

Ph.D. Program Handbook 2021-2022

Mathematics Department Brandeis University

The purpose of this handbook is to provide more program details than are included in the Math Bulletin for the Ph.D. program. It is meant to complement various other sources which apply more broadly to all students at Brandeis University (e.g., the Brandeis University Bulletin, the Rights & Responsibilities Handbook, and information on Student Accessibility Support) or to students in the Graduate School of Arts and Sciences (e.g., the GSAS Student Handbook and Handbook for Teaching Fellows). Please make sure you read the Bulletin carefully:

- GSAS: <https://www.brandeis.edu/registrar/bulletin/provisional/gsas.html>
- Math: <https://www.brandeis.edu/registrar/bulletin/provisional/courses/subjects/4700.html>

This handbook will answer many, but probably not all, of your questions. Further questions about the graduate curriculum and requirements should be directed to the Director of Graduate Study (DGS), formerly known as the Graduate Advising Head or GAH, Omer Offen. For issues related to undergraduate teaching, consult the Elementary Mathematics Coordinator, Becci Torrey. Concerning non-academic matters such as hourly positions, requests for travel funds and office assignments, see the Mathematics Department administrator, Catherine Broderick. For academic paperwork and stipend information, see the Division of Science Graduate Affairs Office Academic Administrator, Emily Palmer. For questions and concerns about the program, you may also turn to the Graduate Representatives (listed in the Appendix).

****Important Note Regarding COVID-19:** Due to the uncertain direction of COVID-19, please note that the contents in this handbook may be subject to change. If there are any changes, we will notify you as soon as possible by email. Please make sure you check your Brandeis email regularly, at least once a day.

For COVID-19 updates, please consult their website: [COVID-19 Response: What's Now, What's Next | Brandeis University](#). For any questions related to COVID-19 rules and testing, please contact: covid-19@brandeis.edu. If you are displaying COVID symptoms, please do NOT come to campus, but instead stay home and call the Health Center. Health Center Contact Information: brandeishealthcenter@brandeis.edu or 781-736-3677 (during regular hours) or 781-239-1948 (after-hours urgent consultation).

1. The Ph.D. program

Students working towards a Ph.D. in mathematics form the core of the department's graduate program. In order to earn the degree, a student is required to write a dissertation demonstrating significant original research. Accomplishing this typically requires mathematical maturity and expertise well beyond the bachelor's degree. The aim of the Ph.D. program is to provide the necessary background and train students to become successful researchers. Most of the department's Ph.D. recipients pursue academic careers, and many are leading mathematicians. The program begins with required courses on fundamental material. Students then move on to more advanced courses, including reading courses that develop breadth and depth of understanding. To be an enrolled, full-time student, the student must be registered for 12 credits every fall and spring semester. If students would like a course outside the Brandeis math department to count towards your requirements, this requires written approval of the Director of Graduate Study.

By the end of their second year, students should select a dissertation advisor and, by the end of their third year, students should complete their major exam. Students are encouraged to complete their minor exam in their second or third year but must pass it no later than their fourth year. The major exam initiates the stage in which students focus primarily on thesis research under the supervision of their thesis advisor. Students also go through a teaching apprenticeship program that trains them to become effective teachers and each student is required to teach their own section of pre-calculus or calculus for at least four semesters. *(Special COVID-19 guidelines: students who taught in spring or fall 2020 will have the option of teaching three semesters and grading an additional semester. This exception is due to the amount of work required for remote teaching).* Ph.D. students making satisfactory progress towards their degree are ordinarily given five years of funding, including a full tuition scholarship, health insurance and a stipend, so that they can focus on their studies and research.

1.1 The first-year program; required courses. Our first-year program is devoted to building a strong mathematical foundation.

All students are required to master the material of the following four core courses: Math 131a (Algebra I), Math 141a,b (Real and Complex Analysis), and Math 151a (Topology I). In addition, students are required to take at least three of the following seven courses: Math 131b (Algebra II), Math 140a (Geometry of Manifolds), Math 151b (Topology II), Math 161a (Advanced Bifurcation Analysis in Dynamical Systems), Math 162a (Numerical Methods for Scientific Computing), Math 165a (Probability), and Math 164a (Partial Differential Equations).

