

**Ohio University**  
**GRADUATE REQUIREMENTS IN CHEMISTRY AND BIOCHEMISTRY**  
**2008-2009**  
**June 10, 2008**

**Candidates for a graduate degree from the Department of Chemistry and Biochemistry at Ohio University must demonstrate the ability to plan, execute, evaluate, and communicate original chemical research. Candidates are expected to develop specialized research skills in order to carry out this work effectively.**

**I. Coursework Requirements**

a. Demonstration of Competency

- i. All graduate students new to the Department of Chemistry and Biochemistry will be required to take entrance examinations in Analytical, Biochemistry, Inorganic, Organic, and Physical Chemistry. The exams will be taken from the current American Chemical Society exam sequence, unless a division decides to generate and grade its own exam. All who score in the 50<sup>th</sup> percentile or greater on a standardized examination demonstrate competence in that area.
- ii. Each student must pass a total of three (3) out of five (5) entrance exams taken including one in the area chosen as the students' major during the first year of graduate study. The exams will be offered three times during the year in September, January, and June.
- iii. Alternately, competency can be demonstrated by passing at a level of B or better one 500 level course in three of the five areas (Analytical, Biochemistry, Inorganic, Organic, and Physical). One of the three courses can be in the student's major area but the other two must be outside of the student's major area and must be in the other areas of Chemistry and Biochemistry (Analytical, Biochemistry, Inorganic, Organic, and Physical). General/review courses will be offered each fall at the 500 level in each research area of Chemistry and Biochemistry (Analytical, Biochemistry, Inorganic, Organic, and Physical).
- iv. Students failing to meet the competency requirement during their first year of graduate study may lose their financial support until competency is demonstrated or may be removed from the program at the discretion of the Graduate Committee.

b. Major Course Requirement

- i. In addition to the courses/exams taken to demonstrate competency, each student will be required to take three courses within their major area of research.
  1. For a M.S. the courses in the major area can be at the 500 level.
  2. For students pursuing a Ph.D. the courses in the major area must be at the 700 level.
- ii. A grade of B or better must be obtained in each course attempted; courses with lower grades will not count towards the major course requirement.
- iii. Students may petition the Graduate Committee to count one 700 level course outside of the department in place of one of the courses within their major area of research.
- iv. The following Department of Chemistry and Biochemistry courses may not be used to satisfy the competency and major course requirements: Chemistry of Photography; Chem 545 and Workshop for Science Teachers; Chem 790E and other courses as determined by the Graduate Committee.

- c. Seminar & Colloquium
  - i. All graduate students are expected to attend the weekly departmental colloquium series.
  - ii. Students are required to enroll in and attend the seminar course for their major area each quarter.
- d. Coursework Expectations
  - i. The expected course load for the incoming student will be three courses in the fall quarter, followed by 2-3 courses in each subsequent quarter during the first year of graduate study. For most students this will substantially satisfy both major and minor course requirements during the first year of graduate study. For some students, depending on the area of interest, an additional 1-2 quarters of academic coursework may be necessary. The Department's goal is for new students to become engaged in research as soon as possible.
  - ii. The student will select all coursework beyond the first quarter in consultation with their advisor and, on occasion, their thesis/dissertation committee.
  - iii. Students are not permitted to audit courses unless they pay the associated tuition fees out of pocket or the audit has been approved by both the advisor and the Graduate Chair. The use of the tuition scholarship provided by the department to cover the costs of any non-approved audit course is not allowed. Students must be formally registered in any class they are attending.
- e. Elective Courses Outside Chemistry and Biochemistry
  - i. Any student who wants to enroll in a course offered outside the Department of Chemistry and Biochemistry must have prior written approval for the course from the research advisor/director.
    - 1. The approval form must be obtained from the graduate secretary and must be completed by the student, signed by the advisor, and turned into the Graduate Chair before any course(s) can be taken from outside the department.
    - 2. For first-year students who have not selected a research advisor, the Graduate Chair serves as the advisor.
  - ii. Failure to follow this process may result in an immediate cancellation of any tuition scholarship and stipend.

## II. Grade Standards

- a. As per Ohio University policy, a student who earns a total of three grades of C+ or poorer (including seminar and research) during the first full year of study cannot receive a graduate degree in Chemistry and Biochemistry and will be terminated from the program upon receiving the third grade of C+ or poorer.
- b. At any time during their degree program, a student who receives more than two grades of C+ or poorer and/or progress reports less than satisfactory may lose financial support and may be removed from the program as determined by the Graduate Committee. (See appendix for progress expectations)
- c. Continuing graduate students are required to maintain at least an overall 3.00 grade-point average. A 3.00 grade point average (exclusive of research, seminar and Chem 510) must be maintained in order to be eligible for or to continue to receive financial support (scholarship, fellowship, associateship).
- d. A student that falls below a 3.00 grade-point average will be put on probation. Failure to achieve a 3.00 grade-point average after one quarter of probation may result in immediate loss of financial support.

