

Fiscal Unit/Academic Org	Astronomy - D0614
Administering College/Academic Group	Mathematical And Physical Sci
Co-administering College/Academic Group	Arts And Sciences
Semester Conversion Designation	Converted with minimal changes to program goals and/or curricular requirements (e.g., sub-plan/specialization name changes, changes in electives and/or prerequisites, minimal changes in overall structure of program, minimal or no changes in program goals or content)
Current Program/Plan Name	Astronomy Minor
Proposed Program/Plan Name	Astronomy and Astrophysics Minor
Program/Plan Code Abbreviation	ASTRON-MN
Current Degree Title	

Credit Hour Explanation

Program credit hour requirements		A) Number of credit hours in current program (Quarter credit hours)	B) Calculated result for 2/3rds of current (Semester credit hours)	C) Number of credit hours required for proposed program (Semester credit hours)	D) Change in credit hours
Total minimum credit hours required for completion of program		20	13.3	12	1.3
Required credit hours offered by the unit	Minimum	15	10.0	9	1.0
	Maximum	20	13.3	12	1.3
Required credit hours offered outside of the unit	Minimum	0	0.0	0	0.0
	Maximum	8	5.3	4	1.3
Required prerequisite credit hours not included above	Minimum	34	22.7	25	2.3
	Maximum	39	26.0	28	2.0

Program Learning Goals

Note: these are required for all undergraduate degree programs and majors now, and will be required for all graduate and professional degree programs in 2012. Nonetheless, all programs are encouraged to complete these now.

Program Learning Goals

Assessment

Assessment plan includes student learning goals, how those goals are evaluated, and how the information collected is used to improve student learning. An assessment plan is required for undergraduate majors and degrees. Graduate and professional degree programs are encouraged to complete this now, but will not be required to do so until 2012.

Is this a degree program (undergraduate, graduate, or professional) or major proposal? No

Program Specializations/Sub-Plans

If you do not specify a program specialization/sub-plan it will be assumed you are submitting this program for all program specializations/sub-plans.

Pre-Major

Does this Program have a Pre-Major? No

Attachments

- AstronomyMinor.pdf
(Program Proposal. Owner: Peterson, Bradley Michael)
- Astronomy and Astrophysics minor cover letter.doc: NMS Division of Arts and Sciences cover letter
(Letter from the College to OAA. Owner: Andereck, Claude David)

Comments

- Unanimously approved by CCI Sciences Subcommittee w/ request for 2 small changes. Feedback will come via e-mail from J. Fredal or C. Daniels (CCI Sciences Subcommittee co-chairs). *(by Vankeerbergen, Bernadette Chantal on 01/05/2011 09:05 AM)*

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Peterson, Bradley Michael	10/21/2010 02:29 PM	Submitted for Approval
Approved	Peterson, Bradley Michael	10/21/2010 02:48 PM	Unit Approval
Revision Requested	Andereck, Claude David	10/27/2010 02:00 PM	College Approval
Submitted	Peterson, Bradley Michael	11/04/2010 03:03 PM	Submitted for Approval
Approved	Peterson, Bradley Michael	11/04/2010 03:18 PM	Unit Approval
Revision Requested	Andereck, Claude David	11/05/2010 04:05 PM	College Approval
Submitted	Peterson, Bradley Michael	11/06/2010 10:00 PM	Submitted for Approval
Approved	Peterson, Bradley Michael	11/06/2010 10:02 PM	Unit Approval
Approved	Andereck, Claude David	12/29/2010 01:22 PM	College Approval
Revision Requested	Vankeerbergen, Bernadette Chantal	01/05/2011 09:05 AM	ASCCAO Approval
Submitted	Peterson, Bradley Michael	01/07/2011 02:47 PM	Submitted for Approval
Approved	Peterson, Bradley Michael	01/07/2011 03:15 PM	Unit Approval
Revision Requested	Andereck, Claude David	01/12/2011 11:41 AM	College Approval
Submitted	Peterson, Bradley Michael	02/18/2011 03:48 PM	Submitted for Approval
Approved	Peterson, Bradley Michael	02/19/2011 11:22 AM	Unit Approval
Revision Requested	Andereck, Claude David	02/19/2011 11:59 AM	College Approval
Submitted	Peterson, Bradley Michael	02/19/2011 02:43 PM	Submitted for Approval
Approved	Peterson, Bradley Michael	02/19/2011 02:44 PM	Unit Approval
Approved	Andereck, Claude David	02/20/2011 12:25 PM	College Approval
Pending Approval	Nolen, Dawn Jenkins, Mary Ellen Bigler Meyers, Catherine Anne Vankeerbergen, Bernadette Chantal Hanlin, Deborah Kay	02/20/2011 12:25 PM	ASCCAO Approval

