DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY
UNIVERSITY OF COLORADO, BOULDER, COLORADO

Departmental Rules for Advanced Degrees[1]
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[1]These rules apply to students entering the Department in the Fall semester, 2009, or later.

I. General Requirements

The major goals of graduate study in chemistry and biochemistry are to master known principles and techniques, and to produce new fundamental knowledge through research. The rules contained in this document are designed to guide the graduate student to successful achievement of these goals.

The Department expects that incoming students have gained a mastery of undergraduate chemistry and/or biochemistry before entering the graduate program. For Chemistry Ph.D. or M.S. degrees, two semesters of undergraduate organic chemistry, at least one semester of physical chemistry, and at least two semesters (total) from the areas of analytical chemistry, biochemistry and/or inorganic chemistry are required. For the Biochemistry Ph.D. degree, two semesters of undergraduate biochemistry, at least one semester of physical chemistry and organic chemistry are generally required. If incoming students have not fulfilled these requirements upon admission to the graduate program, they are expected to demonstrate proficiency in these areas within the first two semesters of graduate study. It should be noted that these graduate programs are a full time endeavors and students are not allowed to work at outside jobs.

The passage through our graduate program is monitored by the faculty to assure completion of various requirements that are important indicators of Ph.D. or M.S. level performance. Specific formal requirements are presented in Section III for the Ph.D. degree program and in Section IV for the Master's Degree program. These formal requirements for

advanced degrees include satisfactory performance both on examinations and in courses, in writing an original research proposal, and in conducting original fundamental research culminating in the candidate's Ph.D. thesis.

In addition, the following general requirements must be fulfilled for a student to remain in good standing:

1) A grade point average of at least 3.0 (B) in all formal coursework, and an overall grade point average of at least 3.0 in all coursework undertaken;

2) Choice of a research advisor no later than the end of the student's 2nd semester in the chemistry and biochemistry graduate program. Thereafter, progress in research as specified by the research advisor is required.

   The Biochemistry Division and the special certificate program, the Graduate Training program in Optical Science and Engineering (OSEP), require research rotations and thus determination of research advisors occurs at the end of the 2nd semester of residency.

Students who do not meet the requirements for admission as regular degree students may be recommended for provisional degree status. With the concurrence of the Dean of the Graduate School, these students are admitted for a probationary term of either one or two semesters of full-time study or the equivalent for part-time students. At the end of the specified probationary period, provisional degree students must be either admitted to regular degree status or dismissed from the graduate program to which they were provisionally admitted. Provisional students are subject to the same standards of performance that are required of regular degree students.

The Chemistry and Biochemistry Department is organized into five divisions, including Analytical and Environmental Chemistry, Biochemistry, Inorganic Chemistry, Organic Chemistry, and Physical Chemistry (including Chemical Physics). The Department has a Graduate Student Advisor and each division has a Divisional Graduate Student Advisor. A student should select a division when entering the Department, notifying the Graduate Secretary of this selection. Every student should select a faculty research advisor as soon as it is possible to make a decision. Some divisions (e.g., Biochemistry) have special policies for the process and timing of research advisor selection, and each student should confer with her/his divisional advisor on this point. The research advisor need not be in the student's division, and it is also possible to carry out a course of interdivisional study. The student may change division or research advisor upon the advice and written notification of the departmental Graduate Advisor.

1A. Faculty Sponsor. In certain instances, students may desire to complete a majority of their research for an advanced degree under the direction of a research advisor who is not a faculty member in the Department. This is possible if the proposed research advisor is a member of the graduate faculty of the University. In this case, the student must also select a faculty member in the Department who is willing to serve as her/his faculty sponsor. The faculty sponsor will help the student to gauge normal progress towards the advanced degree and will represent the student's interests in Departmental matters. It is the student's responsibility to arrange for a faculty sponsor and to inform the Graduate Scholastic Committee in writing of these arrangements. Students working outside the Department, like all students, must demonstrate adequate progress towards the advanced degree, and should plan to meet each year with the faculty sponsor to discuss research progress (more frequent meetings are desirable).

The Department of Chemistry and Biochemistry has additional expectations of its graduate students. Course requirements should be completed and research should be initiated as soon as possible. Graduate students are expected to attend the seminars presented by their division, as well as departmental seminars. The Department sponsors general seminars dealing with research in all areas of chemistry. Such exposure to all areas of chemistry will broaden the student's knowledge of the field.

