Status: PENDING | **PROGRAM REQUEST** Physics | Last Updated: Myers,Dena Elizabeth 04/05/2011

Fiscal Unit/Academic Org	Physics - D0684
Administering College/Academic Group	Mathematical And Physical Sci
Co-adminstering College/Academic Group	
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	Physics
Proposed Program/Plan Name	Physics
Program/Plan Code Abbreviation	PHYSICS-MS
Current Degree Title	Master 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		45	30.0	30	0.0
Required credit hours offered by the unit	Minimum	45	30.0	30	0.0
	Maximum	50	33.3	33	0.3
Required credit hours offered outside of the unit	Minimum	0	0.0	0	0.0
	Maximum	0	0.0	0	0.0
Required prerequisite credit hours not included above	Minimum	0	0.0	0	0.0
	Maximum	0	0.0	0	0.0

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? Yes

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

Status: PENDING

PROGRAM REQUEST
Physics

Last Updated: Myers,Dena Elizabeth
04/05/2011

Attachments

- mastersProgramProposalMar10.pdf: Program proposal

  (Program Proposal. Owner: Hughes,Richard E)

- Physics MS 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	Hughes,Richard E	02/15/2011 06:10 AM	Submitted for Approval
Approved	Hughes,Richard E	02/15/2011 06:10 AM	Unit Approval
Revision Requested	Andereck,Claude David	02/23/2011 03:00 PM	College Approval
Submitted	Hughes,Richard E	03/07/2011 05:17 AM	Submitted for Approval
Approved	Hughes,Richard E	03/07/2011 05:26 AM	Unit Approval
Revision Requested	Andereck,Claude David	03/09/2011 10:48 AM	College Approval
Submitted	Hughes,Richard E	03/10/2011 07:10 AM	Submitted for Approval
Approved	Hughes,Richard E	03/10/2011 08:53 AM	Unit Approval
Approved	Andereck,Claude David	04/04/2011 01:34 PM	College Approval
Approved	Myers,Dena Elizabeth	04/05/2011 02:50 PM	GradSchool Approval
Pending Approval	Soave,Melissa A	04/05/2011 02:50 PM	CAA Approval

THE OHIO STATE UNIVERSITY

Division of Natural and Mathematical Sciences

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230 North Oval Mall
Columbus, OH 43210

Phone (614) 292-8908
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April 1, 2011

Dena Myers
Graduate School
250 University Hall
230 North Oval Mall
Campus

Dear Dena:

It is a pleasure to forward to you the proposal for the masters program in Physics under semesters. The program is similar to its quarter version, with considerable flexibility in courses that may count toward the degree. The two main constraints are the levels of courses required, and the inclusion of research credit hours. The option to obtain a masters degree upon completion of the candidacy examination for the PhD exists as well, of course, following Graduate School rules.

Beyond my own review of the documents, the proposal has been discussed by colleagues from other NMS units at a meeting on February 23, 2011. Feedback from these 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

THE OHIO STATE UNIVERSITY

Department of Physics

Office of the Chair
191 West Woodruff Avenue
Columbus, OH 43210-1117

Phone (614) 292-2653
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To: Office of Academic Affairs
From: James J. Beatty, Chair, Department of Physics
Date: February 28, 2011
Re: Semester Program Proposal for Physics Masters Program

The Physics department has the following programs which will be converted from quarters to semesters:
1) The Undergraduate Engineering Physics Major
2) The Undergraduate Physics Major
3) The Undergraduate Physics Minor
4) The Combined Physics BS/MS
5) The Graduate Physics Masters
6) The Graduate Physics PhD

The subject of this proposal is the Physics Graduate Masters program; the other programs are addressed in separate proposals.

The Graduate Studies Committee of the Department of Physics has worked hard to produce this proposal, describing the conversion of our current Graduate Masters program from the quarter system to the semester system.

The contents of this proposal have been discussed at length in a variety of Graduate Studies Committee meetings as well as faculty meetings through the 2009-2010 academic year.

A vote on this proposal was taken on February 11, 2011. The outcome of the vote was 37 in favor, 0 opposed. As Chair of this department, I strongly endorse this proposal.

The Physics Masters Program Under Semesters

Rationale for Changes to the Masters Program from quarters to semesters

There are no significant changes to the Physics Masters Program under semesters, compared to the present program under quarters.

