

## Graduate Curriculum Summary (August 2017)

The academic guidelines described in this document for students entering the program starting in Fall 2017. Students entering the program before Fall 2017 are covered under the old guidelines.

### I. Academic Good Standing:

Students must meet the deadlines and requirements described in this document to remain in “good standing” in the graduate program in the Department of Astronomy. Students who are not in good standing will lose priority for financial support and may be dismissed from the program, depending on the particular situation. In particular we emphasize section VII. of the document, which states that students beyond their 4<sup>th</sup> year of full-time dissertation research (typically equivalent to their 6<sup>th</sup> year overall) will not be considered in good standing unless an extension is granted by both the graduate coordinator and dissertation committee. Decisions regarding the standing of students, their funding and their continuance in the program will be made by the graduate faculty in consultation with the student’s research advisor and research committee.

In particular, we emphasize that students beyond their 4<sup>th</sup> year of full-time dissertation research (nominally beyond their 6<sup>th</sup> year overall for students completing the 2-year Masters program) will lose priority for funding and will be considered in poor standing in the department.

### II. Course Offerings:

- 1) Students must take a total of 30 credits, including all of the Core courses offered, during their first two years of the program. A minimum of 24 credits must be graded.
- 2) Students must enroll for 3 graded credits of Independent Study (AST 6905) in conjunction with their Masters research during the semester when they complete their Masters projects. The Graduate Coordinator can make exceptions if there are conflicts due to course scheduling.
- 3) No more than 6 of the 30 required credits can be from S/U courses, and Core courses may not be taken S/U.
- 4) Exceptions to these course requirements can be made at the time of admission for students who enter the program with a strong background in similar graduate-level courses.
- 5) Exceptions can also be made for students who pass the written portion of the qualifying exam before the beginning of their second year. These students may be granted exemptions to the particular Core courses whose questions they passed on the written qualifying exam. These exemptions are subject to review by the graduate faculty based on the student’s exam results, an assessment of the student’s expertise on

the core course topics and a review of the student's overall performance in the graduate program.

- 6) Students granted exemptions from the courses offered must still satisfy the degree course and credit requirements established by the Graduate School in CLAS.
- 7) Core courses must include graded exams in preparation for the written qualifying exam.
- 8) Electives outside the Department of Astronomy are acceptable, subject to approval by the Graduate Coordinator, but at least two electives must be in the department.
- 9) Frontiers, Journal Club, plus Colloquium may not be taken as a 3 credit Elective, but may count once towards the 30-credit requirement.
- 10) The core curriculum will consist of the following courses:
  - a. AST 6245: Stellar Atmospheres & Radiative Processes
  - b. AST 6215: Stars and the Galaxy
  - c. AST 6309: Galaxies and Cosmology
  - d. AST 6336: Astrophysics of the Interstellar Medium
  - e. AST 6725C: Fundamentals of Observational Astronomy

The first four courses must have written final exams and will be tested on the comprehensive exam. The last course, Fundamentals of Observational Astronomy, will not be tested on the written comprehensive.

The faculty teaching the five core courses will meet with one another to coordinate syllabi and ensure that all material deemed essential to a graduate education is covered in the core courses. The material covered by these courses will be reviewed every two years.

- 11) The graduate coordinator will have the power to modify or grant exceptions to specific degree criteria in special cases when warranted, so long as the student satisfies the degree requirements specified by the college.

### III. Masters Research Project:

- 1) Students are encouraged to start research as early as possible. A fulltime effort is required during the summer after the first academic year.
- 2) The Research Project must be taken as a graded course (Independent Study, AST6905) for 3 credits during the third semester when the project is due. It may also be taken for credit in the preceding semesters, but only two semesters of AST6910 or AST6905 may count towards the 30-credit requirement.
- 3) The Research Project will be monitored and graded by a Faculty Research Committee consisting of three faculty members, one of which is the student's project supervisor. The grade given during the third semester will be considered as the grade for the overall Research Project. A grade of "B" or higher is required to pass.