- e. The University requires a 3.00 grade point average in course work and also in research before a graduate degree can be awarded.

### **III. Graduate Research Expectations**

- a. The normal grade for a graduate student in research is PR (progress toward degree); exceptional work will rate a grade (A, A-, B+) for completion of a paper, poster, or other research accomplishment as an example. Unacceptable progress will be rated B- or below during registered quarters and by a less than satisfactory interim progress report during non-registered times. In addition, overall progress towards degree will be evaluated annually as initiated by the Graduate Chair. See appendix for research progress expectations.
- b. Students must be registered for Chem 695/895 during any quarter in which they are using research facilities. Letter grades, a grade of Progress (PR), or Credit (CR) may be given at the discretion of the research advisor.

### **IV. Requirements for Students Supported on Teaching Assistantships**

- a. Students must maintain teaching standards as determined by the Department of Chemistry and Biochemistry (See appendix for teaching expectations).
- b. Reprimands or poor evaluations from faculty assigned to laboratory courses can result in loss of student's financial support (including tuition waiver).
- c. Poor evaluations or reprimands will trigger a meeting of the Graduate Committee to determine if disciplinary action is warranted.

### **V. Selection of the Research Advisor and Thesis/Dissertation Committee**

- a. The selection of a research advisor should be accomplished no later than the beginning of the second quarter of study.
  - i. The choice of advisor and indication of all interviews is reported to the Graduate Committee as directed by the Graduate Chair.
  - ii. The Graduate Committee, in conjunction with the departmental faculty will consider the student's preferences when assigning research advisors.
  - iii. In the event that a student is without a research advisor, the Graduate Chair will work with the student to identify a suitable advisor or an alternate career path.
- b. The student and research advisor will select the members of the thesis/dissertation committee within two quarters after the student has selected a research advisor.
  - i. The research advisor will be the chairperson of the committee.
  - ii. For Ph.D. candidates the dissertation committee shall consist of at least 4 members: the research advisor; two other departmental faculty (regular, not adjunct), one must be from the student's major area and the other from outside the major area. The fourth member of the committee must be the graduate faculty representative from outside the department.
  - iii. For M.S. candidates the thesis committee will consist of at least 3 members: the research advisor and two other Chemistry or Biochemistry faculty members, one of whom is from outside the student's major area.

### **VI. M.S.-Specific Requirements:**

- a. Thesis
  - i. A written thesis must be prepared and accepted by the advisor, the student's Thesis Committee, the Department, the College and the University.

- ii. Alternatively, candidates for the M.S. degree may prepare a paper, a major portion of which is based on his/her research, and submit the paper to a refereed journal. If the paper is accepted for publication and accepted by the College and the University in lieu of a thesis, no other written thesis is required.
- b. Oral Defense
- i. An oral examination is required of all M.S. degree candidates. The oral examination consists of two parts. An hour-long presentation of the research work will be given before all faculty, graduate students and interested parties. This will be followed by an oral defense that will be held before the student's Thesis committee.
- c. Additional Requirements
- i. Student-specific requirements
    - 1. The student's graduate advisor and thesis committee will determine the specific requirements for each student within the above framework.
  - ii. Division-Specific Requirements
    - 1. There are, at present, no division-specific requirements

