

# SUMMARY OF REQUIREMENTS FOR ADVANCED DEGREES IN CHEMISTRY AND BIOCHEMISTRY

## 2016-2017 Academic Year

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Graduate students who are in residence at the University of Delaware are expected to register as a listener for one of the Divisional seminars and to participate each semester in that seminar and all departmental colloquia.

### Requirements for the M.A. in Chemistry and Biochemistry

The following requirements are for the M.A. in Chemistry and Biochemistry.

- I. Admission by the Office of Graduate Studies.
- II. A minimum of 30 credit hours of graduate-level courses is required with an overall B average (3.00). A minimum of 18 credit hours must be course work at the 600 level or above (excluding pre-candidacy study, research, thesis or dissertation credits) as specified in Section II of the Ph.D. requirements. A maximum of 12 credit hours, 500 level or greater, may be taken in other departments toward the 30 credit hour requirement. No thesis is required.
- III. Satisfaction of the Ph.D. cumulative examinations, as specified in Section III of the Ph.D. requirements.

The advisor for this program is the Director of Graduate Studies. All courses must have his/her approval.

### Requirements for the M.S. in Chemistry and Biochemistry

The following requirements are for the M.S. in Chemistry and Biochemistry.

- I. Admission by the Office of Graduate Studies.
- II. A minimum of 30 credit hours of graduate-level courses is required with an overall B average (3.00). A minimum of 18 credit hours must be course work at the 600 level or above (excluding pre-candidacy study, research, and thesis credits) as specified in Section II of the Ph.D. requirements. A maximum of nine credit hours, 500 level or greater, may be taken in other departments toward the 30 credit hour requirement. Appendix A and B describes course requirements for students in all divisions regarding the research conducted in the Department and service as a teaching assistant.
- III. Thesis must not represent more than six credit hours. Thesis and/or research must represent a minimum of six and a maximum of twelve credit hours toward the 30 credit hour requirement.

A thesis is required. It must meet the approval of the Thesis Advisor, Department Chairperson, Dean of the College of Arts and Sciences, and the Vice Provost for Graduate and Professional Education. The requirements for formatting of the M.S. thesis are detailed in the "Thesis and Dissertation Manual". <http://grad.udel.edu/>

Students who have completed some graduate courses at other institutions may transfer up to nine credit hours of acceptable work, subject to approval by the Director of Graduate Studies and the Office of Graduate Studies. (Credit hours applied towards a degree at another institution may not be transferred.)

## Summary of Requirements for Advanced Degrees in Chemistry and Biochemistry

### Requirements for the Ph.D. in Chemistry and Biochemistry

The following requirements are for the Ph.D. in Chemistry and Biochemistry.

- I. Admission by the Office of Graduate Studies.
- II. A minimum of 30 credit hours of graduate level courses is required with an overall B average (3.00). The department course requirements are a minimum of eighteen credit hours in graduate level courses (600-level or higher) excluding research and dissertation (CHEM-868 and CHEM-969). At least six of these must be taken outside the student's division. At least six two or three-credit courses must be taken. Appendix A describes specific course requirements for each division. Scientific courses offered by other Departments may be counted as courses outside the student's division, if approved by the faculty in the student's division. The student must achieve at least a cumulative grade point average of 3.00 in the courses that fulfill this requirement. The course requirements, including the division's requirements, should be satisfied within four semesters of entering the program with a bachelor's degree. Any required course may be satisfied by means of a competency examination administered by the secretary of the respective division, upon approval of the division. Appendix B describes course requirements for students in all divisions regarding the research conducted in the Department and service as a teaching assistant.

### III. Cumulative Examinations

The cumulative examinations for all Ph.D. and M.A. students in this department will be given eight times per year in the months of September, October, November, December, February, March, April, and May. Each division will determine the format of its cumulative examinations. To fulfill the cumulative examination requirements, a student must accumulate ten points on eight consecutive examinations. A student may take cumulative exams in any area but must accumulate at least six points in exams offered by his/her division. Grading will be on a scale of 3.0, 2.5, 2.0, 1.5, 1.0, 0.5, and 0 for each examination. In no case will the

student be allowed to take more than eight examinations (with the exception listed in the second paragraph). The division that is responsible for a student may recommend to the Graduate Curriculum Committee (GCC) that they excuse, for cause, a student from completing a series of examinations after the nth exam in the sequence. The excused period is for a specified time. However, when a student resumes taking the examinations again, he/she will only be allowed to take 8-n exams in order to accumulate the balance of his/her points. Unexcused absences will be counted as scores of zero. Students entering with a Bachelor's degree should complete the cumulative requirement during their third and fourth semesters of full-time study. Part-time students are expected to start taking examinations after the equivalent of two full-time semesters. An entering graduate student who holds a master's degree, or a student completing an M.S. (Chemistry and Biochemistry) degree at the University of Delaware, will be expected to begin taking the cumulative exams immediately. However, those graduate students who, for some valid reason (e.g., excessive number of undergraduate courses taken during the first year, illness, change of major, etc.), wish to delay the start of their examinations must obtain written permission to this effect from the GCC.