- 4) Students are required to provide a written paper at the end of the project describing the results. The paper will be at least at a level equivalent to a Conference Proceeding or Journal Letter in scope and length, including a complete bibliography.
- 5) Students are required to make a short (~30 minutes) oral presentation of their projects in front of the Committee and the Department.
- 6) Each oral presentation will be followed by a Q&A session with the Research Committee (only), with questions pertaining to the research topic. The Committee will then meet privately to assign a grade to the overall Research Project.
- 7) The written papers are due 1 week before the oral presentations. The presentations must be completed no later than the last day of classes prior to the reading period during the fall semester.
- 8) Students are responsible for adhering to the timeline and requirements listed below:

1 <sup>st</sup> Academic Year (before end of 2 <sup>nd</sup> semester):	Select faculty advisor & research project. Form committee and give committee a 1-2 page written abstract+outline of the project goals and work plan. Report outcomes to Graduate Coordinator.
Summer after 1 <sup>st</sup> Academic Year	Meet with Committee: provide an updated abstract/outline (with figures & tables) + an informal oral summary.
3 <sup>rd</sup> Semester:	Final written report + oral presentation to department followed by Q&A with research committee.

The Graduate School in CLAS requires that all students must pass both a written and oral qualifying exam for advancement to candidacy for a PhD degree.

#### IV. Written Qualifying Exam:

- 1) The written exam will maintain its present format; namely, one question per course (out of 2 questions offered) based on material covered in that course. The nominal exam length will be 30 minutes per question, but 40 min/question will be granted to the students. See current Academic Guidelines on web. All core courses except for Fundamentals of Observational Astronomy will be tested on the written comprehensive.
- 2) This exam will be administered in the spring of every year, roughly 3 weeks after the spring semester final exam period (nominally in the 3<sup>rd</sup> week of May).
- 3) All students who have been enrolled in the program for at least one academic year are eligible to take the exam.
- 4) Failure on one or more questions is considered failure on the exam.
- 5) Students who fail the exam in their first year can retake the exam in its entirety in their second year.
- 6) Students who pass the exam in their first year can request exemptions from the course requirements, as described in section II above.

- 7) Students who fail the exam in their second year may be granted a retake, subject to a review by the faculty of the student's overall status in the program. This review will include performance in both courses and research.
- 8) Exam retakes granted to second-year students will involve only questions on the failed topics.
- 9) Retakes for second-year students should be administered and at least two weeks prior to the start of the fall semester so that the student's status in the program can be evaluated before commitments are made regarding enrollment and financial support for the fall. These retakes will be administered on the same date and time for all students.

#### V. Doctoral Research and Committee Formation

- 1) Students are expected to begin dissertation research as quickly as possible and must form a dissertation committee no later than the start of their 5<sup>th</sup> semester.

#### VI. Oral Candidacy Exam

- 1) This exam will maintain its present format, as described in the Academic Guidelines on the web. It will consist of i) a ~45 minute formal talk presented to the committee and department followed by a question and answer session with the Thesis Committee, and ii) a written summary with bibliography submitted to the Committee at least 1 week prior to the talk. The Graduate Coordinator must approve the written summary to proceed with the Oral Exam.
- 2) Students must demonstrate through these requirements that they have i) a clear plan for a feasible thesis project, and ii) a sufficient understanding of the field, the literature and the specific analysis techniques to carry out the work. Preliminary research results are an important part of this exam. Students who have changed projects or advisors after their Masters Research Project can be expected to have fewer results.
- 3) Immediately following the oral exam, the committee will meet privately to review the student's qualifications and discuss and evaluate the proposed program of study. The committee will then make a recommendation for the student's advancement to candidacy based on i) approval of the dissertation topic, ii) the student's academic record and overall fitness for candidacy, and iii) satisfactory performance on both the written and oral qualifying exams.
- 4) The oral exams must be taken before the end of the 5<sup>th</sup> semester. This schedule is intended to accelerate the research effort and provide more/earlier opportunities for Thesis Committee involvement.
- 5) Requests for a later exam date may be submitted to the Graduate Coordinator and granted by the faculty under exceptional circumstances.

#### VII. Time to Degree

- 1) Students beyond their 4<sup>th</sup> year of full-time dissertation research (nominally beyond their 6<sup>th</sup> year overall for students completing the 2-year Masters program) will lose priority for funding and will be considered in poor standing in the department.
- 2) Exceptions to this downgrade in status can be requested by the student and approved by the Graduate Coordinator and the student's Thesis Committee.

VIII. Annual Research Talks & Committee Updates

- 1) Every student beyond their second year must give a formal 10-15 talk on their research to the department early in the fall semester of each year. These talks occur presently at our annual 1-day Astronomy Symposium.
- 2) Students who are unable to participate in the 1-day event should contact the Graduate Coordinator ahead of time to schedule another date for their presentation.
- 3) In advance of these yearly talks, students will provide to their research committees a brief written outline of i) their major research activities during the past year, and ii) their plans and expected milestones for research in the coming year.
- 4) Following the talks, the research committees will provide feedback to the students on the quality of their talks. They will also communicate to the student, the research advisor and the Graduate Coordinator any other concerns they might have about the quality, scope or progress of the student's research overall.

