

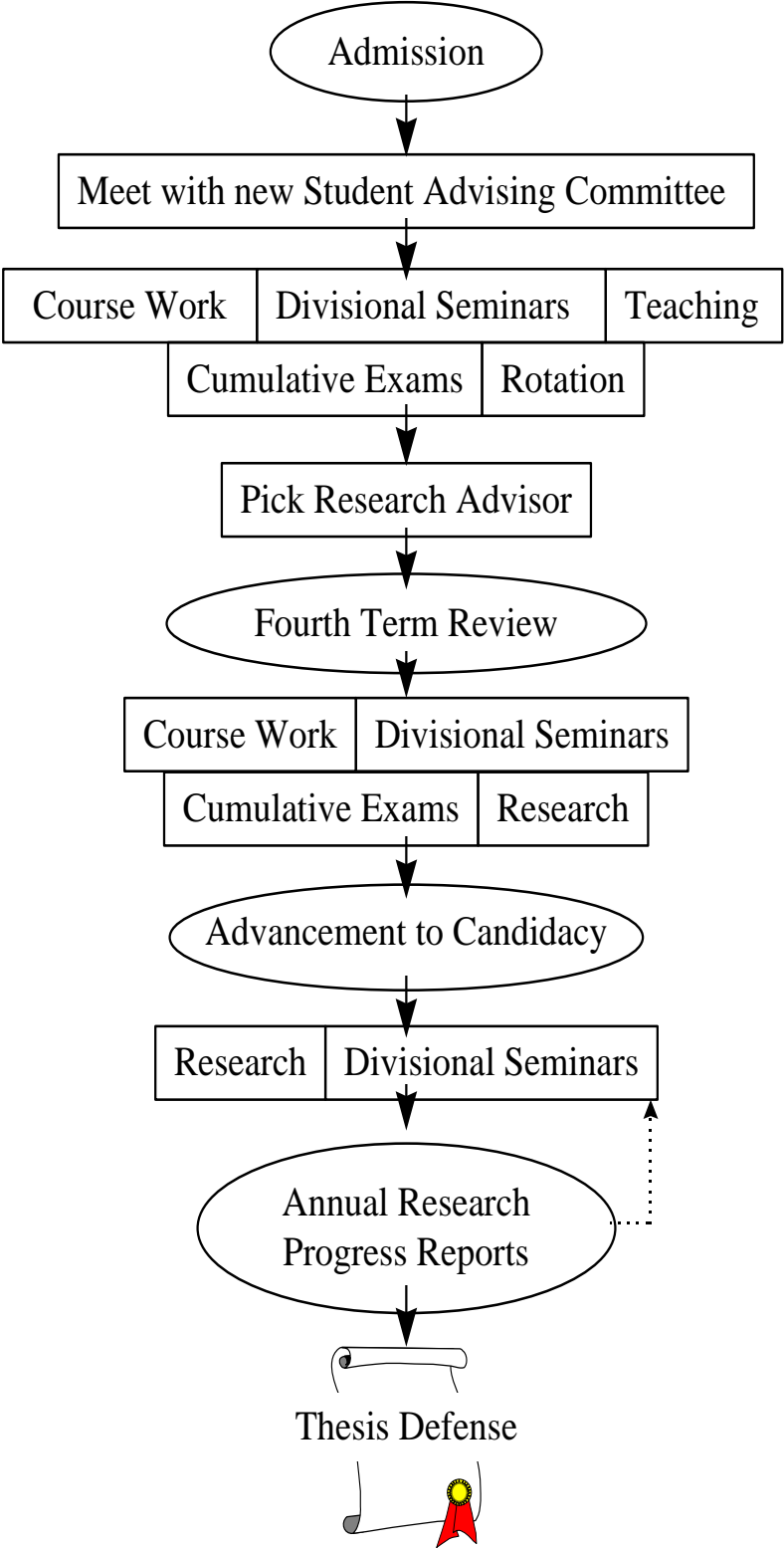
Degree
Requirements
for the
Graduate Program
in
Chemistry
2008-2009

University of Oregon

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This manual is an overview of the Chemistry Department's requirements for both the Ph.D. and the Master's degree programs. Students should consult the University of Oregon General Bulletin for further information on the policies and regulations of the University and Graduate School.