Each student is responsible for mastering the material in these courses. This requirement can be fulfilled in one of two ways:

- (1) Take the course and earn a satisfactory grade that is a grade B- or better, although PhD students should aim for getting most grades in the A range, if possible).
- (2) Place out of the course by demonstrating a thorough understanding of the “core topics” in the syllabus. This must be done during the first two weeks of the semester in which you want to place out of the course. The placement exam (which may be written or oral) is usually given by the faculty member who most recently taught the course. This year’s examiners are listed in Appendix A. The Director of Graduate Study may also grant exemption from the course on the basis of evidence of having excelled in a similar course at another university. Students who place out of required courses are expected to take more advanced courses during their first year.

The usual practice, which assumes a strong undergraduate preparation, is to take 131a, 141a and 151a in the first semester, and 141b and one or two of the seven courses above in the second semester. The remaining required courses are typically taken in the first semester of the second year. There are regular homework assignments in all these classes and most students find the workload heavy. You may find it useful to work together with your classmates.

In order to ensure some consistency in the teaching of the required classes 131ab 141ab 151ab, a checklist is provided to both the instructors and students of these classes. At the end of the semester, you will be asked to review the course checklist of the topics on the syllabi and to

provide your feedback about the course and the topics covered. It is then the responsibility of the instructor to provide resources for any required topics that have not been covered.

It is department policy that to continue in good standing you must pass at least two out of the required courses each semester during your first year. If you do not, or if your performance in these courses is judged inadequate, you will be asked to withdraw from the program or warned that failure to improve your performance will result in your withdrawal (see §3.2).

In addition to taking required courses, first-year students are given grading assignments for undergraduate courses and are asked to participate in the department's evening tutoring program, which serves undergraduate students taking pre-calculus and calculus. In preparation for teaching in their second year and beyond, most graduate students participate in the Teaching Apprenticeship Program in the spring of their first year. Depending on their English Language Exam results, international students may also be required to participate in the university's ELP (English Language Program) (see §1.4.5).

1.2 The second and third years; coursework, qualifying and language exams, residency requirement, Master's degree. In general, the second year is the time to finish up the course requirements and begin teaching. Students should also begin taking more advanced courses, including reading courses, and working on their major and minor exams. If students are teaching in the fall, they take a Teaching Practicum. By the end of their second year, students should have selected their advisor and completed their language exam (they may also complete this in their third year). By the end of their third year, students should have completed their major exam. Students are encouraged to complete their minor exam in their second or third year, but may complete it by the end of their fourth year.

1.2.1 Coursework. In addition to completing any of the seven remaining required courses, second year students must take the "Second Year Seminar" (Math 200a) in the spring semester. This course is less demanding than a lecture course, and is intended as a vehicle for students to gain experience reading research articles and giving talks. The idea is for each student to present a topic as one would in a research seminar. The material is chosen by the student in consultation with the instructor (usually the Director of Graduate Study), and should be taken from journal articles or preprints as opposed to textbooks. The talks should be understandable to the others in the seminar, so the speaker should not assume background beyond the required courses. The speaker can expect a lot of questions and discussion from the audience, as well as advice and feedback on the lectures from the instructor.

Students in their second year are required to take at least two lecture courses per semester. Students may count their remaining required courses and a reading course towards the total each semester, but the Second Year Seminar, Math Seminar Class and Teaching Practicum (see §1.4) do not count.

In addition to taking more advanced courses, students should begin taking reading courses (formerly "Math 299" and now "**Math 290**") in their second year. Reading courses are arranged with a professor by an individual student or a small group of students interested in a topic not covered in a standard lecture course. These courses are an essential part of the Ph.D. program and serve several purposes. They allow students to broaden the scope of their studies, develop independence, explore possible thesis areas in depth, and get to know possible advisors. They are also a vehicle for preparing for major and minor exams.

Students also begin attending departmental seminars more often in their second and third years (see §2). You may also choose to enroll in the Math 299 or Math 298 class, which is a 2-credit class centered around seminar attendance (see syllabus for the precise requirement). The Math 299/298 seminar courses do not count towards your elective requirements.

Students in their third year are required to take at least one lecture course (or reading course) per semester, unless they are registered for 401D research and they get approval from their advisor to waive this course requirement.

Students in their third year are typically ready to commence on their dissertation. Once they have a precise timeline for taking the major exam, they should register for 12 credits of 401D Dissertation Research.