IX. Dissertation Committee Meetings:

- 1) Students are required to meet with their PhD dissertation committees approximately one year prior to their anticipated defense date. The goal of this meeting is to update the committee on the status and expected scope of the dissertation, with enough leadtime to accommodate the committee's recommendations.

IX. Dissertation Defense Dates:

- 1) Oral dissertation defenses must be scheduled at least two weeks prior to the final submission deadline in that term. This minimum time interval is needed to incorporate revisions to the written thesis indicated by the committee.

X. Exceptions to Specific Requirements

- 1) In special cases the graduate coordinator, with the approval of the department chair, may permit modifications or exceptions to specific requirements. In all cases the college requirements must remain satisfied.

<b>CORE COURSES</b>		
1	AST 6245	Stellar Atmospheres & Radiative Processes
2	AST 6215	Stars and the Galaxy

3	AST 6309	Galaxies & Cosmology
4	AST 6336	Astrophysics of the Interstellar Medium
5	AST 6725C	Fundamentals of Observational Astronomy

		<b>POSSIBLE ELECTIVE COURSES</b>
1		Galaxy Formation and Evolution
2		High Energy Astrophysics
3		Star Formation
4		Active Galaxies
5		Stellar Populations
6		Neutron Stars & Black Holes
7		Exoplanets
8		Computational Astrophysics
9		Current Topics in Cosmology

Other Courses within the department:

**AST 6905: Individual Work (1-6; max: 12)** Supervised study or research in areas not covered by other courses.

**AST 6925: Departmental Colloquium (1)** S/U

**AST 6935: Frontiers in Astronomy (1)** S/U

**AST 6936: Journal Club (1)** S/U

**AST 6971: Research for Master's Thesis (1-15)** S/U. Only permitted for a masters with thesis.

**AST 7939: Special Topics (2-4; max: 12)** Assigned reading, programs, seminar, or lecture series in a new field of advanced astronomy.

**AST 7979: Advanced Research (1-12)** Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy. S/U.

**AST 7980: Research for Doctoral Dissertation (1-15)** Research for doctoral students admitted to candidacy. S/U.

*Excerpts from the Graduate Catalog: Masters Degree:*

**Degree requirements:** Unless otherwise specified, for any master's degree, the student must earn at least 30 credits as a graduate student at UF. No more than 9 of the 30 credits (earned with a grade of A, B+, or B) may be transferred from institutions approved for this purpose by the Dean of the Graduate School. At least half of the required credits (not counting 6971) must be in the major.

**Course requirements:** A master's degree with thesis requires at least 30 credits including up to 6 credits of Research for Master's Thesis (6971). All thesis students must register for an appropriate number of credits in 6971. A non-thesis Master of Arts or Master of Science degree requires at least 30 credits. No more than 6 of those credits can be from S/U courses. Non-thesis students cannot use Research for Master's Thesis (6971).

No more than 5 credits each of 6910 (Supervised Research) and 6940 (Supervised Teaching) may be taken by a graduate student at UF. Students who have taken 5 credits of 6910 cannot take 7910; the rule also applies to 6940 and 7940.

**Examination:** Each candidate must pass a final comprehensive examination. This examination must cover at least the candidate's field of concentration. It must occur no earlier than the term before the degree is awarded. The comprehensive examination for the nonthesis master's degree may be taken at a remote site. All other examinations must be held on campus.

*From the online pdf version:*

**Master's Examination**—A final comprehensive examination—oral, written, or both—must be passed by the candidate. This examination must cover at least the candidate's field of concentration and in no case may be scheduled earlier than the term preceding the semester in which the degree is to be conferred. The oral portion of the examination must be attended by the entire supervisory committee. When necessary, one faculty substitute may stand in for a member who is not the committee chair or the external member. The written comprehensive examination for the nonthesis master's degree may be taken at a remote site. All other examinations must be held on campus with all participants.