Students are also expected to meet the requirements of the Graduate School and their division, and to make steady progress towards the M.S. or Ph.D. degree. Students should consult the Graduate Student Advisor of the Department for clarification of these rules or their status. Other academic matters are resolved by the Graduate Scholastic Committee.

II. Interdisciplinary Programs

Some students may pursue certain approved interdisciplinary programs and degrees, such as the formal Ph.D. degree in Chemical Physics, or interdisciplinary programs in Atmospheric Chemistry, or a Graduate training program: Molecular Biophysics, Optical Science and Engineering, or Signal Transduction and Cell Recognition. Such programs can result in certificates in those specialties along with the Ph.D. degree in Chemistry and Biochemistry. In some cases, these interdisciplinary programs may have their own written comprehensive examinations, which may be substituted for the cumulative examinations given by the Department. In addition, required coursework, the timing for selection of research directors and/or oral examinations, and the composition of the Ph.D. committee may be altered to conform with the guidelines of these programs, as approved by the Department.

III. The Chemistry Ph.D. Program

A. Examination Requirements

Each Ph.D. student is required to satisfy divisional preliminary examinations and pass a series of comprehensive examinations to be advanced to candidacy. The candidate must then pass a final thesis defense examination to be awarded the Ph.D. degree. Interdisciplinary students should adhere to specific program requirements.

1. Preliminary Examinations

The Graduate School requires that the Department administer Preliminary examinations in order to "satisfy itself (by examination or other means) that students who signify intent to undertake the Ph.D. degree are qualified to do so". The format of the Departmental Preliminary Examination of each student will be a responsibility of the division that admits them. The formats adopted by each division are described in Appendix 1. The Preliminary Examination will be completed before the end of the second semester of study. Students will be required to follow the format of the Preliminary Examination of the division which admits them. Students who are uncertain of their division, or who are considering an inter-divisional major should consult the Graduate Advisor for advice on the Preliminary Examination requirement.

2. Language Requirements

a. Foreign Language Requirement

The Department does not require proficiency in a foreign language for the Ph.D. degree.

b. English Language Proficiency

The Graduate School rules state that "a student who is noticeably deficient in the written and/or oral use of the English language cannot obtain an advanced degree from CU-Boulder." The Department assesses the English language proficiency of each Ph.D. student in the Oral comprehensive examination. Assessment of the English language proficiency of M.S. students (Thesis M.S. and II), and recommendations for any remedial work, are the responsibility of the thesis advisor; certification of proficiency is part of the M.S. thesis final examination (Plan I) or thesis report approval (Coursework M.S.).

3. Comprehensive Examinations

The comprehensive examinations are made up of three parts: a series of cumulative examinations, an oral examination, and evaluation of an original research proposal. The oral examination and the research proposition evaluation shall be conducted by a five member examining board, according to the rules of the Graduate School. One member of this board shall be the student's research advisor, and one member shall be from outside the primary field of

study of the student. The membership of this board shall be selected by the Graduate Advisor, in consultation with other faculty members as necessary. The comprehensive examinations are considered passed when the requirements of all parts have been met.

a. Cumulative Examinations. The cumulative examinations are given in each division eight times a year from September through May on the first Saturday morning of each month except January. Students must take each examination from the beginning of their third semester and pass six before failing eleven. Students will usually take only the examinations offered in their division, but may elect to take up to three in other divisions; in these cases students must inform the Graduate Secretary of their intentions prior to the examination date. Students in the Atmospheric Program will be advised on the selection of the appropriate examinations. An examination that is not taken counts as a failure unless the student has been excused in writing from the examination by the Graduate Advisor. During the first year the student may elect to take one or more examinations with the advantage that only half of the failed exams are counted; half-failures are rounded to the lower number. Students should note that they are not allowed to read the exam(s) and then leave without taking the exam without penalty of a failure.

   A student completing a Masters degree in this Department, either voluntarily or on the recommendation of the Ph.D. oral examination committee, may wish to be considered for admission to the Ph.D. program. Such students must take the cumulative examinations from the beginning of their third semester (voluntary M.S.) or continue with examinations (recommended M.S.), to assist the Graduate Scholastic Committee in deciding upon admission.

b. Oral Comprehensive Examination. Students must take the oral comprehensive examination no later than the end of the fourth semester. Master's degree students in this Department who wish to continue for a Ph.D. degree must take the oral examination no later than the end of the fifth semester even if they have not completed the master's degree.

   This examination will include questioning on (a) the student's research, and (b) general topics. Students are expected to demonstrate a clear understanding of their thesis research and fundamental knowledge in chemistry, and show the ability to think creatively. Students are strongly advised to spend time reviewing material from chemistry and biochemistry courses they have taken as undergraduates and graduates, since this material is often the subject of questioning during the examination.