Students who fail to achieve a total of ten points in eight consecutive cumulative examinations may start the series over again after completing the requirements for an M.S. degree and obtaining the approval of the GCC.

A schedule of examinations will be posted at the beginning of the academic year. A student may take an examination outside his/her division consistent with the required point distribution described above. However, the student must inform the coordinator of the appropriate division and the Chair's Administrative Assistant of the Department of Chemistry and Biochemistry of his/her interest in taking such an examination at least two weeks prior to the date of the examination. The exams will normally be designed for two hours, but three hours will be allowed. In some cases, take home examinations are given. Each division prepares and grades its own cumulative examinations.

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### IV. Ph.D. Advisory Committee

- (a) The Department Chairperson shall inform the GCC of his/her approval of the supervision of the student's Ph.D. research by a faculty member of the Department of Chemistry and Biochemistry. Students are not allowed to do senior research, a master's thesis, and a Ph.D. dissertation (or senior research and a Ph.D. dissertation if no master's thesis is written) with the same research advisor. In addition to attending the special seminar program for first year graduate students, each graduate student is required to meet individually with at least three faculty members before choosing a research advisor. The choice of research advisors normally occurs by December 15 to enable the student to begin his research effort during the Winter Session of his first year.
- (b) The research supervisor shall submit nominations for the student's Ph.D. Advisory Committee to the GCC for its approval no later than the beginning of the semester following the student's completion of the cumulative examinations. Members of the Ph.D. Advisory Committee should be consulted with regard to their willingness to serve by the student and/or the student's research supervisor prior to their nomination. The committee consists of at least four members: a chairperson, a faculty member in the primary research area of the dissertation, a faculty member outside the primary research area of the dissertation and an external member. If appropriate, the committee may include up to two additional members. If the chairperson of the committee does not have a primary appointment in the Department of Chemistry and Biochemistry, then another member of the committee having a primary faculty appointment in the Department must serve as a co-chair. At least half of the members shall have a primary faculty appointment in the Department of Chemistry and Biochemistry, and at least half of those members shall represent the primary area of study. The external member must be a faculty member having a primary appointment in another department in the University or a scientist from outside the University. An external member having a regular faculty appointment in the University may serve as a co-chairperson. All committee members from outside the University must have outstanding credentials as judged by the GCC. A faculty member having a secondary appointment in the Department of Chemistry and Biochemistry may serve as either an internal or external member of the committee. In order to convene a meeting of the Ph.D. Advisory Committee, at least 75% of the committee members must be present. A temporary and/or permanent substitute for a regular committee member must be approved by the GCC.
- (c) In order to continue in the program, the student shall request and hold a meeting of the Ph.D. Advisory Committee during the student's second year in the program, at which time the student will present a brief oral and written outline of his/her proposed research program.
- (d) The Ph.D. Advisory Committee shall inform the GCC of the suitability of the proposed research program for a Ph.D. in Chemistry and Biochemistry by means of the "Approval of Ph.D. Research Program" form. This form may be obtained in the office of the Chair's Administrative Assistant in Chemistry & Biochemistry or online:  
<https://www.chem.udel.edu/graduate/graduate-student-forms>. For the student to continue in the program, the Ph.D. Research Program must be approved by the end of the student's third year.
- (e) If the research topic is changed at a later stage, the research supervisor shall convene a meeting of the Ph.D. Advisory Committee to discuss and approve the outline of the new research topic.

## Summary of Requirements for Advanced Degrees in Chemistry and Biochemistry

### **V. "Recommendation for Candidacy for the Ph.D. Degree" Form**

This form must be submitted to the Chair's Administrative Assistant in the Department of Chemistry and Biochemistry and then to the Department Chairperson and Office of Graduate Studies after the student has fulfilled the following requirements:

- (a) Course requirements
- (b) Cumulative examinations
- (c) Research project and program of study approval by Ph.D. Advisory Committee, and "Approval of Ph.D. Research Program" submitted to the GCC (see Section IV d)
- (d) One year residence as specified by the University.

