

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
Proposed Program/Plan Name	Astrophysics
Program/Plan Code Abbreviation	ASTRON-BS
Current Degree Title	Bachelor of Science

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		106	70.7	70	0.7
Required credit hours offered by the unit	Minimum	22	14.7	13	1.7
	Maximum	22	14.7	13	1.7
Required credit hours offered outside of the unit	Minimum	49	32.7	34	1.3
	Maximum	49	32.7	35	2.3
Required prerequisite credit hours not included above	Minimum	30	20.0	23	3.0
	Maximum	35	23.3	23	0.3

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

- Undergraduate Astronomy majors acquire a basic mastery of the four fundamental areas of physics.
- Undergraduate Astronomy majors develop powerful analytical and problem solving skills in areas involving astrophysics, physics, and mathematics
- Undergraduate Astronomy majors will acquire a basic mastery of the fundamentals of astronomy and astrophysics.
- Undergraduate Astronomy majors will acquire a basic mastery of data reduction and error analysis.
- Undergraduate Astronomy majors are able to effectively communicate their physical understanding both professionally and colloquially (orally and in writing).
- Undergraduate majors are apprised of and encouraged to participate in academic research and/or outreach activities which are consistent with their interest, ability, and postgraduate plans

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? Yes

Does the degree program or major have an assessment plan on file with the university Office of Academic Affairs? Yes

Summarize how the program's current quarter-based assessment practices will be modified, if necessary, to fit the semester calendar.

Assessment plan includes student learning goals, how these goals are evaluated, and how the information is collected is used to improve student learning.

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

- AstronomyMajor.pdf

(Program Proposal. Owner: Peterson, Bradley Michael)

- CurriculumMap.pdf

(Curricular Map(s). Owner: Peterson, Bradley Michael)

- Astrophysics BS cover letter.doc: NMS Division of Arts and Sciences cover letter

(Letter from the College to OAA. Owner: Andereck, Claude David)

Comments

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Peterson, Bradley Michael	10/21/2010 02:27 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	10/29/2010 05:22 PM	Submitted for Approval
Approved	Peterson, Bradley Michael	10/29/2010 05:23 PM	Unit Approval
Revision Requested	Andereck, Claude David	11/05/2010 04:05 PM	College Approval
Submitted	Peterson, Bradley Michael	11/06/2010 09:57 PM	Submitted for Approval
Approved	Peterson, Bradley Michael	11/06/2010 10:02 PM	Unit Approval
Approved	Andereck, Claude David	12/29/2010 01:30 PM	College Approval
Pending Approval	Hanlin, Deborah Kay Vankeerbergen, Bernadette Chantal Meyers, Catherine Anne Jenkins, Mary Ellen Bigler Nolen, Dawn	12/29/2010 01:30 PM	ASCCAO Approval

Division of Natural and Mathematical Sciences

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December 29, 2010

Larry Krissek
Chair, Arts and Sciences CCI

Dear Larry:

It is a pleasure to forward to you the proposal for the BS major in Astrophysics under semesters. The major has been minimally modified from its present quarter version. Please note that the Department of Astronomy is requesting that the name of the major be changed from Astronomy to Astrophysics. At this point the name change is under discussion with the Department of Physics. For now, I would ask that you consider the curricular substance of the proposal other than the name itself.

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 the discussions 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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6 November 2010

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

Re: Astronomy Undergraduate Major 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.

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 major program as submitted here.

Sincerely yours,

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

Bradley M. Peterson
Professor and Chair

Program Rationale

The Astronomy Undergraduate Major program maps easily from quarters to semesters. Nearly all the Astronomy courses are 5-credit hours and these transfer trivially to 3-credit hour semester courses. The one course that does not is Astron 295, a 1-credit hour seminar for first-year prospective majors. Students currently take two quarters of this seminar which features introductions to the Astronomy program, career advice, and introductions to astronomical observing facilities available to Ohio State astronomers. We also have talks from Ohio State astronomers about their research. Under semesters, the equivalent class, Astron 2895, is a one-credit hour course that students will take only one semester. Given the nature of the course, there is no problem cutting back from 20 sessions under the quarter calendar to 14 under semesters.

We have examined the proposed changes in Physics, Math, and CSE (in which our students take both prerequisites and major courses), and our conversion plans are consistent with theirs.