## VII. Ph.D. Specific Requirements

- a. Advancement to Ph.D. Candidacy
- i. Ph.D. candidates must submit and orally defend a dissertation research proposal to their dissertation committee **before the sixth week of the seventh quarter of study** (Spring quarter of the second year).
    - 1. The proposal must be submitted to the student's committee two weeks **BEFORE** the scheduled oral exam date.
    - 2. The oral exam may also include comprehensive questions on scientific knowledge and creativity.
  - ii. The research proposal must be based on the student's intended dissertation research project, written in the student's own words (i.e., not copied from one or more literature sources) and must contain the sections listed under Proposal Requirements (see Appendix ). The proposal must be at least 2000 words and 10 pages (single-spaced, 1" margins) in length (not including references).
  - iii. Successful completion of this process will be determined by consensus of the student's dissertation committee. The outcome of this examination will determine whether the student may proceed to the Ph.D. degree or be limited to a terminal M.S. degree.
  - iv. Appeals of the decision for candidacy need to be made to the Graduate Committee before the end of the seventh quarter.
    - 1. A positive appeal is only granted for exceptional circumstances and if proper written documentation is supplied from the student, research advisor and the dissertation committee.
  - v. If the student fails to advance to Ph.D. candidacy then financial support is terminated after the tenth quarter of support.
  - vi. Students will not be recommended for Ph.D. candidacy until the written proposal, oral examination, competency coursework and the major coursework requirements have been successfully completed.
- b. Third year student seminar
- i. Third year students are required to give a full period (50 minute) seminar on their current research project in the seminar course for which they are registered.
  - ii. Thorough coverage of background and motivation is recommended. Coherent presentation of experimental results obtained to date is expected, as is an in-depth, logical analysis of those results. It is understood by the audience that these seminars will present a 'work in progress;' they need not tell the story of

a completed research project. Accordingly, time should be devoted to explain the future directions of the project and how the future work will resolve the problems that remain unanswered.

- c. Fourth year (or longer) student presentation
  - i. Students who have not completed or scheduled their dissertation defense by the end of the spring quarter are required to present a poster during ChemPost each spring. Papers/posters/presentations which have the content of previously given departmental posters are not eligible.
  - ii. This presentation will be made at a departmental poster session separately or as part of OU's Research & Creative Activities Expo to be held once per year, usually the first week of May. Typically, abstracts for the poster session must be submitted by April 1st of the current academic year. The abstract and poster must be approved by the research director.
- d. Pre-defense committee meeting
  - i. At least one meeting with the student's Dissertation Committee to discuss research progress should be held before the final dissertation defense.
  - ii. Typically this meeting will be in the student's fourth year and ideally no later than 6 months before anticipated defense date.
- e. Dissertation
  - i. A written dissertation with an oral defense is required.
  - ii. The dissertation must be acceptable to the student's advisor, dissertation committee, the Department, the College, and the University.
- f. Dissertation Defense
  - i. A written dissertation with an oral examination is required for completion of the Ph.D. degree.
  - ii. The oral examination will consist of two parts. A full period (50 minute) presentation of the research work will be made before all faculty, graduate student, and interested parties. This will be followed by an oral defense of the dissertation, which will be held before the dissertation committee.
- g. Additional Requirements
  - i. Student-specific requirements
    - 1. The student's graduate advisor and dissertation committee will determine the specific requirements for each student within the above framework.
  - ii. Division-Specific Requirements
    - 1. There are, at present, no division-specific requirements

## VIII. Policies and Procedures

- a. Limits on Financial Support
  - i. Time limits for associateship, fellowship and/or scholarship support of graduate students seeking Master's (M.S.) degrees shall normally be limited to a total of no more than ten (10) quarters (including summers).
  - ii. Time limits for support of graduate students seeking the Ph.D. degree shall normally be limited to a total of no more than twenty (20) quarters (including summers) beyond the bachelor's degree. Additional quarters of support may be granted based upon a recommendation by the research advisor to the Graduate Committee.
  - iii. The University sets final limits on support based on the number of quarters of graduate study and previous degree(s) obtained. For the limits currently in force, consult the current Graduate Bulletin.

- b. Termination of Financial Support or Dismissal from Program
  - i. Failure to make adequate progress toward your degree or to adequately perform any of the duties assigned or required in conjunction with your associateship/ assistantship are grounds for non-renewal of financial support (including tuition scholarships) and grounds for dismissal from program as determined by the Graduate Committee.
  - ii. For non-native English speaking students, lack of progress in English language skills can be viewed as failure to make adequate progress.
  - iii. In the event that a student's ability to graduate may be negatively affected by a departmental-related decision (e.g., removal of TA support or dismissal from the program) the student may appeal their case to the Graduate Committee. At any time, the student may also discuss their case with the University's Office of the Ombudsman.
  
- c. Scholarly Discipline Requirement
  - i. There is no "scholarly discipline" requirement.
  
- d. University Requirements
  - i. Each student is responsible for insuring that the plan of study (including but not limited to course work, thesis/dissertation preparation, the maintenance of grade standards, and meeting established time limits) conforms to the University-wide standards as published in the current Graduate Catalog.
  - ii. The requirements of the Department of Chemistry and Biochemistry indicated in this document are in addition to those stated in the Graduate Catalog.
  
