only courses not already taken in the degree will apply as electives, with the exception of seminar and topics courses; a different topic must be addressed in the second instance of a seminar or topics course. Students may apply no more than 6 credits of courses with a grade of 'D' to this requirement.

Students intending to pursue a doctorate in neuroscience or a medical degree are advised to take CHEM 313 Organic Chemistry I and CHEM 315 Organic Chemistry Lab I, and consult an advisor for other elective recommendations.

Code	Title	Credits
Select 10-22 credits of major electives. The list below includes pre-approved courses. Elective courses not on the list must be approved by an advisor.		10-22
BENG 101	Introduction to Bioengineering	
BENG 434	Computational Modelling of Neurons and Networks	
BIOL 305	Biology of Microorganisms	

BIOL 306	Biology of Microorganisms Laboratory
BIOL 311 & BIOL 313	General Genetics and General Genetics Laboratory
BIOL 322	Developmental Biology
BIOL 323	Environmental Effects on Embryonic Development
BIOL 326	Animal Physiology
BIOL 417	Selected Topics in Molecular and Cellular Biology (when the topic is: Foundations of the Mammalian Brain)
BIOL 420	Vaccines
BIOL 425	Human Physiology
BIOL 426	Mechanisms of Aging
BIOL 429	Biological Foundations of Pharmacology
BIOL 430	Advanced Human Anatomy and Physiology I
BIOL 431	Advanced Human Anatomy and Physiology II
BIOL 432	Clinical Applications in Human Physiology
BIOL 452	Immunology
BIOL 453	Immunology Laboratory
BIOL 471	Evolution
BIOL 482	Introduction to Molecular Genetics
BIOL 483	General Biochemistry
BIOL 484	Cell Signaling and Disease
BIOL 515	Developmental Neurobiology
CDS 301	Scientific Information and Data Visualization
CHEM 313	Organic Chemistry I
CHEM 314	Organic Chemistry II
CHEM 315	Organic Chemistry Lab I
CHEM 318	Organic Chemistry Lab II
CHEM 321	Quantitative Chemical Analysis
CHEM 463	General Biochemistry I
CHEM 464	General Biochemistry II
CHEM 465	Biochemistry Lab (Mason Core) (https://catalog.gmu.edu/mason-core/)
MATH 114	Analytic Geometry and Calculus II
or MATH 116	Analytic Geometry and Calculus II (Honors)
MATH 203	Linear Algebra
MATH 213	Analytic Geometry and Calculus III
MATH 214	Elementary Differential Equations
NEUR 355	Cross-Cultural Studies in Scientific Inquiry (Mason Core) (https://catalog.gmu.edu/mason-core/)
NEUR 405	RS: Laboratory Methods in Behavioral Neuroscience
NEUR 407	Lab Investigations Using Voltage Clamp Electrophysiology
NEUR 411	Seminar in Neuroscience (Mason Core) (https://catalog.gmu.edu/mason-core/) [1]
NEUR 422	Glutamatergic Systems
NEUR 424	Sleep and Circadian Rhythms (Mason Core) (https://catalog.gmu.edu/mason-core/)
NEUR 430	Introduction to Computational Neuroscience
NEUR 431	Neuroinformatics Methods
NEUR 432	Neural Systems Design
or BENG 350	Neural System Designs
NEUR 440	Independent Study in Neuroscience
NEUR 450	Honors Thesis Proposal
NEUR 451	Honors Thesis
NEUR 461	Special Topics in Neuroscience
NEUR 473	Current Neuroscience Research in Germany (Mason Core) (https://catalog.gmu.edu/mason-core/)
NEUR 480	Biological Bases of Alzheimer's Disease
PHYS 262	University Physics III (Mason Core) (https://catalog.gmu.edu/mason-core/)
PHYS 263	University Physics III Laboratory (Mason Core) (https://catalog.gmu.edu/mason-core/)
PSYC 304	Principles of Learning (Mason Core) (https://catalog.gmu.edu/mason-core/)
PSYC 309	Sensation, Perception, and Information Processing (Mason Core) (https://catalog.gmu.edu/mason-core/)
PSYC 317	Cognitive Psychology
PSYC 441	Criminal Behavior: Psychological and Neurological Aspects
Total Credits	**10-22**

[1] This course fulfills the writing intensive requirement.

