UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

Office of the Provost and Vice Chancellor
for Academic Affairs

Swanlund Administration Building
601 East John Street
Champaign, IL 61820

January 5, 2011

Abbas Aminmansour, Chair
Senate Committee on Educational Policy
Office of the Senate
228 English Building, MC-461

Dear Professor Aminmansour:

Enclosed is a copy of a proposal from the College of Liberal Arts and Sciences to revise the M.S. in Astronomy

This proposal has been approved by the Committee on Courses and Curricula in the College of Liberal Arts & Sciences and the Graduate College Executive Committee. It now requires Senate review.

Sincerely,

Kristi A. Kuntz
Assistant Provost

KAK/njh

Enclosures

c: Y. Chu
L. Looney
A. Mester

UNIVERSITY OF ILLINOIS
AT URBANA - CHAMPAIGN

Graduate College
204 Coble Hall, MC-322
801 South Wright Street
Champaign, IL 61820-6210
www.grad.illinois.edu

November 30, 2010

Kristi Kuntz
Assistant Provost
Office of the Provost
207 Swanlund, MC-304

Dear Kristi:

Enclosed are two proposals entitled "Revision to the M.S. in Astronomy" and "Revision to the Ph.D. in Astronomy." The Graduate College Executive Committee did vote unanimously to approve both of them.

We send them to you now for further review.

Sincerely,

Andrea Golato
Associate Dean, Graduate College

Enclosure

cc: Y. Chu
L. Looney
M. Lowry
A. Mester
P. Santic

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

Office of the Dean

College of Liberal Arts and Sciences
294 Lincoln Hall
702 South Wright Street
Urbana, IL 61801-3631

October 19, 2010

Andrea Golato
Associate Dean
Graduate College
204 Coble Hall MC-322

Dear Dean Golato:

The Committee on Courses and Curricula, on behalf of the Dean's Cabinet, and Executive Committee has voted to approve the following proposals:

Revision to the M.S. in Astronomy
Revision to the Ph.D. in Astronomy

Please address all correspondence concerning these proposals to me. The department is requesting a proposed effective date of Fall 2011.

Sincerely,

Ann M. Mester
Associate Dean

enclosures
C: Professor Leslie Looney
Professor You-Hua Chu

telephone 217-333-1350 • *fax* 217-333-9142

ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Proposal to the Senate Educational Policy Committee

PROPOSAL TITLE: Revised M.S. in Astronomy, in the Department of Astronomy, College of Liberal Arts & Sciences

SPONSOR: Leslie W. Looney, Associate Professor of Astronomy, 244-3615, lwl@illinois.edu

COLLEGE CONTACT: Ann Mester, Associate Dean, College of Liberal Arts & Sciences, 333-6622, mester@illinois.edu

BRIEF DESCRIPTION: The following changes are proposed for the M.S. curriculum in Astronomy:

1. Institute a new 4-section placement exam for incoming graduate students. Each section is based on material from the Department of Astronomy's four advanced-undergraduate level survey of astrophysics, ASTR 404, 405, 406, and 414. If a student fails a section of the exam, they are expected to take the appropriate 400-level course to demonstrate proficiency with a B or better grade in the course. This placement exam replaces the current qualifying exam for the Ph.D. in Astronomy.
2. Change the required "core" classes of the M.S. curriculum. Currently, the M.S. curriculum has three core classes, ASTR 502 (Astrophysical Dynamics), 503 (Observational Astronomy), and 504 (Theoretical Stellar Physics). This revision will make ASTR 503 and 504 elective classes and make ASTR 501 (Radiative Processes, a newly created course) and ASTR 502 the new "core" of the M.S. curriculum.
3. Reduce the total number of formal lecture courses required for a graduate student to earn a M.S. degree to 24 hours (i.e. 6 courses), plus demonstrated proficiency of the four 400-level courses (404, 405, 406, and 414). Up to 8 hours of the 24 hours, may be in 401, 404, 405, 406, or 414 courses. The "cognate course" rules will also be simplified. Instead of a list of specific non-ASTR elective courses that can be taken, students will be required to take a minimum number of hours in the Department of Astronomy. The department will ensure that scheduled astronomy electives will not conflict with astrophysics courses offered by the Physics Department.
4. This revision is being proposed concurrently with the addition of a suite of research-level elective courses to the course catalog. ASTR 503 and 504 will be on the list of these research-level electives.