1.2.2 Advisor Selection. Students should select a faculty research advisor from the math department (or may have a math department advisor and an advisor from another department when applicable) by the end of their second year. Please notify the Division of Science Graduate Affairs Office when you have selected an advisor. We encourage students to start thinking about an advisor early on. To prepare for this, we recommend that students meet with faculty members whom they are interested in and arrange for reading courses in their second year. Students are encouraged to ask faculty about the kind of questions they pursue and the kind of course-work required for their field. Note: The Director of Graduate Study will only advise a student to seek a primary research advisor outside of Brandeis when all other options have been exhausted. Generally, an outside advisor will not be approved.

1.2.3 RCR Workshop. All Ph.D. students are required to take the Division of Science Responsible Conduct of Research (RCR) workshop. You should expect to receive an email asking you to sign up for this workshop; all second-year students should sign up for this workshop. For more details, please go here: <http://www.brandeis.edu/ora/RCR/index.html>.

1.2.4 Major/Minor exams. The examination process consists of two parts: a major exam and a minor exam.

The major exam is intended to lay the foundation for your thesis research. For this exam, you and your thesis advisor will select an examination committee consisting of three faculty members, one of whom should be your advisor. The committee must be approved by the Director of Graduate Study. The exam should be taken by the end of the third year and will consist of an oral presentation of a research area that is likely to be your thesis topic. During the presentation, you should explain your field of study and some key research questions you intend to explore in your Ph.D. thesis. You should demonstrate a deep understanding of the key results in your field, as well as lay a realistic plan of research. If possible, the presentation should include some precise open questions you intend to tackle and some preliminary results.

At least a week before the major exam takes place you need to provide a short document to the three examiners summarizing your plans for your dissertation. This document, between 1 and 3

pages in length, should contain the abstract of your presentation, the field of research, the main references and possibly an indication of some open questions or preliminary results which could be the basis of your dissertation (of course, this document is in no way binding, as your research may continue to evolve and expand over the subsequent years). Once a date has been decided, the student should email Emily Palmer in the Division of Science Graduate Affairs Office (scigradoffice@brandeis.edu) with the date and time so that a room can be reserved.

The dissertation advisor must give his/her approval for the major exam to take place, and in particular you need to have chosen your advisor and field of research well ahead of the exam (preferably, during the second year). At the end of the exam, the committee will write a report for the student to review. In case the committee is not satisfied with the presentation, the major exam can be retaken once, but no later than the first semester of the 4th year.

The minor exam is intended to provide some additional breadth of your math education. For this exam, you choose an area of mathematics and ask a faculty member, who should not be your thesis advisor but can be a member of the major examination committee, to be your examiner. The minor exam needs to be taken no later than the end of the 4th year, but students are encouraged to pass it in their second or third year. It needs to be on a topic which is distinct from your main thesis research, though it can be related or have applications to it (for example, number theory and K -theory). For students in their 2nd and higher years who have not completed their minor exam, the Division of Science Graduate Affairs Office will send a Google form at the beginning of each semester. Please complete the form to indicate whether you are planning on taking a minor exam and with which examiner during the semester.

There are two typical types of work that would qualify as a minor exam. First, you may enroll in any of the graduate elective courses and make an agreement with the faculty member teaching the course that it will be the vehicle for your minor exam. In addition to the course work, you will meet occasionally with the examiner to discuss your progress, and you will present a talk on the topic of the course, either in class or at a departmental seminar. At the end of the semester, the examiner will administer an oral exam on an additional topic related to the course. The second option is that you enroll in a reading course with the examiner. In this option, you will also present a talk on the topic of the reading course, and the examiner will administer an oral exam.

At the completion of either exam, the committee chair (examiner) will fill out a form certifying that you have passed. As soon as you have completed the exam, please turn in the form (either in person or by email) with the correct date to the Division of Science Graduate Affairs Office. If the exam needs to be retaken, the student should submit a new form once the exam has been taken and passed.