Mason Core and Elective Credits

In order to meet a minimum of 120 credits, this degree requires an additional 39-43 credits which may be applied toward any remaining Mason Core (https://catalog.gmu.edu/mason-core/) requirements (outlined below), Requirements for Bachelor's Degrees (https://catalog.gmu.edu/policies/academic/undergraduate-policies/#ap-5-3-2), and elective courses. Students are strongly encouraged to consult with their advisors to ensure that they fulfill all requirements.

Mason Core

Some Mason Core (https://catalog.gmu.edu/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 (https://catalog.gmu.edu/mason-core/) requirements.

All Integration-level requirements must be completed at George Mason and cannot be satisfied through transfer credit. These courses are integral to the university's educational philosophy and ensure that all graduates demonstrate proficiency in writing, critical thinking, and integrative learning consistent with the university's standards. Rare exceptions to this policy may only be granted by the Provost's Office.

Students who have completed the following credentials are eligible for a waiver of the Foundation and Exploration (lower level) requirement categories with the exception of Written Communication, which must be met by transferring in or taking an approved coruse at George Mason University. The Integration category (upper level) is not waived under this policy. See Admissions (https://catalog.gmu.edu/admissions/undergraduate-policies/#transfertext) for more information.

- VCCS Uniform Certificate of General Studies
- VCCS or Richard Bland Associate of Science (A.S.), Associate of Arts (A.A.), Associate of Arts and Sciences (A.A.&S.), or Associate of Fine Arts (A.F.A.)

Code	Title	Credits
Foundation Requirements		
Written Communication (lower-level) (https://catalog.gmu.edu/mason-core/#written)		3
Oral Communication (https://catalog.gmu.edu/mason-core/#oral)		3
Quantitative Reasoning (https://catalog.gmu.edu/mason-core/#quantitative)		3
Information Technology and Computing (https://catalog.gmu.edu/mason-core/#information-technology)		3
Exploration Requirements		
Arts (https://catalog.gmu.edu/mason-core/#arts)		3
Global Contexts (https://catalog.gmu.edu/mason-core/#global-contexts)		3
Global History (https://catalog.gmu.edu/mason-core/#global-history)		3
Literature (https://catalog.gmu.edu/mason-core/#literature)		3
Natural Science (https://catalog.gmu.edu/mason-core/#natural-science)		7
Social and Behavioral Sciences (https://catalog.gmu.edu/mason-core/#social-behavioral-science)		3
Just Societies (optional) (https://catalog.gmu.edu/mason-core/#justsocieties) [1]		
Integration Requirements		
Written Communication (upper-level) (https://catalog.gmu.edu/mason-core/#written-upper)		3
Writing Intensive (https://catalog.gmu.edu/mason-core/#wi) [2]		3
Mason Apex (https://catalog.gmu.edu/mason-core/#apex) [3]		3
Total Credits		**40**

1 In addition to covering content related to the designated category, Exploration level courses marked with a Just Societies "flag" are specifically designed to help students learn how to interact effectively with others from all walks of life, including those with backgrounds and beliefs that differ from their own. Students who wish to increase their knowledge and skills in this area may choose to enroll in a Just Societies-flagged course. Students interested in this approach to completing their Mason Core Exploration Requirements should work closely with their advisor to identify the appropriate Just Societies-flagged courses.

2 Most programs include the writing-intensive course designated for the major as part of the major requirements; this course is therefore not counted towards the total required for Mason Core.