Ph.D. Degree Flow Chart



PH.D. DEGREE REQUIREMENTS

Examination Requirements

Cumulative Examinations

All Ph.D. candidates take the cumulative examinations. The purpose of cumulative exams is two-fold. First, they can be used as a mechanism for exposing graduate students to areas outside their own areas of research. Second, a student's performance on the cumulative exams is one benchmark the faculty uses in deciding if the student is making satisfactory progress and if the student should be advanced to candidacy. The cumulative exams can cover any subject and are not necessarily restricted to research topics. One examination in each divisional area will be given each term of the academic year. There are no cumulative exams during the summer term. The topic of each examination and any suggested reading will be announced one week in advance. The cumulative exams emphasize modern topics of interest in the appropriate divisions. Students may take cumulative exams in any divisional area. The exams for each division are given on the same day of the term in the same classroom; students are permitted to look over all of the exams and take the one most suitable. Copies of past exams are on file in the chemistry office. A minimum of five (5) cumulative exams is required for advancement to candidacy. Students are not required to take the cumulative exam during the term of their advancement to candidacy exam. However, if the advancement to candidacy is delayed then the student must continue to take the exams until the term of the review. Students in interdisciplinary areas, such as Material Science or Physical Biochemistry, may choose the divisional guidelines they wish to follow (i.e., Biochemistry, Organic/Inorganic or Physical).

Biochemistry Division

Students in the Biochemistry Division begin taking examinations during their first academic term of graduate study and will take one examination each term until advancement to candidacy in the sixth term.

Organic/Inorganic Division

Students in the Organic/Inorganic Division begin taking examinations during their first academic term of graduate study and will take one examination each term until advancement to candidacy in the sixth term. Grades must be B or better to count towards the total of five exams.

Physical Chemistry Division

Physical chemistry students normally take cumulative exams during their first six terms, until their seventh term advancement to candidacy. They may skip their first Fall term come to concentrate on coursework and rotations. Students who take the first five cumes may petition their committee to waive taking a sixth cume. If the student's cume exam average is a B, the committee may waive the sixth cume without meeting; otherwise, the committee must meet to decide if the student has met the cumulative exam requirement in physical chemistry.

Advancement to Candidacy Examination

The purpose of the examination is to assess the student's general understanding of chemistry and the scientific method, and the student's ability to successfully carry out research at the doctoral level. These criteria are evaluated in the context of the student's presentation of one original research proposal and a research report/proposal. The original research proposal probes the student's ability to propose research ideas outside of his/her immediate thesis area and to defend those ideas. The research report/proposal allows an evaluation of the student's research to date, the student's ability to place his/her research in the context of the field and the student's understanding of the future direction of the research that will ultimately constitute the basis of his/her thesis. The Chemistry Department's office manager will notify the students by memo when it is time to schedule the oral defense. Note that the outside member of the committee must be present for the oral defense. Examples of successful and well-written proposals are kept on file in the Chemistry Department office. All materials, including copies of the original research proposals and/or research reports must be delivered to members of the examination committee at least one week in advance of the examination date.

The *original research proposal* is a written document that describes: (1) an interesting original research problem, and (2) how the student proposes to investigate the problem. The purpose is to demonstrate ability to select significant research questions and to suggest reasonable scientific approaches for solving the problems. Generally, it is appropriate to include an introduction, background, proposed research, and significance sections as well as a bibliography. Typical proposals are 8 - 12 pages, double spaced. The ideas in the proposal are to be the student's own. Therefore, it is not permissible to ask for, or to receive, help from any faculty member. Short discussions with a faculty member relating to the appropriateness of the topic are permitted, as are brief discussions about whether the topic is in-field or out-of-field. In fact, students should consult with several committee members about the general suitability of the topic while the proposal is still in the informative stage (i.e. not after committing significant time to the topic). At least four weeks in advance of the exam date, a student should submit a written abstract of the proposed topic to his or her committee chair. A student's original research proposal should not be discussed at length with any faculty member present. Students are encouraged to talk to other students to get their opinions of the proposed ideas. Likewise, students are encouraged to have other students read the proposals.

