This document describes the essential steps to the Ph.D. Formal coursework advances the student’s general knowledge and develops necessary expertise for the desired area of research. Our curriculum and 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:

a. At least 21 credits of graduate coursework by the end of the fourth semester, with a GPA ≥ 3.0 overall. Note that GPAs are calculated without considering +’s and –’s. See http://www.gradschool.umd.edu/catalog/academic_record.htm#6.
b. 12 credits of Ph.D. research (BCHM 898 pre-candidacy, BCHM 899 post-candidacy)
c. Oral defense of a written research proposal and general biochemistry knowledge as part of advancement to candidacy
d. Presentation of a seminar and an independent research proposal in an area unrelated to the student’s or research director’s own work
e. Preparation and oral defense of a publication-quality dissertation that advances the field.

I. Courses: items a-f below provide the 21 credits mentioned in item (a) above

a. 9 credits of required core courses (BCHM 671, 674, and 675): at least a B- must be attained in each of the three. If a student receives a C in a course it must be repeated.
b. 3 credits of Laboratory Rotations, Biochemistry 699.
c. 1 credit of Computational Tools in Biochemistry (BCHM 677), to be completed in the Winter term of the first year, though students sign up for it in fall of the second year. Biochemistry students do not take Chem 648X (the “Library course”).
d. At least 4 credits (at least two courses) of electives chosen among CHEM, BCHM, CBMG, or MOCB courses numbered 600 or higher, typically Biochemistry 669, 673, 676 or CBMG modules.
e. 2 x 1 credit of seminar, BCHM 889 (the Biochemistry Seminar Series). Attendance at all Tuesday at 11 a.m. Biochemistry seminars is expected throughout your career here, whether or not you are getting credit.
f. 2 credits of Independent Research Proposal (BCHM 669), taken during the fall of the 4th year.

Typical Fall Semester 1st Year Courses:
- BCHM 671 (Protein Chemistry, 3 credits): core, B- required
- BCHM 674 (Nucleic Acids, 3 credits): core, B- required
- BCHM 699 (Laboratory Rotations, 3 credits): graded Sat/Unsat, required
- BCHM 889 (Seminar, 1 credit)

Typical Spring Semester 1st 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). For example, electives include Regulatory Networks, Biological Mass Spectrometry, Structural Methods, Practical Approaches to Enzymology, Biological Catalysis, or CBMG Molecular Biology modules.
- BCHM 889 (Seminar, 1 credit)

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Univ. Maryland Biochemistry Ph.D. requirements

**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/GraduateProgram/current.php](http://www.chem.umd.edu/GraduateProgram/current.php).**

**Typical Fall Semester 2nd Year Courses:**

- One elective course (2-3 credits), if only one elective was taken in the spring of the 1st year.
- BCHM 677, Computational Tools in Biochemistry, 1 credit (actually taken in winter term of first 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 1st year. If lab rotations are delayed, the student may end up joining a lab after the spring 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 upon 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 Associate Chair for final approval.

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

a. Shortly after 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. The biochemistry group will assign each student to three rotations from the list.

c. Students will do three laboratory rotations of about 4 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. *(continued next page)*

e. On 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.

f. By January 15 (or earlier) the student will be notified of the assignment of his/her advisor.

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. *(continued next page)*

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, the biochemistry division chair, and the director of the departmental 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 Thesis Advisory Committee by October 15 of the second year. The Thesis Advisory committee is made up of four Chem/Biochem faculty members and a Dean’s representative from outside the Dept. The Dean’s rep is required only at the thesis defense but must be notified of earlier meetings and may choose to participate at any time.

b. Students take candidacy examinations in May of the second year. The exam is an oral defenses of a written research proposal describing the student’s Ph.D. work. The oral exam also includes general biochemistry. The Thesis 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 departmental 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 Thesis 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, ordinarily within 2-3 weeks after the seminar.

d. The student will meet with his/her Thesis 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. 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.

September, 2008