Program Approval Form

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

Action Requested:

- [ ] Create New (SCHEV approval required except for minors)
- [ ] Inactivate Existing
- [x] Modify Existing (check **ALL** that apply)
  - [ ] Title (SCHEV approval required except for minors)
  - [ ] **Concentration** (Choose one): [ ] *Add* [ ] *Delete* [ ] *Modify*
  - [x] Degree Requirements
  - [ ] Admission Standards/ Application Requirements
  - [ ] Other Changes: _____

Type (Check one)**:**

- [ ] B.A. [x] B.S. [ ] Minor
- [ ] Master's
- [ ] Ph.D.
- [ ] Undergraduate Certificate*
- [ ] Graduate Certificate*
- [ ] Bachelor's/Accelerated Master's [ ] Other:

College/School:	COS	**Department:**	Physics and Astronomy
Submitted by:	Joseph Weingartner	**Ext:** 4596	**Email:** jweinga1

Effective Term: Fall 2017

Please note: For students to be admitted to 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)

	Existing	New/Modified
Program Title: (Required) Title must identify subject matter. Do not include name of college/school/dept.	Astronomy BS	Astronomy BS
Concentration(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	See attached.	See attached.
Courses offered via distance: (if applicable)		
TOTAL CREDITS REQUIRED:	120	120

***For Certificates Only:** Indicate whether students are able to pursue on a [ ] **Full-time basis** [ ] **Part-time basis**

Approval Signatures

Department	Date	College/School	Date	Provost's Office	Date
				Required for Minors and Interdisciplinary Programs	

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 Undergraduate Programs only

Undergraduate Council Member	Provost Office	Undergraduate Council Approval Date

For Graduate Programs Only

Graduate Council Member	Provost Office	Graduate Council Approval Date

For Registrar Office's Use Only: Received_____Banner_____Catalog_____

revised 9/2/2016

Program Proposal Submitted to the College of Science Curriculum Committee (COSCC)

The form above is processed by the Office of the University Registrar. This second page is for the COSCC's reference. Please complete the applicable portions of this page to clearly communicate what the form above is requesting.

FOR ALL PROGRAMS (required)
Program Title: Astronomy BS

Date of Departmental Approval:

FOR MODIFIED PROGRAMS (required if modifying a program)

- Summary of the Modification: Delete PHYS 262, 263 from requirements, add PHYS 251, 416 to requirements, add ASTR 480 to the elective list, replace MATH 214 with PHYS 301.

- Text before Modification (title, degree requirements, etc.):

The Astronomy, BS prepares students for graduate school, a career in research or teaching positions, 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, subject to approval from the Department of Physics and Astronomy.

Students must fulfill all Requirements for Bachelor's Degrees including the Mason Core. In addition, students must complete a total of 52 credits in physics and astronomy and 14 credits in mathematics with a minimum GPA of 2.00. By taking ASTR 402, astronomy majors satisfy the university's writing-intensive requirement.

Degree Requirements

Required Astronomy Courses (10 credits)

- ASTR 210 - Introduction to Astrophysics Credits: 3
- ASTR 328 - Stars and Interstellar Medium Credits: 3
- ASTR 402 - RS: Methods of Observational Astronomy Credits: 4

Additional Astronomy Courses (6 credits)

Choose two of the following courses:

- ASTR 403 - Planetary Sciences Credits: 3

- ASTR 404 - Galaxies and Cosmology Credits: 3
- PHYS 428 - Relativity Credits: 3

Required Physics Courses (21 credits)

- PHYS 160 - University Physics I Credits: 3 (Mason Core: Natural Science course)
- PHYS 161 - University Physics I Laboratory Credits: 1 (Mason Core: Natural Science course)
- PHYS 260 - University Physics II Credits: 3 (Mason Core: Natural Science course)
- PHYS 261 - University Physics II Laboratory Credits: 1 (Mason Core: Natural Science course)
- PHYS 262 - University Physics III Credits: 3 (Mason Core: Natural Science course)
- PHYS 263 - University Physics III Laboratory Credits: 1 (Mason Core: Natural Science course)
- PHYS 303 - Classical Mechanics Credits: 3
- PHYS 305 - Electromagnetic Theory Credits: 3
- PHYS 308 - Modern Physics with Applications Credits: 3

Required Math Courses (14 credits)

- MATH 113 - Analytic Geometry and Calculus I Credits: 4 (Mason Core: Quantitative Reasoning course)
- 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

Astronomy and Physics Courses (15 credits)

Choose from the following (at least 12 credits must be from upper-level courses):

- 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
- ASTR 403 - Planetary Sciences Credits: 3

  , or

  ASTR 404 - Galaxies and Cosmology Credits: 3

  , **or**

PHYS 428 - Relativity Credits: 3

, if not taken as part of additional astronomy course requirement above, may be used here.