Masters in Physics program under semesters

i) **General information**

The program for the master's degree is not fixed, but is planned by the student and a member of the Graduate Faculty who acts as an advisor to meet the student's individual needs and interests.
Each candidate for the master's degree must fulfill all Graduate School requirements for that degree. The student should become familiar with the current requirements and the order in which they must be fulfilled.

ii) **Options**

a) **Plan A and Plan B**: These two options require the completion of a minimum amount of coursework, a minimum number of research credits, and a written thesis or report on the students research. In addition, students in these options must pass a Final Oral Examination. These students are not expecting to complete the PhD program. More details on these plans are given below.

b) **Non-thesis, Ph.D. Candidacy**: A student who has been admitted to candidacy (passed the Candidacy Examination) for the Ph.D. degree may be recommended for the M.S. degree by the Departmental Graduate Studies Committee without prejudice to her/his status as a candidate for the doctorate. Students in this situation need to notify the Graduate School that they will be continuing on to the Ph.D. so that they can enroll for the next quarter. Application for the M.S. degree under this option must be initiated by the graduate student on the appropriate Graduate School form which must be signed by her/his advisor and the Vice Chair for Graduate Studies and Research.

iii) **Summary and comparison to the program under quarters**

a) **Program under quarters**

1) Minimum GPA of 3.0 (B average) in all required courses. The required courses include:
   a) 2 physics courses at the 800-level
   b) 3 Physics courses at the 600-level or above

   The total hours in the above required courses is 20 quarter-hours.
2) A minimum of 10 quarter-credit hours of research.
3) A minimum of 45 (Plan A) or 50 (Plan B) quarter-credit hours total.
4) A written thesis (Plan A) or report (Plan B) and final oral examination.

b) **Program under semesters**

1) Minimum GPA of 3.0 (B average) in all required courses. The required courses include:
   a) 1 physics course at the 7000-level or above
   b) 1 physics course at the 6000-level or above
   c) 2 Physics courses at the 5000-level or above

   The total hours in the above required courses ranges from 12-15 semester-credit hours.

2) A minimum of 10 semester-credit hours of research.
3) A minimum of 30 (Plan A) or 33 (Plan B) semester-credit hours total.
4) A written thesis (Plan A) or report (Plan B) and final oral examination.

iv) **Plan A and Plan B Masters Requirements - Details**

a) All students together with their advisor will be responsible for the development of a program of course work and research appropriate to her/his background, abilities, and goals.

b) Plan A students must take a minimum of 30 semester hours of graduate credit, while Plan B students must take a minimum of 33 semester hours of graduate credit.

(1) All students must take a minimum of 10 semester-hours of research credit. These hours are normally satisfied by Physics 7998 or 8998.

(2) Minimum GPA of 3.0 (B average) in all required courses. The required courses include:

- 1 physics course at the 7000-level or above.
- 1 physics course at the 6000-level or above.
- 2 physics courses at the 5000-level or above.

c) Plan A students must present a formal thesis, which follows the formatting guidelines from the graduate school and requires submission of the Thesis Approval form to the Graduate School and electronic submission of the approved thesis to OhioLink and payment of microfilming fees by the published deadline for the quarter of graduation. Plan B students must present a written report which along with their above research hours demonstrates competence in individual research.

d) All students must pass a Final Oral Examination. The oral portion of the Master's Examination is held after the submission for approval of the thesis (plan A) or final written report (plan B) and in the semester the student expects to graduate. An "Application to Graduate" form must be filed with the Graduate School by the appropriate deadline for that semester. The oral examination will be at least one hour in length. It will be conducted by a committee composed of the candidate's advisor (chairperson) and at least one other member of the graduate faculty. The chairperson of the examining committee is responsible for arranging the examination and for certifying its results to the Graduate School and to the departmental Graduate Studies Committee. (There is a form for the report to the Graduate School.) The report of a two-person committee must be unanimous in order to be considered satisfactory. The certification to the Graduate School of the successful completion of the requirements for plan B shall be made by the student's advisor and the Vice Chair for Graduate Studies and Research. A candidate who fails this examination must register in the Graduate School and continue work for an additional semester before an opportunity will be given for a second examination. No student will be permitted a third examination.

Masters in Physics (Plan B) 1-year sample program under semesters

Autumn	Spring	May	Summer
Physics 7701 (3)	Physics 68xx (4)	Physics 7998 or 8999(3)	Physics 7998 or 8999(9)
Physics 7601 (3)	Physics 68xx (4)		
Physics 7501 (3)	Physics 7998 (4)		

Transition Policy

Students who began their degree under quarters will not be penalized as we move to semesters, either in terms of progress towards their degree or their expected date of graduation. Most Plan A or B Masters students should be able to finish their degree in one year of study.

