Bachelor of Arts in Astronomy

Why study astronomy?
Because understanding the physical universe starts here.

Undergraduate Programs
Astronomy programs are offered through the Department of Physics and Astronomy. The astronomy curriculum offers undergraduates a survey of modern astronomy and an introduction to physical science, gives science and engineering students an introduction to astronomy and astrophysics, and prepares students majoring in astronomy for graduate study in astronomy or related fields.

Courses for Nonmajors
ASTR 191 surveys a wide range of contemporary astronomy topics while ASTR 293 discusses a shorter list of astrophysically extreme objects in greater detail; both courses require eligibility for MATH 101. ASTR 394 is open to students with previous coursework in astronomy, geology or biology; ASTR 391 offers an introduction to physical astronomy at a calculus-based level.

Undergraduate Admission
Admission to KU
All students applying for admission must send high school and college transcripts to the Office of Admissions. Unless they are college transfer students with at least 24 hours of credit, prospective students must send ACT or SAT scores to the Office of Admissions. Prospective first-year students should be aware that KU has qualified admission requirements that all new first-year students must meet to be admitted. Consult the Office of Admissions (http://admissions.ku.edu) for application deadlines and specific admission requirements.

Visit the Office of International Student and Scholar Services (http://www.iss.ku.edu) for information about international admissions.

Students considering transferring to KU may see how their college-level course work will transfer on the Office of Admissions (http://credittransfer.ku.edu) website.

Admission to the College of Liberal Arts and Sciences
Admission to the College is a different process from admission to a major field. Some CLAS departments have admission requirements. See individual department/program sections for departmental admission requirements.

Advising
Students considering a major in astronomy should confer early with a departmental representative about the selection of courses. The B.A. degree is appropriate for students who want a general education in astronomy as part of a broadly structured liberal education. The B.S. is a more specialized program with a substantial emphasis on physics content as well as astronomy. It provides preparation for a professional career or graduate work in astronomy, astrophysics, or related fields. A total of 120 credit hours is required for graduation.

First- and Second-Year Preparation
All major programs in physics and astronomy share requirements in basic physics and mathematics including PHSX 150, a seminar course for majors. Completion of MATH 125 and MATH 126 in the first year allows students to start calculus-based physics foundation courses (PHSX 211 or PHSX 213, followed by PHSX 212 or PHSX 214, with labs PHSX 216 and PHSX 236) by the second semester. Majors are encouraged to take PHSX 213 and PHSX 214, the honors versions of PHSX 211 and PHSX 212. Students should take these courses and ASTR 391 in their first two years. B.S. astronomy majors normally complete additional course work in mathematics (MATH 223, MATH 290, and MATH 320), as well as PHSX 313 and PHSX 316, in the second year.

Requirements for the B.A. Major in Astronomy
All students pursuing the Bachelor of Arts in Astronomy must complete the KU Core requirements and the College BA specific requirements, listed in the KU Core and College sections of the catalog.

Additional general science requirements (22.5-34.5)
Majors must complete courses as specified in each of the following areas. Majors are advised to take honors courses when eligible. These hours do not contribute to the minimum number of hours required for the major.

Calculus I. Satisfied by one of the following:
- Or equivalent
  - MATH 125  Calculus I  4
  - or MATH 145  Calculus I, Honors

Calculus II. Satisfied by one of the following:
- Or equivalent
  - MATH 126  Calculus II  4
  - or MATH 146  Calculus II, Honors

Seminar in Physics, Astronomy, & Engineering Physics. Satisfied by the following:
- PHSX 150  Seminar in Physics, Astronomy and Engineering Physics  0.5

General Physics I. Satisfied by one of the following:
- PHSX 211  General Physics I  1-4
  - & PHSX 216  and General Physics I Laboratory
- PHSX 213  General Physics I Honors  1-5

General Physics II. Satisfied by one of the following:
- PHSX 212  General Physics II  1-3
  - & PHSX 236  and General Physics II Laboratory
- PHSX 214  General Physics II Honors  1-4

Foundations of Chemistry I. Satisfied by one of the following:
- CHEM 130  General Chemistry I  5
- CHEM 190  Foundations of Chemistry I, Honors  5

Astronomy Major Requirements (11)
Majors must complete each of the following courses:
- ASTR 391  Physical Astronomy, Honors  3
- ASTR 591  Stellar Astronomy  3
- ASTR 596  Observational Astrophysics  2
- ASTR 592  Galactic and Extragalactic Astronomy  3
Additional astronomy, astrophysics, or physics courses required for major (5)
In addition to the above specifically required courses, Astronomy BA candidates must complete at least 5 additional credits in physics or astronomy at the 300+ level. Students may enroll in ASTR 390 for undergraduate problems for 1 or more credit hours and in ASTR 503 (501 honors) for research credit. ASTR 394 is highly recommended. Other recommended courses include ASTR 691 and 692, PHSX 594, GEOL 572, PHSX 313/316 and other PHSX courses 500 and above; most of these course have pre-requisites that may require additional preparation in mathematics and/or physics.

Major Hours & Major GPA
While completing all required courses (above), majors must also meet each of the following hour and grade-point average minimum standards:

Major Hours
Satisfied by 25.5 hours of major courses.

Major Hours in Residence
Satisfied by a minimum of 15 hours of KU resident credit in the major.

Major Junior/Senior (300+) Hours
Satisfied by a minimum of 16 hours from junior/senior courses (300+) in the major.