JUSTIFICATION:

1. Many incoming graduate students come from undergraduate programs without a large astronomy program (often just a few courses in the Physics curriculum). This leaves these students with potentially large gaps in their undergraduate preparation in astrophysics. The new placement exam assesses students' background at the advanced undergraduate level and provides students recommendations for courses to take to complete their background.
2. The Department of Astronomy's research focus has grown to include a strong focus on cosmology (observational, theoretical, and computational). Recognizing this growth means that ASTR 503 and 504 are not appropriate for every graduate student. The Department has revised ASTR 502 to reflect the modern research topics of astrophysical dynamics and has created a new core course, ASTR 501, in radiative processes, a course that is core-building for astronomy graduate students but has been missing from our curriculum. These base courses are meant to strengthen a student's understanding of fundamental astronomy issues, but they are not required for elective courses. However, students with the additional background will be at an advantage in the elective courses.
3. Reducing the number of hours of formal coursework from 7 courses (28 credit hours) to 6 courses (24 credit hours) and easing the restrictions on courses taken outside of Astronomy brings the requirements for a M.S. in Astronomy to a more comparable level with M.S. programs in peer departments at Illinois (See Appendix A). It also allows more credit for independent study research projects undertaken by M.S. program students. The total hours required (32) do not change.
4. The Astronomy Department will offer, on an every-other-year basis, the following research-level electives for graduate students (additional graduate-level courses are offered as cross-lists from Physics and Chemistry, i.e., PHYS/ASTR 515, 516, 540, 541 and CHEM/ASTR 450, 451). See Appendix B for information on staffing the electives.

    - ASTR 503 – Observational Astronomy
    - ASTR 504 – Theoretical Stellar Physics
    - ASTR 505 – Star Formation
    - ASTR 506 – Galaxies
    - ASTR 507 – Cosmology
    - ASTR 510 – Computational Astrophysics

BUDGETARY AND STAFF IMPLICATIONS:

a. Additional staff and dollars needed – No additional staff will be needed. The department currently teaches 2 graduate-level courses per semester (not counting cross-listed courses). That will continue under this curriculum revision.
b. Internal reallocations (e.g., change in class size, teaching loads, student-faculty ratio, etc.) – No changes in class sizes or teaching loads are anticipated. The new electives have each been "piloted" more than once as seminar courses (ASTR 596) to refine each course's syllabus and test demand.
c. Effect on course enrollment in other units and explanations of discussions with representatives of those departments. – No changes are anticipated.
d. Impact on the University Library – No impact anticipated.
e. Impact on computer use, laboratory use, equipment, etc. – No impact anticipated.

DESIRED EFFECTIVE DATE: Fall 2011

STATEMENT FOR PROGRAMS OF STUDY CATALOG:

Master of Science

Required Courses:	Required Hours
Formal Coursework:	
ASTR 501, ASTR 502	8
Additional formal coursework (excluding thesis research, non-thesis research, and independent study credit hours, e.g., ASTR 599, ASTR 590)	16
Of the additional coursework, the **minimum** number of hours in the unit (excluding thesis research, non-thesis research, and independent study credit hours)	8
Of the additional coursework, the **minimum** number of 500-level hours (excluding thesis research, non-thesis research, and independent study credit hours)	4
Based on Placement Exam results, students may be required to complete ASTR 404, 405, 406, and/or 414 during their first year. A maximum of 8 hours of these courses may be applied to the degree.	Max 8
Research/Project/Independent Study Hours (e.g., ASTR 590; min/max applied toward degree):	4-8
Total Hours	32
Other Requirements:*	
Minimum GPA	3.0
Language Requirement	No
Thesis Required	No

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

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

A. 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.

B. Pass the course with a B grade or better.

C. Students who have had an equivalent course at other institutions (B grade or better) may petition for those courses to count as proficiency.

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.

