

Handbook

PhD Graduate Program in Biochemistry and Biophysics

Brandeis University
August 2015

The purpose of this handbook is to help students navigate the various requirements and expectations of the Graduate Program in Biochemistry and Biophysics. It describes the requirements for the Ph.D. degree and contains general information about the procedures to be followed in satisfying these requirements. These are also summarized in the "Pocket Handbook" on the final page of this handbook. You will need to consult the instructions and forms contained here at various times during your graduate studies, so please save your copy or select "Student handbook" at the website:

<http://www.bio.brandeis.edu/grad/bb/index.html>

The Biochemistry & Biophysics Graduate Program is an interdepartmental graduate training program with faculty drawn from the Biochemistry, Biology, Chemistry, and Physics departments. Progress of students in the program is monitored mainly by faculty of the Biochemistry Department and the Biochemistry & Biophysics Graduate Program Chair. An up-to-date list of faculty associated with this program is posted on the Biochemistry & Biophysics Graduate program webpage:

<http://www.bio.brandeis.edu/grad/bb/index.html>

Program Chair: Dorothee Kern, Volen 444, dkern@brandeis.edu , ext. 6-2354

Program administration and record keeping:

**Biochemistry and Graduate Affairs Office, scigradoffice@brandeis.edu,
Ros/Kos 3-RK02, 6-2300**

The primary administrative contact for Biochemistry & Biophysics graduate students is **Elysha Schickel**, eschickel@brandeis.edu, 6-2327

The graduate affairs office also consists of:

Maryanna Aldrich, maldrich@brandeis.edu 6-4850

Jena Pitman-Leung, jpitmanleung@brandeis.edu, 6-2302

Degree requirements -- General Information

To obtain the Ph.D. degree, students must satisfy both the general requirements of the graduate school and the specific requirements of the Biochemistry & Biophysics Graduate Program. Both sets of requirements are summarized in the Brandeis catalog: <http://www.brandeis.edu/registrar/bulletin/>

The following sections contain additional details about the program requirements.

The student is responsible for fulfilling each requirement before the relevant deadline. Students failing to complete requirements on time may, at the discretion of the faculty, be required to leave the Program.

Students in the Biochemistry & Biophysics Graduate Program are expected to work full-time towards the degree throughout the entire calendar year. Students should be aware that scientific research is a demanding occupation and that researchers often find it necessary to do work on nights, weekends, and holidays in addition to that during "normal working hours." This precludes students undertaking outside employment or outside academic activities that would require a significant amount of time.

The Graduate School requires that "Students entering Brandeis University with no previous graduate work must earn the doctorate within eight years from the inception of study. Students who are granted credit for a year of graduate work completed elsewhere must earn the degree within seven years from the inception of their study at Brandeis."

However, the Biochemistry & Biophysics Graduate Program expects students to complete Ph.D. thesis research before year 5.5.

Requirements for the Ph.D. degree

1. Courses

To fulfill the course requirement for the Ph.D. degree, the student must complete each course with a letter grade of B- or higher. To make any subsequent modifications to the Required Program of Study, the student must obtain, in advance, written approval from the Program Chair. All elective courses must be chosen with consultation of the Program Chair.

The required Program of Study consists of seven one-semester courses. The student will meet with the program chair to discuss the selection of courses [before registering](#) for courses and fill out the form “Program of Study for the Biochemistry & Biophysics Ph.D. Program” (see Appendix). The only required course is BCBP 200b. In addition, students must complete one year of laboratory rotations, BCBP 300a and BCBP 300b, and the non-credit course CONT 300b, *Responsible Conduct of Science*, which do not count towards the seven courses required. All graduate students beyond the first year must register for BCBP 401 *Biochemical Research Problems*, [the official designation for Ph.D. thesis research](#). That course also does not count toward the seven course requirement. The following is a typical program of study:

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Year 1, Fall Semester

BCHM 100a Introductory Biochemistry OR
BCHM 101a Advanced Biochemistry: Enzyme Mechanism
BCHM 102a Quantitative Approaches to Biochemistry
BCBP 300a Laboratory rotations

Year 1, Spring Semester

BCHM 104b Physical Chemistry of Macromolecules
BCBP 200b Readings in Macromolecular Structure-function Analysis
BCBP 300b Laboratory rotations
CONT 300b Ethical Practice

Year 2 and 3

BCBP 401 Biochemical Research Problems (all four semesters of years 2-3)

Three additional courses, often including one or more of these:

BCHM 103 Advanced Biochemistry: Information Transfer Mechanisms
CHEM 235 Advanced NMR Spectroscopy
BCHM 171b X-ray crystallography
PHYS 105a Biological Physics
QBIO 110a Numerical Modeling of Biological Systems
QBIO 120b Quantitative Biology Instrumentation Laboratory

Year 4 and beyond

BCBP 401 Biochemical Research Problems (every semester)

In addition to passing the formal course requirements, all students should endeavor to keep abreast of current developments in Biochemistry & Biophysics and related fields. To accomplish this, students are urged to attend the following seminars weekly during the academic year:

- 1) The Biochemistry & Biophysics Friday Pizza Talks
- 2) The research talks sponsored by the students from the MSM and QB training programs.
- 3) One or more departmental colloquia or specialty journal clubs according to the student's interest.

Biochemistry & Biophysics Ph.D. with Specialization in Quantitative Biology (QB)

In order to receive a Ph.D. in Biochemistry & Biophysics with a specialization in Quantitative Biology, students must complete the requirements defined above for the Biochemistry & Biophysics Ph.D. degree and in addition must satisfy the course requirements for the QB specialization that are described in the quantitative biology section of the *Bulletin*. Any alteration to the QB course requirements must be approved by the QB program faculty advisory committee. With the approval of the graduate program chair, courses taken to satisfy the QB specialization requirements can be used to satisfy course requirements of the Biochemistry & Biophysics Ph.D. degree.

Students wishing to obtain the specialization must first gain approval of the graduate program chair or QB liaison (Prof. Kern or Prof. Gelles). This should be done as early as possible, ideally during the first year of graduate studies. For information on how to apply to the QB program, see

<http://www.brandeis.edu/programs/quantbio/application.html>

2. Rotations and acceptance by dissertation advisor

All first year students are required to register for the research rotations (BCBP 300a,b). Every student is required to complete four rotations of nine weeks each in four different laboratories during the academic year (specific dates below). The choice of laboratory rotations is made jointly by the student, the chair of the graduate program, and the faculty member in whose lab the rotation is to take place. Students may choose advisers from any department within the School of Science. The complete list of faculty research interests can be found at: www.bio.brandeis.edu.

During orientation week, students will attend a three-night faculty bazaar where faculty members will introduce their work. After, students will turn in a list of three top choices

for the first rotation. We will then **assign** students to a first rotation by Friday, August 28th at 5:00pm, doing our best to give everyone their first or second choice.

The remaining three rotations are the responsibility of the student to arrange with the appropriate faculty member ahead of time. We recommend that you arrange your rotations as early as possible. At the end of each rotation, the student will give an oral presentation of their research project to the Biochemistry Department.

Rotation Schedule:

	Start	End/Presentation Given
1st	Mon. 8/31/15	Fri. 10/30/15
2nd	Mon. 11/2/15	Fri. 1/1/15 (Date of talks TBA)
3rd	Mon. 01/04/16	Fri. 03/04/16
4th	Mon. 03/07/16	Fri. 05/06/16

After the first year, research for the PhD dissertation is carried out under the supervision of a faculty adviser. Advisors can be chosen from any department within the Division of Science. The complete list of faculty research interests can be found at: www.bio.brandeis.edu. Ordinarily, students choose a research laboratory immediately upon completion of the fourth laboratory rotation in May of the first year. However, some students elect to do a fifth rotation during the summer after the first year's courses are completed. In that case, the Ph.D. advisor must be selected before the beginning of the student's second year.