#### **Master's Degrees —**

- **Thesis**—In addition to the general responsibilities and those listed below for all master's committees, the supervisory committee for a thesis program must approve a thesis topic and the plans for carrying out the research. The committee must meet when the thesis is at least 50 percent completed to review procedures, progress, and expected results and to make suggestions for the completion of the study.
- **Thesis and Nonthesis**—The final exam must be attended by the entire supervisory committee. When necessary, there may be one faculty substitute standing in for a member who is not the chair of the committee. Only the supervisory committee members may sign the signature pages for the thesis. Unanimous approval is required.

*Excerpts from the Graduate Catalog: Doctoral Degree:*

### **Supervisory Committee ---**

Supervisory committees are nominated by the academic unit chair, approved by the dean of the college concerned, and appointed by the Dean of the Graduate School. The committee should be appointed as soon as possible after the student starts doctoral work and no later than the end of the second term of equivalent full-time study. The Dean of the Graduate School is an ex-officio member of all supervisory committees. Duties and responsibilities of the supervisory committee:

— Inform the student of all regulations governing the degree sought. This does not absolve the student from responsibility for being informed about these regulations. See General Regulations.

— Meet immediately after appointment to review the student's qualifications and discuss and approve a program of study.

— Meet to discuss and approve the proposed dissertation project and the plans for carrying it out.

— Give the student a yearly evaluation letter in addition to S/U grades earned for research courses 7979 and 7980. The chair writes this letter after consulting with the supervisory committee.

— Conduct the qualifying examination (or participate in it, if administered by the academic unit). In either event, the student and the entire supervisory committee must be present for the oral part of the examination. This examination must be given on campus. For exceptions, see Examinations in General Regulations.

— Meet when at least half the work on the dissertation is complete, to review procedure, progress, and expected results; and to make suggestions for completion.

--- Meet on campus when the dissertation is completed and conduct the final oral examination to assure that the dissertation is a piece of original research and a contribution to knowledge. At least four faculty members, including the entire supervisory committee, must be present with the candidate for this examination.

### **Qualifying Examination ---**

All Ph.D. candidates must take the qualifying examination. It may be taken during the third term of graduate study beyond the bachelor's degree.

The student must be registered in the term the qualifying examination is given.

The examination, prepared and evaluated by the full supervisory committee or the major and minor academic units, is both written and oral and covers the major and minor subjects. Except for allowed substitutions, all members of the supervisory committee must be present with the student at the oral part. At this time the supervisory committee is responsible for deciding whether the student is qualified to continue work toward a Ph.D. degree. If a student fails the qualifying examination, the Graduate School must be notified. A reexamination may be requested, but it must be recommended by the supervisory committee and approved by the Graduate School. At least 1 term of additional preparation is needed before re-examination.

**Admission to Candidacy ---**

A graduate student becomes a candidate for the Ph.D. degree when the student is granted formal admission to candidacy. Such admission requires the approval of the student's supervisory committee, the academic unit chair, the college dean, and the Dean of the Graduate School. The approval must be based on

- The academic record of the student
- The supervisory committee's opinion on overall fitness for candidacy
- An approved dissertation topic
- A qualifying examination as described above

The student should apply for admission to candidacy as soon as the qualifying examination is passed and a dissertation topic is approved by the student's supervisory committee.

### Tentative Two-Year Course Cycle

	2017	2018
Fall	Frontiers/Journal Club/Colloq. Galaxies and Cosmology Fund. of Observational Astronomy Computational Astrophysics (E) AST 6905	Frontiers/Journal Club/Colloq. Stars and the Galaxy Exoplanets (E) AST6905
Spring	Frontiers/Journal Club/Colloq. Stellar Atmospheres and Rad. Proc. Neutron Stars and BHs (E) AST 6905	Frontiers/Journal Club/Colloq. Astrophysics of the ISM Elective AST 6905

#### Guideline for TA assignments:

Graduate Student Fellows (GSFs) should ideally not be asked to TA during the fall semesters of their first two years.

All 1<sup>st</sup> year students will be expected to attend Frontiers regardless of whether they are enrolled. All advanced students will be expected to attend or enroll in JC/Colloq.

#### Example schedule for student entering in 2017:

	TA	GSF
Fall 17	Galaxies Elective FOA	Galaxies Elective FOA F/J/C
Spring 18	SARP Elective or AST 6905 F/J/C	SARP Elective AST 6905 Course outside Astro

Summer 18 All students expected to be doing Masters projects.

Fall 18	Stars&Gal Elective AST 6905	Stars&Gal Elective AST 6905 F/J/C
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Spring 19	ISM Elective AST 6905 F/J/C	ISM Elective AST6905 Course outside Astro
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