PHYSICS, BS

Banner Code: SC-BS-PHYS

Undergraduate Physics Advisor

203 Planetary Hall
Fairfax Campus

Phone: 703-993-5356
Email: uadvstr@gmu.edu
Website: https://science.gmu.edu/academics/departments-units/physics-and-astronomy-department/physics-bs

The Physics, BS program prepares students for graduate school and careers in education, business, or industry.

Teacher Licensure

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

- Secondary Education - Physics (6-12) Undergraduate Certificate (https://catalog.gmu.edu/colleges-schools/education-human-development/school-education/secondary-education-physics-6-12-undergraduate-certificate/)
- Physics, BS/Curriculum and Instruction, Accelerated MEd (Secondary Education Physics concentration)

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

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/).

The intensive writing requirement is fulfilled by taking PHYS 407 Senior Laboratory in Modern Physics (Mason Core) (https://catalog.gmu.edu/mason-core/), PHYS 410 Computational Physics Capstone (Mason Core) (https://catalog.gmu.edu/mason-core/), or ASTR 402 RS: Methods of Observational Astronomy (Mason Core) (https://catalog.gmu.edu/mason-core/), which are also capstone courses for the major.

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

Double Majors

Students considering a double major with physics should discuss this option with the respective undergraduate coordinators.

Note that at least 18 credits used to fulfill the Physics, BS cannot be used to fulfill another major or minor. Some course substitutions are allowed for double majors, but these should be discussed with a physics advisor in advance.

Alternative Introductory Sequence

Normally, students who intend to major in physics should begin with one of the physics introductory sequences:

Code	Title	Credits
PHYS 160 & PHYS 161	University Physics I (Mason Core) (https://catalog.gmu.edu/mason-core/) and University Physics I Laboratory (Mason Core) (https://catalog.gmu.edu/mason-core/)	4
PHYS 260 & PHYS 261	University Physics II (Mason Core) (https://catalog.gmu.edu/mason-core/) and University Physics II Laboratory (Mason Core) (https://catalog.gmu.edu/mason-core/)	4
Or		
PHYS 170 & PHYS 161	Introductory and Modern Physics I (Mason Core) (https://catalog.gmu.edu/mason-core/) and University Physics I Laboratory (Mason Core) (https://catalog.gmu.edu/mason-core/)	4
PHYS 270 & PHYS 261	Introductory and Modern Physics II (Mason Core) (https://catalog.gmu.edu/mason-core/) and University Physics II Laboratory (Mason Core) (https://catalog.gmu.edu/mason-core/)	4

Students who decide to major in physics after completing PHYS 243 College Physics I (Mason Core) (https://catalog.gmu.edu/mason-core/), PHYS 244 College Physics I Lab (Mason Core) (https://catalog.gmu.edu/mason-core/), PHYS 245 College Physics II (Mason Core) (https://catalog.gmu.edu/mason-core/) and PHYS 246 College Physics II Lab (Mason Core) (https://catalog.gmu.edu/mason-core/) are welcome, but are required to obtain written permission from the Department of Physics and Astronomy (https://catalog.gmu.edu/colleges-schools/science/physics-astronomy/) before a change of major can be approved.

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 a minimum of 74 credits in the major (68 credits if completing a second major), including at least 11 credits in mathematics, with a minimum GPA of 2.00.

Students must complete the coursework described below and either select a concentration or select the "BS without Concentration" option:

Physics Core Courses

Code	Title	Credits
Choose one of the following two sequences:		8
Sequence One		
PHYS 160 & PHYS 161	University Physics I (Mason Core) (https://catalog.gmu.edu/mason-core/) and University Physics I Laboratory (Mason Core) (https://catalog.gmu.edu/mason-core/) (the lab can be taken with, or any time after, PHYS 160)	
PHYS 260 & PHYS 261	University Physics II (Mason Core) (https://catalog.gmu.edu/mason-core/) and University Physics II Laboratory (Mason Core) (https://catalog.gmu.edu/mason-core/) (the lab can be taken with, or any time after, PHYS 260)	
Sequence Two		
PHYS 170 & PHYS 161	Introductory and Modern Physics I (Mason Core) (https://catalog.gmu.edu/mason-core/) and University Physics I Laboratory (Mason Core) (https://catalog.gmu.edu/mason-core/) (the lab can be taken with, or any time after, PHYS 170)	
PHYS 270 & PHYS 261	Introductory and Modern Physics II (Mason Core) (https://catalog.gmu.edu/mason-core/) and University Physics II Laboratory (Mason Core) (https://catalog.gmu.edu/mason-core/) (the lab can be taken with, or any time after, PHYS 270)	
PHYS 251	Introduction to Computer Methods in Physics (Mason Core) (https://catalog.gmu.edu/mason-core/)	3
PHYS 262	University Physics III (Mason Core) (https://catalog.gmu.edu/mason-core/)	3
PHYS 301	Analytical Methods of Physics	3
PHYS 303	Classical Mechanics	3
PHYS 305	Electromagnetic Theory [1]	3
PHYS 307	Thermal Physics	3
PHYS 402	Introduction to Quantum Mechanics and Atomic Physics	3
Total Credits		**29**

[1] Students double majoring in engineering and physics may substitute ECE 305 Electromagnetic Theory for PHYS 305 Electromagnetic Theory.