3. Teaching

All Ph.D. candidates are required to serve as teaching assistant for two courses, sections, or labs. This is usually done in the student's second year of study.

4. Propositions

Propositions are research proposals that the student writes and then defends in an oral exam. Each student must pass *two* propositions in order to obtain the Ph.D. degree. Each proposition is an original research proposal based on an understanding of current literature in specific fields of research. The student should identify an interesting and experimentally tractable question at the forefront of biochemistry or biophysics, and should design a plan to attack this question (and maybe even to answer it!).

The first proposition (the "outside" proposition) should be in the general field of the student's dissertation research. If the student wishes, it may take the form of a thesis research proposal, but this is not a requirement. This proposition must be completed before the beginning of the second semester of the second year (~ Jan 15).

The second proposition (the "inside" proposition) is a proposal for research that does not

cover the field of the student's Ph.D. research. This proposition must be completed before the end of the second year (July 1).

For both propositions, the chosen topic should be approved by the thesis advisor well in advance. **The examining committee, consisting of three faculty members including the thesis advisor, should be assembled in advance by the student and must be approved by the Chair of the Biochemistry & Biophysics Program.** The propositions are defended orally before the committee. **The Chair of the committee should NOT be the advisor.**

At least two weeks before the scheduled date the student must submit the proposition exam scheduling form (see Appendix). **Each member of the committee must be given a final copy of the written proposition no later than three days before the examination date.** The student should bring a copy of the proposition defense form (see Appendix) to the oral exam for the signatures of the committee. *It is the responsibility of the student to choose the proposition committee, to schedule the oral presentation, and to reserve a room through the Biochemistry office.*

Written proposition. Proposition topics are original research proposals formulated by the student. The subject of each proposition must be approved by the student's dissertation advisor. Propositions are academic exercises only; students do not actually perform the research proposed. A proposition defines a specific current research problem and proposes the experimental means to investigate it.

The proposition should clearly and explicitly define a goal of the proposed research. Usually, the goal is to answer a single, specific scientific question.

The proposition should make a convincing case, using appropriate literature citations, that achieving the goal would be scientifically worthwhile and should summarize (with references) relevant work done by others.

The proposition should also describe a practical plan of experiments by which the goal could be achieved. The plan should explicitly state the experimental methods to be used and contain sufficient detail, including literature citations, to allow the reader to evaluate its feasibility.

The written proposition is typically ~10 pages in length (double-spaced). Many students have found the following format, based on that used in NIH grant proposals, to be useful: i) Specific Aim; ii) Significance; iii) Background and iv) Experimental Plan. This should include citation of pertinent literature relating to the project.

Oral examination. The student should prepare a 30-minute presentation, which will in practice end up as a one-hour discussion. The student should bring a copy of the proposition defense form (see Appendix) to the oral exam for the signatures of the committee.

Grading. Propositions are graded pass-fail. Students receiving a failing grade are ordinarily given the opportunity to repeat the defense within five weeks of the initial defense.

5. Progress Meetings

Starting with the third year of study, the student meets with a faculty committee of three members at least once every academic year to discuss progress towards completing research and the dissertation. The committee, which includes the dissertation advisor, is chosen by the student, and its makeup should approximate that of the intended dissertation committee. The student should bring to the meeting the required form (see Appendix) which the committee members sign to indicate whether the student is making satisfactory progress toward completion of an acceptable dissertation. **Students should not view these meetings as exams!** Their sole purpose is to facilitate the student's trajectory towards a successful dissertation.

For the first Progress Meeting, held in the third year, the student should submit a written description of the general aims of the thesis research-project and the progress made towards these aims. In subsequent years, the meetings are more informal and do not require a written report. However, students often find it helpful to prepare a written outline to bring to the meeting.

