

Fiscal Unit/Academic Org	Physics - D0684
Administering College/Academic Group	Mathematical And Physical Sci
Co-administering 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	Chemical Physics
Proposed Program/Plan Name	Chemical Physics
Program/Plan Code Abbreviation	CHEMPHY-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				
	Maximum				
Required credit hours offered outside of the unit	Minimum				
	Maximum				
Required prerequisite credit hours not included above	Minimum				
	Maximum				

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

Attachments

- chemphys transition to semesters-masters.pdf

(Program Proposal. Owner: Lafyatis, Gregory Paul)

Comments

- The attached includes all the required quarter to semester conversion documents in the requested order *(by*

Lafyatis, Gregory Paul on 07/10/2011 09:15 PM)

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Lafyatis, Gregory Paul	07/10/2011 09:15 PM	Submitted for Approval
Approved	Hughes, Richard E	07/13/2011 02:50 PM	Unit Approval
Pending Approval	Andereck, Claude David	07/13/2011 02:50 PM	College Approval



Chemical Physics
<http://chemphys.chemistry.ohio-state.edu/chemphys>

120 West 18th Avenue
Columbus, OH 43210-1173

Phone 614-292-2569
FAX 614-292-1948
chemphys@chemphys.chemistry.ohio-state.edu

July 5, 2011

TO: Office of Academic Affairs
FROM: Terry A. Miller, Chair, Chemical Physics Program
RE: Semester Program Proposal for Chemical Physics Masters Program

Chemical Physics has the following programs which will be converted from quarters to semesters:

- 1) The Graduate Chemical Physics Masters
- 2) The Graduate Chemical Physics PhD

The subject of this proposal is the Chemical Physics Masters program; the other program is addressed in a separate proposal.

The Chemical Physics Graduate Studies Committee has worked extensively 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 by the Graduate Studies Committee and were unanimously approved June 22.

The proposal was circulated to the entire Chemical Physics faculty with a request for comment or objections. Only one objection was received concerning format issues, which has been resolved. As Chair of the Chemical Physics Graduate Studies Committee, I strongly endorse this proposal.

Rationale for Changes to the Masters Program from quarters to semesters

Overall, the goals and requirements are essentially unchanged. With minimal exceptions detailed below, the required courses for a Chemical Physics Masters Degree are offered by either the Physics or Chemistry Departments. Each department has supplied a detailed mapping of the quarter to semester conversion. The Chemical Physics program has followed this map to offer nearly equivalent core and elective course requirements under quarters and semesters. The tables below summarize this mapping.

<u>Core Areas</u>	<u>Courses</u>			
	<u>Chemistry</u> <u>Quarters</u>	<u>Chemistry</u> <u>Semesters</u>	<u>Physics</u> <u>Quarters</u>	<u>Physics</u> <u>Semesters</u>
1) Quantum Mechanics	861, 862, 863	6510,6540,7520	827,828,829, 830	7501,7502,7503
2) Statistical Mechanics/ Thermodynamics/Kinetics	880, (775 or 876)	6520,6530, 7550	846,847	7601, 7602
3) Spectroscopy	866	7530		* (I)
4) Safety Seminar (to be completed in first year)	685	6781		

* Depending on topic Physics 880.20 → Physics 8804.1 may satisfy this requirement

<u>Elective Areas</u>	<u>Suggested Courses</u>			
	<u>Chemistry</u> <u>Quarters</u>	<u>Chemistry</u> <u>Semesters</u>	<u>Physics</u> <u>Quarters</u>	<u>Physics</u> <u>Semesters</u>
Optics	-	7570	657	3470
Classical Mechanics	-		821	7601
Kinetics	876	7540		-
Electricity and Magnetism	-		834,835	7401
Condensed Matter Physics	-	7580	780.06	8806.1
Atomic Physics/ Spectroscopy			780.04	8804.1
Analytic Spectroscopy	823(S)	7140		-
Electrochemistry	821(A)	7120		-
Advanced Topics	-	6550,7570	880.0X	880X.X
Special Topics of Current Interest	996 (I)	8599,8699	880.20	6810,6820

Mathematics	Appropriate math courses at the 500 level (→4000 level) or above, e.g., Math 601(A), 602(W) (→ Math 4512,4551,4552,4557,4568) or Physics 730,731 (→ Physics 7701)
-------------	---

Chemical Physics of course offers doctoral research (CP8999) and non-doctoral research (CP7998) under semesters which map trivially from their counterparts under quarters. Chemical Physics also offers the Frontiers in Spectroscopy course featuring (usually) outside speakers presenting 3 days of lectures on specific topics. Under quarters this course offers 5 speakers with interspersed reading weeks. Under semesters it (CP8880) will be a half semester course offering 4 weeks of lectures plus 3 reading period weeks.

