



Program Approval Form

For approval of new programs and deletions or modifications to an existing program.

Registrar.

Action Requested:

- Create New (SCHEV approval required except for concentration, minors, and certificates)
- Delete Existing
- Modify Existing (check all that apply)
 - Title (SCHEV approval required except for concentration, minors, certificates)
 - Degree Requirements Admission Standards
 - Application Requirements
 - Other Changes: _____

Type (Check one):

- B.A. B.S. Minor
- Undergraduate Certificate
- M.A. M.S. M.Ed.
- Ph.D. Graduate Certificate
- Concentration
- Other: _____

College/School: Department:
 Submitted by: Ext: Email:

Effective Term: Fall **Please note:** For students to start a new degree, minor, certificate or concentration, the program must be fully approved, entered into Banner, and published in the University Catalog.

Justification: (attach separate document if necessary)

Program Title: (Required)
 Use title to identify subject matter. Do not include name of college/school or department.

Concentration Title(s):

Admissions Standards / Application Requirements:
 (Required only if different from those listed in the University Catalog)

Degree Requirements:
 Consult University Catalog for models, attach separate document if necessary using track changes for modifications

Courses offered via Distance:
 (if applicable)

TOTAL CREDITS REQUIRED:

	Existing	New/Modified
	B.S. Astronomy	B.S. Astronomy
	See below.	See below.
	65	65

Approval Signatures

Department _____ Date _____ College/School _____ Date _____ Provost's Office _____ Date _____
Required for Undergraduate Programs Only

If this program may impact another unit or is in collaboration with another unit at Mason, the originating department must circulate this proposal for review by those units and obtain the necessary signatures prior to submission. Failure to do so will delay action on this proposal.

Unit Name	Unit Approval Name	Unit Approver's Signature	Date

For Graduate Programs Only

Graduate Council Member _____ Provost Office _____ Graduate Council Approval Date _____

Summary of Revisions

1. The total number of credits remains the same, but they are slightly redistributed among courses.
 - a) MATH 313 or 314 is removed from the requirements.
 - b) PHYS 303 is added to the requirements.
 - c) Students are now free to pick 2 out of the following 3: ASTR 403, 404, 428. Previously, all 3 were required.
 - d) The number of elective credits increases from 9 to 12. The number of courses explicitly mentioned in the elective list is decreases, but we retain flexibility by accepting other courses with permission of the department.

The objectives of these changes are to promote research and fundamental physics courses, which are essential in preparing students for research careers.

2. The introductory text has been slightly modified, to clarify and tighten it.
3. The emphasis in graduate school preparation has been deleted, since the base program fully prepares students for graduate school.

New catalog copy:

Banner Code: SC-BS-ASTR

The BS in astronomy 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. Note that 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; these must be approved by the department.

Students must fulfill all [requirements for bachelor's degrees](#) including [university general education requirements](#). In addition, students must complete a total of 39 credits in physics and astronomy and 14 credits in mathematics with a minimum GPA of 2.00. Through the course work below, astronomy majors satisfy the university-wide requirements in natural science and quantitative reasoning. Also, by taking ASTR 402, they satisfy the university's writing-intensive requirement.

This program of study is offered by the [College of Science](#).

Degree Requirements

A. Required astronomy courses (12 credits):

- [ASTR 103 - Astronomy](#) Credits: 3
- or

- [ASTR 113 - Introductory Astronomy: Stars, Galaxies, and the Universe](#) Credits: 3
- [ASTR 328 - Stars and the Interstellar Medium](#) Credits: 3
- [ASTR 402 - Methods of Observational Astronomy](#) Credits: 3
- [ASTR 490 - Astronomy Capstone](#) Credits: 3

B. Additional astronomy courses (6 credits); pick 2 of the following:

- [ASTR 403 - Planetary Sciences](#) Credits: 3
- [ASTR 404 - Galactic Astronomy](#) Credits: 3
- [ASTR 428 - Relativity and Cosmology](#) Credits: 3

C. Required physics courses (21 credits):

- [PHYS 160 - University Physics I](#) Credits: 3
- [PHYS 161 - University Physics I Laboratory](#) Credits: 1
- [PHYS 260 - University Physics II](#) Credits: 3
- [PHYS 261 - University Physics II Laboratory](#) Credits: 1
- [PHYS 262 - University Physics III](#) Credits: 3
- [PHYS 263 - University Physics III Laboratory](#) Credits: 1
- [PHYS 303 - Classical Mechanics](#) Credits: 3
- [PHYS 305 - Electromagnetic Theory](#) Credits: 3
- [PHYS 308 - Modern Physics with Applications](#) Credits: 3