This form may be obtained from the Chair's Administrative Assistant in Chemistry and Biochemistry or online: <http://grad.udel.edu/>

### **VI. Preliminary Oral Examination(s) of Research Progress**

At least one meeting of the Ph.D. Advisory Committee must be held no less than six months preceding the day of the final dissertation defense. The Ph.D. Advisory Committee shall inform the Chair's Administrative Assistant of this meeting by means of the "Record of Preliminary Oral Examination" form. This form may be obtained from the Chair's Administrative Assistant or at <https://www.chem.udel.edu/graduate/graduate-student-forms>.

### **VII. "Application for Advanced Degree" Form**

This form must be submitted to the Chair's Administrative Assistant in the Department of

Chemistry and Biochemistry by the Office of Graduate Studies established dates for the Spring, Summer, Fall, and Winter graduations.

The form can be found at <http://grad.udel.edu/>

### **VIII. Dissertation**

A dissertation is required. It must meet the approval of the Dissertation Advisor, the Ph.D. Advisory Committee, the Department Chairperson, the Dean of the College of Arts and Sciences and the Vice Provost for Graduate and Professional Education. The requirements for formatting of the Ph.D. dissertation are detailed in the "Thesis and Dissertation Manual" which may be found on the Graduate Studies website, <http://grad.udel.edu/>

### **IX. Final Oral Defense of Dissertation**

The Department of Chemistry and Biochemistry requires that the final examination for the Ph.D. include a public oral presentation of the candidate's dissertation results that meets the approval of the Ph.D. advisory committee. The presentation should be about one hour long. The Chair's Administrative Assistant in the Department of Chemistry and Biochemistry must be notified three weeks in advance of the date of the exam so that the appropriate notification of the University community can be made. A hard or electronic copy of the dissertation must be available for examination in the Department of Chemistry and Biochemistry Chair's Office at least two weeks in advance of the date of the exam. In the event that a student is unsuccessful, the Ph.D. Advisory Committee may arrange for the student to be reexamined.

### **X. "Certificate of Ph.D. Dissertation" Form**

This form must be submitted to the Office of Graduate Studies with the Dissertation. It may be obtained from the Graduate Studies website: <http://grad.udel.edu/>

# Summary of Requirements for Advanced Degrees in Chemistry and Biochemistry

## APPENDIX A

### **Divisional Course Requirements**

A course is defined as a unit of three credit hours. In the case of a divisional course requirement where a particular course is not specified, this "course" may be satisfied by a combination of graduate level courses whose value equals or exceeds three credit hours. Other stipulations of the division concerning the nature of courses must be satisfied (divisions are also called concentrations by the University).

Specific course requirements by division are outlined below. If a student wished to take courses other than those specified, then each of these courses must be approved in writing: (a) at the Fall and Spring advisements for first-year graduate students by the representative from the respective Division on the Graduate Curriculum Committee, and (b) at other times by the research advisor.

The remaining courses satisfying the departmental course requirement of 18 credits in graduate level coursework can be selected from offerings in the Department of Chemistry and Biochemistry, or appropriate graduate level courses in other Departments.

All students pursuing a degree program in Chemistry and Biochemistry need to secure the written permission from both their research advisor and the Director of Graduate Studies prior to enrolling in any course not bearing a CHEM-6XX or CHEM8XX designation.

Course requirements for students in the various divisions are:

Analytical Six credit hours of graduate analytical courses from the list below plus six additional credit hours of graduate coursework approved by the research advisor. Analytical courses which can satisfy these requirements include CHEM620, CHEM621, CHEM622, CHEM623, CHEM624, CHEM625, CHEM627, CHEM628, CHEM629 and CHEM820.

Biochemistry At least 9 credits in graduate-level biochemistry courses. CHEM 641 must be taken as one of these courses unless this requirement is waived by the Biochemistry Division. The Division, or the student's research advisor, must approve the courses used to satisfy the departmental course requirement of 18 credits in graduate level courses. Biochemistry courses which can

satisfy these requirements include CHEM641, CHEM642, CHEM643, CHEM644, CHEM645, CHEM646, CHEM647, CHEM648, CHEM684, and CHEM686.

Inorganic Nine credit hours from CHEM651, CHEM652, CHEM653, CHEM654 or CHEM850.

Organic CHEM633 and CHEM634. Two additional courses (6 credit hours) with a CHEM-63X or CHEM-83X designation. One of these additional courses may be audited. It is strongly recommended that the courses taken outside of Organic Chemistry should be chosen from the following list: CHEM641, CHEM642, CHEM651, CHEM652, CHEM654. If a student wishes to take other courses than these outside of Organic Chemistry, then each of these courses must be approved: (a) at the Fall and Spring advisements for first-year graduate students by the representative from the Organic Chemistry Division on the Graduate Curriculum Committee and (b) at other times by the Organic Chemistry Faculty.