The *research report/proposal* summarizes in detail a student's research accomplishments while working in the mentor's research group, and future directions and possible extensions of this research area. The purposes are to assess the student's depth of knowledge in the field and research progress. Since it is expected that students will have worked closely with their advisor on the research work accomplished and future directions of the work, students are encouraged to discuss the content of the research report/proposal with their mentor and other faculty.

The *oral defense* is to test the student's ability to think on one's feet when confronted with probing questions and to demonstrate specific, as well as general, chemical knowledge. In both the written and oral presentations of the proposals, the student should stress the question or questions to be examined and indicate clearly how a successful completion of the proposed research would answer the question or questions posed. Students are advised to prepare a 15-20 minute talk on each proposal (i.e. the original research proposal and the research

report/proposal). Students will thus need to have a "chalk talk" or an overhead projector and transparencies ready for the presentation. (Numerous questions from the committee will lengthen the presentation beyond the twenty minutes prepared time. Generally, two hours are required for a discussion of both proposals.) Students are advised to consult with their Committee Chair prior to the oral defense regarding the procedures.

An official statement that the meeting has taken place, the results of the advancement to candidacy examination, and any written comments that the committee wishes to make concerning the candidate's progress will be forwarded to the Chemistry Office via the chair of the committee as soon as the examination is completed. The letter should also include a written critique of the student's proposals. Immediately following the exam, students will be given an oral evaluation of their performance.

Graduate students must maintain a cumulative grade point average of 3.00 in all graduate courses taken during the degree program. Furthermore, students cannot be advanced to candidacy without a grade point average of 3.00 or higher. Students must be registered for at least 3 credit hours during the term in which they are advanced to candidacy.

Biochemistry Division

Students in the Biochemistry Division have their advancement to candidacy examination during the sixth (6) regular term of their graduate career (excluding summers). The examination committee is not on the thesis committee, but instead is composed of five faculty members, usually four from the Biochemistry Division and one faculty member from outside the division or department, and will not include the student's thesis advisor. Note that for the Biochemistry Division the research report/proposal should be written in much the same style and length as the original research proposal.

Organic/Inorganic Chemistry Division

Students in the Organic/Inorganic Division have their advancement to candidacy examination during the sixth (6) regular term of their graduate career (excluding summers). The committee will include the candidate's research mentor. The research report/proposal is typically 30-50 pages double spaced, and all reports must be written in *J. Am. Chem. Soc.* format.

Physical Chemistry Division

Students in the Physical Chemistry Division have their advancement to candidacy examination during the seventh (7) regular term of their graduate career (excluding summers). The committee will include the candidate's research mentor. The research report /proposal should be written in much the same style and length as the original research proposal.

Language Requirement

The Chemistry Department has no formal foreign language requirement for the Ph.D. program. In certain cases, however, a student's committee may establish a language requirement.

Course Requirements

With the exception of seminars and journal clubs, all course requirements are established by the Chemistry Department; the divisions and institutes have no separate requirements. Students must register for a minimum of nine (9) graduate hours per term up to a maximum of sixteen (16) total hours per term. The programs of first-year students will be worked out in consultation with faculty members at the time of entrance into the graduate program. The subsequent program of course work should be selected by the student following discussions of degree and research objectives with the research supervisor. A student's advising committee may recommend or require specific courses deemed to be a necessary part of a student's program of study.

First-year students typically take two graduate level chemistry courses plus additional hours to meet the minimum of nine required graduate hours. Except for first-year students and those in special circumstances, the Department requires students to register for sixteen hours. Formal course work requirements consist of at least six (6) graded graduate courses (3 or 4 credits each) at the 500 or 600 level. At least four of these courses must be in chemistry; two may be in an obviously related field.