- Other ASTR or PHYS course with the permission of the department

Mason Core and Elective Credits (54 credits)

In order to meet a minimum of 120 credits, this degree requires an additional 54 credits, which may be applied towards any remaining Mason Core requirements (outlined below), requirements for Bachelor's Degrees, and elective courses. Students are strongly encouraged to consult with their advisors to ensure that they fulfill all requirements.

- Text after Modification (title, degree requirements, etc.):

The Astronomy, BS prepares students for graduate school, a career in research or teaching positions, 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, subject to approval from the Department of Physics and Astronomy.

Students must fulfill all Requirements for Bachelor's Degrees including the Mason Core. In addition, students must complete a total of 55 credits in physics and astronomy and 11 credits in mathematics with a minimum GPA of 2.00. By taking ASTR 402, astronomy majors satisfy the university's writing-intensive requirement.

Degree Requirements

Required Astronomy Courses (10 credits)

- ASTR 210 - Introduction to Astrophysics Credits: 3
- ASTR 328 - Stars Credits: 3
- ASTR 402 - RS: Methods of Observational Astronomy Credits: 4

Additional Astronomy Courses (6 credits)

Choose two of the following courses:

- ASTR 403 - Planetary Sciences Credits: 3

- ASTR 404 - Galaxies and Cosmology Credits: 3
- PHYS 428 - Relativity Credits: 3
- ASTR 480 – The Interstellar Medium Credits: 3

Required Physics Courses (24 credits)

- PHYS 160 - University Physics I Credits: 3 (Mason Core: Natural Science course)
- PHYS 161 - University Physics I Laboratory Credits: 1 (Mason Core: Natural Science course)
- PHYS 260 - University Physics II Credits: 3 (Mason Core: Natural Science course)
- PHYS 261 - University Physics II Laboratory Credits: 1 (Mason Core: Natural Science course)
- PHYS 251 – Introduction to Computer Techniques in Physics Credits: 3
- PHYS 301 – Analytical Methods of Physics Credits: 3
- PHYS 303 - Classical Mechanics Credits: 3
- PHYS 305 - Electromagnetic Theory Credits: 3
- PHYS 308 - Modern Physics with Applications Credits: 3
- PHYS 416 – Special Topics in Modern Physics Credits: 1

Required Math Courses (11 credits)

- MATH 113 - Analytic Geometry and Calculus I Credits: 4 (Mason Core: Quantitative Reasoning course)
- MATH 114 - Analytic Geometry and Calculus II Credits: 4
- MATH 213 - Analytic Geometry and Calculus III Credits: 3

Astronomy and Physics Courses (15 credits)

Choose from the following (at least 12 credits must be from upper-level courses):

- 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
- ASTR 403 - Planetary Sciences Credits: 3

  , or

  ASTR 404 - Galaxies and Cosmology Credits: 3

, **or**

PHYS 428 - Relativity Credits: 3

, or

ASTR 480 – The Interstellar Medium Credits: 3

, if not taken as part of additional astronomy course requirement above, may be used here.

- Other ASTR or PHYS course with the permission of the department

Mason Core and Elective Credits (54 credits)

In order to meet a minimum of 120 credits, this degree requires an additional 54 credits, which may be applied towards any remaining Mason Core requirements (outlined below), requirements for Bachelor's Degrees, and elective courses. Students are strongly encouraged to consult with their advisors to ensure that they fulfill all requirements.

- Reason for the Modification: PHYS 262 overlaps highly with PHYS 308; PHYS 251 provides important skills for astronomers; PHYS 416 will summarize and synthesize much of the physics and astronomy curriculum and assist with program assessment; ASTR 480 is a new undergraduate course covering a fundamental area of astronomy; PHYS 301 is more relevant (and is in fact a corequisite) than MATH 114 for the required courses PHYS 303 and 305.