The only change we propose is changing the name of the program from “Astronomy” to “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 major program was most recently revised in 1997, with the addition of Astronomy 681 and 682 to the major program. Minor changes in 2009 include elimination of Phys 664 (Theoretical Mechanics) as a required course, addition of CSE 202 (Introduction to C++ Programming), and addition of two units of Astron 295 (Undergraduate Seminar) as a degree requirement.

Astronomy Major Program Semesters	Credit Hours	Notes
Prerequisites		
Math 1151	5	
Math 1172	5	
Math 2173	3	
Phys 1250/1250H	5	
Phys 1251/1251H	5	
Total Prereqs	23	
Major Courses		
Astron 2895	1	
Astron 2291	3	
Astron 2292	3	
Astron 3350	3	
Astron 5681 or Astron 5682	3	
subtotal Astronomy	13	
Phys 2300	4	
Phys 2301	4	
Phys 3700	3	
Phys 5400/5400H	4	
Phys 5500/5500H	4	
Phys 5401H or 5501H or 5300 or 3470	4	Phys 3470 is 3 cr; others are 4
Phys 5600	4	
subtotal Physics	27	
Math 2174	3	
Math 4551	3	
subtotal Math	6	
CSE 1222	2	
Total Major	48	(47 if Phys 3470)
Total Program	71	(70 if Phys 3470)
Other recommended		
Astron 2193	var	individual studies
Astron 2194	var	group studies
Astron 4193	var	individual studies
Astron 4194	var	group studies
Astron 4998	var	Non-thesis research
Astron 4999	var	Non-honors thesis research
Astron 4999H	var	Honors thesis research
Astron 5681 or 5682	3	One is required, both are recommended
Phys 5401H or 5501H	4	E&M II or QM II. One is required, both are recommended
Phys 5300	4	Theoretical mechanics

Major Program Form

The College of Arts and Sciences

Name: _____ Major: ASTRONOMY
 OSU NAME.#: _____ Degree Sought: BA _____ BS X BA Jur _____
 Columbus Address: _____
 Phone: _____ Expected Semester/Year of Graduation: _____
 Alt Phone: _____

Have you filed a Degree Application in the College Office? Yes _____ No _____

(NOTE: This form is NOT a degree application)

Please check whether this is: original _____ revision _____

If completing two majors list both here: (1) _____ (2) _____

(NOTE: You need to file a separate Major Program Form for each major)

Part A. Required Prerequisites (Minimum grade of "C-" per course and minimum grade average of "C" required)

	Hrs	Grade		Hrs	Grade
Math 1151	5	_____	Physics 1250	5	_____
Math 1172	5	_____	Physics 1251	5	_____
Math 2173	3	_____			

Part B. Major Program (same minimum grade requirements as Part A)

Astron 2291	3	_____	Physics 2300	4	_____
Astron 2292	3	_____	Physics 2301	4	_____
Astron 2895	1	_____	Physics 3470	3	_____**
Astron 3350	3	_____	Physics 3700	3	_____
Astron 5681	3	_____*	Physics 5300	4	_____**
Astron 5682	3	_____*	Physics 5400	4	_____
CSE 1222	2	_____	Physics 5401H	4	_____**
Math 2174	3	_____	Physics 5500	4	_____
Math 4551	3	_____	Physics 5501H	4	_____**
_____	_____	_____+	Physics 5600	4	_____
_____	_____	_____+	_____	_____	_____+

* Note: Only one of Astron 5681 and 5682 is required

** Note: Only one of Physics 3470, 5300, 5401H, and 5501H is required

+ Note: For substitutions or additions to Major Program only

Total Hours of Part B _____

FOR OFFICE USE ONLY

Date of Exit Interview _____

Distribute one copy to: Advisor
 Student
 College Office

 (Signature of Faculty Advisor and date)

Name of Advisor: _____

Campus Phone: _____

Major Program Form

The College of Arts and Sciences

Name: _____ Major: ASTRONOMY
 OSU NAME.#: _____ Degree Sought: BA _____ BS X BA Jur _____
 Columbus Address: _____
 Phone: _____ Expected Qtr and Year of Graduation: _____
 Alt Phone: _____

Have you filed a Degree Application in the College Office? Yes _____ No _____

(NOTE: This form is NOT a degree application)