   The oral examination committee consists of three of the five faculty members appointed to the examining board selected by the Graduate Advisor. The student's research advisor, while a member of the examining board, may not be a member of this committee. The decision of this committee shall be determined by a simple majority of the members. The committee shall determine whether the student is capable of (a) Ph.D. degree work, (b) Master's degree work, or (c) no advanced degree work. The committee may require that the student repeat the examination, and/or may require the student to take additional courses. The committee may require that the student complete a thesis Master's degree before continuing on to the Ph.D.; in this case the committee will decide if it is necessary for the student to repeat the Oral Comprehensive examination at some time during the completion of the Master's degree research. The committee may also require that a student complete a Master's degree (thesis or coursework M.S.), and then leave the graduate program. As described in the Graduate School rules, students who fail the examination have the right to request a second attempt; in this case the student should contact the Graduate Scholastic Committee.

Students are responsible for arranging the examination date with their committee and should notify the Graduate Secretary two weeks prior to the scheduled date. At least one week before the exam date students will present a short written overview (approximately 5 pages) of their thesis research plan to each committee member. This overview will outline clearly the direction of the student's thesis, will provide the committee with some advance idea of the thesis research area, and will describe promising research results (if any). Students might be asked at the time of the exam to describe and defend alternate experimental approaches to their research goals.

c. Research Proposal. Upon completion of the Oral Comprehensive Examination each student shall submit an original research proposal on a topic not related to the student's thesis research to the two members of the examination board who were not members of the oral examination committee. The proposal may be written as a part of any graduate course in the Department, where the written proposals are required, or may be written as a part of an individual's group meeting activity. It is the thesis advisor's primary responsibility to assure that the proposal is original. The proposal must obtain the approval of both the members of the research proposition committee. In the event of a dispute between the two members, the proposal will be referred to the full examination board for a decision.

Upon satisfactory completion of all three examination requirements, the five members of the examination board shall recommend the student for advancement to candidacy for the Ph.D. degree.

4. Final Examination

This examination is primarily a defense of the candidate's thesis. The examining committee consists of the student's thesis advisor, as chair, and four other faculty members, at least one of whom is rostered outside of the Department. These committee members are selected by the Graduate Advisor upon request and after consultation with the student. The student must arrange for one of these other committee members to be the "second reader" of the thesis. The second reader will carefully review the thesis with the candidate. The student is responsible for arranging the date of the examination and notifying the Graduate Secretary at least two weeks prior to the date, and is responsible for distributing copies of the dissertation to the committee members -- after it has been approved by the thesis advisor -- at least two weeks before the examination. Failure to meet this latter deadline is a legitimate reason for any thesis committee member to postpone the examination.

B. Course Requirements

1. General Requirements

Sixty credit hours of courses are required consisting of 30 hours of research in Chemistry 8991, at least 15 hours in formal courses (see section 2 below), and the remainder in other courses, such as summer courses, seminar courses, group meeting courses, and research in Chemistry 6901.

A minimum grade of B- is required in all courses counting for the Ph.D. degree; students should also be aware that they must maintain a cumulative grade point average of 3.0 in all formal courses and an overall grade point average of 3.0, or they will be placed on academic probation. Students may also be placed on probation if they are not making satisfactory progress in their research. Probationary status must be removed within two semesters or a student will become ineligible to receive a Ph.D. degree from the Department of Chemistry and Biochemistry. Students on probation will not have a high priority for financial support.

A degree plan of courses taken and yet to be taken must be filed with the Graduate School by the end of the student's third semester (see Section II. E.)

2. Selection of Formal Courses

All students will be required to take a minimum of 15 credit hours of formal courses. Formal courses are regularly scheduled, examined, and graded courses; courses such as summer courses, seminar courses, group meeting courses, and research in Chemistry 6901 are not considered formal courses. Each student's program plan for coursework must be approved by the student's research advisor and the Departmental Graduate Advisor. These formal courses must be approved prior to the end of the second semester and students are encouraged to complete formal course requirements within their first three semesters.

C. Transfer of Credit

Up to 10 credit hours of graduate level, formal coursework may be transferred from another school subject to demonstrated proficiency in the subject(s) and written approval by the Graduate Advisor. Forms for this purpose can be obtained from the Graduate Secretary.