3 Minimum 3 credits required.

Honors

Honors in the Major

Highly-qualified students may apply to graduate with honors in the major.

Eligibility

To be eligible for admission, neuroscience majors must have completed at least 60 credits and have a minimum cumulative GPA of 3.25 and a minimum GPA of 3.25 in neuroscience courses.

Honors Requirements

If accepted, students must take a sequence of three courses, which culminates in the successful completion and presentation of an independent honors thesis.

Code	Title	Credits
NEUR 411	Seminar in Neuroscience (Mason Core) (https://catalog.gmu.edu/mason-core/)	3
NEUR 450	Honors Thesis Proposal	2-3
NEUR 451	Honors Thesis	3-4
Total Credits		**8-10**

To graduate with honors, students must earn a minimum GPA of 3.50 in their honors courses, maintain a minimum cumulative GPA of 3.25, and complete an honors thesis.

Accelerated Master's

Neuroscience, BS/Biology, Accelerated MS

Overview

Highly-qualified undergraduates may be admitted to the combined bachelor's and accelerated master's degree pathway program (accelerated master’s or BAM) and obtain a Neuroscience, BS and a Biology, MS through the Neuroscience, BS/Biology, Accelerated MS in an accelerated time-frame after satisfactory completion of a minimum of 138 credits.

See AP.6.7 Bachelor's/Accelerated Master's Degrees (https://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7) for policies related to this program.

Students in an accelerated master's degree program must fulfill all university
requirements for the master's degree. For policies governing all graduate degrees, see AP.6 Graduate Policies (https://catalog.gmu.edu/policies/academic/graduate-policies/).

BAM Pathway Admission Requirements

Applicants to all graduate programs at George Mason University must meet the admission standards and application requirements for graduate study as specified in the Graduate Admission Policies (https://catalog.gmu.edu/policies/academic/graduate-policies/) and accelerated master's degree policies (https://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7-1/).

Students will be considered for admission into the BAM Pathway after completion of a minimum of 60 credits with an overall undergraduate GPA of at least 3.00, and:

1. Students should seek out the Biology, MS Program Director who will aid in preparing the plan of study and the student for success in graduate studies,
2. Provide two letters of recommendation from academic or professional sources, and
3. Students are encouraged to have completed a selection of the courses listed below with a grade of B or better:

Undergraduate Courses

Code	Title	Credits
BIOL 213 & BIOL 215	Cell Structure and Function and Cell Structure and Function Laboratory	
BIOL 311 & BIOL 313	General Genetics and General Genetics Laboratory	
NEUR 327	Cellular Neuroscience	
One statistics course from the following:		
BIOL 214	Biostatistics for Biology Majors	
or MATH 352	Statistics	
or PSYC 300	Statistics in Psychology	
or STAT 250	Introductory Statistics I (Mason Core) (https://catalog.gmu.edu/mason-core/)	

Students who are accepted into the BAM Pathway will be allowed to register for graduate-level courses after the successful completion of a minimum of 75 undergraduate credits.

Students should seek out the graduate program's advisor who will aid in preparing the plan of study and the student for success in graduate studies.

Accelerated Master's Admission Requirements

Undergraduate students already admitted to the BAM Pathway will be admitted to the intended master's program, if they have met the following criteria that will be verified:

- Submission of BAM Transition Form by the deadline stated on the form.
- Sufficient minimum overall 3.00 cumulative GPA for conferred undergraduate degree (which does not include any earned reserve graduate credits), including a GPA of 3.00 in biology coursework.
- Completion of approved advanced standing courses and any reserve graduate courses that have met the minimum grade requirement (please refer to AP.6.7 Bachelor's/Accelerated Master's Degrees).
- Successful completion of required minimum of 120 credits needed for undergraduate degree conferral (after exclusion of any satisfactory reserve graduate credits earned).
- Successfully meeting George Mason's requirements for undergraduate degree conferral (graduation) and timely submission of the application for graduation.