Courses for consideration by first-year students are:

Inorganic Chemistry (CH 531, 532, 533)
Quantum Chemistry and Spectroscopy (CH 541, 542, 543)
Chemical Thermodynamics (CH 544)
Statistical Mechanics (CH 545)
Chemical Kinetics (CH 546)
Advanced Organic/Inorganic Chemistry (CH 551, 552, 553)
Biochemistry (CH 561, 562, 563)
Research Instrumentation (CH 570, two courses are required)
Topics (CH 613 or 614 or 616)
Physical Methods of NMR Spectroscopy (CH 634)
Physical Methods of Spectroscopy (CH 635)
Advanced Biochemistry (CH 662, 663)
Physical Biochemistry (CH 664, 665)

Courses in Reading and Conference (CH 605) do not qualify as one or more of the required six courses.

Programs for first-year students will be worked out in consultation with a faculty advisory team. Further course requirements for the completion of an effective program will be selected following discussions of degree and research objectives with the student's research supervisor.

A minimum of 18 credit hours is required in Dissertation (CH 603) for the Ph.D. degree. Credit for Research and Thesis is recorded on a P/NP basis. During the term the thesis is defended the student must be registered for at least 3 hours of Dissertation (CH 603). Graduate students must maintain a cumulative grade point average of 3.00 in all graduate courses taken during the degree program.

Journal Clubs and Seminar Requirements

Biochemistry Division

1. All Biochemistry Division graduate students are expected to sign up for, attend, and participate in the Institute of Molecular Biology Student Research Seminar Series. Beginning in the third year, students will be called upon to present a seminar on their ongoing thesis research. This provides an opportunity to present research results to a general audience. Typically, students will be scheduled for a presentation once a year.
2. To improve general seminar and lecture presentation skills, all Biochemistry Division graduate students are expected to sign up for, attend, and participate in the Institute of Molecular Biology Journal Club Series. Beginning in their second year, graduate students will be called upon to present a journal club seminar in this series. Typically, students will be scheduled to make presentations approximately once a year.
3. All Biochemistry Division graduate students are expected to sign up for and attend the weekly Institute of Molecular Biology Seminar Series, which features research seminars presented by invited speakers from other universities. These seminars should provide students with exposure to forefront research covering a wide range of topic areas from experts in their discipline.

Organic/Inorganic Division

1. Students in the Organic/Inorganic Division are required to give two formal seminars for the Ph.D. degree. A literature seminar is given in the Spring term of the first year. A seminar on the student's thesis research is given in the Spring term of the third year. All first- and third-year students are expected to register for CH 610, the course for students giving a seminar. As part of this course, a series of "how to give a seminar" lectures will be given.
2. All Organic/Inorganic students are expected to register for and attend CH 607, "Organic/Inorganic Seminar."

Physical Chemistry Division

1. Second and third year Physical chemistry students prepare and deliver one colloquium-style lecture once each year on a paper or papers from the literature. Each lecture is generally 30-40 minutes in length. It may, but need not, be about a paper closely related to their current research. First, second, and third year students attend these lectures and participate in the discussions. Enrollment is required for all Physical chemistry students in their first three years but is optional for more advanced students.
2. All Physical chemistry students are expected to register for and attend CH 607, "Physical Chemistry Seminar."

Teaching Requirement

Candidates for an advanced degree are required to participate in the undergraduate teaching program in chemistry for a period of three terms sometime during their graduate career. This typically occurs during the first year of study. Non-English-speaking students are required to take the SPEAK test and to score 50 or higher before they may teach.

Research Requirements

The Ph.D. program prepares a candidate for independent scientific research. Such preparation requires active experience with the research process.

Rotations

All graduate students are required to rotate through three different laboratories during the fall, winter, and spring terms of their first year. Research rotations give students an opportunity to work in three different research environments which both broadens the educational experience and provides a strong basis for the selection of a thesis advisor.

Students are expected to discuss possible rotations with faculty before the beginning of each term. Formal arrangements for thesis research will not be made until the final week of spring term.

At the end of each rotation period, students will present a 10-15 minute talk on the results of their research project to faculty and students.

Doctoral Research

The ultimate, and by far the most important, requirement for the Ph.D. degree is that the student pursue a research problem to a point where a thesis can be written. The thesis is expected to make a significant and original contribution to the understanding of some aspect of chemistry. After the thesis has been written, it is submitted to the student's thesis advisory committee for review. The candidate must then defend the thesis before the committee and be prepared to answer questions about the thesis and related subjects. Graduate School regulations stipulate that the residency requirement, advancement to candidacy, and the doctoral dissertation must be completed within a seven-year period from the initial date of enrolling, unless an "on-leave" status has been approved.

