

## SHORT GUIDE TO REQUIREMENTS: BIOCHEMISTRY Ph.D.

### University of Maryland, College Park

This document describes the essential steps to the Ph.D. The essence of the degree is the conduct of cutting-edge research in Biochemistry. Formal coursework advances the student's general knowledge and develops necessary expertise for the desired area of research. The curriculum and elective courses provide modern instruction for graduate students with a wide range of research interests. The preparation and defense of research proposals is integral to the training. Effective communication of results is essential to scientific research.

#### The Ph.D. in Biochemistry must include:

- At least 20 credits of graduate coursework, with 19 credits completed by the end of the fourth semester, with an overall GPA  $\geq 3.0$ . Note that GPAs are calculated without considering +'s and -'s (see: [http://www.gradschool.umd.edu/catalog/academic\\_record.htm#6](http://www.gradschool.umd.edu/catalog/academic_record.htm#6)).
- 12 credits of Ph.D. research (BCHM 898 pre-candidacy, BCHM 899 post-candidacy).
- Oral defense of a written research proposal and general biochemistry knowledge as part of advancement to candidacy.
- Presentation of a seminar and an independent research proposal in an area unrelated to the student's or research director's own work.
- Preparation and oral defense of a publication-quality dissertation that advances the field.

#### I. Courses: items a-f below provide the 20 credits mentioned in item (a) above

- 10 credits of required core courses (BCHM 671, 661/662, and 675): at least a B- must be attained in each of the four courses. If a student receives a C in one of these courses, the course must be repeated. At least a B- in 661 is a prerequisite for continuing in 662, except by permission of the instructor of BCHM 662.
- 2 credits of Laboratory Rotations, Biochemistry 699.
- 1 credit of Computational Tools in Biochemistry (BCHM 677), to be completed in the Winter term of the first year. (Biochemistry students do not take CHEM 611 and CHEM 612.)
- At least 4 credits (at least two courses) of electives chosen from among CHEM, BCHM, CBMG, etc., courses numbered 600 or higher, typically Biochemistry 669, 673, 676 or CBMG 688X modules. If other electives are needed and your research advisor agrees, you may take more than 4 credits of electives.
- 2 x 1 credit of seminar, BCHM 889A (the Biochemistry Seminar Series). Attendance at all Tuesday at 11 am Biochemistry seminars is expected throughout your career here, whether or not you are getting credit.
- 1 credit of Seminar Preparation (BCHM 698), taken during the fall of the 4<sup>th</sup> year.

#### *Typical Fall Semester 1<sup>st</sup> Year Courses:*

- BCHM 671 (Protein Chemistry, 3 credits): core, B- required
- BCHM 661/662 (Nucleic Acids, 2+2 credits): core, B- required in each
- BCHM 699 (Laboratory Rotations, 2 credits): graded Sat/Unsat, required
- BCHM 889A (Seminar, 1 credit)

#### *Typical Winter Term 1<sup>st</sup> Year Courses:*

- BCHM 677, Computational Tools in Biochemistry, 1 credit

#### *Typical Spring Semester 1<sup>st</sup> Year Courses:*

- BCHM 675 (Biophysical Chemistry, 3 credits): core, B- required.
- Two electives (2 or 3 credits each) OR one elective (2-3 credits) and BCHM 898 (Research). Electives offered in BCHM and CHEM include Regulatory Networks,

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Biological Mass Spectrometry, Structural Methods, Practical Approaches to Enzymology, Biological Catalysis.

- BCHM 889A (Seminar, 1 credit)

**Students must have completed 15 credits and have at least a 3.0 GPA at the end of the second semester. Other requirements for remaining in good standing in the program can be found at:**

[http://www.chem.umd.edu/files/chem/doc/graduate\\_student\\_pdfs/Criteria\\_for\\_Progress.pdf](http://www.chem.umd.edu/files/chem/doc/graduate_student_pdfs/Criteria_for_Progress.pdf)

<http://www.chem.umd.edu/graduateprogram>.