Mathematics

Code	Title	Credits
MATH 113	Analytic Geometry and Calculus I (Mason Core) (https://catalog.gmu.edu/mason-core/)	4
MATH 114	Analytic Geometry and Calculus II	4
MATH 213	Analytic Geometry and Calculus III	3
Total Credits		**11**

BS without Concentration

Code	Title	Credits
Mathematics/Computational Physics		**6**
Select 6 credits from the following:		
MATH 203	Linear Algebra	
MATH 214	Elementary Differential Equations	
PHYS 325	Intermediate Computer Methods in Physics	
Intermediate Laboratory		**6**
PHYS 311	Instrumentation	
PHYS 312	Waves and Optics	
Research, Internship, or Independent Study		**3**
Select 3 credits from the following:		
PHYS 326	Problems in Physics II	
PHYS 405	Honors Thesis in Physics I	
PHYS 406	Honors Thesis in Physics II	
PHYS 408	Senior Research	
PHYS 409	Physics Internship	
Capstone		**4**
PHYS 407	Senior Laboratory in Modern Physics (Mason Core) (https://catalog.gmu.edu/mason-core/) [1]	
PHYS 410	Computational Physics Capstone (Mason Core) (https://catalog.gmu.edu/mason-core/) [1]	
Physics Theory		**9-15**
All students complete the following 9 credits:		
PHYS 306	Wave Motion and Electromagnetic Radiation	
PHYS 403	Quantum Mechanics II	
PHYS 428	Relativity	
Only students who are not completing a second major or a second bachelor's degree must select 6 additional credits from the following:		
ASTR 210	Introduction to Astrophysics	
ASTR 328	Stars	
ASTR 403	Planetary Science	

ASTR 404	Galaxies and Cosmology	
PHYS 308	Modern Physics	
PHYS 331	Physics of Renewable Energy	
PHYS 370	Molecular Biophysics	
PHYS 412	Solid State Physics and Applications	
PHYS 440	Nuclear and Particle Physics	
PHYS 465	Planetary Atmospheres and Ionospheres	
PHYS 475	Atmospheric Physics	
Total Credits		**28-34**

[1] Fulfills the writing intensive requirement.

Applied and Engineering Physics Concentration (PHAE)

Code	Title	Credits
Mathematics/Computational Physics		**3**
PHYS 325	Intermediate Computer Methods in Physics	
Intermediate Laboratory		**6**
PHYS 311	Instrumentation	
PHYS 312	Waves and Optics	
Physics Theory		**9**
PHYS 306	Wave Motion and Electromagnetic Radiation	
Select 6 credits from the following:		
PHYS 331	Physics of Renewable Energy	
PHYS 370	Molecular Biophysics	
PHYS 403	Quantum Mechanics II	
PHYS 412	Solid State Physics and Applications	
Capstone		**4**
Select 4 credits from the following:		
PHYS 407	Senior Laboratory in Modern Physics (Mason Core) (https://catalog.gmu.edu/mason-core/) [1]	
PHYS 410	Computational Physics Capstone (Mason Core) (https://catalog.gmu.edu/mason-core/) [1]	
Practical Work		**6-12**
Students who are not completing a second major or a second bachelor's degree should select 12 credits from the following. Students who are completing a second major or a second bachelor's degree should select 6 credits:		
PHYS 405	Honors Thesis in Physics I	
PHYS 406	Honors Thesis in Physics II	
PHYS 408	Senior Research	
PHYS 409	Physics Internship	
BENG 320	Bioengineering Signals and Systems	
ECE 415	Power System Analysis	
ECE 416	Electric Machinery and Modern Applications	
Or other approved 300 or 400-level Volgenau School of Engineering courses		
Total Credits		**28-34**

[1] Fulfills the writing intensive requirement.