Review of Progress and Additional Requirements

Prior to Joining a Research Group

A student's progress during the first year will be assessed by quarterly rotation reports, which are submitted by the student's rotation supervisor; course grades; cumulative exams; and teaching evaluations. These are reviewed by the Department Head. Should a minor problem arise, the Department Head will meet with the student to assess the situation and offer advice. For more substantial issues, the Department Head will assemble a review committee of faculty to consult/advise the student and to make appropriate recommendations to the Department Head.

Fourth-Term Review

During the fourth term of residence (usually the fall term of the second year), graduate students are required to meet with their assigned thesis advisory committees. The purpose of the fourth-term review is to assess your early progress toward the Ph.D. degree. The review has three parts:

1. To review course requirements and progress
2. To review initial cumulative exam results
3. To review and discuss the student's ideas and progress towards a thesis

This review is not a pass/fail situation, but should be viewed as an opportunity to get better acquainted with your thesis committee and to discuss your research ideas and goals with them.

The student is expected to write a 3-5 page report summarizing ideas and plans for the thesis. Included in this report should be very specific plans for what you will do first (and why), what you will do second (and why), etc. This report should be presented to the committee one week before the scheduled review.

The student should also prepare a ten minute talk describing the proposed work. This talk will be a framework for the discussion at the review.

All members of the committee should be invited to the meeting, but the outside member is not required to attend. Immediately following the review, students will be given an oral evaluation of their performance to date. In addition, a brief report summarizing the meeting and the committee's assessment of the student's progress will be forwarded for placement in the student's file. A copy of the report will be sent to the student. The Chemistry Department's office manager will notify the students by memo when it is time to schedule the exam.

Annual Review of Academic Progress

Each year following advancement to candidacy students will be required to meet with their theses advisory committee during the winter term. The Chemistry Department office manager will notify the students when it is time to schedule the review. The students should contact all members of their committee and try to accommodate their schedules in arranging a meeting. It is not necessary for all members to attend each year, but a minimal group consisting of the student's thesis advisor, the committee chair, and one other member must be present.

Students will be expected to write a brief report, usually 3 - 5 pages, summarizing research progress and plans for the coming year. Students are also encouraged to list other academic activities since the last Annual Review, such as courses taken for a grade, seminars presented and scientific meetings attended, at the beginning of the report.

In addition to the written report, students should be prepared to give a short talk (10 minutes) on their work, including a brief introduction, suitable for committee members who are not specialists in the immediate area of research.

Immediately following the review, students will be given an oral evaluation of their progress. In addition, a brief report summarizing the meeting and the committee's assessment of the student's

progress will be forwarded for placement in the student's file. A copy of the report will be sent to the student. The department chair will place any graduate students for whom a report of the meeting has not been received by the end of the winter term on a list indicating that these students are not making satisfactory progress toward the degree. Possible sanctions include suspension of support.

Guidelines for Dismissing a Graduate Student

Separation from a Research Group

This category applies to cases in which separation of a student from a research group, but not dismissal from the graduate program, is considered. In these cases, it is assumed that the student has complied with (and continues to comply with) all Department and University requirements and that the student is making satisfactory progress toward the Ph.D.

Separation Prior to Advancement to Candidacy

At any time before advancement to candidacy, a student may be asked to leave a research group by the professor in charge. The student's committee should be informed of the impending action before the student is informed of the professor's decision. A meeting may be held at the request of the student, the advisor, or any member of the committee to clarify the situation, but no formal vote of the committee is required. The student's original advisor must continue to support the student until a new advisor is found.

Separation after Advancement to Candidacy

Students who have been advanced to candidacy, who comply with Department and University requirements, and who are making satisfactory research progress cannot be separated involuntarily from a research group. The student's committee must meet to arbitrate an agreeable solution to the conflict.

Dismissal from the Chemistry Program

This category applies to those students who have failed to meet Department or University requirements and to those students who are not making satisfactory progress toward the Ph.D.