The overall credit requirements are the same under quarters or semesters for both Plans. The requirements are slightly different for quarters and semesters in the two broad categories of course hours and research hours: more research hours and less coursework hours are required under semesters.

Students who begin their study under quarters but finish under semesters will use the following guidelines:

1) Students will be allowed to graduate under fully quarter requirements or fully semester requirements, with the standard conversion of 1 quarter hour of credit being equal to (2/3) semester hour of credit.
2) 7000-level courses under semesters will count as 800-level courses under quarters and vice versa. Same for 6000-level semester courses and 700-level quarter courses, as well as 5000-level semester courses and 600-level quarter courses.
3) The minimum required coursework hours will be 20 quarter hours for graduating under quarter requirements, and 12 semester hours for graduating under semester requirements.
4) The minimum required research hours will be 10 quarter hours for graduating under quarter requirements, and 10 semester hours for graduating under semester requirements.

Students who begin their study under semesters can only graduate under fully semester requirements.

COLLEGE OF ARTS AND SCIENCES: MASTERS in PHYSICS: Semester Advising Sheet						
Last name:					Address	
First Name:					City	
Middle:					Zip Code	
OSU ID						
lastname.#						
Expected graduation		(semester)			(year)	

Required courses: Students must complete 1 Physics course at 7000-level , 1 Physics course at 6000-level or above, and 2 Physics courses at 5000-level or above.			**Total Graduate Credit Hours Earned:**	
List the courses below, along with the credit hours and grade attained:				
			Plan A Requirements:	**Completed**
Courses	**Credits**	**Grade**	1) Minimum GPA of 3.0 (B) in required courses.	
Course 1:			2) Minimum 10 hours of research	
Course 2:			3) Minimum of 30 credit hours	
Course 3:			4) Satisfactory presentation of formal Thesis	
Course 4:			5) Pass Final Oral Examination	
Course 5:				**Completed**
			Plan B Requirements:	
A minimum of 10 hours of research required			1) Minimum GPA of 3.0 (B) in required courses.	
Course	**Credits**	**Grade**	2) Minimum 10 hours of research	
Physics 7998			3) Minimum of 33 credit hours	
Physics 8998			4) Demonstration of competence in individual research	
			5) Pass Final Oral Examination	
List any other graduate-level courses				
Course	**Credits**	**Grade**	Masters Option Plan Chosen (circle one): Plan A Plan B	
Course 1:			**Signature of Advisor:**	
Course 2:				
Course 3:				
Course 4:				
Course 5:			**Signature of Grad Vice Chair:**	

The Master's Examination written portion:
A student working for a Master's degree under plan B (non-thesis option) is required by the Graduate School to pass a written portion of the Master's Examination designed to test the candidate's ability in physics. In the Department of Physics, the final written report is used to satisfy this requirement.

The Master's Examination Oral Portion
The oral portion of the Master's Examination is held after the submission for approval of the thesis (plan A) or final written report (plan B) and in the quarter the student expects to graduate. An "Application to Graduate" form must be file with the Graduate School by the appropriate deadline for that semester.
The oral examination will be at least one hour in length. It will be conducted by a committee composed of the candidate's advisor (chairperson) and at least one other member of the graduate faculty.
The chairperson of the examining committee is responsible for arranging the examination and for certifying its results to the Graduate School and to the departmental Graduate Studies Committee. (There is a form for the report to th Graduate School.) The report of a two-person committee must be unanimous in order to be considered satisfactory. The certification to the Graduate School of the successful completion of the requirements for plan B shall be made by the student's advisor and the Vice Chair for Graduate Studies and Research.
A candidate who fails this examination must register in the Graduate School and continue work for an additional semester before an opportunity will be given for a second examination. No student will be permitted a third examination.