D. Formal Application of Admission for Candidacy for the Ph.D. Degree

All students must make formal application for admission to candidacy for the Ph.D. degree by the end of the third semester on forms that can be obtained from the Graduate Secretary. This Graduate School requirement should be fulfilled even though students have not completed all their formal coursework. After filling in the form, indicating graduate courses taken and to be taken, it should be approved and signed by the student's research advisor and then the Graduate Advisor.

Ph.D. students shall have passed their cumulative exams and the oral comprehensive examination before they may be admitted to candidacy for the Ph.D. degree. Students should note that the approved research proposal must be filed in order for a student to be advanced to candidacy.

E. Research Requirements

The results of a completed research program are submitted as a thesis for the final examination described above. Some students may pursue their Ph.D. research in a laboratory outside of the Department (e.g. JILA, NOAA, etc.) with the approval of the Graduate Advisor. In this case the student must find a surrogate advisor in the Department who agrees to monitor the activity of the student. It is recommended that meetings between the surrogate advisor, student and day-to-day advisor be frequent, perhaps in the form of a group meeting.

F. Time Limit

Students should note the time limit specified in the Graduate School rules: "All doctoral students are expected to complete all degree requirements within six years from the date of the start of course work in the program". Information on extension of the time limit can be found in the University catalog.

IV. The Biochemistry Ph.D. Program

A. Examination Requirements

Each Ph.D. student is required to satisfy a preliminary examination and pass a series of comprehensive examinations to be advanced to candidacy. The candidate must then pass a final thesis defense examination to be awarded the Ph.D. degree. Interdisciplinary students should adhere to specific program requirements.

1. Preliminary Examinations

The Graduate School requires that the Department administer Preliminary examinations in order to "satisfy itself (by examination or other means) that students who signify intent to undertake the Ph.D. degree are qualified to do so". The Biochemistry division Preliminary Examination will be conducted at the end of the student's second semester by a committee of three or more members of the division. The record of each student, including undergraduate preparation, performance in graduate coursework, TA performance and performance in laboratory rotations will be reviewed, and a recommendation will be made on the qualification of the student to continue in the Ph.D. program. Outcomes may include recommendation for additional coursework, delay in joining a research lab or a recommendation to leave the program. Students who are considering inter-divisional work should consult the Biochemistry Graduate Committee for advice on the Preliminary Examination requirement.

2. Language Requirements

a. Foreign Language Requirement
The Department does not require proficiency in a foreign language for the Ph.D. degree.

b. English Language Proficiency
The Graduate School rules state that "a student who is noticeably deficient in the written and/or oral use of the English language cannot obtain an advanced degree from CU-Boulder." The Department assesses the English language proficiency of each Ph.D. student in the Oral comprehensive examination.

3. Comprehensive Examinations

The comprehensive examinations are made up of three parts: a written examination, an oral examination, and the evaluation of an original research proposal. The oral examination and the research proposition evaluation shall be conducted by a five member examining board, according to the rules of the Graduate School. One member of this board shall be the student's research advisor. The membership of this board shall be selected by the Biochemistry Graduate Committee, in consultation with other faculty members as necessary. The comprehensive examinations are considered passed when the requirements of all parts have been met.

a. Written Comprehensive Examination. All Biochemistry Ph.D. students will take a Written Comprehensive Examination at the end of their first year. If a student fails the exam, they may be encouraged to take classes in Fall of their second year to help make up for deficiencies and must take the written exam again. The student can still take their Oral Comprehensive Exam but will not be able to advance to candidacy until they pass the written exam. The Written Comprehensive Examination will remain in the student's folder and be available for the orals committee. The orals committee will use this exam to help in their decision to determine if the student is capable of Ph.D. work.

   The Written Comprehensive Examination for the Biochemistry Ph.D. will be written and graded by a selection of faculty within the Department. The Biochemistry Graduate Committee is responsible for the overall administration of the process, and will certify that each Ph.D. Candidate has satisfied the examination requirements as stated above.

b. Oral Comprehensive Examination. Students must take the oral comprehensive examination no later than the end of the fourth semester. This examination will

include questioning on (a) the student's research, and (b) general topics. Students are expected to demonstrate a clear understanding of their thesis research and fundamental knowledge in biochemistry, and show the ability to think creatively. Students are strongly advised to spend time reviewing material from chemistry and biochemistry courses they have taken as undergraduates and graduates, since this material is often the subject of questioning during the examination.

The oral examination committee consists of three of the five faculty members appointed to the examining board selected by the Biochemistry Graduate Committee. The student's research advisor, while a member of the examining board, may not be a member of this committee. Students are responsible for arranging the examination date with their committee and should notify the Graduate Secretary two weeks prior to the scheduled date. At least one week before the exam date students will present a short written overview (5 single-spaced pages) of their thesis research plan to each committee member. This overview will outline clearly the direction of the student's thesis, will provide the committee with some advanced idea of the thesis research area, and will describe promising research results (if any).