Accelerated Pathway Requirements

To maintain the integrity and quality of both the undergraduate and graduate degree programs, undergraduate students interested in taking graduate courses must choose from the following:

Advanced Standing Courses

Students must complete at least 3 credits from the following list of graduate-level courses, while in undergraduate status, up to a maximum of 12:

Code	Title	Credits
BIOL 682	Advanced Eukaryotic Cell Biology	3
BIOL 689	Interdisciplinary Tools in the Biosciences	3
BIOL 690	Introduction to Graduate Studies in Biology	1-2
BIOL 695	Seminar in Molecular, Microbial, and Cellular Biology	1
NEUR 601	Developmental Neuroscience	3
NEUR 602	Cellular Neuroscience	3
NEUR 603	Mammalian Neuroanatomy	3
NEUR 612	Bioscience, Neurotechnology Society	3
NEUR 634	Neural Modeling	3
NEUR 651	Molecular Neuropharmacology	3

Reserve Graduate Credits

While in undergraduate student status, students may complete up to 6 credits of graduate-level coursework that will only count toward the graduate degree program. Reserve credits must be selected from the curated list of courses above.

For more detailed information on coursework and timeline requirements, see AP.6.7 Bachelor's/Accelerated Master's Degree (https://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7) and AP.1.4.4 Graduate Course Enrollment by Undergraduates (https://catalog.gmu.edu/policies/academic/registration-attendance/#ap-1-4-4).

Bachelor's Degree (selected), Bioinformatics Management, Accelerated PSM

Overview

This bachelor's/accelerated master's degree program allows academically strong undergraduates with a commitment to advance their education to obtain both the Biology, BS (https://catalog.gmu.edu/colleges-schools/science/biology/biology-bs/), or the Chemistry, BS (https://catalog.gmu.edu/colleges-schools/science/chemistry-biochemistry/chemistry-bs/), or the Computational and Data Sciences, BS (https://catalog.gmu.edu/colleges-schools/science/computational-data-sciences/computational-data-sciences-bs/), or the Physics, BS (https://catalog.gmu.edu/colleges-schools/science/physics-astronomy/physics-bs/), or the Neuroscience, BS (https://catalog.gmu.edu/colleges-schools/science/neuroscience-program/neuroscience-bs/) and the Bioinformatics Management, PSM (https://catalog.gmu.edu/colleges-schools/science/systems-biology/bioinformatics-management-professional-science-masters/) degrees within an accelerated timeframe. Upon completion of this 138 credit accelerated program, students will be exceptionally well prepared for entry into their careers or into a doctoral program in the field or in a related discipline.

Students are eligible to apply for this accelerated program once they have earned at least 60 undergraduate credits and can enroll in up to 18 credits of graduate coursework after successfully completing 75 undergraduate credits. This flexibility makes it possible for students to complete a bachelor's and a master's in five years.

For more detailed information, see AP.6.7 Bachelor's/Accelerated Master's Degrees (https://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7). For policies governing all graduate degrees, see AP.6 Graduate Policies (https://catalog.gmu.edu/policies/academic/graduate-policies/). For more information on undergraduates enrolling in graduate courses, see AP.1.4.4 Graduate Course Enrollment by Undergraduates (https://catalog.gmu.edu/policies/academic/registration-attendance/#text).

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 the Graduate Admission Policies (https://catalog.gmu.edu/admissions/graduate-policies/) section of this catalog.

Important application information and processes for this accelerated master's program can be found here (https://www2.gmu.edu/admissions-aid/how-apply/accelerated-masters).

