ASTRONOMY

http://www.astro.illinois.edu

Chair of the Department: Leslie Looney
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Urbana, IL 61801
(217) 333-3090
E-mail: astronomy@illinois.edu

Major: Astronomy
Degrees offered: M.S., Ph.D.
Graduate Concentration: Astrochemistry (http://catalog.illinois.edu/graduate/graduate-major-astrochemistry) (Ph.D. only)

Graduate Degree Programs
The Department of Astronomy offers graduate programs leading to the Master of Science and Doctor of Philosophy degrees. The goal of the graduate program in astronomy is to provide broadly based training in modern astrophysics and astronomy for a small and carefully selected student body. Individually designed programs involving close contact with faculty members are encouraged, and an understanding of fundamental principles and techniques and their applications to research problems of current interest is emphasized. Students are expected to acquire a solid knowledge of modem physics as well as of general astronomy. A major objective is to maintain an exciting intellectual environment in which students can develop their scientific creativity and their enthusiasm for astronomy.

Admission
Admission to the astronomy graduate program requires an outstanding record of accomplishment and clear evidence of considerable academic promise, as judged by test scores, resume (or c.v.), letters of recommendation, personal statement, and strong intellectual achievements. A bachelor’s degree or its equivalent in astronomy, physics, chemistry, mathematics, or another related technical field from an accredited college or university in the U.S. or an approved institution of higher learning abroad is required for admission.

A minimum grade point average of 3.0 (A = 4.0) and satisfactory scores on the Graduate Record Examination (GRE) (verbal, quantitative, and advanced physics portions) are required for admission. Course preparation in intermediate and advanced undergraduate physics and astronomy are essential. Students are expected to make up deficiencies during the first graduate year.

All applicants whose native language is not English are required to submit the results of the TOEFL or IELTS as evidence of English proficiency, as required by Graduate College policy. More information on the English Proficiency Requirement can be found at the Graduate College Web site (http://www.grad.illinois.edu/admissions/requirements/english-proficiency).

Graduate Concentration: Astrochemistry

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Graduate Concentration: Astrochemistry

Information listed in this catalog is current as of 10/2017
cyberinfrastructure environments to facilitate data transport for the Sloan Digital Sky Survey (SDSS), the Dark Energy Survey, the Square Kilometer Array, and the Large Synoptic Survey Telescope. NCSA and the Astronomy Department also jointly founded the Laboratory for Cosmological Data Mining to apply novel algorithms to the rich datasets now available for cosmological analysis, including those from the SDSS and Wilkinson Microwave Anisotropy Probe.

- Illinois is the home of the Blue Waters National Petascale Computing Facility, one of the most powerful supercomputers in the world, and the most powerful on a university campus. A portion of Blue Waters time is dedicated to Illinois faculty, and Astronomy students and faculty use Blue Waters for their research.

Financial Aid

University fellowships are available and may be combined with part-time teaching assistantships. Most resident students are supported for their first two or three years by half-time teaching assistantships. The typical teaching assistant takes two or three graduate courses per semester and spends twenty hours per week handling quiz sections in elementary astronomy courses. Teaching assistantships are responsible positions, and the concomitant duties are considered to be a valuable part of the student’s educational experience. Advanced students may compete for research assistantships offered by faculty members whose research is partially supported by federal grants.

Master of Science in Astronomy

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTR 501</td>
<td>Radiative Processes</td>
<td>4</td>
</tr>
<tr>
<td>ASTR 502</td>
<td>Astrophysical Dynamics</td>
<td>8</td>
</tr>
<tr>
<td>ASTR 404</td>
<td>Additional formal coursework (excluding thesis research, non-thesis research, and independent study credit hours, e.g., ASTR 599, ASTR 590)</td>
<td>16</td>
</tr>
<tr>
<td>ASTR 599</td>
<td>Thesis Research (min/max applied toward degree)</td>
<td>32-52</td>
</tr>
</tbody>
</table>

Research/Project/Independent Study Hours (e.g. ASTR 590; min/max applied toward degree): 4-8

Based on Placement Exam results, students may be required to complete ASTR 404, ASTR 405, ASTR 406, and/or ASTR 414 during their first year. A maximum of 8 hours of these courses may be applied to the degree. 2

Total Hours 32

Other Requirements 3

Other requirements may overlap

Of the additional formal coursework (the minimum number of hours in the unit (excluding thesis research, non-thesis research, and independent study credit hours))

Of the additional formal coursework (the minimum number of 500-level hours (excluding thesis research, non-thesis research, and independent study credit hours))

1 Research Project (minimum 4 hours)

- The student will complete a research project with an Astronomy Department faculty member (i.e. ASTR 590). A paper reporting the results is required, which must be prepared in scientific journal style and approved by the faculty member.