Quarter Advising Sheet for Masters

COLLEGE OF ARTS AND SCIENCES: MASTERS in PHYSICS: Quarter Advising Sheet						
Last name:					Address	
First Name:					City	
Middle:					Zip Code	
OSU ID						
lastname.#						
Expected graduation		(quarter)			(year)	

All Masters students must complete at least 5 of the courses below, including two at the 800-level:

Total Graduate Credit Hours Earned:

Courses	Credits	Grade
Physics 617		
Physics 821		
Physics 822		
Physics 846		
Physics 847		
Physics 827		
Physics 828		
Physics 829		
Physics 834		
Physics 835		
Physics 836		
Physics 780.xx		
Physics 780.xx		
Physics 780.xx		
Physics 780.xx		
Physics 780.xx		

A minimum of 10 hours of research required

Course	Credits	Grade
Physics 816		
Physics 999		

Plan A Requirements:

1) Minimum GPA of 3.0 (B) in required courses.
2) Minimum 10 hours of research
3) Minimum of 45 credit hours
4) Satisfactory presentation of formal Thesis
5) Pass Final Oral Examination

Plan B Requirements:

1) Minimum GPA of 3.0 (B) in required courses.
2) Minimum 10 hours of research
3) Minimum of 50 credit hours
4) Demonstration of competence in individual research
5) Pass Final Oral Examination

Masters Option Plan Chosen (circle one): Plan A Plan B

Signature of Advisor:

_____

Signature of Grad Vice Chair:

_____

The Master's Examination written portion:
A student working for a Master's degree under plan B (non-thesis option) is required by the Graduate School to pass a written portion of the Master's Examination designed to test the candidate's ability in physics. In the Department of Physics, the final written report is used to satisfy this requirement.

The Master's Examination Oral Portion
The oral portion of the Master's Examination is held after the submission for approval of the thesis (plan A) or final written report (plan B) and in the quarter the student expects to graduate. An "Application to Graduate" form must be filed with the Graduate School no later than the second Friday of that quarter.
The oral examination will be at least one hour in length. It will be conducted by a committee composed of the candidate's advisor (chairperson) and at least one other member of the graduate faculty.
The chairperson of the examining committee is responsible for arranging the examination and for certifying its results to the Graduate School and to the departmental Graduate Studies Committee. (There is a form for the report to the Graduate School.) The report of a two-person committee must be unanimous in order to be considered satisfactory. The certification to the Graduate School of the successful completion of the requirements for plan B shall be made by the student's advisor and the Vice Chair for Graduate Studies and Research.
A candidate who fails this examination must register in the Graduate School and continue work for an additional quarter before an opportunity will be given for a second examination. No student will be permitted a third examination.

Course conversion map; page 1

Semester Course Number	Course Title	Semester Units		Quarter Equivalent Course Number	Quarter Credits	Notes
Combined Undergrad/Grad Level Courses						
Physics 5400/5400H	E&M I	4		Physics 555	4	Semester course has all of 555 and some of 656
				Physics 656	4	
Physics 5500/5500H	Quantum I	4		Physics 631	4	Semester course has all of 631 and some of 632
				Physics 632	4	
Physics 5700	Advanced Laboratory	3		Physics 616	4	Same content
Physics 5401H	E&M II	4		Physics 656	4	Semester course has some of 656 and all of 657
				Physics 657	4	
Physics 5501H	Quantum II	4		Physics 632	4	Semester course has some of 632 and all of 633
				Physics 633	4	
Physics 5600	Statistical Physics	4		Physics 621	4	Semester course has all of 621 and some of 622
				Physics 622	4	
Physics 5300	Theoretical Mechanics	4		Physics 664	4	Enhanced content
Graduate Introductory						
Physics 6802	Topics in Elementary Particle Physics	4		Physics 780.xx	4	Enhanced content
Physics 6803	Topics in Astroparticle Physics	4		Physics 780.xx	4	Enhanced content
Physics 6804	Topics in Atomic and Molecular Physics	4		Physics 780.xx	4	Enhanced content
Physics 6805	Topics in Nuclear Physics	4		Physics 780.xx	4	Enhanced content
Physics 6806	Topics in Condensed Matter Physics	4		Physics 780.xx	4	Enhanced content
Physics 6809	Topics in Biophysics	4		Physics 780.xx	4	Enhanced content
Physics 6810	Topics in Computational Physics	4		Physics 780.xx	4	Enhanced content
Physics 6820	Special Topics	4		Physics 780.xx	4	Enhanced content
Physics 6780	Special Topics Seminar	1		Physics 795	1	Same content