1.2.5 Language exam. Students typically complete their language exam in their second year but may also complete it in their third year. Students are required to have some knowledge of French, German, or Russian, for which the requirement is to be able to read mathematical literature in that language without difficulty. The department designates an examiner each year for each of these languages. The exam should be scheduled with the designated examiner, and may be retaken several times without penalty. To pass the exam, you will need to translate a page of a mathematical paper or text in the language. To prepare for the exam, you should first acquire some basic skill in the language, and then read some mathematical texts carefully in an area of interest to learn the mathematical terms. The language examiner can provide

suggestions for practice texts. You can also audit Brandeis undergraduate language courses, or take courses given by the graduate school tailored for graduate language exam preparation.

1.2.6 Residency requirement. The minimum academic residence requirement for the Ph.D. is three years.

1.2.7 Master's degree. Students who have successfully completed the M.S. or M.A. requirements outline in the [Math Bulletin](#) are welcome to apply for one of these degrees, without charge. Please keep in mind that you cannot apply for both degrees but must decide between the two. We recommend applying for it early on so that, if you were to unexpectedly need to leave the Ph.D. program, you would at least have a master's degree. The online application can be found here: <https://www.brandeis.edu/registrar/forms/graddegree.html>. If you have questions about whether you have met program requirements, please contact Emily Palmer (scigradoffice@brandeis.edu).

1.3 The fourth and fifth years, the thesis, applying for jobs. The emphasis in these years should of course be on finishing your thesis. Students should make significant progress on their theses in their fourth year. Exceptional students will complete their theses and graduate in four years. A student's final year is devoted primarily to writing up the thesis, applying for jobs and making the transition from a graduate student to a mathematician working in academia or in industry.

1.3.1 Time-to-degree. Students are required to spend at least three years in the program in order to be eligible for a Ph.D. Students may file an application with the Graduate School to have up to one year of graduate work at another institution applied towards their Ph.D. Some students finish in four years; most take five. Occasionally students take an extra semester or more. Scholarships, health insurance and stipends are guaranteed through year five for students in good academic standing. Support beyond the fifth year is granted only under exceptional circumstances. (See §3.3.)

Students who have maintained good academic standing but have not completed the Ph.D. by their fifth year may continue to work towards the degree. The Graduate School requires that "Students entering Brandeis with no previous graduate work must earn the doctorate within eight years from the inception of study. In recognition of the extraordinary circumstances of the COVID-19 pandemic and the myriad research and health disruptions of our doctoral students' progress, GSAS will be automatically granting an extension of time to degree for any doctoral student who was enrolled during the Spring 2020 semester, thereby extending their time from eight to nine years. Students who have passed the terminal point for the degree must petition the Graduate School for an extension no later than the final semester prior to the expiration of their time to graduate."

1.3.2 Coursework. In addition to enrolling in 12 credits of 401D Dissertation Research course with your advisor, you are encouraged to attend seminars; fourth-year students are also encouraged to take one lecture course a semester, usually a "topics" course. While it is important to focus on your thesis problem, is also important to continue developing perspective and breadth in mathematics. While it is important to focus on your thesis problem, it is also important to continue developing perspective and breadth in mathematics.

1.3.3 The thesis. A Ph.D. dissertation is an original and substantial piece of research. The thesis topic might be suggested by your advisor, or it may be your own choice approved by your advisor. While you are likely to work closely with your advisor, the research must be primarily

yours in both ideas and details. The advisor's role is to advise, to listen to your ideas and provide feedback, to point you to relevant literature and, occasionally, to suggest possible approaches when you are stuck.

A student is sometimes interested in working with a mathematician at another university (for example, Harvard or MIT). If that person agrees to act as your advisor, you must also have an official advisor at Brandeis who monitors your progress.

1.3.4 The defense. Your dissertation examination committee will be at least three faculty members, approved by the Director of Graduate Study. Your advisor is the chair of the examination committee and will help choose the other members. One committee member must come from outside the department. This is usually a mathematician at another institution, but it can also be a Brandeis faculty member from another department (for example, physics or computer science). You then need to coordinate the scheduling of the thesis defense with your committee and our Academic Administrator, Emily Palmer, in the Division of Science Graduate Affairs Office.

Copies of your thesis need to be given to the examination committee at least two weeks before the defense date. During the defense, you should give a short lecture (40–50 minutes) explaining the results in your thesis, and be prepared to answer questions about it. After the exam, the committee deliberates in private before informing you of the outcome.

In the unlikely event that there are serious problems with the thesis, the committee is expected to identify them before the defense. In that case, the defense would be rescheduled after the problems are resolved. It is not unusual, however, for the committee to request minor corrections to the thesis. If the committee requests substantial revisions, then these must be completed and approved within six months or another defense is required.