Division of Natural and Mathematical Sciences

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February 20, 2011

Larry Krissek
Chair, Arts and Sciences CCI

Dear Larry:

It is a pleasure to forward to you the proposal for the minor in Astrophysics under semesters. The minor has been minimally modified from its present quarter version. Please note that the Department of Astronomy is requesting that the name of the minor be changed from Astronomy to Astronomy and Astrophysics. The Department of Physics and the Department of Astronomy have a signed MOU (included) that addresses how they will administer the program going forward.

Beyond my own review of the documents, the proposal has been discussed by colleagues from other NMS units at a meeting on October 27, 2010. Feedback from that discussion, and from the CCI Sciences Subcommittee has been incorporated in the proposal.

If you have any questions, I would be happy to address them.

Sincerely,



David Andereck
Professor of Physics
Associate Dean of Natural and Mathematical Sciences, College of Arts and Sciences



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10 February 2011

Office of Academic Affairs
203 Bricker Hall
190 North Oval Mall
CAMPUS

Re: Astronomy Undergraduate Minor Program under Semesters

Dear colleagues,

The Department of Astronomy offers two degree programs, a Bachelor of Science with a major in Astronomy and Doctor of Philosophy in Astronomy.

The Department additionally offers a minor program in Astronomy. The Department also awards a Master's of Science in Astronomy to students who complete the required graduate core courses and pass an oral examination, usually the same examination that admits students to candidacy for the PhD; students are not admitted for a Master's degree only, so we do not list this as a separate program.

As outlined in the following Program Rationale, we propose to change the name of the undergraduate major and minor programs from "Astronomy" to "Astronomy and Astrophysics." On account of the significant physics content of the major and minor programs in astronomy, we are proposing that the "Astronomy and Astrophysics" major and minor programs be recognized as interdisciplinary programs, jointly managed by the Departments of Physics and Astronomy, with the Department of Astronomy as the home department, as described in the accompanying Memorandum of Understanding between the Departments of Physics and Astronomy.

Curricular changes are made through the Department's standing Curriculum Committee upon approval by the entire regular faculty. In the current conversion to semesters, the Curriculum Committee did not recommend any changes to the undergraduate minor program because the current curriculum is deemed to be academically sound, up to date, and will transfer transparently to a semester schedule.

The plan proposed here has been presented to the Astronomy faculty and they have voted to support it.

As chair of the Department, I recommend approval of the undergraduate minor program as submitted here.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Bradley M. Peterson".

Bradley M. Peterson
Professor and Chair

MEMORANDUM OF UNDERSTANDING

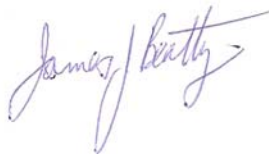
The Departments of Astronomy and Physics recognize that the undergraduate major program in astronomy has strong commonalities with the Advanced Physics Option of the undergraduate major in physics. In both programs, the majors are being prepared for graduate work that requires background at the intermediate to advanced level in classical mechanics, quantum mechanics, electricity and magnetism, and thermodynamics and statistical mechanics, and both majors require similar a background in advanced mathematics. The principal differences are that physics majors take additional advanced laboratory classes and astronomy majors take a minimum of four additional courses in astronomy and astrophysics. We note that many students choose to double-major in physics and astronomy, and this has historically been encouraged by both departments. But given the large physics component to the astronomy major program, the astronomy major is essentially a joint program that is administered by the Department of Astronomy.

The Departments of Physics and Astronomy agree that the educational opportunities afforded our joint majors and our respective majors are enhanced by stronger interaction between the two programs. Since the Astronomy major already includes significant Physics content, we propose that it be formally recognized as an interdisciplinary program, jointly managed by the Departments of Astronomy and Physics, with Astronomy as the home department. Students in this interdisciplinary program would be considered as majors in both departments, although they would choose an advisor (or be assigned one) from just one department. To formalize this change, the Departments also agree that the name of the astronomy major program will change from "Astronomy" to "Astronomy and Astrophysics," in recognition of the large physics and astrophysics component of the astronomy major program. The name of the undergraduate minor in astronomy will also be changed from "Astronomy" to "Astronomy and Astrophysics." It is proposed that these changes take effect no later than Autumn Semester 2012, as a part of the change in the academic calendar from quarters to semesters.