- e. Professional Ethical Conduct
  - i. Students are expected to maintain standards of professional and ethical conduct in keeping with Ohio University policy and the scientific discipline (see appendix).
  - ii. Student conduct gauged to be professional ethical misconduct may result in termination of support, dismissal from the program and/or referral to University authorities as determined by the Graduate Committee.
  
- f. Changes in Coursework Requirements
  - i. Students are expected to follow coursework requirements in effect at the time of their initiation of graduate work.
  - ii. If the coursework requirements are changed during the period of study, the student has the option of following the original set of requirements or adopting in entirety a new set of requirements.
  - iii. The student's thesis/dissertation committee must approve any change in the coursework requirements.
  
- g. Keys
  - i. You will be issued keys to the building, your office and any other room to which you need access.
  - ii. Key request forms must be obtained from the chemistry office.
  - iii. Failure to return keys will result in an academic hold on your University record and non-clearance for graduation.
  
- h. Computer Usage
  - i. The department provides access to several computer stations and each research lab should have access as well.
  - ii. Computers are available for departmental graduate students, authorized undergraduate students and faculty use only. Some software and manuals are available. Do not remove these materials from the room.

- iii. The Ohio University Student Code of Conduct Policy defines the Misuse or Abuse of Computers – as the “misuse, or abuse of any computer, computer system, service, program, data, network, cable television network, or communication networks.” Students found in violation of this policy are subject to a possible sanction of suspension or expulsion from Ohio University. Additionally, the Computer and Network Use Policies (91.003) provide guidelines on acceptable computer use. The following are considered Misuse of Computers. Students found to have engaged in such actively will be referred to the Ohio University Office of Judiciaries for a disciplinary hearing.
  - 1. **Pornography**- There will be NO browsing, downloading, printing, bookmarking, creating shortcuts, etc. to pornography on ANY computer.
  - 2. **Printing** – Printers are provided as a convenience in the use of computers. Printing of materials necessary for research and courses is acceptable practice. It is NOT acceptable to print large files of non-university related items. For example, printing a newspaper is not allowed.
  - 3. **Software** is not to be installed on these machines without prior permission from the system manager.
  - 4. **File-sharing (P2P)** of materials (e.g., movies, music, and books) protected by copyright is forbidden by Ohio University and has resulted in criminal prosecution.
- iv. Xerox Usage
  - 1. Graduate students are entitled to 100 copies per month. Anyone averaging more than 100 copies per month over a six-month period will be billed for additional copies at a rate of 5 cents per copy.

**IX. The Department of Chemistry and Biochemistry reserves the right to change or modify these requirements as necessary and without prior notice.**

## APPENDIX

**A1. RESEARCH PROPOSAL REQUIREMENTS** (students should discuss with their advisor and committee members the expected scope of the proposal significantly in advance of submitting it for review)

- a. **Proposal Summary (1 page)**
  - i. The proposal summary contains a description of the proposed activity suitable for publication. It should NOT be an abstract of the proposal, but rather a self-contained description of the activity that would result from the research.
  - ii. The summary should be written in the third person and include a statement of objectives (Specific Aims and sub-aims) and methods to be employed.
  - iii. It should be informative to other persons working in the same or related fields and insofar as possible, understandable to a scientifically or technically literate lay reader.
- b. **History and Background (minimum 3 pages)**
  - i. How did this research area develop?
  - ii. What is already known?
- c. **Significance (1 page)**
  - i. Why is this research area important?
  - ii. What important questions in this research area remain to be answered?
- d. **Research Design and Methods (minimum 5-6 pages)**
  - i. Describe how your research plan will accomplish the specific aims of the project.
  - ii. Describe and critically discuss the experimental techniques that you plan to use in your project.
  - iii. Discuss any possible difficulties that may occur and possible solutions
  - iv. Provide a timeline for completion of each specific aim (and sub-aims)
- f. **Preliminary Results (as appropriate)**
- g. **Conclusion (1/2 page)**
  - i. Discuss the anticipated outcomes/results and their significance
  - ii. Discuss how the proposed project will add to the knowledge base of the discipline
- e. **References**
  - i. References must be sequentially numbered in the text and cited according to standard ACS format with complete titles.
  - ii. The bibliography must include at least 30 citations.

## **A2. PROGRESS TOWARDS DEGREE EXPECTATIONS**

Satisfactory quarterly and yearly progress is expected of all graduate students in the Department of Chemistry & Biochemistry. Only with satisfactory progress will it be possible to complete a Ph.D. (or M.S.) degree before reaching the University and College imposed term limits regarding tuition support. Criteria necessary to successfully complete a degree are detailed elsewhere in the Graduate Requirements document and are not affected by the term limit rules.