CHEMICAL PHYSICS SEMESTER COURSES

Semster Course Number	Course Title	Semester Credits	Quarter Equivalent course
CP8880	Frontiers in Spectroscopy	1.5-3	880
CP7998	Research	arranged	
CP8999	Doctoral Research	arranged	999

CHEMICAL PHYSICS MASTERS PROGRAM UNDER SEMESTERS

General Information

The graduate degree program in Chemical Physics has several options:

- I Terminal M.S. degree
- II M.S. degree followed by Ph.D.
- III Ph.D. degree, not preceded by the M.S. degree

The choice among these programs will be determined on the basis of the student's academic record and his/her performance on the Integrated Oral Examination (IOE).

The **IOE** is given on an individual basis, but will normally be taken at the end of Spring Quarter or the beginning of Summer Quarter of the student's first year. At this point, the student should have completed most of the course requirements listed above. The IOE shall be administered by 3 Chemical Physics faculty members appointed by the Graduate Studies Chairperson and will test the depth and integration of understanding of the student's knowledge in the core Chemical Physics areas as indicated above and in selected other areas of the student's specialization. The examination shall be oral. In the case of an overall ambiguous performance, the committee can require a second, written examination.

The Chemical Physics program has both thesis and non-thesis options for the Masters Degree.

Graduate School:

The student must fulfill all of the Graduate School requirements. The current requirements and the order in which they must be fulfilled are listed in the Graduate School Handbook.

Foreign Language:

All international students who are not citizens of countries in which English is the official language are required to be certified in spoken English prior to the end of the second semester of study, not including Summer Term, by the department (Chemistry or Physics) wherein they hold a TA appointment. In addition, the Graduate School requires that English XXXX (a writing course) or its equivalent be completed within one year of entering graduate school.

M.S. Degree with Thesis. The student must have a minimum residence of two semesters at The Ohio State University with completion of at least 30 semester hours of graduate work, including credit for research. Course work must be at the 6000-9000 level (6000 or above outside the Physics and Chemistry Departments), and the courses must be acceptable to the Chemical Physics Graduate Studies Committee and the student's advisor, and must include the core courses listed in the Doctoral program. The student's course program should be decided in conjunction with the thesis advisor.

Students will carry out a research program that will culminate in the writing of a thesis. The research program should be initiated as soon as possible after preceptor selection.

At least two weeks prior to the date proposed for conferring the M.S. degree, the candidate must pass an oral examination before a committee, approved by the Graduate Studies Committee Chairperson and composed of at least three Chemical Physics faculty (including the advisor). Should the graduate record of the candidate be wholly satisfactory to the examining committee, the scope of the examination will be confined to the candidate's field of specialization.

M.S. Degree without Thesis. The following provision is made for granting a terminal Master's degree only without the necessity of completing a thesis. Upon application by the student, he/she must have satisfied the course requirements above for the Master's degree, passed the IOE at level 3 (see ChemPhys Ph.D. program requirements) and successfully completed both the written and oral portion of an exam comparable to the General Examination (see ChemPhys Ph.D. program requirements)

The course requirements may be divided into two categories: i) core requirements and ii) elective requirements. Each student must satisfy each of the following three core requirements for a total minimum of 5 full semester-equivalent courses (15 credit hours). The core areas are:

	Area	Suggested Course	
		Chemistry	Physics
1)	Quantum Mechanics	6510(Au-1), 6540(Au-2), 7520(Sp)	7501(Au), 7502(Sp), 7503(Au)
2)	Statistical Mechanics/ Thermodynamics/Kinetics	6520(Au-1), 6530(Au- 2), 7550(Sp), 7540 (every other year)	7601(Au), 7602(Sp)
3)	Spectroscopy	7530 (every other year)	* (I)

* Depending on topic 8804.XX may satisfy this requirement

If the student does chemical research, the Safety Seminar, Chem 7681, must be taken.