Course conversion map; page 2

Semester Course Number	Course Title	Semester Units		Quarter Equivalent Course Number	Quarter Credits	Notes
Graduate Core						
7701	Analytic and Numeric methods of Physics	3.00		Physics 730	4	Semester course has some of 730 and some of 834
				Physics 834	4	
7401	Electromagnetic Field Theory	3.00		Physics 835	4	Semester course has some of 835 and some of 836
				Physics 836	4	
7501	Quantum Mechanics 1	3.00		Physics 827	5	Semester course has some of 827 and some of 828
				Physics 828	5	
7502	Quantum Mechanics 2	3.00		Physics 828	5	Semester course has some of 828 and some of 829
				Physics 829	5	
7601	Classical and Statistical Physics I	3.00		Physics 821	4	Semester course has all of 821 and some of 846
				Physics 846	4	
7602	Classical and Statistical Physics II	3.00		Physics 846	4	Semester course has some of 846 and some of 847
				Physics 847	4	
Graduate Advanced						
7503	Quantum Mechanics 3	3.00		Physics 830	4	Enhanced content
7603	Advanced Statistical Physics	3.00		Physics 848	4	Enhanced content
7891	Departmental Seminar or Workshop	Variable		Physics 816	Variable	Semester version
7998	Graduate Research	Variable		Physics 816	Variable	Semester version
8301	Elasticity and Fluid Mechanics	3.00		Physics 822	4	Content of 822
8802.01	Topics in Elementary Particle Physics 1	3.00		Physics 880.02	3	Enhanced content
8802.02	Topics in Elementary Particle Physics 2	3.00		Physics 880.02	3	Enhanced content
8803.01	Topics in Astroparticle Physics 1	3.00		Physics 880.20	3	Enhanced content

Course conversion map; page 3

Semester Course Number	Course Title	Semester Units		Quarter Equivalent Course Number	Quarter Credits	Notes
8803.02	Topics in Astroparticle Physics 2	3.00		Physics 880.20	3	Enhanced content
8804.01	Topics in Atomic and Molecular Physics 1	3.00		Physics 880.20	3	Enhanced content
8804.02	Topics in Atomic and Molecular Physics 2	3.00		Physics 880.20	3	Enhanced content
8805.01	Topics in Nuclear Physics	3.00		Physics 880.05	3	Enhanced content
8805.02	Topics in Nuclear Physics	3.00		Physics 880.05	3	Enhanced content
8806.01	Topics in Condensed Matter Physics 1	3.00		Physics 880.06	3	Enhanced content
8806.02	Topics in Condensed Matter Physics 2	3.00		Physics 880.06	3	Enhanced content
8808.01	Topics in the theory of Quantized Fields 1	3.00		Physics 880.08	3	Enhanced content
8808.02	Topics in the theory of Quantized Fields 2	3.00		Physics 880.08	3	Enhanced content
8809.01	Topics in Biophysics	3.00		Physics 880.20	3	Enhanced content
8809.02	Topics in Biophysics	3.00		Physics 880.20	3	Enhanced content
8820	Special Topics	3.00		Physics 880.20	3	Enhanced content
8999	Research in Physics	Variable		Physics 999	Variable	Semester version

Comparison of Masters and BS/MS Programs under quarters and semesters.						
Requirements	**BS/MS under semesters**	**BS/MS under Quarters**	**Masters Plan A under semesters**	**Masters Plan A under quarters**	**Masters Plan B under semesters**	**Masters Plan B under quarters**
Physics Courses	1 at 7000 level or above	2 at 800 level	1 at 7000 level or above	2 at 800 Level	1 at 7000 level or above	2 at 800 Level
	2 at 5000 level or above	3 at 600 level or above (see note 1)	2 at 5000 level or above	3 at 600 or above (see note 2)	2 at 5000 level or above	3 at 600 or above (see note 2)
Other grad Courses (could be physics)	2 approved grad courses	2 approved grad courses	1 at 6000 level or above (see note 3)	none	1 at 6000 level or above (see note 3)	none
Credit hours in courses QH: Quarter hours SH: Semester hours	15-19 SH (=22.5-28.5 QH)	26-28 QH	12-15 SH (=18-22.5 QH)	20 QH	12-15 SH (=18-22.5 QH)	20 QH
Research hours	10	14	10	10	10	10
Maximum double counted hours	12 for BS	20 for BS	None	None	None	None
Total hours	33	50	30	45	33	50
Thesis	No	No	Yes	Yes	No	No
Note 1:	Physics courses required for the BS/MS are allowed to be any 600-level course or above. Note that only 20 of these hours can be double counted for the BS and MS degrees.					
Note 2:	Physics courses required for the Masters (Plans A and B) under quarters are specified in a list, which included Physics 617, Physics 780.xx, and Physics 8xx courses. So the requirement is not exactly 3 courses at 600-level or above.					
Note 3:	This course is expected to be a 6000-level or higher Physics course. Exceptions to this (e.g. 5000-level Statistics course) are allowed if approved by the student's faculty advisor.					