In addition to satisfying the curricular requirements, satisfactory progress will minimally require that the student:

- 1) Work on thesis/dissertation project during registered quarters as directed by advisor.
- 2) Work on thesis/dissertation project during breaks, intercessions and non-registered quarter as directed by advisor.
- 3) Obtain prior approval from the Graduate Chair for time off during registered quarters. The Graduate Chair will confer with the student's advisor and other affected faculty).
- 4) Obtain prior approval from advisor for time off during winter intercession or other breaks between quarters. (NOTE: International students may need additional approvals depending on their visa and should consult with the Graduate Chair and International Student Services)

### **A3. TEACHING ASSISTANT EXPECTATIONS**

All graduate students supported on a TA are expected to fulfill the time-commitment specified on their contract via direct teaching of students, evaluation/grading of student work, or preparation for student instruction as directed by the TA coordinator and/or course instructor.

In addition, all TAs will have to achieve competency with the material they are teaching/grading. This may be demonstrated by methods such as passing a competency exam, attending relevant course lectures or solving assigned problems as directed by the TA coordinator and/or course instructor.

Satisfactory performance of TA duties is expected and will be monitored by the TA coordinator and/or course instructor. Any TA with a less than satisfactory performance will be reported to the Graduate Chair.

#### **A4. Professional Ethical Conduct**

The scope of professional conduct expected is exemplified by the "Chemical Professional's Code of Conduct" adopted by the American Chemical Society in 2007 and copied below

([http://portal.acs.org:80/portal/acs/corg/content?nfpb=true&pageLabel=PP\\_ARTICLEMAIN&node\\_id=1095&content\\_id=CTP\\_004007&use\\_sec=true&sec\\_url\\_var=region1](http://portal.acs.org:80/portal/acs/corg/content?nfpb=true&pageLabel=PP_ARTICLEMAIN&node_id=1095&content_id=CTP_004007&use_sec=true&sec_url_var=region1): accessed May 6, 2008)

"The Chemist's Creed," was approved by the ACS Council in 1965. The principles of The Chemist's Code of Conduct were prepared by the Council Committee on Professional Relations, approved by the Council (March 16, 1994), and replaced "The Chemist's Creed". They were adopted by the Board of Directors (June 3, 1994) for the guidance of Society members in various professional dealings, especially those involving conflicts of interest. The Chemist's Code of Conduct was updated and replaced by The Chemical Professional's Code of Conduct to better reflect the changing times and current trends of the Society. It was approved by Council on March 28, 2007 and adopted by the Board of Directors on June 2, 2007.

#### **Chemical Professionals Acknowledge Their Responsibilities**

##### **To the Public**

Chemical professionals have a responsibility to serve the public interest and safety and to further advance the knowledge of science. They should actively be concerned with the health and safety of co-workers, consumers and the community. Public comments on scientific matters should be made with care and accuracy, without unsubstantiated, exaggerated, or premature statements.

##### **To the Science of Chemistry**

Chemical professionals should seek to advance chemical science, understand the limitations of their knowledge, and respect the truth. They should ensure that their scientific contributions, and those of their collaborators, are thorough, accurate, and unbiased in design, implementation, and presentation.

##### **To the Profession**

Chemical professionals should strive to remain current with developments in their field, share ideas and information, keep accurate and complete laboratory records, maintain integrity in all conduct and publications, and give due credit to the contributions of others. Conflicts of interest and scientific misconduct, such as fabrication, falsification, and plagiarism, are incompatible with this Code.

##### **To Their Employer**

Chemical professionals should promote and protect the legitimate interests of their employers, perform work honestly and competently, fulfill obligations, and safeguard proprietary and confidential business information.

##### **To Their Employees**

Chemical professionals, as employers, should treat subordinates with respect for their professionalism and concern for their well-being, without bias. Employers should provide them with a safe, congenial working environment, fair compensation, opportunities for advancement, and proper acknowledgment of their scientific contributions.

##### **To Students**

Chemical professionals should regard the tutelage of students as a trust conferred by society for the promotion of the students' learning and professional development. Each student should be treated fairly, respectfully, and without exploitation.

##### **To Associates**

Chemical professionals should treat associates with respect, regardless of the level of their formal education, encourage them, learn with them, share ideas honestly, and give credit for their contributions.

**To Their Clients**

Chemical professionals should serve clients faithfully and incorruptibly, respect confidentiality, advise honestly, and charge fairly.

**To the Environment**

Chemical professionals should strive to understand and anticipate the environmental consequences of their work. They have a responsibility to minimize pollution and to protect the environment.