At the beginning of the semester in which you defend, you should be in close contact with our Academic Administrator in the Division of Science Graduate Affairs Office, as well as with the International Students and Scholars Office (ISSO) if you are an international student and are interested in applying for OPT. The Academic Administrator will review with you important deadlines regarding your dissertation, health insurance and stipend end date. You will also want to email ALL forms to the Division of Science Graduate Affairs Office when you email them to the Registrar. Please see Appendix C for additional information.

1.3.5 The job search. Most of our students go on to successful academic careers after graduating, though some pursue non-academic careers. Be warned though that the application process can be time-consuming and emotionally draining.

For a very comprehensive overview of recommendations for the academic job search and application process, [please review these tips](#) from our faculty/postdoc panel last spring. You should start working on your job-market portfolio (CV, research statement, etc.) during the summer preceding your academic jobs. A CV or “curriculum vita” is an academic version of a resume. Most institutions request at least three letters of recommendation, including one that specifically addresses your teaching skills. Some places ask for a statement of teaching philosophy and diversity statement as well. Your advisor will help you decide whom to ask for research letters, and the Elementary Mathematics Coordinator usually writes a teaching letter. The application materials should be uploaded to <http://www.mathjobs.org/> or mailed directly to those departments that do not advertise there.

The NSF deadline is mid October and some postdocs in Europe ask for applications by October 1st so you need to be ready for that. It is a good idea to have a complete draft of your research statement (both NSF and regular), teaching statement, diversity statement, CV, and publication list ready by September 1st. You must have it all ready 4 weeks before your first deadline, so that you can send your materials to your letter writers then. You should estimate that it takes about a month of dedicated time to prepare these documents.

Job listings for most academic positions in the US and Canada are posted on the American Mathematical Society website <https://www.ams.org/home/page> as well as at <http://www.mathjobs.org/>. The latter website can be used to apply for jobs.

Do not underestimate the importance of demonstrating your teaching ability to potential employers. It is the most important factor when applying for jobs at most small colleges. It is also a major factor in hiring decisions in departments that emphasize research. It is even a significant factor when applying for non-academic jobs since it highlights your communication skills. An outstanding teaching performance as a graduate student translates into strong teaching recommendations and student evaluations. The department provides excellent training and support to help you improve your teaching skills (see §1.4), but successful teaching requires a serious effort on your part as well.

Some students pursue non-academic careers (e.g. in finance, data science, computer science) after graduating. In addition to seeking advice from faculty and alumni, we highly recommend creating a Brandeis Handshake account (Brandeis's equivalent of LinkedIn) and making an appointment with the Brandeis GSAS Center for Career and Professional Development. The Center (<https://www.brandeis.edu/gsas/career/index.html>) provides one-on-one coaching on interviewing, networking, resumes and CVs. During the semester, we recommend reading postings on Handshake and emails about career-related networking events, such as data science or computer science job fairs. You may also want to use the [Math Department's Career Resources page](#).

1.4 Teaching. Teaching is an integral part of the doctoral program in mathematics, as it will be in the career of most mathematicians. All mathematics Ph.D. students are expected to teach a section of calculus or pre-calculus for at least four semesters, usually beginning in their second year of study. When students are completing these four semesters of teaching, they are paid as "Teaching Fellows" for a portion of their stipend pay at a rate that is negotiated by the Graduate Student Union. *Special COVID-19 guidelines: students teaching in spring or fall 2020 have the option of teaching three semesters and grading an additional semester.* The department provides each student with extensive training before beginning to teach, and ongoing advice and support when the student is teaching. The valuable training and experience in teaching is an important asset in the academic job market (see 1.3.5). There is a departmental Teaching Prize awarded each year in appreciation for dedication and skill in teaching mathematics.

The Elementary Mathematics Coordinator is the faculty member who oversees graduate student teaching of calculus and pre-calculus.

Students interested in designing and teaching upper-level undergraduate courses are encouraged to apply for a University Prize Instructorship (see 3.3.3).

While students receive a lot of teaching support from the Department and Elementary Mathematics Coordinator, you are also welcome to attend workshops

and use the resources of Brandeis's Center for Teaching and Learning:
<https://www.brandeis.edu/teaching/faculty-development/index.html>.