Physical A minimum of three courses from among the following: CHEM671, CHEM672, CHEM674 and CHEM677 and CHEM678. One may substitute for one of these three courses from related three-credit courses upon the approval of the research advisor.

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### APPENDIX B

#### **General Office of Graduate Studies Requirements**

A teaching assistant, research assistant or tuition scholar must be registered each semester for at least six hours of graduate credit, not including courses for which he/she is registered as a listener or courses which are not for graduate credit (400 series and lower courses). Similarly, a research fellow must be registered for at least nine credits of graduate work, not including undergraduate courses or courses for which he/she is registered as a listener.

After admission to candidacy, the candidate shall register for a total of nine hours of CHEM-969 (Ph.D. Dissertation).

Following these registrations, if the dissertation has not been submitted to the Office of Graduate Studies, the candidate shall register for UNIV-999 (Sustaining) status each semester in the fall or spring semester, or register as full-time if on contract during these periods. Sustaining or other registrations shall be required for summer session if the candidate graduates during that session.

**The student must register continuously or he/she will be charged in the semester before he/she graduates for the missing semester(s) unless he/she is on a leave of absence.** A student who receives a master's degree and wishes to continue for the Ph.D. must submit a Graduate Student Change of Classification form to his/her Ph.D. advisor requesting reclassification as G1 (graduate pre-candidacy). The form is approved in turn by the Chairperson of the GCC, the Director of Graduate Studies, the Department Chairperson, and the Office of Graduate Studies. If the form is not submitted with the Application for Advanced Degree, the student is automatically reclassified CEND (Continuing Education Non-Degree).

#### Office of Graduate Studies Academic Standards

For full-time students, the index shall be computed after the first semester and for every semester increment thereafter with the qualification that to be classified as a full-time student there must be a minimum of nine hours for credit in each semester. The following degrees of substandard cumulative indices will obtain:

2.50 - 2.99 cumulative -- warning  
2.00 - 2.49 cumulative -- probation  
below 2.00 cumulative -- drop

If the index is not raised to the next higher category by the following semester, the student is placed in the next lower category (warning to probation -- probation to drop). If the

index places the student on probation, and that index is not raised to the next higher category after one additional semester, the student is terminated. If the index places the student on warning, and that index of 2.50 - 2.99 is not raised to the next higher category after an additional semester increment, the student is placed on probation for one semester. If the student fails to achieve a 3.00 after one semester on warning and one semester on probation, he/she is terminated from the Office of Graduate Studies and the Department of Chemistry and Biochemistry.

In the case of graduate teaching or research assistants, a minimum of six credit hours of graduate level course work is required per semester. However, graduate teaching or research assistants may take more hours per semester if they wish to do so and are permitted by their advisor.

If a student does not take a minimum of nine hours a semester or six hours as a graduate teaching or research assistant, he/she becomes a part-time student and the following rules apply:

The index shall be computed after the first nine hours and for every nine-hour increment thereafter. The following degrees of substandard cumulative indices will obtain:

2.50 - 2.99 cumulative -- warning  
2.00 - 2.49 cumulative -- probation  
below 2.00 cumulative -- drop

If the index is not raised by the following nine-hour increment, the student is placed in the next lower category (warning to probation -- probation to drop).

If the index places the student on probation, and that index of 2.00 - 2.49 is not raised to the next higher category after one nine-hour increment, the student is terminated. If the index places the student on warning, and that index of 2.50 - 2.99 is not raised to the next higher category after one nine-hour increment, the student is placed on probation for one semester. If the student fails to achieve a 3.00 after one nine-hour increment on probation, he/she is then terminated.

In the case of graduate teaching assistants on a six-hour per semester course load, the increment shall consist of six hours as soon as the graduate teaching assistantship is in force.

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APPENDIX C

**Other Departmental Course Requirements**

All full-time students in the M.S. and Ph.D. programs must enroll in CHEM-865 *New Student Seminar* during their first fall of residence. **Withdrawal from CHEM-865 *New Student Seminar* without the permission of the instructor constitutes resignation from the graduate program.** CHEM-865 *New Student Seminar* must be passed by all full-time students in the M.S. and Ph.D. programs within their first two years of residence. CHEM-601 is required for all students in the M.S. and Ph.D. programs who serve as teaching assistants and must be taken concurrently with their first teaching assignment or in the following semester.

Effective Sept. 1, 2016