Students should feel free to call a Progress Meeting at any time, i.e., before the scheduled time, if they feel that the advice of a committee would be helpful. Otherwise, these meetings will be scheduled by the Program Chair.

6. Residence

The graduate school requires a student be resident at Brandeis (i.e., enrolled as an on-campus graduate student) for three years to receive the Ph.D. degree. Consult the Brandeis catalog and/or the Graduate Affairs Office if you need more information on the residency requirement.

7. Dissertation

The Ph.D. candidate must write a dissertation that summarizes the results of an original investigation of an approved subject and which demonstrates the competence of the candidate in independent research. The student must give a public seminar on the dissertation research.

A final oral examination based on the dissertation must be passed. The defense committee will be composed of 3-4 faculty members, one being the dissertation advisor. At least one of the members of the defense committee should be chosen from outside the Biochemistry & Biophysics Program (and is customarily from outside the University).

The examination is open only to the student, the committee, and members of the Biochemistry & Biophysics Graduate Program faculty.

It is the responsibility of the student:

- to ensure that all requirements are satisfied before the dissertation exam
- to ensure that the dissertation is in a form and format acceptable to the Graduate School and is submitted by the required deadlines (students should obtain specific instructions for the preparation of the dissertation directly from the Graduate School office before starting to prepare the dissertation)
- to fill out the defense committee form (obtained from GSAS) with the required signatures prior to the defense, and give a copy to Maryanna Aldrich in the Biochemistry and Graduate Affairs office, MS 009.
- to arrange a time and place for the Ph.D. defense at least two weeks in advance
- to give a copy of the dissertation to each committee member, **as well as a copy to Elysha Schickel in the Biochemistry and Graduate Affairs office**, at least two weeks before the defense. You may retrieve the copy left in the office following the defense.
- to come to the examination with the forms required by the university: (1) Report on Ph.D. Dissertation and Final Oral Examination (obtained from the registrar's office), and (2) signature pages for final dissertation copies.
- to obtain the signatures of the members of the dissertation defense committee and to file the forms and the final dissertation copies with the graduate school.

Students have not fulfilled the dissertation requirement until the final version of the dissertation, including any changes required by the committee and the Graduate School, is submitted to the Graduate School office. For theses that include copyrighted material (for example, text already published in journal articles), copyright permission must be obtained from each journal and submitted to the Graduate School office with the dissertation. There is usually no need to get permission from co-authors, since it is usually the journal, not the authors, that owns the copyright.

The Graduate School requires that the oral exam be retaken if the final thesis is not submitted sufficiently soon after the exam; if delays are anticipated please consult the Graduate School office.

Summary of deadlines for Ph.D. degree requirements

End of second semester of year 1:

- pass first-year courses
- be accepted by dissertation advisor (for students doing only four rotations)

Before start of year 2:

- be accepted by dissertation advisor (for students doing five rotations)

Before start of second semester of year 2:

- pass first proposition (the “inside” proposition)

End of year 2:

- pass second proposition (the “outside” proposition) before July 1

Autumn of year 3:

- Set up a Progress Meeting Committee and present proposed thesis project

In every subsequent year:

- complete Progress Meeting

Note: For the purpose of program deadlines, "end of the second semester" refers to the date listed in the Brandeis academic calendar as the date final grades are due, and "before the start of year" means before the first day of classes.

Information for first-year students

Upon arrival on campus, first-year students should stop by the Biochemistry Department Office (Ros/Kos 3-RK02) check your mailbox (located in the hallway outside the Biochemistry office) for information about orientation activities, registration, and class schedules. **It is mandatory that you attend the Orientation Meeting scheduled for your program.** Your primary administrative contact in the graduate affairs office will be Elysha Schickel, who can be found in the Biochemistry and Graduate Affairs office in Ros/Kos 3-RK02. Please also contact the Biochemistry & Biophysics Graduate Program Chair (Dorothee Kern, Volen 444) to set up an appointment to discuss your course selections. It is best not to register for classes until after this meeting. It is at this meeting that the form “Program of Study for the Biochemistry & Biophysics Ph.D. Program” (see Appendix) should be completed. Provide a copy of this form to the Biochemistry and Graduate Affairs Office (MS 009).