(Letters in parenthesis indicates semester normally offered: (Au)=autumn; (Sp)=spring; 1, 2 indicates half-semester courses. All full semester courses are 3 credit hour courses; ½ semester courses are 1.5 credit hour courses)

To fulfill the core requirement in each area the student may take the appropriate courses in either department (but not both). These courses will normally be taken during the student's first year of enrollment (except for Physics 7503).

In addition, the student must also demonstrate proficiency in several electives exemplified by the following:

<u>Area</u>	<u>Suggested Course</u>	
	<u>Chemistry</u>	<u>Physics</u>
Frontiers in Spectroscopy	ChemPhys 8880	
Laser and Optics	7580	3470
Kinetics	7540	-
Electricity and Magnetism	-	7401
Condensed Matter Physics	7590	8806.1
Atomic Physics/Spectroscopy		8804.1
Analytic Spectroscopy	7140	-
Electrochemistry	7120	-
Advanced Topics	6550, 7570	880X.X
Special Topics of Current Interest	8599, 8699	6810, 6820
Mathematics	Appropriate math courses at the 4000 level or above, e.g., Math 4512, 4551, 4552, 4557, 4568, Phys 7701	

Overall the student must complete the equivalent of 9 credit hours of these elective requirements, with at least one of these being completed within the first year. Credit in the core areas in excess of 5 semester courses may be applied to fulfill up to 2 of the 3 course elective credit requirements. However, for the Chemical Physics degree, a student must accumulate a total of at least 6 credit hours in each of the Chemistry and the Physics Departments. ChemPhys8880-Frontiers in Spectroscopy, taken for a letter grade, will count as one elective.

Chemical Physics also offers research courses as follows:

<u>Research</u>	<u>Course</u>	<u>Hours</u>
Non-Doctoral Research	ChemPhys7998	By Arrangement
Doctoral Research	ChemPhys8999	By Arrangement Nominally 3 credit hours/quarter

In summary, degree program will consist of at least 15 credit hours of core courses, at least 9 hours of elective courses with research taking up the balance to a minimum 30 credit hours, total.

Sample Plan (Thesis Option)

Year 1 (total Hours: 31)

Autumn	Spring	May	Summer
Chem 6510/6540* (3)	Chem 7520 (3)	ChemPhys 7998 (3)	ChemPhys 7998 (8)
Physics 7601 (3)	Physics 7602 (3)		
Physics 7701 (3)	Physics 7401 (3)		IOE
Chem 8895 (1)	Chem 8895 (1)		

Year 2 (total Hours: 24)

Autumn	Spring
Chem 7530 (3)	ChemPhys 8880 (3)
ChemPhys 7998 (8)	ChemPhys 7998 (8)
Chem 8895 (1)	Chem 8895 (1)

* Chem 6510 and 6540 are sequential half semester courses.

Chemical Physics Masters program under quarters

I. MASTERS PROGRAM

M.S. Degree with Thesis. The student must have a minimum residence of three quarters at The Ohio State University with completion of at least 45 quarter hours of graduate work, including credit for research. Course work must be at the 600-900 level (500 or above outside the Physics and Chemistry Departments), and the courses must be acceptable to the Chemical Physics Graduate Studies Committee and the student's advisor, and must include the core courses listed in the Doctoral program. The student's course program should be decided in conjunction with the thesis advisor.

Students will carry out a research program that will culminate in the writing of a thesis. The research program should be initiated as soon as possible after preceptor selection.

At least two weeks prior to the date proposed for conferring the M.S. degree, the candidate must pass an oral examination before a committee, approved by the Graduate Studies Committee Chairperson and composed of at least three Chemical Physics faculty (including the advisor). Should the graduate record of the candidate be wholly satisfactory to the examining committee, the scope of the examination will be confined to the candidate's field of specialization.