A few students are hired by the university each summer to teach undergraduate courses. Among eligible students who wish to do this, priority is given to those who have taught least in previous summers. Summer teaching does not count towards the teaching requirement. Students who wish to teach outside Brandeis while supported by Brandeis must get approval from the department.

1.4.1 Teaching Apprenticeship Program. First-year students do not teach, but are expected to focus on the required courses and the adjustment to life as a graduate student. They are also required to grade for one undergraduate course per semester as part of their stipend, and tutor one to two evenings per week in the department's drop-in tutoring program for students in pre-calculus or calculus. (They are paid hourly for tutoring.)

In the spring of the first year, most first-year students participate in a three-week Teaching Apprenticeship Program. This program pairs each new student, the apprentice, with one who is currently teaching, the "coach"; the apprentice first visits several of the coach's classes, and then—working closely with the coach at each step—teaches three of his or her classes. The program is supervised by the Elementary Mathematics Coordinator.

Some students may not be ready for the Teaching Apprenticeship Program in their first year. Those whose native language is not English may need to focus on building up their English skills in preparation for their teaching later on (see 1.4.5).

Students who complete the Teaching Apprenticeship Program may need to improve their teaching skills further before they are ready to teach their own section of pre-calculus or calculus. In that case, they participate in an extended apprenticeship program until they are ready.

1.4.2 Teaching responsibilities. Students usually begin teaching their own sections of calculus or pre-calculus in the fall of their second year. Graduate student instructors work closely with the faculty member overseeing the course (usually the Elementary Mathematics Coordinator), but nonetheless each graduate student has full responsibility for his or her section; this means preparing lectures, writing and grading quizzes, holding office hours, and participating in the writing and grading of common exams. The Elementary Mathematics Coordinator is available to graduate students who have questions about teaching or who are trying to improve their teaching skills.

Every attempt is made to equitably distribute teaching duties and provide all students with adequate training and experience. Most students will teach each semester during their second and third years, so that they will teach a total of four semesters. Students who are not ready to teach in the fall of their second year will end up doing more teaching in their final years of graduate school. There are typically fewer sections of calculus taught by graduate students each spring semester than there are graduate students who are eligible to teach. (Students are eligible to teach if they have successfully completed the Teaching Apprenticeship Program, are enrolled with Resident or Post-Resident status, and are not restricted from teaching by an outside funding agency.) Students who have already taught the most semesters are given the first opportunity to opt out of teaching that semester. Among those who have taught the same number of semesters, students enrolled the longest are given priority. Ties are then broken by

drawing straws. Students who are not teaching assist by grading undergraduate courses that semester. Final decisions on teaching assignments are made by the Elementary Mathematics Coordinator and the Director of Graduate Study.

1.4.3 Teaching Practicum. During the fall semester of each year, all graduate student instructors enroll in a Teaching Practicum (Math 204a) to work on their teaching skills. As part of the course, the practicum instructor observes the classes taught by graduate students, evaluates their teaching performance and provides advice to improve their teaching skills. The Teaching Practicum also provides a few mandatory workshops on teaching skills, pedagogy, innovations or concerns.

1.4.4 Mandatory training. Ph.D. students will attend the TF/TA orientation run by GSAS at the beginning of their first year. The TF/TA is required for all instructors, half-TAs, graders and evening tutors.

1.4.5 The ELP program. The university's English Language Program (or ELP) program provides English language support. Any incoming GSAS student whose admission letter includes an English-language diagnostic exam requirement must take the ELP exam in order to determine if English language coursework is necessary during the first year of study. The diagnostic exam helps ELP accurately determine the level of English proficiency and whether a student will require language and communication support in order to be successful and have a positive overall experience at Brandeis. The exam takes place each August during GSAS Orientation and each January for midyear students. ELP will contact students with details prior to their program start date.

If a student is required to take ELP courses, the Director of Graduate Study and Elementary Mathematics Coordinator may decide to postpone teaching while the student completes ELP courses. If you are asked to take an ELP class, then attendance and participation are required in order to maintain good academic standing, and a passing grade is a university requirement for graduation.