Miscellaneous information

As a graduate student, your only official affiliation with Brandeis is as a member of the graduate program, not of a department (e.g., Biochemistry) or center (e.g., Volen).

The following is information from the Registrar's office which all students (both first-year and beyond) should be aware of:

"Every semester some graduate students completely overlook their obligations to enroll in classes, thinking it a matter of little importance which can easily be corrected at anytime. ***This is a false impression.*** We will make a concerted effort to reach unregistered and unenrolled students in advance of the deadline. But thereafter, we are not at liberty to enroll students in courses; we will presume they are not in attendance, and process their withdrawal from the University, which in turn will invalidate any financial support they may be receiving."

However, first-year students should not register until they discuss their academic program with the program chair.

Program of Study for the Biochemistry & Biophysics Ph.D. Program

Student		Entering semester & year	
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Dear Student,

The list below is your Program of Study for the Biochemistry & Biophysics Ph.D. program. To complete the course requirement for the B&B Ph.D., you must register for and successfully complete (with a grade of B- or higher) each course listed below during the semester specified.

You should be aware that no deviation from this program is permitted without written permission of the program chair. Students who fail to successfully complete one or more courses in their plan of study may be required to leave the program. If you are experiencing or anticipating academic difficulties at any time during your studies at Brandeis, please come to talk with me as soon as possible.

I hope that you will find the courses to be intellectually stimulating and a valuable learning experience.

Sincerely,

Dorothee Kern, Chair
Biochemistry & Biophysics Graduate Program

Date:

Semester/Year	Course	Counts toward 7 – course Requirement if passed?	Grade received
Fall	BCBP 300a (lab rotations course)	No	
Spring	BCBP 300b (lab rotations course)	No	
	BCBP 200b (proseminar)	Yes	
	CONT 300 (ethics course)	no	
Fall			
Spring			

*Elective courses can be any non-laboratory course (100-200 level) offered in BCHM, BIOL, CHEM, QBIO, or PHYS. Many other advanced courses can also be used, but only with prior written permission of the program chair.

**Biochemistry & Biophysics Program
Proposition Examination Scheduling Form**

I have scheduled my proposition exam for

(date, time and location)

The proposition defense committee consists of the following faculty in addition to my advisor:

(Chair-printed name)

(Advisor-printed name)

(Committee member-printed name)

The subject or title of my proposition is:

(Student's signature and date)

(printed name)

I approve the proposition subject. [Note to advisor: if the student is taking the outside proposition, the subject must be outside of the student's dissertation research field].

(Advisor's signature and date)

(printed name)

Instructions for the student. Photocopy the completed form and give original to Elysha Schickel in the Biochemistry and Graduate Affairs office, MS 009. Please also keep a copy in your own files.

**Biochemistry & Biophysics Program
Proposition Defense Form**

_____ 's proposition defense took place on
(student's name)

(date)

The grades were:

Written proposition -- pass fail;

Oral examination -- pass fail;

(chair signature)

(chair printed name)

(committee member signature)

(committee member printed name)

(dissertation advisor signature)

(dissertation advisor printed name)

Instructions for the student: Give a copy of this form to the examination committee chair before the exam.

Instructions for the chair of the examination committee: Please give the completed form to Elysha Schickel in the Biochemistry and Graduate Affairs office, MS 009.

**Biochemistry & Biophysics Program
Progress Meeting form**

The undersigned held a meeting with

_____ on _____
Student's name date

to discuss his/her progress toward the completion of the Ph.D. degree.

