

Ph.D. in Biomedical Sciences: Health and Environmental Chemistry Specialization

Program Procedures and Information

SHORT TUTORIAL

(for details see following pages)

1. Cumulative exams should be passed during first year and must be passed by the end of the second year.
2. The first oral exam is presented to the thesis committee and is a thesis proposal defense. This should be accomplished before or during the first semester of the second year.
3. The public seminar will follow shortly thereafter (same semester).
4. Students are now allowed to enroll in CHM 799.
5. Second oral exam: The student presents a brief 20 min progress report during second semester of second year or the first semester of third year in the program. The student is questioned on knowledge of the subject matter related to thesis and general knowledge. Failure of the 2nd oral can lead to dismissal or a retake if only some areas of weakness are found.
6. The next public seminar is the thesis defense which is given in the last semester before graduation. This is followed by a closed questioning by the dissertation committee and selected faculty who will approve or disapprove the thesis.
7. Deviation from the timeline above requires approval of the Graduate Program Committee.
8. The completion of the program is expected within 4-5 years.

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Degree Requirements: The basic requirements for the interdisciplinary **Ph.D.** in Biomedical Sciences (Health and Environmental Chemistry Specialization) include completion of a unified program of formal course work, a series of qualifying exams, and independent thesis research. These areas are described later in this document. All requirements for the degree must be completed within seven years from the time of admission to the program.

Admission: Students will be considered for admission if they hold baccalaureate or master degrees in the natural sciences (chemistry, biology, physics, mathematics), interdisciplinary sciences (biochemistry, pharmacology), or other areas relevant to the health and environmental specialization. Admission is selective; students should submit a graduate application, official transcripts from all colleges and universities previously attended, three letters of recommendation for graduate study, and Graduate Record Examination (GRE) results. Students should take the general GRE. International applicants may have additional requirements such as TOEFL (International students possessing a Masters degree from a U.S. institute may waive the TOEFL requirement subsequent to an interview with the departmental graduate committee); please consult the Office of Graduate Admissions at <http://www.oakland.edu/grad/>. Short personal statement is encouraged to be included in the application materials.

Proficiency: Proficiency is defined as satisfactory knowledge of coursework equivalent to specified Oakland University courses. Proficiency is required so that students will be able to succeed in required coursework and anticipated research in this interdisciplinary program. Specifically, students in the health and environmental chemistry specialization must establish proficiency in analytical chemistry (CHM 325) and biochemistry (CHM 454); and in at least two of the following: inorganic chemistry (CHM 463), physical chemistry (CHM 343), cell biology (BIO 309), or physiology (BIO 321). Individual proficiency requirements will be determined by the specialization advisor after review of transcripts and consultation with student.

Program Administration: The Ph.D. in Biomedical Sciences is offered by the College of Arts and Sciences with specializations currently housed in the Departments of Biological Sciences, Chemistry, and Physics. The Biomedical Sciences Doctoral Program Committee is appointed by the Dean and includes representatives from each specialization and the graduate programs coordinator for the college. At the departmental level in chemistry, the Graduate Programs Committee functions as the health and environmental chemistry specialization committee. That committee is responsible for screening of applicants, approval of dissertation committees and examiners, curricular review, administration of qualifying exams, program review, and consideration of student petitions.

Residence: Doctoral students are required to register for at least one credit of course work every fall and winter semester after their admission to the program. In addition, all students are required to fulfill a full-time residency requirement for this program. Although students may complete some of the program on a part-time basis, continuous full-time enrollment is highly preferred. The minimal residency requirement is full-time residency (8 credits per semester) for

at least three consecutive full semesters (not including the summer semester), with at least two of these devoted primarily to the student's research project.

