The Department of Astronomy offers the doctor of philosophy in astronomy. Although a master’s degree is offered, students generally are not admitted for a terminal master’s degree.

The department has a long-standing reputation as one of the finest graduate astronomy and astrophysics programs in the United States. The program provides each student with a broad knowledge of modern observational and theoretical astrophysics, while emphasizing the development of independent research skills. Beginning with the first year in the program, graduate students play an active role in the department’s research programs and have access to all research facilities. As teaching assistants, they also acquire experience as astronomy educators.

The faculty are engaged in a broad range of observational and theoretical research. Topics of study include dynamical phenomena of massive stars; binary star evolution; dynamics of star clusters and star forming regions; compact objects; the interstellar and intergalactic medium; star formation; plasma astrophysics; computational fluid mechanics; magnetic fields; turbulence; the structure, kinematics, and stellar populations of nearby galaxies; active galactic nuclei; galactic winds and chemical evolution; galaxy clusters; galaxy formation and evolution; the star formation and black hole accretion history of the universe; and the development of innovative astronomical instrumentation. More information is available on the department website.

### REQUIREMENTS

#### MINIMUM DEGREE REQUIREMENTS AND SATISFACTORY PROGRESS

To make progress toward a graduate degree, students must meet the Graduate School Minimum Degree Requirements and Satisfactory Progress (http://guide.wisc.edu/graduate/#policiesandrequirementstext) in addition to the requirements of the program.

#### MASTER’S DEGREES

- **M.S.**

#### MINIMUM GRADUATE DEGREE CREDIT REQUIREMENT

34 credits

#### MINIMUM GRADUATE RESIDENCE CREDIT REQUIREMENT

16 credits

#### MINIMUM GRADUATE COURSEWORK (50%) REQUIREMENT

Half of the degree coursework (17 of 34 credits) must be completed in graduate-level coursework; courses with the Graduate Level Coursework attribute are identified and searchable in the university’s Course Guide (http://my.wisc.edu/CourseGuideRedirect/BrowseByTitle).

#### PRIOR COURSEWORK REQUIREMENTS: GRADUATE WORK FROM OTHER INSTITUTIONS

With program approval, students are allowed to count no more than 17 credits of graduate coursework from other institutions. Coursework earned five or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

#### PRIOR COURSEWORK REQUIREMENTS: UW–MADISON UNDERGRADUATE

Up to 7 credits numbered 700 or above from a UW–Madison undergraduate degree are allow to count toward the degree.

#### PRIOR COURSEWORK REQUIREMENT: UW–MADISON UNIVERSITY SPECIAL

With program approval, students are allowed to count no more than 15 credits of coursework numbered 400 or above taken as a UW–Madison Special student. Coursework earned five or more years prior to admission to a master’s is not allowed to satisfy requirements.

#### CREDITS PER TERM ALLOWED

15 credits

#### PROGRAM-SPECIFIC COURSES REQUIRED

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTRON 500</td>
<td>Techniques of Modern Observational Astrophysics</td>
<td>3</td>
</tr>
<tr>
<td>ASTRON 700</td>
<td>Basic Astrophysics I</td>
<td>2</td>
</tr>
<tr>
<td>ASTRON 702</td>
<td>Basic Astrophysics II</td>
<td>2</td>
</tr>
<tr>
<td>ASTRON 715</td>
<td>Stellar Interiors and Evolution</td>
<td>2</td>
</tr>
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<td>ASTRON 720</td>
<td>The Interstellar Medium I: Basic Processes</td>
<td>2</td>
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<tr>
<td>ASTRON 730</td>
<td>Galaxies</td>
<td>2</td>
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<tr>
<td>ASTRON 735</td>
<td>Observational Cosmology</td>
<td>2</td>
</tr>
<tr>
<td>ASTRON 990</td>
<td>Research and Thesis</td>
<td>1-12</td>
</tr>
</tbody>
</table>

#### BREADTH REQUIREMENT

All M.S. students are required to complete 12 credits of coursework in relevant departments outside of astronomy. The coursework will normal be at the 400 level and above although special exceptions may be made in the case where 300-level courses are needed to satisfy prerequisites. At least two courses must be at the 600 level and above. Courses in departments other than physics should be approved by the student’s mentoring committee (or the graduate advisor if the mentoring committee has not yet been formed.)

#### OVERALL GRADUATE GPA REQUIREMENT

3.0 GPA required

#### OTHER GRADE REQUIREMENTS

A grade of S must be received in ASTRON 990 Research and Thesis before the preliminary examination may be taken.

#### PROBATION POLICY

A grade of C or lower in a core course will result in the student being placed on academic probation. This is removed after the next grade of B or better in a core course. Grades of C or lower in two or more core courses will result in dismissal.

A semester GPA below 3.0 will result in the student being placed on academic probation. This will be removed if the student attains a GPA of 3.0 or above in the subsequent semester.
ADVISOR / COMMITTEE
All students will be assigned a mentoring committee consisting of the student's advisor and two other faculty members. Students are strongly encouraged (but not required) to meet with their mentoring committees twice a year.

ASSESSMENTS AND EXAMINATIONS
Students take a preliminary examination after completing their second academic year. Possible scores are "high pass," "low pass," and "fail." Students attaining a high pass or a low pass are eligible for a master's. Students who fail will be dismissed from the program.

To receive a terminal master's degree, students must complete a written master's thesis that is approved by their faculty advisor.

TIME CONSTRAINTS
Master's degree students who have been absent for five or more consecutive years will be dismissed from the program.

LANGUAGE REQUIREMENTS
No language requirements.

ADMISSIONS
This master's program is offered for work leading to the Ph.D. Students may not apply directly for the master's, and should instead see the admissions information for the Ph.D (http://guide.wisc.edu/graduate/astronomy/astronomy-phd).

LEARNING OUTCOMES

KNOWLEDGE AND SKILLS
• Demonstrate a broad understanding of core astrophysical topics including gravitational dynamics; radiative processes; the interstellar medium; the formation, structure, and evolution of stars and galaxies; cosmology; and observational and numerical techniques.
• Identify sources and assemble evidence pertaining to questions or challenges in their area of concentration.
• Synthesize knowledge from disparate sources and evaluate evidence for and against hypotheses.
• Demonstrate academic mastery in their area of concentration, including an understanding of appropriate research methodologies, current theories, recent findings, and their broader implications.

PROFESSIONAL CONDUCT
• Students will recognize and apply principles of ethical and professional conduct.

PEOPLE
Faculty: Professors Zweibel (chair), Barger, Bershady, Gallagher, Heinz, Lazarian, Mathieu, Stanimirovic, Wilcots; Associate Professor Townsend; Assistant Professors D'Onghia, Tremonti