The decision of the oral examining board shall be determined by a simple majority of the members. The committee shall determine whether the student is capable of Ph.D. degree work or not. The possible outcomes of the examination are:

PASS: The student's performance on the examination was Ph.D. caliber.

INCOMPLETE: The student's performance was Ph.D. caliber in some areas, but in other important areas was below what is expected for a Ph.D. student. In this case the committee will give the student a set of specific requirements to fulfill and will reconvene in no more than 3 months to complete the examination. If the examination is not completed within the three-month period, this will be considered a fail.

FAIL: The student's performance on the examination was not "Ph.D. caliber." By the graduate school rules, a student has the option of requesting a second attempt of this examination. This request should be made to the Biochemistry Graduate Committee. Before the student can take a second exam, the committee may require that the student completes classwork to remediate deficiencies and/or completes a research Masters degree. If the request for a second examination is granted, it will occur no later than a year from the first exam, but the committee can set an earlier date. For the second examination, the oral committee will be expanded to five faculty with at least two from the first examination. The result of this examination will be limited to pass or fail. If a student doesn't take this second examination by the date specified by the committee, they will not be able to continue in the Ph.D. program.

c. Out-of-Field Research Proposal. Each graduate student in the Department is required to write an out-of-field research proposal. Biochemistry students write and defend such a proposal in the Advanced Biochemistry II Course (Spring semester "Core"). Biochemistry students should make note of critiques of the proposal, rewrite it and hand it in to the CORE instructor for final approval. The final copy of the approved proposal needs to be in the students file before they can take the Written Comprehensive Examination.

Upon satisfactory completion of all three examination requirements, the five members of the examination board shall recommend the student for advancement to candidacy for the Ph.D. degree.

4. Final Examination

This examination is primarily a defense of the candidate's thesis. The examining committee consists of the student's thesis advisor, as chair, and four other faculty members, at least one of whom is rostered outside of the Department. These committee members are selected by the Biochemistry Graduate Committee upon request and after consultation with the student. The student must arrange for one of these other committee members to be the "second reader" of

the thesis. The second reader will carefully review the thesis with the candidate. The student is responsible for arranging the date of the examination and notifying the Graduate Secretary at least two weeks prior to the date, and is responsible for distributing copies of the dissertation to the committee members -- after it has been approved by the thesis advisor -- at least two weeks before the examination. Failure to meet this latter deadline is a legitimate reason for any thesis committee member to postpone the examination.

B. Course Requirements

1. General Requirements

Sixty credit hours of courses are required consisting of 30 hours of research in Chemistry 8991, at least 15 hours in formal courses (see section 2 below), and the remainder in other courses, such as summer courses, seminar courses, group meeting courses, and research in Chemistry 6901. All students are required to take a one-credit course in Scientific Ethics (Chem 5776).

A minimum grade of B- is required in all courses counting for the Ph.D. degree; students should also be aware that they must maintain a cumulative grade point average of 3.0 in all formal courses and an overall grade point average of 3.0, or they will be placed on academic probation. Students may also be placed on probation if they are not making satisfactory progress in their research. Probationary status must be removed within two semesters or a student will become ineligible to receive a Ph.D. degree from the Department of Chemistry and Biochemistry. Students on probation will not have a high priority for financial support.

A degree plan of courses taken and yet to be taken must be filed with the Graduate School by the end of the student's third semester (see Section II. E.)

2. Selection of Formal Courses

All students will be required to take a minimum of 15 credit hours of formal courses. Formal courses are regularly scheduled, examined, and graded courses; courses such as summer courses, seminar courses, group meeting courses, and research in Chemistry 6901 are not considered formal courses. Each student's program plan for coursework must be approved by the student's research advisor and the Biochemistry Graduate Committee. These formal courses must be approved prior to the end of the fourth semester and students are encouraged to complete formal course requirements within their first four semesters. The Biochemistry division recognizes that some formal courses of interest are only offered every two years, and this will be taken into account by the Biochemistry Graduate Committee.

C. Transfer of Credit

Up to 10 credit hours of graduate level, formal coursework may be transferred from another school subject to demonstrated proficiency in the subject(s) and written approval by the Biochemistry Graduate Committee. Forms for this purpose can be obtained from the Graduate Secretary.

