ASTRONOMY AND ASTROPHYSICS | ASTRONOMY

Curious about what’s out there? Students who are comfortable with mathematics and physics and who want to understand the nature of the Solar System and other planetary systems, stars, galaxies and/or the universe are encouraged to pursue a B.A. in astronomy or a B.S. in astrophysics.

About this Program

• College: Liberal Arts and Sciences
• Degrees: Bachelor of Arts in Astronomy | Bachelor of Science in Astrophysics
• Credits for Degree: 120
• Additional Information
• Related Astronomy Programs

To graduate with this major, students must complete all university, college, and major requirements.

The knowledge acquired and the analytical skills developed provide excellent broad-based training for careers in industry, education and government as well as preparation for graduate study in astronomy and astrophysics, science education, engineering, law, and medicine.

The Department of Astronomy offers two undergraduate degree options. The Bachelor of Science (B.S.) in astrophysics is designed for students who intend to pursue careers in a scientific or technical field by continuing to study astronomy, astrophysics or physics at the graduate level or to commence study in some related field such as planetary science.

The Bachelor of Arts (B.A.) in astronomy is broader and less specialized than the B.S., with the aim of developing and sharpening analytical and quantitative reasoning while at the same time cultivating broader knowledge that can be applied to a variety of careers, including business, law, the health professions, science writing, and teaching.

Coursework for the Major

All students are required to take 10 core courses in mathematics, physics and astronomy. The B.A. in astronomy requires a total of 41 credits; the B.S. in astrophysics requires a minimum of 62 credits. Students pursuing the B.A. have fewer additional required astronomy and physics courses, which offers greater flexibility for taking courses in other disciplines.

All required courses must be completed with minimum grades of C.

Required Courses for Both Degrees

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAC 2311</td>
<td>Analytic Geometry and Calculus 1</td>
<td>4</td>
</tr>
<tr>
<td>MAC 2312</td>
<td>Analytic Geometry and Calculus 2</td>
<td>4</td>
</tr>
<tr>
<td>MAC 2313</td>
<td>Analytic Geometry and Calculus 3</td>
<td>4</td>
</tr>
<tr>
<td>PHY 2048</td>
<td>Physics with Calculus 1</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 2048L</td>
<td>and Laboratory for Physics with Calculus 1</td>
<td></td>
</tr>
<tr>
<td>PHY 2049</td>
<td>Physics with Calculus 2</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 2049L</td>
<td>and Laboratory for Physics with Calculus 2</td>
<td></td>
</tr>
<tr>
<td>AST 3018</td>
<td>Astronomy and Astrophysics 1</td>
<td>3</td>
</tr>
</tbody>
</table>

Recommended Coursework for Graduate Study

Students should talk with the undergraduate coordinator and plan to take:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PHY 4604</td>
<td>Introductory Quantum Mechanics 1</td>
<td>3</td>
</tr>
</tbody>
</table>

Select additional courses from the following:

- COP 2271 Computer Programming for Engineers
- MAA 4402 Functions of a Complex Variable
- MAS 3114 Computational Linear Algebra
- PHY 3513 Thermal Physics 1
- PHY 4424 Optics 1
- PHY 4523 Statistical Physics
- STA 3032 Engineering Statistics

Students of exceptional ability who have some background in physics are encouraged to take the enriched physics with calculus sequence PHY 2060/PHY 2061 instead of PHY 2048/PHY 2049; PHY 3063 may then be taken in place of PHY 3101; and PHZ 3113 may be substituted for PHY 3221.

Relevant Minors and/or Certificates

UFTeach Program

More Info

There is a severe shortage of qualified secondary science teachers in Florida and nationwide. Students interested in becoming part of this high-demand profession should see the undergraduate coordinator about the UFTeach program. UFTeach students can complete the UFTeach minor in science teaching along with their B.A. in astronomy and have the coursework and preparation for professional teacher certification in Florida when they graduate.

Research

Students pursuing the B.S. in astrophysics are encouraged to engage in research with astronomy faculty by signing up for at least three credits of AST 4911; 3 credits of AST 4911 may count toward the 4000 level requirement; an additional 3 credits of AST 4911 may be applied toward the 4000 level requirement with the approval of the undergraduate coordinator.