Dismissal Prior to Advancement to Candidacy

In this case, the student's committee must meet. The committee has the authority to immediately terminate the student's enrollment in the graduate program, or it can warn the student by establishing the conditions under which the student may continue in the program. (The latter course of action is preferred.) If the student fails to comply with the conditions set forth by the committee, a second committee meeting with the student should be called to dismiss the student.

The full faculty must be informed at a faculty meeting before the dismissal is official. The full faculty may direct the committee to reconsider the dismissal, but no formal vote of the faculty is required for dismissal. Any dismissal from the program should follow ACS guidelines with regard to financial support. The research advisor is responsible for this support.

Dismissal at the 6th or 7th Term Review

It should be made clear to students that three things can happen at the 6th or 7th term review. Students can pass unconditionally, they can be asked to rewrite selected parts of the proposals or to fulfill certain other obligations, or they can fail. Outright failure with subsequent dismissal from the program becomes official only after the full faculty is informed at a faculty meeting. Students for whom the decision is postponed and who fail to do the agreed-upon requirements can be dismissed at a subsequent committee meeting. As always, the dismissal becomes official only after the faculty is informed of the decision at a faculty meeting. In all cases, ACS guidelines should be followed with regard to financial support. The faculty advisor is responsible for this support.

Dismissal after Advancement to Candidacy

The student's committee must meet with the student to establish the conditions under which the student may continue in the program. A second meeting should be scheduled to review the student's compliance with the conditions set forth by the committee. Failure to comply can result in dismissal, as determined by the committee. The dismissal becomes official only after the faculty is informed of the decision at a faculty meeting. In all cases, ACS guidelines should be followed with regard to financial support. The faculty advisor is responsible for this support.

Dismissal with a Ph.D.

This category applies to students who have been told by their research advisors to finish their research and write a Ph.D. thesis by a certain date. Typically, the deadline is accompanied by notification that financial support will be terminated should time beyond the deadline be required. The student's committee must be notified if a research advisor plans to set a deadline for receipt of a Ph.D. thesis. At a meeting with the advisor and the student both present, the committee should work to set a realistic date for receipt of the thesis. The student must be notified in writing of the date set by the committee. The committee must meet a second time to review the student's progress and to approve the termination of financial support.

Additional Information

Upon matriculation, beginning students will be asked which divisional degree program (Biochemistry, Organic/Inorganic, or Physical chemistry) they wish to follow. At any subsequent time during their course of study, students may transfer from one program to another by simply making up any deficiencies in requirements for the specific program to which the transfer is being made. While the official thesis advisor must be a member of the Department of Chemistry, the thesis research may be carried out with a faculty member from another science department and/or institute, assuming that satisfactory arrangements can be made with the individuals concerned. Such interdisciplinary research programs are strongly encouraged.

MASTER'S DEGREE REQUIREMENTS

The preceding material has been prepared with the expectation that most entering graduate students plan to attain a Ph.D. degree in chemistry. Students who have been admitted to candidacy for the Ph.D. degree without a master's degree do not ordinarily elect to receive a master's degree; however, they may petition to receive an M.A. or M.S. degree if they wish. In addition, for any of a wide variety of reasons there may be some students who wish to complete their graduate training in chemistry with an M.A. or M.S. degree. Following is a summary of departmental and Graduate School requirements for a master's degree. Students are advised to consult the University of Oregon General Bulletin for a complete description of the Graduate School requirements.

Course Requirements

All work applied toward a master's degree must be completed within seven years, including transferred credits, thesis and all examinations. Students must complete no fewer than 45 credits in courses approved for graduate credit with a grade point average of 3.00 or better in all graded courses. Of this work, 30 hours must be in the Chemistry Department, 24 must be taken as graded credits, and nine hours must be in courses numbered 600-699. If a thesis is presented as part of the master's degree program, a minimum of nine credit hours in Thesis (CH 603) must be completed.

Master's Thesis

Master's degree candidates are strongly advised to undertake a research problem and write a thesis. The specifications for this thesis should represent a research effort on a problem of significance. The thesis is prepared for review by a faculty committee and oral presentation as a seminar topic. Students must register for a minimum of nine credit hours in Thesis (CH 603) when this option is chosen as part of the degree program.