Credit Requirements: Completion of the Ph.D. in Biomedical Sciences requires a minimum of 90 credits beyond the baccalaureate; this must include at least 30 credits of dissertation research (CHM 799 or CHM 690 and 799). Transfer credits are limited by existing graduate policy (consult catalog), must meet graduate level requirements, and must receive approval from the faculty advisor and Graduate Study and Lifelong Learning office. Students entering the program with an earned master's degree may have their Ph.D. credit requirement reduced by up to 32 credits based on review of the master's coursework by the Graduate Program Committee. A memo detailing the credit reduction must be sent by the chair of the Graduate Program Committee to the Office of Graduate Studies for approval and inclusion in the student's official file.

Course Work Requirements: Areas of graduate level proficiency required for the health and environmental chemistry specialization and the courses which fulfill them are as follows: analytical chemistry (CHM 521, 522, or 523), biochemistry (CHM 550, 553, 554, or 555), toxicology (ENV 446 and CHM 581), environmental science (ENV 485 or 486), and ethics (SCI 511). In addition to the five proficiency courses, students will take 9 credits of advanced course work that is related to their dissertation area and 2 credits of doctoral seminar (CHM 685).

Attendance at all departmental seminars is also a requirement.

Academic Conduct and Research Ethics: Personal integrity is central to all aspects of graduate study. Academic misconduct or violation of accepted research ethics will not be tolerated. Please become familiar with the *Academic conduct of graduate students* section of the current graduate catalog. Specific examples of research ethics will be discussed in the required ethics course (SCI 511).

Research: The Ph.D. program is research-based. While students are encouraged to begin laboratory and research activities as soon as they enter the program, it is expected that the bulk of the dissertation research will be carried out after the second year in the program. Registration in CHM 799 (Doctoral Research in Chemistry) is permitted only after the student's dissertation proposal has been approved. Prior to that, students will register for CHM 690 (Graduate Research) credits. During the fall and winter semesters, students are expected to spend at least 4-5 hours doing research for each credit taken. It is recommended that students provide their research advisor with a brief summary of their research progress at the end of each term.

Selection of Research Advisor: Students, who are not already committed to a research advisor, should seek one early in their first year. Ideally, students should speak with several faculty about research opportunities in their labs prior to making a decision. Uncommitted students could also consider doing CHM 690 rotations in two or three labs to facilitate the decision-making process.

Qualifying Exams: Together with successful course completion, these exams determine whether the student will be allowed to continue in the Health and Environmental Chemistry Specialization of the Ph.D. in Biomedical Sciences Program. Full time students are expected to complete these exams during their first two years in the program. The **written exams** consist of a series of "cume exams" given every year. Topics for the exams will be determined by

faculty administering the exam, will relate to the health and environmental aspect of the program, and will be announced one to two weeks in advance of the scheduled exam. Possible topics include current papers or reviews from the literature, material from recent departmental seminars, or general exams which cover core course material; reading material and/or lists will be included with the topic announcement. Five exams will be offered during the academic year; students are expected to sit for these exams as soon as they begin the program. Exams will be graded: **O (outstanding)**, **S (satisfactory)**, **C (conditional)**, or **N (no credit)**. Grades of O and S are passing; a C grade can be combined with an O grade to yield two passing grades. Successful completion of this requirement consists of passing 4 of the first 5 exams; 5 of 7 exams; or 6 of 10 exams. Failure of full-time graduate students to pass six cumulative exams during the first two years in the program will result in dismissal from the program. The Graduate Program Committee will evaluate cume performance on an individual basis and may, at its option, set other completion requirements.