As a practical matter, the two Departments agree that communication on curricular and scheduling issues can be improved by assigning a member of the Physics Department Undergraduate Studies Committee as a voting member of the Astronomy Department Undergraduate Studies and Curriculum committees and assigning a member of the Astronomy Department Undergraduate Studies and Curriculum committees as a voting member of the Physics Department Undergraduate Studies Committee. It is proposed that this take effect no later than Autumn Quarter 2011.



Bradley M. Peterson
Professor and Chair of Astronomy



James J. Beatty
Professor and Chair of Physics

Program Rationale

The Astronomy Undergraduate Minor program maps easily from quarters to semesters. All the Astronomy courses are 5-credit hours and these transfer trivially to 3-credit hour semester courses

We have examined the proposed changes in Physics and Math (in which our students take prerequisites and minor courses), and our conversion plans are consistent with theirs. Because of the increased content of the Physics courses at the 2000 level or above, we now require only ONE course (in Physics or Astronomy) as an elective and, for greater consistency with the Physics minor and for increased flexibility for the student, we have included a broad range of high-level Physics courses in the list of possible electives.

The only other change we propose is changing the name of the program from “Astronomy” to “Astronomy and Astrophysics”: this is a long-overdue change that better represents what our students are learning. “Astrophysics” is less likely to be misunderstood by prospective employers of our BS students; many people equate “astronomy” with star-gazing or astrophotography or, even worse, “astrology,” and this more accurate degree name will better serve our students who do not continue in the field.

The undergraduate minor program was most recently revised in 1997, with the addition of Astronomy 681 and 682 as electives in the minor program.

Astronomy and Astrophysics Minor Program Semesters	Credit Hours
Prerequisites	
Math 1151	5
Math 1172	5
Math 2173	5
Math 2174	3
Phys 1250/1250H	5
Phys 1251/1251H	5
Total Prereqs	28
Required Courses	
Astron 2291	3
Astron 2292	3
Astron 3350	3
Total Astronomy	9
Elective Courses (3 credit minimum)	
Astron 5681	3
Astron 5682	3
Phys 2300	4
Phys 2301	4
Phys 3470	3
Phys 3700	4
Phys 4700	4
Phys 5300	4
Phys 5400/5400H	4
Phys 5401H	4
Phys 5500/5500H	4
Phys 5501H	4
Phys 5600	4

TOTAL MINOR PROGRAM 12-13

TOTAL MINOR + PREREQS 40-41

Astronomy and Astrophysics Minor Advising Checklist	Credit Hours	Prerequisites
Prerequisite Courses		
Math 1151	5	
Math 1172	5	
Math 2173	5	
Math 2174	3	required only for Astron 5681 and 5682
Phys 1250/1250H	5	
Phys 1251/1251H	5	
Total Prereqs	28	23 if electives do not include Astron 5681 or 5682
Required Courses		
Astron 2291	3	Phys 133 or 1251 or concurrent or permission of instructor
Astron 2292	3	Astron 291 or 2291
Astron 3350	3	Astron 292 or 2292, Math 153 or 1258, Phys 133 or 1251
Total Astronomy	9	
Elective Courses (3 cr min)		
Astron 5681	3	Math 255, 415, or 2174; Physics 263 or 2301; Physics 621 or 5600 (or concurrent) recommended; or permission of instructor.
Astron 5682	3	
Phys 2300	4	Math 1151
Phys 2301	4	Math 254 or 2173
Phys 3470	3	Phys 1251 or 132 and CSE 1222 or 202
Phys 3700	4	Phys 133 or 1251
Phys 4700	4	Phys 133 or 1251
Phys 5300	4	Phys 262 or 2301
Phys 5400/5400H	4	Phys 133 or 1251 and 2300 or concurrent
Phys 5401H	4	Phys 5400
Phys 5500/5500H	4	Phys 263 or 2301
Phys 5501H	4	Phys 5500
Phys 5600	4	Phys 263 or 2301
Note: Honors version of any course may be substituted.		