Related Astronomy Programs

• Astronomy minor

Bachelor of Arts in Astronomy

The B.A. in astronomy is broader and less specialized than the B.S., with the aim of developing and sharpening analytical and quantitative reasoning while at the same time cultivating broader knowledge that can be applied to a variety of careers, including business, law, the health professions, and teaching.
Additional Required Coursework for the B.A. in Astronomy

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>AST or PHY courses at the 3000/4000 level</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>AST 2003</td>
<td>Introduction to the Solar System</td>
<td></td>
</tr>
<tr>
<td>AST 2037</td>
<td>Life in the Universe</td>
<td></td>
</tr>
<tr>
<td>GLY 2010C</td>
<td>Physical Geology</td>
<td></td>
</tr>
<tr>
<td>GLY 2042</td>
<td>Planetary Geology</td>
<td></td>
</tr>
<tr>
<td>GLY 3106C</td>
<td>Evolution of Earth and Life</td>
<td></td>
</tr>
<tr>
<td>MCB 3703</td>
<td>Astrobiology</td>
<td></td>
</tr>
<tr>
<td>PHY 2464</td>
<td>The Physical Basis of Music</td>
<td></td>
</tr>
<tr>
<td>PHY 3101</td>
<td>Introduction to Modern Physics</td>
<td></td>
</tr>
<tr>
<td>PHZ 4710</td>
<td>Introduction to Biological physics</td>
<td></td>
</tr>
<tr>
<td>SWS 2007</td>
<td>The World of Water</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits: 12

Critical Tracking records each student’s progress in courses that are required for entry to each major. Please note the critical-tracking requirements below on a per-semester basis.

For degree requirements outside of the major, refer to CLAS Degree Requirements: Structure of a CLAS Degree.

Equivalent critical-tracking courses as determined by the State of Florida Common Course Prerequisites may be used for transfer students.

All students must meet these criteria to remain on track for the major.

Note that critical tracking is the same for both degrees.

Semester 1
- Complete MAC 1147 or MAC 2311
- 2.0 UF GPA required

Semester 2
- Complete MAC 2311
- 2.0 UF GPA required

Semester 3
- Complete MAC 2312, PHY 2048 and PHY 2048L with a 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

Semester 4
- Complete MAC 2313, PHY 2049 and PHY 2049L with 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

UF freshmen and sophomores should take AST 3018 by semester 4

Semester 5
- 2.5 critical-tracking GPA with completion of AST 3018
- 2.0 UF GPA required

Students are expected to complete the writing requirement while in the process of taking the courses below. Students are also expected to complete the general education international (GE-N) and diversity (GE-D) requirements concurrently with another general education requirement (typically, GE-C, H or S).

To remain on track, students must complete the appropriate critical-tracking courses, which appear in bold. These courses must be completed by the terms as listed above in the Critical Tracking criteria.

This semester plan represents an example progression through the major. Actual courses and course order may be different depending on the student’s academic record and scheduling availability of courses. Prerequisites still apply.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IUF 1000</td>
<td>What is the Good Life (Gen Ed Humanities) 4</td>
<td></td>
</tr>
<tr>
<td>MAC 2311</td>
<td>Analytic Geometry and Calculus 1 (Critical Tracking; State Core Gen Ed Mathematics) 4</td>
<td></td>
</tr>
<tr>
<td>PHY 2048</td>
<td>Physics with Calculus 1 (Critical Tracking; Gen Ed Physical Sciences) 3</td>
<td></td>
</tr>
<tr>
<td>PHY 2048L</td>
<td>Laboratory for Physics with Calculus 1 (Critical Tracking; Gen Ed Physical Sciences) 1</td>
<td></td>
</tr>
<tr>
<td>Gen Ed Biological Sciences 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Core Gen Ed Composition; Writing Requirement 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Core Gen Ed Social and Behavioral Sciences 3</td>
<td></td>
<td></td>
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</tbody>
</table>

Semester Six

Credits 15-17
Astronomy and astrophysics provide knowledge of basic concepts, theories and observational findings concerning the structure and evolution of planetary systems, stars, stellar systems such as galaxies, and cosmology. Students will learn scientific methodology and its application in specific contexts, the use of observations in testing hypotheses and the limitations of astronomical observations as well as how to critically evaluate them.

The Bachelor of Arts in Astronomy enables students to become familiar with modern physics and to understand mathematics, including calculus. The Bachelor of Science in Astrophysics enables students to understand the basic concepts, theories and experimental findings in modern physics, electricity and magnetism, and mechanics as they apply to astronomy and astrophysics.

Before Graduating Students Must

• Demonstrate satisfactory (minimum grades of C) performance on a selection of coursework from each of the 4000-level astronomy courses as graded by a faculty committee independent of the instructor and not as part of the course grade.
• Complete requirements for the baccalaureate degree, as determined by faculty.

Students in the Major Will Learn to

Student Learning Outcomes (SLOs)

Content
1. Bachelor of Arts in Astronomy
   Identify, describe and define the fundamentals of astronomy, including the basic concepts, theories and observational results for planetary systems, stars, stellar systems and cosmology.
   Bachelor of Science in Astrophysics
   Identify, describe and define the fundamentals of astrophysics, including mechanics, electromagnetism, modern physics and the basic concepts, theories and observational results for planetary systems, stars, stellar systems and cosmology.

2. Define and use the techniques of astronomical observation.

Critical Thinking
3. Critically evaluate results of astronomical research.

Communication
4. Effectively and clearly communicate ideas and results in speech and in writing in an accepted style of presentation.

Curriculum Map: B.A. and B.S.

I = Introduced; R = Reinforced; A = Assessed