D. Formal Application of Admission for Candidacy for the Biochemistry Ph.D. Degree

All students must make formal application for admission to candidacy for the Ph.D. degree before they take their Comprehensive Oral Examination. The appropriate form can be obtained from the Graduate Administrative Assistant. This Graduate School requirement should be fulfilled even though students have not completed all their formal coursework. After filling in the form, indicating graduate courses taken and to be taken, it should be approved and signed by the student's research advisor and then the Biochemistry Graduate Committee. A completed form needs to be in the Students file before they can take the Comprehensive Oral Examination

Ph.D. students shall have passed their written cumulative exam and the oral comprehensive examination before they may be admitted to candidacy for the Ph.D. degree. Students should note that the approved research proposal must be filed in order for a student to be advanced to candidacy.

E. Research Requirements

During the course of the Ph.D. thesis work, students will arrange annual meetings with a thesis advisory committee composed of their research advisor and two other biochemistry faculty. The purpose of these advisory meetings is to ensure the student is making adequate progress on a suitable Ph.D. thesis project. The final annual meeting should be planned to be about 1 year from the end of the thesis work. For this meeting the advisory committee will be expanded to 5 faculty members: the thesis advisor, three biochemistry faculty and one faculty member from another department. This committee will become the examination committee that evaluates the results of a completed research program submitted as a thesis for the final examination as described above.

F. Time Limit

Students should note the time limit specified in the Graduate School rules: "All doctoral students are expected to complete all degree requirements within six years from the date of the start of course work in the program". Information on extension of the time limit can be found in the University catalog.

G. Petitions

With the approval of the thesis advisor, students may petition for exceptions to the above mentioned rules due to special circumstances. The petition should be addressed to the Biochemistry Graduate Committee, which may consult with other faculty before responding to the petition.

V. The Master's Degree in Chemistry

A. Type of Program

There are two methods of obtaining a Master's degree: thesis (Thesis M.S. – Plan I) and a coursework (Coursework M.S. - Plan II). A candidate for a Master's degree may be allowed to select the coursework M.S. track only on the recommendation of the Graduate Advisor.

Some students may pursue an interdisciplinary M.S. degree in the Optical Sciences and Engineering Program. For these students, required coursework, timing for selection of a research advisor, and the composition of the M.S. committee may be altered to conform with the guidelines of this Program, as approved by the Department.

1. Thesis M.S.

   a. Thirty credit hours of courses are required which are divided between formal coursework and research. Fifteen credit hours of formal coursework are required. Courses outside the Department (4000 level and above), but not 4000 level courses within the Department, may be used to partially fulfill this requirement only if written approval is obtained from the Graduate Advisor and the Graduate School, and if they were not used for any other college degree. In any case, at least 12 of the 15 credits must be at the 5000 level or above and the coursework plan must be approved by the student's research advisor and the Departmental Graduate Advisor. The remaining 15 credit hours should be in research, including 4 or 6 credit hours in Chem. 6951, and the remainder in CHEM 6901 and group meeting and divisional seminars and special topic summer courses. Students outside the Biochemistry Division should note that CHEM 5711 and 5731 can be taken for normal course credit only if the student has not had a similar undergraduate biochemistry course.

      Up to 8 credit hours may be transferred from another school subject to demonstrated proficiency in the subject(s) and written approval by the Graduate Advisor.

   b. Completion of a research investigation and the presentation of a thesis defense is required. The examining committee consists of the student's thesis advisor, as chair, and two other faculty members. These committee members are selected by the Graduate Advisor upon request and after consultation with the student. The

student must arrange for one of these other committee members to be the "second reader" of the thesis. The second reader will carefully review the thesis with the candidate. The student is responsible for arranging the date of the examination and notifying the Graduate Secretary at least two weeks prior to the date, and is responsible for distributing copies of the dissertation to the committee members after it has been approved by the thesis advisor and at least two weeks before the examination. Failure to meet this latter deadline is a legitimate reason for any thesis committee member to postpone the examination.

2. Coursework M.S. (Requires written permission of the Graduate Advisor)

a. Thirty credit hours of courses are required which are divided between formal coursework and research. 21 credit hours of formal coursework are required. Courses outside the Department (4000 level and above), but not 4000 level courses within the Department, may be used to fulfill this requirement only if written approval is obtained from the Graduate Advisor and the Graduate School, and they were not used for any other college degree. In any case, at least 16 of the 21 credits must be at the 5000 level or above and the coursework plan must be approved by the student's research advisor and the Departmental Graduate Advisor. The remaining 9 credit hours (research) must be taken in Chem. 6901, spread over at least two semesters or one semester and a summer, and up to 3 credit hours of graduate chemistry or biochemistry seminar, group meeting, or summer special topics courses. Students outside the Biochemistry Division should note that CHEM 5711 and 5731 can be taken for normal course credit only if the student has not had a similar undergraduate biochemistry course.