Demonstrated Proficiency in Astronomy (ASTR 404, ASTR 405, ASTR 406 and ASTR 414)

Students must show proficiency in the four courses by one of the following options:

- Pass the appropriate section of the placement exam (four sections aligned to the four courses), which is offered at the start of every Fall semester. A student can petition to take the exam once more the following year. The decision on petition approval by the graduate advisor will depend on the student’s background and proficiency plan.
- Pass the course with a B grade or better.
- Students who have had an equivalent course at another institution (B grade or better) may petition for those courses to count as proficiency.

For additional details and requirements refer to the department's Graduate Programs (http://www.astro.illinois.edu/academics/graduate/programs) and the Graduate College Handbook (http://www.grad.illinois.edu/gradhandbook).

Doctor of Philosophy in Astronomy

Entering with approved M.A./M.S. degree

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<td>ASTR 599</td>
<td>Thesis Research (min/max applied toward degree)</td>
<td>32-52</td>
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</table>

Total Hours 64

Other Requirements 3

Other requirements may overlap

Students may add a graduate concentration in Astrochemistry.

Qualifying Exam Required No

Preliminary Exam Required Yes

Final Exam/Dissertation Defense Required Yes

Dissertation Deposit Required Yes

Minimum GPA: 3.0

Doctor of Philosophy in Astronomy

Entering with approved B.A./B.S. degree

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Total Hours 64

Other Requirements 3

Other requirements may overlap

Students may add a graduate concentration in Astrochemistry.

Qualifying Exam Required No

Preliminary Exam Required Yes

Final Exam/Dissertation Defense Required Yes

Dissertation Deposit Required Yes

Minimum GPA: 3.0

Doctor of Philosophy in Astronomy

Entering with approved B.A./B.S. degree

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Total Hours 64

Other Requirements 3

Other requirements may overlap

Students may add a graduate concentration in Astrochemistry.

Qualifying Exam Required No

Preliminary Exam Required Yes

Final Exam/Dissertation Defense Required Yes

Dissertation Deposit Required Yes

Minimum GPA: 3.0
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<td>ASTR 599</td>
<td>Thesis Research (min/max applied toward degree)</td>
<td>32-60</td>
</tr>
<tr>
<td></td>
<td><strong>Total Hours</strong></td>
<td>96</td>
</tr>
</tbody>
</table>

**Other Requirements**

Other requirements may overlap

Students may add a graduate concentration in Astrochemistry.

**First Summer Research Project (4 hours)**

During the first summer in residence, each student will enroll in ASTR 590 (independent Study) and will complete a research project with an Astronomy Department faculty member. A paper reporting the results is required, which must be prepared in scientific journal style and approved by the faculty member.

**Master's Degree Required Before Admission to PhD?**

No

**Qualifying Exam Required**

No

**Preliminary Exam Required**

Ph.D. Preliminary Examination consists of a written preliminary paper on the Ph.D. research topic and an oral examination. It must be passed by the end of the third year of study.

**Final Exam/Dissertation Defense Required**

Completion of an original research project culminating in a dissertation thesis publishable in whole or in part is required. The final examination is a defense of the doctoral dissertation.

**Dissertation Deposit Required**

Yes

Minimum GPA:

3.0

1. **Students entering with an approved M.A. or M.S. degree may proficiency out of ASTR 501 and ASTR 502 with departmental approval. Other 500-level ASTR graduate courses must be taken in the unit for substitute credit hours**

2. **Demonstrated Proficiency in Astronomy**

   (ASTR 404, ASTR 405, ASTR 406 and ASTR 414)

   Students must show proficiency in the four courses by one of the following options:
   - Pass the appropriate section of the placement exam (four sections aligned to the four courses), which is offered at the start of every Fall semester. A student can petition to take the exam once more the following year. The decision on petition approval by the graduate advisor will depend on the student’s background and proficiency plan.
   - Pass the course with a B grade or better.
   - Students who have had an equivalent course at another institution (B grade or better) may petition for those courses to count as proficiency.

3. **For additional details and requirements refer to the department’s Graduate Programs (http://www.astro.illinois.edu/academics/graduate/programs) and the Graduate College Handbook (http://www.grad.illinois.edu/gradhandbook).**

4. Of the additional formal coursework, 8 is the minimum number of hours in the unit (excluding thesis research, non-thesis research, and independent study credit hours)