### *Typical Fall Semester 2<sup>nd</sup> Year Courses:*

- One elective (2-3 credits), if only one elective was taken in the spring of the 1<sup>st</sup> year.
- BCHM 898 (Research)

### II. Points of information on courses and scheduling:

- a. Pre-candidacy students on Teaching Assistantships are required to register for up to 10 credits/semester of courses and seminars.
- b. Pre-candidacy students on Research Assistantships are required to register for 2 credits/semester of BCHM 898 if they are not taking classes.
- c. Post-candidacy students will be registered automatically by the graduate school for 6 credits/semester of BCHM 899.
- d. In some cases a student is asked to take undergraduate level Biochemistry (BCHM 461, 462 or 465) or Physical Chemistry (CHEM 481). The impact of this on selection of other courses in the first year will be considered on a case-by-case basis. 400-level BCHM courses do not count toward the 21-credit course requirement. If lab rotations are delayed, the student may end up joining a lab after the spring semester.
- e. If a student fails the UMEI English exam or is otherwise required to take an English course, he/she may need to start Laboratory Rotations in the spring semester of the 1<sup>st</sup> year. If lab rotations are delayed, the student may end up joining a lab after the spring semester. **The student does have the option of performing the rotations in the fall semester.** This will be addressed on a case by case basis.
- f. Entering students are advised about course selection by faculty in the Biochemistry group during graduate student orientation. Continuing students select graduate courses after consultation with their Ph.D. advisors and Thesis Advisory Committees.
- g. Entering students who have performed graduate-level studies at other institutions may request a waiver of graduate course requirements through the Biochemistry group. If it is approved at this level the request will be forwarded to the Director of the Biochemistry Graduate Program for final approval.

### III. Laboratory Rotation and Research Advisor Selection Guidelines:

- a. Shortly before the first semester begins, there will be an afternoon/evening of research presentations to introduce the students to biochemical research in the department.
- b. Each student will then be asked to rank five professors with whom they would like to do rotations. The biochemistry faculty will assign each student to three rotations from the list.
- c. Students will do three laboratory rotations of about 4-5 weeks each, starting after Labor Day and ending in December. Specific dates will be provided.
- d. Students are welcome but are not required to discuss research opportunities with other faculty members besides those with whom the student rotates.
- e. On or about **December 15** the student will turn in his/her ranked list of three desired research advisors, which may include laboratories that were not among the rotation labs.

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- f. Before December 22 each student will be notified of the assignment of his/her advisor. The students are responsible to meet with the advisor to schedule the first day of work in the laboratory.
- g. As mentioned above, a delay in starting rotations may delay joining a lab until after the spring semester. This is handled on a case by case basis.

### IV. Advancement to Candidacy, Independent Research Proposal, and Dissertation Defense.

Note: These brief descriptions are not exhaustive. More detail will be provided. If a student's circumstances require changing the timing of any of these steps, this will be handled on a case by case basis. Changes must be approved in advance by the student's research advisor and the Director of the Biochemistry Graduate Program.

**At all times, students must maintain reasonable progress toward the degree.** This does not mean that experiments must always succeed, but it does mean that you must continue to make an effort toward successful completion of the Ph.D. It is your advisor's and your committee's responsibility to make sure that you are pursuing a reasonable path, but it is your responsibility to help choose the path and to move along it purposefully!

- a. Students select a dissertation Advisory Committee by October 15 of the second year. The dissertation Advisory committee is made up of four Chem/Biochem faculty members and a Dean's representative from outside the Dept. No more than one of the four can be an Affiliate faculty member. The Dean's rep is required only at the dissertation defense but must be notified of earlier meetings and may choose to participate at any time.
- b. Students take candidacy examinations by the end of May of the second year. The exam is an oral defense of a written research proposal describing the student's Ph.D. work. The oral exam also includes general biochemistry. The student's Advisory Committee conducts the exam. It is the student's responsibility to contact the committee and to arrange the time and place of the examination. More detail will be provided to second-year students.
- c. The independent research proposal is done in the fall of the fourth year. The student presents a formal departmental literature review seminar on an area of current interest in biochemistry, not related to her/his own work or his/her research advisor's current work. He/she then prepares an independent research proposal in the area and defends it before the Advisory Committee. The proposal concerns what the student would do as a postdoc in a lab of the student's choice in the field. More detail will be provided. Again, it is the student's responsibility to schedule the proposal defense within 2-3 weeks after the seminar.
- d. The student will meet with his/her Advisory Committee at the qualifying exam, optionally once during the third year, and once early in the fourth year for the independent proposal defense. There must be at least one post-candidacy meeting before the dissertation is prepared, and in addition at least once every year after the fourth year. These meetings are intended to ensure that adequate progress is being made toward the Ph.D. Ordinarily the Ph.D. dissertation should be defended during the student's fifth year. For each of the post-candidacy meetings, including the independent proposal defense, the student should prepare a 1-2 page written summary and a 10-15 minute PowerPoint presentation of research progress and future directions.

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