Up to 8 credit hours may be transferred from another school subject to demonstrated proficiency in the subject(s) and written approval by the Graduate Advisor.

b. A research report is required. The research report is a concise (normally 10 pages; length to be specified by the research advisor) summary of the student's research activities. The report will include a statement of the research goals and significance as well as a description of the research performed and results obtained. The research report must be approved and signed by the Research Advisor and provided to the Graduate Secretary to form a part of the student's departmental file.

B. Examination Requirements

Each master's degree student must satisfy the divisional preliminary examination requirement, and pass a final examination (thesis M.S.). There is no foreign language requirement.

1. Preliminary Examination

Each student will take the Preliminary Examination specified by their division (see section II.A.1 and Appendix 1) in the first year of study. The results of the Preliminary Examination may lead to a recommendation that the student complete a Master's degree (rather than a Ph.D.).

2. Foreign Language

The Department does not require proficiency in a foreign language for the Masters degree.

3. Final Examination

The examining committee consists of the student's thesis advisor, as chair, and two other faculty members. These committee members are selected by the Graduate Advisor upon request and after consultation with the student. The student is responsible for arranging the date of the examination and notifying the Graduate Secretary at least two weeks prior to the date, and is responsible for distributing copies of the research report to the committee members after it has been approved by the research advisor at least two weeks before the examination. Failure to

meet this latter deadline is a legitimate reason for any examining committee member to postpone the examination.

Thesis M.S.: This oral examination is essentially a defense of the student's thesis but may include general questions.

Coursework M.S.: An oral examination is not required.

C. Research Requirements

1. Thesis M.S. Students should select a research advisor and start research in their first year. The results of a completed research program are submitted as a thesis for final examination.

2. Coursework M.S. A student should select a research advisor and preferably start research in the first year. Results of the research are submitted as a research report. The format of the research report is given in part IV. A.

D. Application for Admission to Candidacy

The Application for Admission to Candidacy for the M.S. degree should be submitted to the Graduate School no later than 10 weeks before graduation. The student should note that approval of any transfer of credits by the Graduate Advisor must be done at least 30 days in advance of the submission of the Application for Candidacy.

E. Students Who Wish to Continue for Ph.D. Degree

Only students who are pursuing a thesis M.S. degree, have satisfied the Preliminary Examination requirement of their division, and have passed more than half of the required cumulative examinations may request admission to the Chemistry or Biochemistry Ph.D. program. If a student wishes to enter/re-enter a Ph.D. program after completion of the thesis M.S., he/she should make this request in writing to the Graduate Scholastic Committee (for Chemistry Ph.D.) or the Biochemistry Graduate Committee (for Biochemistry Ph.D.). If a positive recommendation is received, the Graduate Advisor (for Chemistry Ph.D.) or the Biochemistry Graduate Committee (for Biochemistry Ph.D.) will constitute a Ph.D. oral comprehensive examination committee, and the student should arrange this examination as soon as possible. The Biochemistry division may require a 5 member committee.

1. Examination Requirements. The requirements for the Preliminary, Foreign language, and Comprehensive examinations are described in section III.A. for the Chemistry Ph.D. and section IVA or the Biochemistry Ph.D.

2. Research Proposition. A student pursuing a master's degree who wishes to continue for a Ph.D. degree must write an original research proposal as described in the Ph.D. rules in Section II.B.

3. Course Requirements. Upon written approval of the Research Advisor and the Graduate Advisor (for Chemistry Ph.D.) or the Biochemistry Graduate Committee (for Biochemistry Ph.D.), a student pursuing a masters degree who wishes to continue for a Ph.D. degree may apply some or all of the credit hours taken for the masters degree towards the Ph.D. requirement with the exception of research in Chem. 6951, and all 4000 level coursework.

F. Time Limit

As specified by the Graduate School, all work, including the final examination and the filing of the thesis (thesis M.S.) must be completed within four years. Information on extension of the time limit can be found in the University catalog.