1.4.6 Grading (non-union position). Students who are not teaching assist by grading one undergraduate course per semester (working on average 7 hours per week). In addition, students may be hired for additional grader positions by the Dean's office, with the approval of their advisor. Students apply to the Dean's office for these paid positions. The pay is \$2500 per semester (2021-2022 rates). Graduate student graders are expected to grade homework for a class and may be asked to grade midterm exams as well. In large classes, they may also help the instructor in grading the final exam or proctoring the midterms or final; however, the primary proctor (a TA or instructor) should be responsible for answering content questions during the exam. The grader should also allocate one hour per week during which students can come to the grader's office and ask about their grades. **Students cannot be hired as graders for a course in which they are the TF.**

1.4.7 Graduate Student Union. For more information on the services offered by the union, please read the Union Contract SEIU Local 509 when it becomes available (a new contract was just negotiated in summer 2021): <https://www.brandeis.edu/human-resources/employee-resources/collective-bargaining/index.html>.

1.4.8 Teaching Assistantships (union positions). The Dean's office hires graduate students as teaching assistants (TAs) for some large undergraduate courses, with the approval of their

advisor. The Math Department typically advertises half-TA jobs, which are half the time commitment and pay of full TA-ships. These half TA jobs are in addition to usual responsibilities (e.g., teaching or grading) and are compensated separately (not included in the stipend). The expectation is that half TAs work an average of 5 hours per week with a rate of \$1,935 per semester (rates for 2021-2022). Students apply through the Dean's office for these positions. Half TA responsibilities vary based on the needs of the instructor and the course, but can include things like: attending class; holding office hours and/or recitations and/or review sessions outside of class; helping grade quizzes and exams; helping to proctor quizzes and exams; answering questions online; helping to write quizzes, exams, worksheets, review material (e.g., contributing problems). **Students on their first semester of teaching cannot TA or half TA.**

1.5 Boston Area Graduate Consortium. It is possible for Brandeis graduate students to cross-register for mathematics courses at Boston University, Boston College, and Tufts. Graduate students should check with their advisor and the Director of Graduate Study before cross-registering for courses. For information on cross-registering, see <https://www.brandeis.edu/registrar/registration/graduates.html>. Graduate students sometimes sit in on courses at Harvard or MIT, but it is not possible to formally cross-register for these courses.

2. Seminars and other activities

There are seminars and numerous other activities that graduate students benefit from, academically and otherwise. You are encouraged to take advantage of the opportunities available to you as a student in the department, at the university, and as part of the Boston area mathematical community. For a full listing of seminar times and dates, please visit the Math Department "Talks" webpage: <https://www.brandeis.edu/mathematics/talks.html>.

2.1 Seminars. The department has a variety of (usually) weekly seminars. Some are intended to be accessible to all graduate students, while others require more background. For example, the *Everytopic Seminar* is intended to expose graduate students and undergraduates to research topics in mathematics and occasionally related areas, such as physics and computer science.

The Graduate Student Seminar, organized by the graduate students, is one in which the students lecture to each other on topics of interest and eat pizza. This is an excellent opportunity to prepare for giving talks at conferences and to receive helpful feedback from your peers in a low-stakes setting.

The Joint Brandeis-Harvard-MIT-Northeastern Colloquium is a weekly event that rotates among the four universities and meets at Brandeis 2 or 3 times a semester. The speakers are leading mathematicians from around the world, and the talks are often accessible to graduate students. The department takes the speaker to dinner afterwards and subsidizes dinners for graduate students.

The New Directions Lecture Series, also known as the *NOSY (for Not Only Second Year) Seminar*, is a series of lectures or mini-courses offered in the fall semester of each year. They are given by faculty members and are designed to introduce students to a current area of research in more depth than is possible in a single seminar lecture. Second-year students are especially encouraged to attend this seminar, as it offers them an opportunity to learn about the research interests of faculty members.

The Math Biology Seminar has the purpose of bringing together experimentalists and theorists. It is organized by the labs of Thomas Fai and Jonathan Touboul in the Department of Mathematics at Brandeis University, two interdisciplinary research groups applying mathematical models to biological sciences.

The New England Dynamics and Number Theory Seminar features research talks on ergodic theory, homogeneous dynamics, number theory, and their interactions.

The Topology Seminar tends to choose a theme for the semester and works as a learning seminar with participants taking turns giving talks. Outside speakers sometimes give talks as well.