Please check whether this is: original _____ revision _____

If completing two majors list both here: (1) _____ (2) _____

(NOTE: You need to file a separate Major Program Form for each major)

Part A. Required Prerequisites (Minimum grade of "C-" per course and minimum grade average of "C" required)

	Hrs	Grade		Hrs	Grade
Math 151	5	_____	Physics 131	5	_____
Math 152	5	_____	Physics 132	5	_____
Math 153	5	_____	Physics 133	5	_____
Math 254	5	_____			

Part B. Major Program (same minimum grade requirements as Part A)

Astronomy 291	5	_____	Physics 261	4	_____
Astronomy 292	5	_____	Physics 262	4	_____
Astronomy 350	5	_____	Physics 263	4	_____
Astronomy 681	5	_____*	Physics 416	4	_____
Astronomy 682	5	_____*	Physics 555	4	_____
CSE 202	4	_____	Physics 656	4	_____
Math 415	4	_____	Physics 631	4	_____
Math 513	3	_____	Physics 632	4	_____
Math 568	4	_____	Physics 621	4	_____
_____	_____	_____+	_____	_____	_____+
_____	_____	_____+	_____	_____	_____+

* Note: Only one of Astronomy 681 and 682 is required

+ Note: For substitutions or additions to Major Program only

Total Hours of Part B _____

FOR OFFICE USE ONLY

Date of Exit Interview _____

Distribute one copy to: Advisor
 Student
 College Office

 (Signature of Faculty Advisor and date)

Name of Advisor: _____

Campus Phone: _____

Year	Autumn			Spring		
	Course	Credit Hours	Notes	Course	Credit Hours	Notes
1	Math 1151	5	Prereq [GEC: Math]	Math 1172	5	Prereq
	Phys 1250/1250H	5	Prereq [GEC: Science]	Phys 1251/1251H	5	Prereq
	Astron 2895	1	Major	Biol 1113	4	[GEC:Science]
	CSE 1222	2	Major	GEC	3	
	GEC	3				
		16			17	
2	Astron 2291	3	Major	Astron 2292	3	Major
	Math 2173	3	Prereq	Math 2174	3	Major
	Math 4551	3	Major	Phys 2301	4	Major
	Phys 2300	4	Major	Phys 3700	3	Major [GEC: data analysis]
	GEC	3		GEC	3	
		16			16	
3	Astron 3350 (or GEC)	3	Major	Astron 5681/5682	3	Major
	Phys 5400/5400H	4	Major	Phys 5401H	4	Major/Recommended
	Phys 5500/5500H	4	Major	Phys 5501H	4	Major/Recommended
	GEC	3		GEC	4	
	GEC	3				
		17			15	
4	Phys 5600	4	Major	Astron 5681/5682	3	Recommended
	Astron 3350 (or GEC)	3		Phys 5300	4	Recommended
	GEC	4		GEC	4	
	GEC	3		GEC	3	
	GEC	3				
		17			14	
	Total hours:	128				
	Required credit hours, including prereqs:			71	71/128 = 55.47%	
	GECs without language:			46	46/120 = 38.33%	
	GECs with language:			58	58/128 = 45.31%	

Year	Autumn			Winter			Spring		
	Course	Credit Hours	Notes	Course	Credit Hours	Notes	Course	Credit Hours	Notes
1	Math 151	5	Prereq [GEC: Math]	Math 152	5		Math 153	5	Prereq
	Phys 131	5	Prereq [GEC: Science]	Phys 132	5		Phys 133	5	Prereq
	Astron 295	1	Major	Astron 295	1		CSE 202	4	Prereq
	GEC	5		GEC	5	(foreign language)	GEC	5	(foreign language)
		16			16			19	
2	Astron 291	5	Major	Astron 292	5	Major	Math 415	4	Major
	Math 254	5	Prereq	Math 513	3	Major	Math 568	3	Major
	Phys 261	4	Major	Phys 262	4	Major	Phys 263	4	Major
	GEC	5	(foreign language)	GEC	5	(foreign language)	Phys 416	4	Prereq [GEC: data analysis]
		19			17			15	
3	Astron 3350 (or GEC)	5	Major	Astron 681 or 682	5	Major	Phys 664	4	Recommended
	Phys 555	4	Major	Phys 656	4	Major	GEC	5	
	Phys 631	4	Major	Phys 632	4	Major	GEC	5	Major/Recommended
	GEC	3		GEC	5		GEC	5	Free elective if no language
		16			18			19	
4	Phys 621	4	Major	Astron 681 or 682	5	Recommended	GEC	5	
	Astron 3350 (or GEC)	5		Phys 622	4	Recommended	GEC	5	
	GEC	5		Third Writing Course	3		elective	3	
		14			12			13	
	Total hours:	206							