Astrophysics Concentration (PHAP)

Code	Title	Credits
Mathematics/Computational Physics		**6**
ASTR 401	Computer Simulation in Astronomy	
MATH 214	Elementary Differential Equations	
Intermediate Laboratory		**6**
PHYS 311	Instrumentation	
PHYS 312	Waves and Optics	
Research, Internship, or Independent Study		**3**
Select 3 credits from the following:		
ASTR 405	Honors Thesis in Astronomy I	
ASTR 406	Honors Thesis in Astronomy II	
ASTR 408	Senior Research	
ASTR 409	Astronomy Internship	
PHYS 326	Problems in Physics II	
PHYS 405	Honors Thesis in Physics I	
PHYS 406	Honors Thesis in Physics II	
PHYS 408	Senior Research	
PHYS 409	Physics Internship	
Capstone		**4**
Select 4 credits from the following:		
ASTR 402	RS: Methods of Observational Astronomy (Mason Core) (https://catalog.gmu.edu/mason-core/) [1]	
PHYS 407	Senior Laboratory in Modern Physics (Mason Core) (https://catalog.gmu.edu/mason-core/) [1]	
PHYS 410	Computational Physics Capstone (Mason Core) (https://catalog.gmu.edu/mason-core/) [1]	
Physics and Astronomy Theory		**12-18**
Students who are not completing a second major or a second bachelor's degree must complete the following:		
ASTR 210	Introduction to Astrophysics	
ASTR 328	Stars	
PHYS 306	Wave Motion and Electromagnetic Radiation	
PHYS 428	Relativity	
Select two courses from the following:		
ASTR 403	Planetary Science	
ASTR 404	Galaxies and Cosmology	
ASTR 420	Exoplanets	
ASTR 480	The Interstellar Medium	
Students who are completing a second major or a second bachelor's degree must complete the following:		
ASTR 210	Introduction to Astrophysics	
ASTR 328	Stars	
Select 3 credits from the following:		
PHYS 306	Wave Motion and Electromagnetic Radiation	
PHYS 428	Relativity	

Select 3 credits from the following:		
ASTR 403	Planetary Science	
ASTR 404	Galaxies and Cosmology	
ASTR 420	Exoplanets	
ASTR 480	The Interstellar Medium	
Total Credits		**31-37**

[1] Fulfills the writing intensive requirement.

Computational Physics Concentration (PHCP)

Code	Title	Credits
Mathematics/Computational Physics		**15**
PHYS 325	Intermediate Computer Methods in Physics	
MATH 203	Linear Algebra	
MATH 214	Elementary Differential Equations	
Select 6 credits from the following:		
ASTR 401	Computer Simulation in Astronomy	
CDS 302	Scientific Data and Databases (Mason Core) (https://catalog.gmu.edu/mason-core/)	
CDS 303	Scientific Data Mining	
MATH 446	Numerical Analysis I	
MATH 447	Numerical Analysis II	
Intermediate Laboratory		**3**
PHYS 311	Instrumentation	
Research, Internship, or Independent Study		**3**
Select 3 credits from the following:		
PHYS 326	Problems in Physics II	
PHYS 405	Honors Thesis in Physics I	
PHYS 406	Honors Thesis in Physics II	
PHYS 408	Senior Research	
PHYS 409	Physics Internship	
Capstone		**4**
PHYS 410	Computational Physics Capstone (Mason Core) (https://catalog.gmu.edu/mason-core/) [1]	
Physics and Astronomy Theory		**3-9**
Students who are not completing a second major or a second bachelor's degree must select 9 credits of the following. Students who are completing a second major or a second bachelor's degree must select 3 credits from the following:		
ASTR 210	Introduction to Astrophysics	
ASTR 328	Stars	
ASTR 403	Planetary Science	
PHYS 306	Wave Motion and Electromagnetic Radiation	
PHYS 412	Solid State Physics and Applications	
Total Credits		**28-34**

[1] Fulfills the writing intensive requirement.

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 (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 electives. Students are strongly encouraged to consult with their advisors to ensure that they fulfill all requirements.

- Without concentration: 46-52 credits
- PHAE concentration: 46-52 credits
- PHAP concentration: 43-49 credits
- PHCP concentration: 46-52 credits

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.

Students who have completed the following credentials are eligible for a waiver of the Foundation and Exploration (lower level) requirement categories. 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)		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

Physics majors who have maintained an overall GPA of at least 3.50 in physics courses and a GPA of 3.50 in all courses taken at George Mason University may apply to the physics honors program when they complete the first semester of their junior year. Not all applicants who meet the minimum requirements are guaranteed acceptance.

To graduate with honors in physics, a student is required to maintain a minimum GPA of 3.00 in physics courses and successfully complete PHYS 405 Honors Thesis in Physics I and PHYS 406 Honors Thesis in Physics II with a GPA of at least 3.50 and a grade of at least 'A-' in PHYS 406 Honors Thesis in Physics II. Please visit the department for details.