Students in the Biology, BS (https://catalog.gmu.edu/colleges-schools/science/biology/biology-bs/); Chemistry, BS (https://catalog.gmu.edu/colleges-schools/science/chemistry-biochemistry/chemistry-bs/); Computational and Data Sciences, BS (https://catalog.gmu.edu/colleges-schools/science/computational-data-sciences/computational-data-sciences-bs/); Neuroscience, BS (https://catalog.gmu.edu/colleges-schools/science/neuroscience-program/neuroscience-bs/); or Physics, BS (https://catalog.gmu.edu/colleges-schools/science/physics-astronomy/physics-bs/) with an overall GPA of at least 3.00 in their last 60 credits are welcome to apply to the Bioinformatics Management, PSM (https://catalog.gmu.edu/colleges-schools/science/systems-biology/bioinformatics-management-professional-science-masters/) accelerated master's program. Applicants to this accelerated master's should have previously taken courses in molecular biology, computer science, calculus, physical chemistry, and statistics. Students with deficiencies in one or more of these areas may be required to take additional courses from the undergraduate curriculum.

The GRE requirement is waived for students accepted into this accelerated program.

Students should seek out the graduate program's advisor who will aid in choosing the appropriate graduate courses and help prepare the student for graduate studies.

Accelerated Option Requirements

After the completion of 75 undergraduate credits, students may complete 3 to 12 credits of graduate coursework that can apply to both the undergraduate and graduate degrees.

In addition to applying to graduate from the undergraduate program, students in the accelerated program must submit a bachelor's/accelerated master's transition form (available from the Office of the University Registrar (https://registrar.gmu.edu/forms/)) to the College of Science's Office of Academic and Student Affairs (https://cos.gmu.edu/about/contact-us/) by the last day to add classes of their final undergraduate semester. Students should enroll for courses in the master's program in the fall or spring semester immediately following conferral of the bachelor's degree, but should contact an advisor if they would like to defer up to one semester.

Students must maintain an overall GPA of 3.00 or higher in all graduate coursework and should consult with their faculty advisor to coordinate their academic goals.

Reserve Graduate Credits

Accelerated master's students may also take up to 6 graduate credits as reserve graduate credits. These credits do not apply to the undergraduate degree, but will reduce the master's degree by up to 6 credits. With 12 graduate credits counted toward the undergraduate and graduate degrees plus the maximum 6 reserve graduate credits, the credits necessary for the graduate degree can be reduced by up to 18.

Graduate Course Suggestions

The following list of suggested courses is provided for general reference. To ensure an efficient route to graduation and post-graduation readiness, students are strongly encouraged to meet with an advisor before registering for graduate-level courses.

Code	Title	Credits
BINF 630	Bioinformatics Methods	3
BINF 631	Molecular Cell Biology for Bioinformatics	3
GBUS 623	Marketing Management	3
GBUS 643	Managerial Finance	3

GBUS 738	Introduction to Machine Learning for Business Applications	3

Bachelor's Degree (selected)/Quantum Science and Engineering, Accelerated MS

Overview

Highly-qualified undergraduates may be admitted to the combined bachelor's and accelerated master's degree pathway program (BAM Pathway) and obtain a Bachelor of Science degree in any College of Science major and a Master of Science in Quantum Science and Engineering in an accelerated time-frame after satisfactory completion of a minimum of 138 credits.

This accelerated option is offered jointly by undergraduate Bachelor of Science programs in the College of Science and the Quantum Science and Engineering, MS program, which is jointly offered by the College of Science (https://catalog.gmu.edu/colleges-schools/science/) and the College of Engineering and Computing (https://catalog.gmu.edu/colleges-schools/engineering-computing/).

Students in an accelerated master’s degree program must fulfill all university
requirements for the master's degree. See AP.6.7 Bachelor's/Accelerated Master's Degree (https://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7) for policies related to this program. For policies governing all graduate degrees, see AP.6 Graduate Policies (https://catalog.gmu.edu/policies/academic/graduate-policies/).

BAM Pathway Admission 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 (https://catalog.gmu.edu/admissions/graduate-policies/) and accelerated master's degree policies (https://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7).

Students must major in a College of Science Bachelor of Science program and will be considered for admission into the BAM Pathway after completion of a minimum of 60 credits.