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 2895	Seminar	1	Astron 295	1	Some content reduction as requirement reduced from two quarters to one semester.	
	Astron 3350	Methods of Astronomical Observation and Data Analysis	3	Astron 350	5	Same content	
	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		Same content	
Required Programming	CSE 1222	Intro to C++	2	CSE 202	4	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	3	Math 254	5	Same content	
Required Math	Math 2174	Engineering Mathematics C	3	Math 415	4	Merges Math 415 and Math 568	
	Math 4551	Vector Analysis	3	Math 513	3	Same content	
				Phys 570			
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		
Required/Recommended 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 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		
Other Astronomy	Astron 2193	individual studies	var	Astron 293	var	Same content	
	Astron 2194	group studies	var	Astron 294	var	Same content	
	Astron 4193	individual studies	var	Astron 693	var	Same content	
	Astron 4194	group studies	var	Astron 694	var	Same content	
	Astron 4998	non-thesis research	var	Astron 693	var	Same content	
	Astron 4999	thesis research	var	Astron 693	var	Same content	
	Astron 4999H	honors thesis research		Astron H783	var	Same content	

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 major or minor courses in Astronomy: nearly all of these courses translate directly from 5-hour quarter courses to 3-hour semester courses. The only exception is Astron 295, a 1-hour quarter seminar that students must take twice. This will be replaced with a 1-hour semester seminar, Astron 2895, which students will take only once. As of Autumn 2012, any student who has completed either one quarter of Astron 295 or one semester of Astron 2895 will be deemed to have met the seminar requirement.

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, 415, 513, and 568 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.

Transition Plan for 2011-12 First-Year Students (Class of 2015)											
	Course	Credit Hours	Notes		Course	Credit Hours	Notes		Course	Credit Hours	Notes
Year	Autumn Quarter 2011				Winter Quarter 2012				Spring Quarter 2012		
1	Math 151	5	Prereq		Math 152	5			Math 153	5	Prereq
	Phys 131	5	Prereq		Phys 132	5			Phys 133	5	Prereq
	Astron 295	1	Major		Astron 295	1			CSE 202	4	Major
	GEC	5			GEC	5			GEC	5	
		16				16				19	
	Autumn Semester 2012				Spring Semester 2013						
2	Astron 2291	3	Major		Astron 2292	3	Major				
	Math 2173	3	Prereq		Math 2174	3	Major				
	Math 4551	3	Major		Phys 2301	4	Major				
	Phys 2300	4	Major		Phys 3700	3	Major				
	GEC	3			GEC	3					
		16				16					
	Autumn Semester 2013				Spring Semester 2014						
3	GEC	3			Astron 5681	3	Major				
	Phys 5400/5400H	4	Major		Phys 5401H	4	Major/Recommended				
	Phys 5500/5500H	4	Major		Phys 5501H	4	Major/Recommended				
	GEC	3			GEC	4					
	GEC	3									
		17				15					
	Autumn Semester 2014				Spring Semester 2015						
4	Phys 5600	4	Major		Astron 5682	3	Recommended				
	Astron 3350	3			Phys 5300	4	Recommended				
	GEC	4			GEC	4					
	GEC	3			GEC	3					
	GEC	3									
		17				14					