Accelerated Master's

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	Data Mining for Business Analytics	3

Physics, BS/Applied and Engineering Physics, Accelerated MS

Overview

This bachelor's/accelerated master's degree program allows academically strong undergraduates with a commitment to research to obtain both the Physics, BS (https://catalog.gmu.edu/colleges-schools/science/physics-astronomy/physics-bs/) and the Applied and Engineering Physics, MS (https://catalog.gmu.edu/colleges-schools/science/physics-astronomy/applied-engineering-physics-ms/) degrees within an accelerated timeframe. Upon completion of this 138 credit accelerated program, students will be exceptionally well prepared for entry into a professional school, or a physics doctoral program, or a related discipline's doctoral program.

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/).

Additionally, interested applicants should submit a letter to the undergraduate physics coordinator requesting admission along with the aforementioned recommendation letter(s). Contact the physics undergraduate or graduate coordinator for further details.

Successful applicants will have earned 60 undergraduate credits and have an overall GPA of at least 3.00. Additionally, they will have completed 45 credits in physics-major coursework. The physics major GPA must be at least 3.50.

One or more recommendation letters from one or more research supervisors are also required.

Interested applicants should submit a letter to the undergraduate physics coordinator requesting admission along with the aforementioned recommendation letter(s). Contact the physics undergraduate or graduate coordinator for further details.

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 Credit

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, which may be taken while in undergraduate status, 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
ASTR 601	Computer Simulation in Astronomy	3
PHYS 502	Introduction to Quantum Mechanics and Atomic Physics	3
PHYS 510	Computational Physics I	3
PHYS 513	Applied Electromagnetic Theory	3
PHYS 534	Introduction to Quantum Computation and Quantum Information	3
PHYS 591	Systems for Quantum Scientists	3
PHYS 613	Computational Physics II	3
PHYS 620	Continuum Mechanics	3
PHYS 683	Mathematical Methods in Physics	3
PHYS 684	Quantum Mechanics I	3
PHYS 685	Classical Electrodynamics I	3
PHYS 690	Engineering Thermodynamics	3

Physics, BS/Secondary Education, Accelerated MEd (Secondary Education - Science Concentration)

Overview

Highly-qualified undergraduates may be admitted to the bachelor's/accelerated master's program and obtain a BS in Physics and an MEd in Secondary Education (Secondary Education (https://catalog.gmu.edu/colleges-schools/education-human-development/school-education/curriculum-instruction-med/) - Science (https://catalog.gmu.edu/colleges-schools/education-human-development/school-education/secondary-education-med/)s concentration) (https://catalog.gmu.edu/colleges-schools/education-human-development/school-education/curriculum-instruction-med/)in an accelerated time-frame after satisfactory completion of a minimum of 143 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.

This accelerated option is offered jointly by the department of Physics and Astronomy (https://catalog.gmu.edu/colleges-schools/science/physics-astronomy/) and the School of Education (https://catalog.gmu.edu/colleges-schools/education-human-development/school-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 (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 Bachelor's/Accelerated Master's Degree (https://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7) policies. For information specific to this accelerated master's program, see Application Requirements and Deadlines (https://cehd.gmu.edu/bachelors-accelerated-masters-program/).

Students will be considered for admission into the BAM Pathway after completion of a minimum of 60 credits, and additional unit-specific criteria.

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 and course-specific pre-requisites.

Accelerated Master's Admission Requirements

Students already admitted in the BAM Pathway will be admitted to the MEd program, if they have met the following criteria, as verified on the Bachelor's/Accelerated Master's Transition form:

- 3.0 overall GPA
- Completion of specific undergraduate coursework
- Successfully meeting Mason's requirements for undergraduate degree conferral (graduation) and completing 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 which can be taken as Advanced Standing or Reserve Graduate credit (https://catalog.gmu.edu/policies/academic/graduate-policies/#text) (to be determined by the student and their advisor):

Code	Title	Credits
EDRD 619	Literacy Across the Disciplines	3
EDUC 545	Teaching Science and Engineering Practices	3
SEED 522	Foundations of Secondary Education	3
SEED 540	Human Development and Learning: Secondary Education	3
SEED 573	Teaching Science in the Secondary School	3
SEED 673	Advanced Methods of Teaching Science in the Secondary School	3
One of the following:		
SEED 507	Assessing Learning and Teaching in the Secondary Classroom	
SEED 508	Creating Advocacy with Adolescent Learners	
SEED 509	Perspectives on Extraordinary Teaching	
SEED 510	Secondary Education in International Contexts	

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) policies.