Major Junior/Senior (300+) Graduation GPA
Satisfied by a minimum of 2.0 KU GPA in junior/senior courses (300+) in the major. GPA calculations include all junior/senior courses in the field of study including F’s and repeated courses. See the Semester/Cumulative GPA Calculator (http://clas.ku.edu/undergrad/tools/gpa).

Below is a sample 4-year plan for students pursuing the BA in Astronomy. To view the list of courses approved to fulfill KU Core Goals, please visit the KU Core website (http://kucore.ku.edu/courses).

This degree plan assumes students will have completed MATH 104, or equivalent prior to the freshman year, fall semester.

<table>
<thead>
<tr>
<th>Freshman</th>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 101 (Goal 2.1 (2 hrs req), BA Writing I)</td>
<td>3 ENGL 102 (Goal 2.1 (2 hrs req), BA Writing II)</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Goal 1.1 Critical Thinking</td>
<td>3 Goal 2.2 Communication</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CHEM 130 or 190 (Goal 3 Natural Science, BA Lab, Major Pre-requisite)</td>
<td>5 MATH 126 (Major Pre-requisite)</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>MATH 125 (Major Pre-requisite)</td>
<td>4 PHSX 211 &amp; PHSX 216 (Major Requirement), or</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>PHSX 150 (Major Requirement)</td>
<td>0.5 PHSX 213</td>
<td>0.5</td>
<td>Elective or possible minor course (Total Hours)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>15.5</td>
<td></td>
<td>17</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sophomore</th>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Semester Language (BA Second Language)</td>
<td>5 2nd Semester Language (BA Second Language)</td>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Goal 3 Humanities | 3 ASTR 391 (Major Requirement) | 3     |
| PHSX 212         | 4 Goal 3 Social Science | 3     |
| & PHSX 236 (Major Requirement), or |                          |       |
| PHSX 214         | Elective or possible minor course (Total Hours) | 3     |
|                   | 15                            |       |

<table>
<thead>
<tr>
<th>Junior</th>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd Semester Language (BA Second Language)</td>
<td>3 4th Semester Language, or 1st semester of Another Language (BA Second Language)</td>
<td>3-5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goal 4.1 US Diversity</td>
<td>3 ASTR 592 (Major Requirement)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASTR 591 (Major Requirement)</td>
<td>3 Goal 5 Social Responsibility &amp; Ethics</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASTR 596 (Major Requirement)</td>
<td>2 Elective or possible minor course 300+ (Total Hours)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective or possible minor course 300+ (Total Hours)</td>
<td>3 Elective or possible minor course 300+ (Total Hours)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>15-17</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Senior</th>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal 4.2 Global Awareness</td>
<td>3 PHSX 503 (Major Requirement, Goal 6 Integration &amp; Creativity)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASTR Elective (Major Requirement)</td>
<td>3 Elective or possible minor course 300+ (Total Hours)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASTR Elective (Major Requirement)</td>
<td>3 Elective or possible minor course 300+ (Total Hours)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective or possible minor course 300+ (Total Hours)</td>
<td>3 Elective or possible minor course 300+ (Total Hours)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Hours: 120.5-122.5

1 The BA requires completion of two courses of collegiate-level writing instruction. Students who test out of Composition will still need to complete ENGL 102 (or equivalent) and one additional Goal 2.1 course.

2 CHEM 130 requires MATH 115 eligibility for enrollment.

3 Majors are required to complete a minimum of 5 hours of 300+ level electives in Physics or Astronomy.

4 Course Timing is interchangeable between Junior and Senior years and is dependent on course offering/availability.

Please note:
All students in the College of Liberal Arts and Sciences are required to completed 120 total hours of which 45 hours must be at the Jr/Sr (300+)
level, and 100 hours must be from within the College of Liberal Arts and Sciences.

The same course cannot be used to fulfill more than one KU Core Goal. However, overlap of a KU Core course with a major or degree-specific requirement is allowed. Overlapping is recommended to allow more opportunities to explore other majors and/or minors.

**Departmental Honors in Physics and Astronomy**

A student who plans to graduate with honors in physics and astronomy must file a Declaration of Intent Form with the Departmental Honors Coordinator, preferably during his/her junior year but in any case no later than enrollment for the final undergraduate semester. All of our department’s honors requirements include student research, for which results shall be presented in at least one of the following forms:

a) a written research summary, read by 3 faculty members in physics and astronomy or related fields or authorship on a peer-reviewed manuscript

b) a research-based oral presentation at an appropriate venue (e.g., Undergraduate Research symposium, a presentation in an advanced department seminar class, a discipline specific meeting)

c) presentation of a poster at an appropriate venue. Additional requirements are:

Qualified students earning either a B.A. or a B.S. degree in the College of Liberal Arts and Sciences with a major in astronomy or physics may graduate with Honors in Physics & Astronomy by fulfilling the following requirements: (1) By the end of the candidate’s final semester, achieve a minimum GPA of 3.25 overall and 3.5 in the major, in all courses taken in residence and elsewhere; (2) Complete at least 24 semester hours of astronomy and physics courses numbered 500 or above, including undergraduate research represented by two hours of credit in ASTR 597, ASTR 503, PHSX 501 or PHSX 503. A grade of B or better must be earned in one of the following: ASTR 597, ASTR 503, PHSX 501 or PHSX 503.