Transition Plan for 2011-12 Second-Year Students (Class of 2014)									
	Course	Credit Hours	Notes	Course	Credit Hours	Notes	Course	Credit Hours	Notes
Year	Autumn Quarter 2010			Winter Quarter 2011			Spring Quarter 2011		
1	Math 151	5	Prereq	Math 152	5		Math 153	5	Prereq
	Phys 131	5	Prereq	Phys 132	5		Phys 133	5	Prereq
	Astron 295	1	Major	Astron 295	1		CSE 202	4	Major
	GEC	5		GEC	5		GEC	5	
		16			16			19	
	Autumn Quarter 2011			Winter Quarter 2012			Spring Quarter 2012		
2	Astron 291	5	Major	Astron 292	5	Major	Math 415	4	Major
	Math 254	5	Prereq	Math 513	3	Major	Math 568	3	Major
	Phys 261	4	Major	Phys 262	4	Major	Phys 263	4	Major
	GEC	5		GEC	5		Phys 416	4	Major
		19			17			15	
	Autumn Semester 2012			Spring Semester 2013					
3	Astron 3350	3		Astron 5682	3	Major			
	Phys 5400/5400H	4	Major	Phys 5401H	4	Major/Recommended			
	Phys 5500/5500H	4	Major	Phys 5501H	4	Major/Recommended			
	GEC	3		GEC	4				
	GEC	3							
		17			15				
	Autumn Semester 2013			Spring Semester 2014					
4	Phys 5600	4	Major	Astron 5681	3	Recommended			
	GEC	3		Phys 5300	4	Recommended			
	GEC	4		GEC	4				
	GEC	3		GEC	3				
	GEC	3							
		17			14				

Transition Plan for 2011-12 Third-Year Students (Class of 2013)									
	Course	Credit Hours	Notes	Course	Credit Hours	Notes	Course	Credit Hours	Notes
Year	Autumn Quarter 2009			Winter Quarter 2010			Spring Quarter 2010		
1	Math 151	5	Prereq	Math 152	5		Math 153	5	Prereq
	Phys 131	5	Prereq	Phys 132	5		Phys 133	5	Prereq
	Astron 295	1	Major	Astron 295	1		CSE 202	4	Major
	GEC	5		GEC	5		GEC	5	
		16			16			19	
	Autumn Quarter 2010			Winter Quarter 2011			Spring Quarter 2011		
2	Astron 291	5	Major	Astron 292	5	Major	Math 415	4	Major
	Math 254	5	Prereq	Math 513	3	Major	Math 568	3	Major
	Phys 261	4	Major	Phys 262	4	Major	Phys 263	4	Major
	GEC	5		GEC	5		Phys 416	4	Major
		19			17			15	
	Autumn Quarter 2011			Winter Quarter 2012			Spring Quarter 2012		
3	GEC	5	Major	Astron 681	5	Major	Phys 664	4	Recommended
	Phys 555	4	Major	Phys 656	4	Major	GEC	5	
	Phys 631	4	Major	Phys 632	4	Major	GEC	5	
	GEC	3		GEC	5		GEC	5	
		16			18			19	
	Autumn Semester 2012			Spring Semester 2013					
4	Phys 5600	4	Major	Astron 5682	3	Recommended			
	Astron 3350	3	Major	Phys 5300	4	Recommended			
	GEC	4		GEC	4				
	GEC	3		GEC	3				
	GEC	3							
		17			14				

Required Astronomy Courses	Goal #1	Goal #2	Goal #3	Goal #4	Goal #5	Goal #6
Astron 2291	intermediate	intermediate	beginning			
Astron 2292	intermediate	intermediate	beginning			
Astron 2895			beginning			beginning
Astron 3350		intermediate	intermediate	intermediate	intermediate	
Astron 5681	advanced	advanced	advanced			
Astron 5682	advanced	advanced	advanced			
Other Required Courses						
Math 2174		intermediate				
Math 4551		advanced				
Phys 2300	intermediate	intermediate				
Phys 2301	intermediate	intermediate				
Phys 3470	advanced	advanced				
Phys 5300	advanced	advanced		advanced		
Phys 5400/5400H	advanced	advanced				
Phys 5401H	advanced	advanced				
Phys 5500/5500H	advanced	advanced				
Phys 5501H	advanced	advanced				
Phys 5600	advanced	advanced				
Rerequisite Courses						
CSE 1222		beginning				
Math 1151		beginning				
Math 1172		beginning				
Math 2173		beginning				
Phys 1250/1250H	beginning	intermediate				
Phys 1251/1251H	beginning	beginning				
Phys 3700	intermediate	intermediate		intermediate		
Elective Courses						
Phys 5300	advanced	advanced		advanced		
Astron 5681/5682 (only one required)	advanced	advanced	advanced	advanced		
Astron 4998/4999/4999H			advanced		advanced	
Astron 2193			intermediate		advanced	
Astron 2194			intermediate			
Astron 4193			advanced		advanced	
Astron 4194			advanced			
writing courses					intermediate	