CLEARANCES: *(Clearances should include signatures and dates of approval) - - These signatures must appear on a separate sheet. If multiple departments or colleges, add lines.)*

Signatures:

Unit Representative: Jesus Vargas, Curriculum Committee Chair, Astronomy — Date: Sept 9 2010

College Representative: — Date: 10/19/10

Graduate College Representative: — Date: 11/30/10

Provost Representative: — Date:

Educational Policy Committee Representative: — Date:

Appendix A:
Degree Requirement Comparisons

Current Astronomy MS Course Requirements at Illinois

Required Courses:	Required Hours
Formal Coursework	28
Minimum Hours of Coursework Required Within the Unit:	20
Minimum Hours of Coursework Required at the 500-level:	20
Research/Project/Independent Study Hours:	4
Total Hours	32
Other Requirements:*	
Thesis Required	No

Proposed Astronomy MS Course Requirements at Illinois

Required Courses:	Required Hours
Formal Coursework	24
Minimum Hours of Coursework Required Within the Unit:	16
Minimum Hours of Coursework Required at the 500-level:	12 (8 in unit)
Research/Project/Independent Study Hours (min/max applied toward degree):	4-8
Total Hours	32
Other Requirements:*	
Thesis Required	No

MS Course Requirements in Peer Departments at Illinois

Physics:

Required Courses:	Required Hours
Formal Coursework	24
Minimum Hours of Coursework Required Within the Unit:	16
Minimum Hours of Coursework Required at the 500-level:	12 (8 in unit)
Research/Project/Independent Study Hours (min/max applied toward degree):	0-8
Total Hours	32
Other Requirements:*	
Thesis Required	No

Atmospheric Sciences (non-thesis option):

Required Courses:	Required Hours
Formal Coursework	28
Minimum Hours of Coursework Required Within the Unit:	12
Minimum Hours of Coursework Required at the 500-level:	8
Research/Project/Independent Study Hours (min/max applied toward degree):	4
Total Hours	32
Other Requirements:*	
Thesis Required	No

Geology (non-thesis option):

Required Courses:	Required Hours
Formal Coursework	32
Minimum Hours of Coursework Required Within the Unit:	8
Minimum Hours of Coursework Required at the 500-level:	8
Research/Project/Independent Study Hours (min/max applied toward degree):	4-8
Total Hours	40
Other Requirements:*	
Thesis Required	No

Appendix B:
New Graduate Level Course Staffing

New core courses

This proposal changes the Astronomy graduate program "core courses" to two courses, ASTR 501 (Radiative Processes) and ASTR 502 (Astrophysical Dynamics). These two core courses will be taught every other year. Possible instructors include:

- ASTR 501: Gammie, Fields, Kemball, Mouschovias, Wong
- ASTR 502: Brunner, Fields, Gammie, Ricker, Mouschovias, Wong

Graduate level electives

The main reasons for adding these courses is to guarantee that classes will be taught regularly and to advertise our research interests to prospective graduate students. The courses are research level classes, and should reflect the diversity of research interests in the Department. As they must be taught regularly, more than 2 professors need to be able to teach each listed course.

- ASTR 503 (Observational Astronomy): Brunner, Chu, Kemball, Looney, Sutton, Thompson, Wong
- ASTR 504 (Theoretical Stellar Physics): Gammie, Mouschovias, Ricker
- ASTR 505 (Star Formation): Chu, Gammie, Looney, Kemball, Mouschovias, Sutton, Thompson, Wong
- ASTR 506 (Galaxies): Brunner, Chu, Fields, Ricker, Thompson, Wong
- ASTR 507 (Cosmology): Brunner, Fields, Ricker
- ASTR 510 (Computational Astrophysics): Brunner, Gammie, Mouschovias, Ricker

Master of Science

CURRENT		PROPOSED	
Required Courses	Required Hours	Required Courses	Required Hours
ASTR 502, 503, 504, and 590	16	ASTR 501 and 502	8
Additional 500-level ASTR courses	8	Additional formal coursework (excluding thesis research, non-thesis research, and independent study, e.g. ASTR 590, ASTR 599)	16 (8 in ASTR and 4 at the 500-level)
Electives from approved departmental list	8	Based on Placement Exam results, students may be required to complete ASTR 404, 405, 406 and/or 416 and earn a grade of B or higher, during their first year. A maximum of 8 hours of these courses may be applied to the degree.	Max 8
Research/Project/Independent Study Hours (min/max applied toward degree):	4/4	**Research/Project/Independent Study Hours (min/max applied toward degree):**	4-8
Total Hours	32	**Total Hours**	32
Minimum Hours Overall Required Within the Unit:	24	**Minimum Hours Overall Required Within the Unit:**	20
Minimum 500-level Hours Required Overall:	24	**Minimum 500-level Hours Required Overall:**	16
Other Requirements:*		**Other Requirements:***	
Minimum GPA:	3.0	**Minimum GPA:**	3.0

[1] footnote

Insert Demonstrated Proficiency... and Research Project text from original proposal