Comments:

(committee member signature)

(committee member printed name)

(committee member signature)

(committee member printed name)

(dissertation advisor signature)

(dissertation advisor printed name)

Instructions for the student. Photocopy and give original to Elysha Schickel in the Biochemistry and Graduate Affairs office, MS 009. Please also keep a copy in your own files.

Graduate Teaching Assistants

Assignments. Over the course of graduate study, each Ph.D. student is required to teach undergraduate sections, courses, or labs. These are usually done in the second year. TA assignments are made before the summer prior to the commencement of teaching responsibilities. In rare cases of unexpected enrollment shifts, cancellation or addition of courses, or inequities in work loads, assignments may be changed with little notice. In such a case the teaching assistants concerned will be notified as soon as the changes are known.

Responsibilities. Graduate teaching assistants and faculty members will discuss course requirements, attendance policies and the range of graduate responsibilities (e.g. in class or lab, outside class or lab, administrative duties, technical assistance).

If graduate teaching assistants are to grade undergraduate work, the faculty member and TA will discuss the number of assignments, grading procedures and standards and an expected range of grades.

Graduate teaching assistants should hold weekly office hours as needed for the course.

Graduate teaching assistants are seldom asked to tutor students requiring additional help. If regular tutoring is needed to address difficulties in the course, the graduate student will refer the problem to the professor and, if necessary (and agreed upon), to the appropriate agency on campus for additional assistance.

Faculty members will advise graduate teaching assistants on policies for academic honesty and sexual harassment at the beginning of the term, at which time procedures for alerting the proper university officers and dealing with such matters will be agreed upon.

Graduate teaching assistants are encouraged to discuss teaching with the professor or with a member of the graduate committee.

Graduate teaching assistants are advised to consult teaching materials available at the Office of the Dean of Arts & Sciences and to attend teaching seminars sponsored by the Graduate School.

Every attempt should be made to resolve difficulties arising between graduate teaching assistants and faculty members. If such resolution is impossible, official grievances should be made per the stated procedures in the student handbook.

Graduate teaching assistants are encouraged to document teaching experiences for future job searches. Faculty members should agree to provide letters of reference for teaching which will be included in the student's departmental file.

Pocket Handbook - Graduate Program in Biochemistry & Biophysics

Here's what you have to do - and when:

First year

Show up in the Biochemistry and Graduate Affairs Office (Ros/Kos 3-RK02) and announce yourself to Elysha Schickel, Maryanna Aldrich, and Jena Pitman-Leung.

Mandatory attendance at the Orientation Meeting.

Meet with Program Chair (Dorothee Kern, Volen 444) to plan out your academic courses; **complete a “Program of Study form”** and give a copy to the Biochemistry and Grad Studies office.

Register for classes.

Start completing your **course requirement, You must take:** BCBP 300a,b, BCBP 200b, CONT300b. During the 4th rotation, choose a Ph.D. thesis advisor

In May, you will receive T.A. assignments for next year

Second year

Continue towards completing your **course requirements**

Register for **BIOP 401** from this point forward

Carry out **T.A. assignments**

Prepare your **1st Proposition Defense** (written and oral), to be completed before mid-Jan

Prepare your **2nd Proposition Defense** (written and oral), to be completed before July 1

Third year

Continue towards completing your **course requirement**

Choose **Progress-Meeting** committee - in fall semester. You will be prompted to do this.

Succeeding years

Complete **course requirement**

Yearly **Progress Meeting:** you will be prompted to arrange this.

You should aim to have completed your Ph.D. research by the end of year 5. This does not always (or often) happen, but you should certainly be finished in year 6.

Hint: As you begin to see light at the end of the tunnel, start to think about where you want to do postdoctoral research **12-18 months in advance**. Contact prospective postdoc advisors and give them plenty of lead-time in knowing that you're interested in working with them. An early-bird attitude will enhance the likelihood of your acceptance into your preferred postdoctoral lab