Astronomy Minor Advising Checklist	Credit Hours	Alternate	Prerequisites	Option A: Physics Major	Option B: Others
Prerequisite Courses					
Math 151	5				
Math 152	5	Math 161/162			
Math 153	5				
Math 254	5				
Math 415	4				
Phys 131/H131	5				
Phys 132/H132	5				
Phys 133/H133	5				
Total Prereqs	39	34			
Required Courses					
Astron 291	5		Prerequisites: Phys 133 or concurrent or permission of instructor		
Astron 292	5		Prerequisites: Astron 291		
Astron 350	5		Prerequisites: Astron 292, Math 153, Phys 133		
Total Astronomy	15				
Elective Courses					
Phys 261	4		Physics 1251		
Phys 262	4		Math 254 or 2249, Phys 2301		
Astron 681 or	5		Prerequisites: Math 255, or 415; Physics 263; Physics 621		
Astron 682	5		(or concurrent) recommended; or permission of instructor.		

TOTAL MINOR

20 23

TOTAL MINOR + PREREQS

59 58

TOTAL MINOR + PREREQS (ALTERNATE)

54 57

Note: Honors version of any course may be substituted.

Requirements	Semester Course Number	Course Title	Semester Units	Quarter Equivalent Course Number	Quarter Credits	Notes
Required Astronomy	Astron 2291	Basic Astrophysics and Planetary Astronomy	3	Astron 291	5	Same content
	Astron 2292	Stellar, Galactic, and Extragalactic Astronomy and Astrophysics	3	Astron 292	5	Same content
	Astron 3350	Methods of Astronomical Observation and Data Analysis	3	Astron 350	5	Same content
Elective Astronomy	Astron 5681	Principles of Stellar Evolution and Nucleosynthesis	3	Astron 681/ Phys 681	5	Same content
	Astron 5682	Introduction to Cosmology	3	Astron 682/ Phys 682	5	Same content
Prerequisite Math	Math 1151	Calculus I	5	Math 151	5	Semester sequence has same content as quarter sequence
	Math 1172	Engineering Mathematics A	5	Math 152	5	
				Math 153	5	
	Math 2173	Engineering Mathematics B	5	Math 254	5	Combined material from Math 254, 152, 153
	Math 2174	Engineering Mathematics C	3	Math 415	4	Merges Math 415 and Math 568
Prerequisite Physics	Phys 1250/1250H	Mechanics, Thermal Physics, Waves	5	Phys 131	5	Semester sequence has same content as quarter sequence
	Phys 1251/1251H	E&M, Optics, Modern Physics	5	Phys 132	5	
				Phys 133	5	
Elective Physics	Phys 2300	Dynamics of Particles and Waves I	4	Phys 261	4	Semester sequence has same content as quarter sequence
	Phys 2301	Dynamics of Particles and Waves II	4	Phys 262	4	
				Phys 263	4	
	Phys 3470	Modern Optics	3	Phys 570	4	Same content
	Phys 3700	Methods in Experimental Physics	3	Phys 416	4	Same content
	Phys 4700	Introductory Electronics for Physicists	3	Phys 517	4	Same content
	Phys 5300	Theoretical Mechanics	4	Phys 664	4	Enhanced content
	Phys 5400/5400H	E&M I	4	Phys 555	4	Semester sequence has same content as quarter sequence
	Phys 5401H	E&M II	4	Phys 656	4	
				Phys 657	4	
	Phys 5500/5500H	Quantum Mechanics I	4	Phys 631	4	Semester sequence has same content as quarter sequence
	Phys 5501H	Quantum Mechanics II	4	Phys 632	4	
				Phys 633	4	
	Phys 5600	Statistical Physics	4	Phys 621	4	Semester course has all of 621 and part of 622
				Phys 622	4	

Note: Honors version of any course may be substituted.

Transition Policy:

Students who began their degree under quarters will not be penalized as the university moves to a semester schedule, either in terms of progress towards their degree or their expected date of graduation. No special transition plan is necessary for the minor courses in Astronomy: nearly all of these courses translate directly from 5-hour quarter courses to 3-hour semester courses. Transition policies for the required or prerequisite physics and math courses will be established by the Departments of Physics and Mathematics, respectively.

Students can minimize their own transition difficulties by making sure of the following:

2011-12 first-year students should make certain that they have completed Mathematics 153 and Physics 133 by no later than Spring 2012.

2011-12 second-year students should make certain that they complete Math 254 and 415 and Phys 263 by no later than Spring 2012.

2011-12 third year students should make certain that they complete Phys 632 and 656 by no later than Spring 2012.

Astronomy advisors will remind astronomy and astrophysics minors of the necessity to complete these course sequences throughout the 2011-12 academic year.