M.S. Degree without Thesis. The following provision is made for granting a terminal Master's degree only without the necessity of completing a thesis. Upon application by the student, he/she must have satisfied the course requirements above for the Master's degree, passed the IOE at level 3 (see Section VI.B.1) and successfully completed both the written and oral portion of an

exam comparable to the General Examination (see VI.B.2)

The course requirements may be divided into two categories: i) core requirements and ii) elective requirements. Each student must satisfy each of the following three core requirements for a total minimum of 6 courses. The core areas are:

	<u>Area</u>	<u>Suggested Course</u>	
		<u>Chemistry</u>	<u>Physics</u>
1)	Quantum Mechanics	861(A), 862(W), 863(S)	827(A), 828(W), 829(S), 830(A)
2)	Statistical Mechanics/ Thermodynamics/Kinetics	880(S), (775(A) or 876(W))	846(W), 847(S)
3)	Spectroscopy	866(S odd years)	* (I)
4)	Safety Seminar (to be completed in first year)	685 (W)	

* Depending on topic 880.20 may satisfy this requirement

(Letter in parenthesis indicates quarter normally offered: (A)=Autumn; (W)=Winter; (S)=Spring; (I)=Irregular)

To fulfill the core requirement in each area the student may take the appropriate courses in either department (but not both). These courses will normally be taken during the student's first year of enrollment (except for Physics 830).

In addition, the student must also demonstrate proficiency in several electives in at least two areas exemplified by the following:

<u>Area</u>	<u>Suggested Course</u>	
	<u>Chemistry</u>	<u>Physics</u>
Optics	-	657(S)
Classical Mechanics	-	821(A)
Kinetics	876(W)	-
Electricity and Magnetism	-	834(A), 835(W)
Condensed Matter Physics	-	780.06(S)
Atomic Physics/Spectroscopy		780.04((A) also Astron 823)
Analytic Spectroscopy	823(S)	-
Electrochemistry	821(A)	-
Advanced Topics	-	880.0X (I)
Special Topics of Current Interest	996 (I)	880.20 (I)
Mathematics	Appropriate math courses at the 500 level or above, e.g., Math 601(A), 602(W), Phys 730(Su), 731(W)	

Overall the student must complete the equivalent of 4 courses of these elective requirements, with at least half of these being completed within the first year. Credit in the core areas in excess of 6 courses may be applied to fulfill up to 2 courses of the 4 courses elective credit requirements. However, for the Chemical Physics degree, a student must normally accumulate a total of at least 3 courses from the core and elective courses in each of the Chemistry and the Physics Departments. (ChemPhys880(W)-Frontiers in Spectroscopy taken for a grade will count as an elective.)

The **IOE** is given on an individual basis, but will normally be taken at the end of Spring Quarter or the beginning of Summer Quarter of the student's first year. At this point, the student should have completed most of the course requirements listed above. The IOE shall be administered by 3 Chemical Physics faculty members appointed by the Graduate Studies Chairperson and will test the depth and integration of understanding of the student's knowledge in the core Chemical Physics areas as indicated above and in selected other areas of the student's specialization. The examination shall be oral. In the case of an overall ambiguous performance, the committee can require a second, written examination.

Chemical Physics Masters Transition Policy

Students who began their degree under quarters will not be penalized as the university moves to semesters, either in terms of progress towards their degree or their expected timing of graduation. The Chemical Physics Graduate Studies Chair is the advisor for all graduate students upon entry to the program, and remains the students' advisor until they join research groups. At this point the student's research advisor also becomes his/her academic advisor. This support structure will continue under semesters.

The transition plan for the Masters degree details how students who have completed portions of their required coursework under quarters be able to fulfill their coursework requirements under semesters. Nearly all Chemical Physics Masters students take the core-course multi-quarter sequences during a single academic year, in which case a one-year sequence under quarters will be counted as the corresponding one-year sequence under semesters. However, if a student has taken only one or two quarters of a sequence, then the student will take the second semester of the sequence. If the student has only taken one quarter, individual study will be provided to ensure that he/she is ready to take the second semester. The elective courses are all one-semester courses and they will be substituted on a one-to-one basis for quarter courses to satisfy the elective requirements.

Sample Plan (Thesis Option)

Year 1 (Quarters)

Autumn	Winter	Spring	Summer
Chem 861	Chem 862	Chem 863	Physics 816
Physics 834	Physics 835	Physics 836	
Physics 821	Physics 846	Physics 847	IOE
	ChemPhys 880		

Year 2 (Semesters)

Autumn	Spring
Chem 7530 (3)	ChemPhys 8880 (3)
ChemPhys 7998 (8)	ChemPhys 7998 (8)
Chem 8895 (1)	Chem 8895 (1)