The **oral exams** are designed to measure student mastery of research-related material and core course content and to evaluate oral communication skills. The **first required oral exam** is in conjunction with the dissertation proposal approval process (see Dissertation Proposal section below). The **second required oral exam** will occur during the second semester of the second year or first semester of third year, when most coursework has been finished and the written cumes have been completed. Delays of this exam past the first semester of the third year must be justified to and approved by the Graduate Program Committee or the student risks loss of financial support. The examining committee for this oral will consist of the dissertation committee (see below) and two additional examiners approved by the Graduate Program Committee. It is desirable that one of the additional examiners have no formal association with the Ph.D. program. For this second oral exam, the student will give a brief account of research progress; the committee will then question the student on research and related material to determine whether the student has any serious deficiencies. If the committee is satisfied that the student has adequate knowledge in relevant areas, the oral exams are considered complete. If the committee is not satisfied with student knowledge and/or performance, an additional **third oral exam** will be scheduled. If student performance is still deemed unsatisfactory, the student will be dismissed from the Ph.D. program but will be allowed to complete an MS in chemistry.

Selection of Dissertation Committee: The dissertation committee will consist of the research advisor and two other faculty members. Selection of appropriate members is the joint responsibility of the student and the research advisor. This can occur as soon as the research direction of the student is clear; in any case, the committee must be selected prior to review of the dissertation proposal. The Graduate Program Committee should be informed in writing of the composition of the dissertation committee. The dissertation committee will monitor the student's research progress and ultimately approve the dissertation.

Dissertation Proposal: By the end of their second year, students should have prepared a dissertation proposal for approval by the dissertation committee. The proposal, developed in consultation with the research advisor, should outline the problem to be studied, survey the appropriate literature, describe the relevant techniques, and outline anticipated experiments. It is recommended that the dissertation proposal follow NIH/NSF predoctoral fellowship format. After the written proposal is distributed to the dissertation committee, the committee will meet with the student to discuss the proposal. This meeting constitutes the **first required oral exam**. Typically, the student will make a brief oral presentation (15 to 20 min) of the

dissertation proposal; the committee will then question the student on the proposal and related matters. Subsequent to this meeting/exam, the dissertation committee will approve and/or request changes in the dissertation proposal. After the committee approves the dissertation proposal, the student will present the proposal to the department during a scheduled **open seminar**. After formal presentation and approval, the student will be allowed to initiate doctoral research in chemistry (CHM 799).

The purpose of the dissertation proposal is to outline an initial plan for the student's research; to give the student the opportunity to review and summarize the relevant literature; to demonstrate the student's readiness to undertake the proposed research; and, to allow for an evaluation of the student's writing skills.

Publication Expectations: In addition to the completion of the dissertation, it is expected that the research accomplished will be published in peer-reviewed journals. Students are also encouraged to make presentations at national meetings and to participate in the grant writing process.

Preparation of Dissertation Draft: When the student and research advisor agree that the dissertation research is essentially complete, the student should begin drafting the dissertation. A recommended course of action is for the student to present the dissertation committee with a detailed outline of the dissertation and to seek their feedback and comments. Students should note that completion of research does not necessarily occur when 30 credits of dissertation research or 90 total credits are completed; rather, completion comes when the actual research accomplishments are sufficient to form the basis of a Ph.D. dissertation.

Please note that the dissertation committee should be involved in review of iterative drafts of the dissertation. The student may need to make changes and/or perform additional experiments based on consensus feedback from the committee. Students should also note that dissertations must conform to university format standards as articulated in the "Guide to the Preparation of Theses and Dissertations" as found on the Graduate Studies website.

Dissertation Defense: After the dissertation committee has approved a penultimate draft of the dissertation, the dissertation defense may be scheduled. The final defense is a two-part process. First, the student will present dissertation results in a public seminar and field questions from the general audience. After the seminar, a closed meeting with the dissertation committee will occur. One or two additional examiners may be appointed by the Graduate Program Committee and may include the Chair of the Department of Chemistry and/or the Chair of the Graduate Program Committee. After questioning the student, this group will decide if final approval is merited. As additional dissertation suggestions may arise at this meeting, the final draft will be prepared after the defense.

Completion of Dissertation: It is the student's responsibility to prepare carefully the final draft, produce acceptable copies for binding, obtain required signatures, and submit the finished dissertation to the Office of Graduate Study according to the schedule published by the Registrar.