Appendix 1: Divisional Preliminary Examinations

(Revised March 2009)

The Graduate School requires that the Department administer Preliminary examinations in order to "satisfy itself (by examination or other means) that students who signify intent to undertake the Ph.D. degree are qualified to do so." The following statements describe how each division of the Department will conduct the Preliminary Examination. Students are responsible for satisfying this requirement in the division that admits them to graduate school; this includes students who wish to pursue an interdivisional degree (e.g., physical-organic, bio-physical, etc.). Where written examinations are required, the scores received may become a permanent part of the student's record.

Students should recognize that even though each division may not require written Preliminary examinations, it is still the responsibility of all students to develop a broad chemical background throughout their graduate studies. Each division has somewhat different methods of administering the Preliminary examination, and students who fail to develop this knowledge base will have difficulty passing the Oral Comprehensive Examinations in their second year.

Analytical: The Analytical division Preliminary Examination will be conducted at the end of the student's second semester by the Divisional Coordinator and the Divisional Advisor. The record of each student, including undergraduate preparation and performance in graduate coursework, and effectiveness as a teaching assistant will be reviewed. A recommendation will be made on the qualification of the student to continue in the Ph.D. program.

Biochemistry: The Biochemistry division Preliminary Examination will be conducted at the end of the student's second semester by a committee of three or more members of the division. The record of each student, including undergraduate preparation, performance in graduate coursework, TA performance and performance in laboratory rotations will be reviewed, and a recommendation will be made on the qualification of the student to continue in the Ph.D. program. Outcomes may include recommendation for additional coursework, delay in joining a research lab or a recommendation to leave the program.

Biophysical program: Students who elect to participate in the Biophysical Program should follow the Preliminary Examination requirements of the division that admits them.

Inorganic: In order to determine whether each student has met the requirements of the preliminary examination, the Inorganic Faculty will meet at the end of the student's second semester. The record of the student, including undergraduate preparation and performance in graduate coursework, and effectiveness as a teaching assistant, will be reviewed. A recommendation will be made on the qualification of the student to continue in the Ph.D. program. The Inorganic divisional advisor will discuss this recommendation with each student.

Organic: In order to determine whether each student has met the requirements of the preliminary examination, the Organic Faculty will meet at the end of the student's second semester. The record of the student, including undergraduate preparation and performance in graduate coursework, and effectiveness as a teaching assistant, will be reviewed. A recommendation will be made on the qualification of the student to continue in the Ph.D. program. The organic divisional advisor will discuss this recommendation with each student.

Physical: There will be no written examination administered upon entrance to graduate school. In the Spring semester the Physical Chemistry faculty will discuss each student's progress with respect to course work, cumulative exams, and acceptance into a research group. At the conclusion of this deliberation, one of three recommendations will be made.

A) The student has satisfied the Preliminary Examination requirement.

B) Remedial work is recommended for this student.

C) Remedial work is recommended, and the student is not encouraged to continue graduate study.

For any student whose evaluation falls into category B or C, the recommendation is only advisory, but the student will be re-evaluated at the end of the second semester of graduate study.

If normal progress is being made at that time, then the student will be certified as having fulfilled the Preliminary Examination requirement.

It will be the responsibility of the Divisional Graduate Advisor to inform both the student and the Graduate Scholastic Committee of the outcome of our deliberations.

Atmospheric Chemistry Program: Students who elect to participate in the Atmospheric Program should follow the Preliminary Examination requirements of the division that admits them.

Materials and Nanoscience: This new division is being organized in Spring, 2009, and information on it will be uploaded to the Departmental web site.

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(Revised March 2009)

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Biochemistry: The Biochemistry division Preliminary Examination will be conducted at the end of the student's second semester by a committee of three or more members of the division. The record of each student, including undergraduate preparation, performance in graduate coursework, TA and performance in laboratory rotations will be reviewed, and a recommendation will be made on the qualification of the student to continue in the Ph.D. program. Outcomes may include recommendation for additional coursework, delay in joining a research lab or a recommendation to leave the program.

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Inorganic: In order to determine whether each student has met the requirements of the preliminary examination, the Inorganic Faculty will meet at the end of the student's second semester. The record of the student, including undergraduate preparation and performance in graduate coursework, and effectiveness as a teaching assistant, will be reviewed. A recommendation will be made on the qualification of the student to continue in the Ph.D. program. The Inorganic divisional advisor will discuss this recommendation with each student.

Organic: In order to determine whether each student has met the requirements of the preliminary examination, the Organic Faculty will meet at the end of the student's second semester. The record of the student, including undergraduate preparation and performance in graduate coursework, and effectiveness as a teaching assistant, will be reviewed. A recommendation will be made on the qualification of the student to continue in the Ph.D. program. The Inorganic divisional advisor will discuss this recommendation with each student.

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