Students who are accepted into the BAM Pathway will be allowed to register for graduate level courses after successful completion of a minimum of 75 undergraduate credits.

Accelerated Master's Admission Requirements

Undergraduate students already admitted to the BAM Pathway will be admitted to the intended master’s program if they have met the following criteria that will be verified:

- Submission of BAM Transition Form by stated deadline.
- Sufficient minimum 3.0 cumulative GPA for conferred undergraduate degree (which does not include any earned reserve graduate credits).
- Completion of approved advanced standing courses and any reserve graduate courses; please refer to policy A.P. 6.7 (https://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7).
- Successful completion of required minimum of 120 credits needed for undergraduate degree conferral (after exclusion any satisfactory reserve graduate credits earned).
- Successfully meeting George Mason’s requirements for undergraduate degree conferral (graduation) and timely submitting the application for graduation.

Accelerated Pathway Requirements

To maintain the integrity and quality of both the undergraduate and graduate degree programs, undergraduate students interested in taking graduate courses must choose from the following:

Advanced Standing Courses

Students must complete at least 3 credits from the following list of graduate-level courses while in undergraduate status, up to a maximum of 12.

Students are encouraged to consult with both their undergraduate advisor and the Quantum Science and Engineering, MS advisor:

Code	Title	Credits
Select from the following options:		**3-12**
Up to one 500-600 level specialized course from the following:		
ASTR 601	Computer Simulation in Astronomy	
BINF 690	Numerical Methods for Bioinformatics	
CS 583	Analysis of Algorithms	
CS 630	Advanced Algorithms	
CS 635	Foundations of Parallel Computation	
CSI 690	Numerical Methods	
ECE 511	Computer Architecture	
ECE 547	Applied Cryptography	
ECE 633	Error Control Coding	
ECE 647	Post-Quantum Cryptography	
GGS 579	Remote Sensing	
MATH 625	Numerical Linear Algebra	
MATH 685	Numerical Analysis	
MATH 686	Numerical Solutions of Differential Equations	
OR 541	Operations Research: Deterministic Optimization	
OR 542	Operations Research: Stochastic Models	
OR 646	Stochastic Optimization	
PHYS 510	Computational Physics I	
PHYS 613	Computational Physics II	
Remaining credits are selected from the following:		
QSE 500	Ideas in Quantum Science and Technology	
QSE 501	Mathematical Foundations of QSE [1]	
QSE 502	Programming Foundations of QSE [1]	
QSE 505	Classical and Quantum Information Theory	
QSE 511	Quantum Algorithms	
QSE 520	Applications of Quantum Technology	

QSE 570	Quantum Computing System Design
or ECE 570	Quantum Computing System Design

Reserve Credit Courses

Students may complete up to 6 credits while in undergraduate student status, of graduate-level coursework from the list below that will only count toward the graduate degree program.

Code	Title	Credits
Select up to 6 credits of not previously completed courses from the following:		**6**
QSE 500	Ideas in Quantum Science and Technology	
QSE 501	Mathematical Foundations of QSE [1]	
QSE 502	Programming Foundations of QSE [1]	
QSE 505	Classical and Quantum Information Theory	
QSE 511	Quantum Algorithms	
QSE 520	Applications of Quantum Technology	
QSE 570	Quantum Computing System Design	
or ECE 570	Quantum Computing System Design	

[1] As only one of these courses count for Quantum Science and Engineering, MS, credit, and these courses may not be necessary for all students, consult with an academic advisor prior to enrolling in QSE 501 Mathematical Foundations of QSE or QSE 502 Programming Foundations of QSE.

For more detailed information on coursework and timeline requirements, see AP.6.7 Bachelor's/Accelerated Master's Degree (https://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7) and AP.1.4.4 Graduate Course Enrollment by Undergraduates (https://catalog.gmu.edu/policies/academic/registration-attendance/#ap-1-4-4).