# ASTRONOMY, BS

**Banner Code: SC-BS-ASTR**

**Undergraduate Astronomy Advisor**

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Fairfax Campus

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This program prepares students for graduate school, a career in research or teaching, or employment in industry, business, or education fields where analytical skills and a scientific background are advantageous. Students who are considering a double major should talk to the undergraduate coordinator.

## Admissions & Policies

## Admissions

University-wide admissions policies can be found in Undergraduate Admissions Policies (http://catalog.gmu.edu/admissions/undergraduate-policies/).

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 (http://catalog.gmu.edu/policies/academic/undergraduate-policies/#ap-5-3-2) including the Mason Core (http://catalog.gmu.edu/mason-core/).

At least 18 credits used to fulfill an Astronomy, BS cannot be used to fulfill another major or minor. Some course substitutions are allowed for double majors, subject to approval from the Department of Physics and Astronomy (http://catalog.gmu.edu/colleges-schools/science/physics-astronomy/).

By taking ASTR 402 RS: Methods of Observational Astronomy (Mason Core) (http://catalog.gmu.edu/mason-core/), astronomy majors satisfy the university's writing-intensive requirement.

For policies governing all undergraduate programs, see AP.5 Undergraduate Policies (http://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 a total of 58 credits in physics and astronomy and 14 credits in mathematics with a minimum GPA of 2.00.

### Required Astronomy Courses

| Code | Title | Credits |
|---|---|---|
| ASTR 124 | Introduction to Observational Astronomy | 1 |
| ASTR 210 | Introduction to Astrophysics | 3 |
| ASTR 328 | Stars | 3 |
| ASTR 401 | Computer Simulation in Astronomy | 3 |
| ASTR 402 | RS: Methods of Observational Astronomy (Mason Core) (http://catalog.gmu.edu/mason-core/) [1] | 4 |
| Total Credits | | 14 |

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Fulfills the writing intensive requirement.

### Required Physics Courses

| Code | Title | Credits |
|---|---|---|
| **Choose one of the following two sequences:** | | **8** |
| Sequence One | | |
| PHYS 160 & PHYS 161 | University Physics I (Mason Core) (http://catalog.gmu.edu/mason-core/) and University Physics I Laboratory (Mason Core) (http://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) (http://catalog.gmu.edu/mason-core/) and University Physics II Laboratory (Mason Core) (http://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) (http://catalog.gmu.edu/mason-core/) and University Physics I Laboratory (Mason Core) (http://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) (http://catalog.gmu.edu/mason-core/) and University Physics II Laboratory (Mason Core) (http://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) (http://catalog.gmu.edu/mason-core/) | 3 |
| PHYS 262 | University Physics III (Mason Core) (http://catalog.gmu.edu/mason-core/) | 3 |
| PHYS 301 | Analytical Methods of Physics | 3 |
| PHYS 303 | Classical Mechanics | 3 |

| | | |
|---|---|---|
| PHYS 305 | Electromagnetic Theory | 3 |
| Total Credits | | 23 |

## Required Math Courses

| Code | Title | Credits |
|---|---|---|
| MATH 113 | Analytic Geometry and Calculus I (Mason Core) (http://catalog.gmu.edu/mason-core/) | 4 |
| MATH 114 | Analytic Geometry and Calculus II | 4 |
| MATH 213 | Analytic Geometry and Calculus III | 3 |
| MATH 214 | Elementary Differential Equations | 3 |
| Total Credits | | 14 |

## Additional Coursework

| Code | Title | Credits |
|---|---|---|
| Select 21 credits from the following: | | 21 |
| ASTR 301 | Astrobiology | |
| ASTR 403 | Planetary Science | |
| ASTR 404 | Galaxies and Cosmology | |
| ASTR 408 | Senior Research | |
| or ASTR 409 | Astronomy Internship | |
| ASTR 420 | Exoplanets | |
| ASTR 480 | The Interstellar Medium | |
| PHYS 306 | Wave Motion and Electromagnetic Radiation | |
| PHYS 307 | Thermal Physics | |
| PHYS 308 | Modern Physics | |
| PHYS 311 | Instrumentation | |
| PHYS 312 | Waves and Optics | |
| PHYS 325 | Intermediate Computer Methods in Physics | |
| PHYS 402 | Introduction to Quantum Mechanics and Atomic Physics | |
| PHYS 403 | Quantum Mechanics II | |
| PHYS 428 | Relativity | |
| PHYS 440 | Nuclear and Particle Physics | |
| PHYS 465 | Planetary Atmospheres and Ionospheres | |
| PHYS 475 | Atmospheric Physics | |
| Total Credits | | 21 |

## Mason Core and Elective Credits

In order to meet a minimum of 120 credits, this degree requires an additional 48 credits, which may be applied toward any remaining Mason Core (http://catalog.gmu.edu/mason-core/) requirements (outlined below), Requirements for Bachelor's Degrees (http://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.

### Mason Core

Some Mason Core (http://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 (http://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 (http://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 (ENGH 101) (http://catalog.gmu.edu/mason-core/#written) | | 3 |
| Oral Communication (http://catalog.gmu.edu/mason-core/#oral) | | 3 |
| Quantitative Reasoning (http://catalog.gmu.edu/mason-core/#quantitative) | | 3 |
| Information Technology and Computing (http://catalog.gmu.edu/mason-core/#information-technology) | | 3 |
| **Exploration Requirements** | | |
| Arts (http://catalog.gmu.edu/mason-core/#arts) | | 3 |
| Global History (http://catalog.gmu.edu/mason-core/#global-history) | | 3 |
| Global Understanding (http://catalog.gmu.edu/mason-core/#global) | | 3 |
| Literature (http://catalog.gmu.edu/mason-core/#literature) | | 3 |
| Natural Science (http://catalog.gmu.edu/mason-core/#natural-science) | | 7 |
| Social and Behavioral Sciences (http://catalog.gmu.edu/mason-core/#social-behavioral-science) | | 3 |
| **Integration Requirements** | | |
| Written Communications (ENGH 302) (http://catalog.gmu.edu/mason-core/#written) | | 3 |
| Writing-Intensive (http://catalog.gmu.edu/mason-core/#wi) [1] | | 3 |
| Synthesis/Capstone (http://catalog.gmu.edu/mason-core/#synthesis-capstone) [2] | | 3 |
| Total Credits | | 40 |

[1]

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.

[2]

Minimum 3 credits required.

# Honors

# Honors in the Major

## Eligibility

Astronomy majors who have completed the prerequisites for ASTR 405 Honors Thesis in Astronomy I, have a GPA of at least 3.50 in ASTR and PHYS courses taken at Mason, and have a GPA of at least 3.50 in all courses taken at Mason may apply for admission to the astronomy

honors program. Not all applicants who meet the minimum requirements are guaranteed acceptance. Please visit the department for details.

## Honors Requirements

To graduate with honors in astronomy, a student must maintain a GPA of at least 3.50 in their ASTR/PHYS courses. Students accepted into the honors program must complete ASTR 405 Honors Thesis in Astronomy I and ASTR 406 Honors Thesis in Astronomy II with a GPA of at least 3.50 and a grade of 'A-' or better in ASTR 406 Honors Thesis in Astronomy II. Students in ASTR 405 Honors Thesis in Astronomy I/ASTR 406 Honors Thesis in Astronomy II will complete a research project and write a thesis working under the supervision of a faculty member. At the end of ASTR 406 Honors Thesis in Astronomy II, the student will write a substantial thesis paper and make a presentation of results to their honors committee.