D. Required math courses (14 credits):

- [MATH 113 - Analytic Geometry and Calculus I](#) Credits: 4
- [MATH 114 - Analytic Geometry and Calculus II](#) Credits: 4
- [MATH 213 - Analytic Geometry and Calculus III](#) Credits: 3
- [MATH 214 - Elementary Differential Equations](#) Credits: 3

E. 12 credits from the following:

(at least 9 credits must be from upper-level courses)

- [The course omitted in section B above](#) Credits: 3
- [ASTR 301 - Astrobiology](#) Credits: 3
- [ASTR 408 - Senior Research](#) Credits: 3
- [PHYS 306 - Wave Motion and Electromagnetic Radiation](#) Credits: 3
- [PHYS 307 - Thermal Physics](#) Credits: 3
- [PHYS 402 - Introduction to Quantum Mechanics and Atomic Physics](#) Credits: 3
- [Any other course with the permission of the department](#)

Areas of Emphasis

In meeting the above requirements, students may choose an area of emphasis. Students who wish to complete an emphasis should plan a program of study in consultation with their advisors. Some emphases listed below require more than 12 credits in category (E) above. It is not necessary to complete an emphasis, as the base program provides full preparation for graduate school.

Emphasis in Astrobiology

This emphasis prepares students for careers in research, teaching, or science journalism. Students must take the following, and complete a senior project or internship.

- [BIOL 213 - Cell Structure and Function](#) Credits: 4
 - [BIOL 305 - Biology of Microorganisms](#) Credits: 3
 - [BIOL 506 - Selected Topics in Microbiology](#) Credits: 1-4
-
- [ASTR 408 - Senior Research](#) Credits: 3
- or
- [ASTR 409 - Astronomy Internship](#) Credits: 3

Emphasis in Computational Astronomy

This emphasis prepares students planning for computation and information-related jobs in industry and government labs. Students must take 9 credits of the following. In addition, they should complete a senior project or internship.

- [ASTR 401 - Computer Simulation in Astronomy](#) Credits: 3
-
- [PHYS 251 - Introduction to Computer Techniques in Physics](#) Credits: 3
- or
- [PHYS 510 - Computational Physics I](#) Credits: 3
-
- [MATH 446 - Numerical Analysis I](#) Credits: 3
- or
- [MATH 447 - Numerical Analysis II](#) Credits: 3
-
- [ASTR 408 - Senior Research](#) Credits: 3
- or
- [ASTR 409 - Astronomy Internship](#) Credits: 3

Sample Schedule for Astronomy BS

(excluding general education courses)

First Semester

- [MATH 113 - Analytic Geometry and Calculus I](#) Credits: 4
- [ENGL 101 - Composition](#) Credits: 3
- [ASTR 103 - Astronomy](#) Credits: 3

Second Semester

- [MATH 114 - Analytic Geometry and Calculus II](#) Credits: 4
- [PHYS 160 - University Physics I](#) Credits: 3
- [PHYS 161 - University Physics I Laboratory](#) Credits: 1

Third Semester

- [PHYS 260 - University Physics II](#) Credits: 3
- [PHYS 261 - University Physics II Laboratory](#) Credits: 1
- [MATH 213 - Analytic Geometry and Calculus III](#) Credits: 3

Fourth Semester

- [PHYS 262 - University Physics III](#) Credits: 3
- [PHYS 263 - University Physics III Laboratory](#) Credits: 1
- [MATH 214 - Elementary Differential Equations](#) Credits: 3

Fifth Semester

- [ASTR 328 - Stars and the Interstellar Medium](#) Credits: 3
- [PHYS 303 - Classical Mechanics](#) Credits: 3
- [PHYS 305 - Electromagnetic Theory](#) Credits: 3
- [ENGL 302 - Advanced Composition](#) Credits: 3

Sixth Semester

- [ASTR 404 - Galaxies and Cosmology](#) Credits: 3
- [PHYS 308 - Modern Physics with Applications](#) Credits: 3

Seventh Semester

- [ASTR 402 - Methods of Observational Astronomy](#) Credits: 3
- [ASTR 403 - Planetary Sciences](#) Credits: 3
- [ASTR 408 - Senior Research](#) Credits: 3
- [PHYS 402 - Introduction to Quantum Mechanics and Atomic Physics](#) Credits: 3

Eighth Semester

- [ASTR 428 - Relativity](#) Credits: 3
 - [ASTR 490 - Astronomy Capstone](#) Credits: 3
 - [PHYS 307 - Thermal Physics](#) Credits: 3
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