The Combinatorics Seminar is an introductory seminar for combinatorics. The talk should be accessible to first year graduate students.

There are a number of informal learning seminars on topics of interest to students in a particular area. In the past academic year, this included working seminars on dynamics and number theory, modular and automorphic forms, and other topics.

The Undergraduate Math Club sometimes organizes interesting and accessible interdisciplinary lectures.

There are many other seminars in the Boston area that are regularly attended by Brandeis faculty and students—MIT's Combinatorics Seminar, Harvard's Number Theory Seminar, the Harvard-MIT Algebraic Geometry seminar, Harvard's Gauge Theory and Topology Seminar, the Boston College Geometry and Topology Seminar, and the Boston University Algebra Seminar, to name a few.

2.2 Travel funds. Attending workshops and conferences is a useful way to learn mathematics, meet others in the field and let people know about your work. Ph.D. students who have settled on an area of research are encouraged to go to at least one during their graduate career. Students can apply to the Math Department for Travel Funds for this purpose; however, please note that receiving travel funds from the Department are not guaranteed. Use of the funds requires permission of your thesis advisor or the Director of Graduate Study. Please apply for travel funds before the end of the fiscal year and **by May 1st at the very latest.**

2.3 The Jerome Levine Outstanding Thesis Award. Every year the Jerome Levine Outstanding Thesis Award is given to the student who, in the opinion of the faculty, has written the best Ph.D. thesis in the past year.

2.4 Summer support. Though quieter than during the school year, the department still has a fair amount of activity during the summer, with many faculty and students still coming in regularly.

While everyone needs a break, we hope that you'll spend most of the summer pursuing your studies. However, the department cannot guarantee financial support to students during the summer months. It is therefore understandable that some of you will seek employment during the summer, and some of you will take the opportunity to travel home.

A few students are hired each summer to teach undergraduate mathematics courses (see §1.4). A few others sometimes find jobs on-campus that leave them time for mathematics. The department also has some funding to support students working on their research during the summer. We will support a limited number of students for up to a month each. To be eligible, you must have taken all the required courses and you must be residing in the US and not otherwise employed during the period of support. To apply, you need to write a brief proposal describing your summer research plans. Awards will be based on merit, with priority given to those students who are not teaching in the summer and have not received summer support before. The two best proposals each year will be funded from the *Harold L. Levine Endowed Fellowship Fund*. This award is similar to the regular summer research fellowships that are funded by grants and other department funds, but has a somewhat higher amount.

2.5 Internships. Over the summer, students may be interested in pursuing an outside internship to help them further their career goals. Completing an internship is especially helpful for students considering careers outside of academia. We encourage students making progress in their program and research to apply for these kinds of opportunities even though it isn't a requirement for the Ph.D. program. Important note: international students who would like to pursue a summer internship MUST consult both ISSO and receive approval of the DGS to register for an internship course (Math 393G - Math Internship, a 1.00 course credit). International students will need to make an appointment with their ISSO advisor to discuss the [steps for applying for CPT](#).

2.6 Social events. The department's friendly and informal atmosphere fosters interaction among faculty and students and enhances the environment for learning and research. A variety of social events contribute to this atmosphere. There is an afternoon tea in the department lounge each week when classes are in session. Two or three days each semester, the Joint Colloquium (see §2.1) is held at Brandeis; it is preceded by a tea in the department and followed by dinner at a local restaurant. In addition, there are several annual events, usually including a fall barbecue and a holiday party.

3. Math Dept. Administrative Information

The Director of Graduate Study is responsible for overseeing the instruction and advising of graduate students in the mathematics department. This responsibility includes making recommendations to the university concerning admission, readmission, and funding of graduate students and the granting of graduate degrees. Another resource is the Academic Administrator in the Division of Science Graduate Affairs Office (email: scigradoffice@brandeis.edu), who assists the Director of Graduate Study with academic matters and tracking student progress. The Department Administrator handles Department related issues, such as office space, course scheduling and ordering new equipment. If the Director of Graduate Study is unavailable, or unable to address a particular concern, then the matter should be taken care of by the Department Chair.

3.1 Advising. All students should meet with the Director of Graduate Study at the beginning of each semester to discuss courses and plans for the semester and progress towards the degree.

The Director of Graduate Study serves as the primary advisor for all incoming Ph.D. students until a dissertation advisor is chosen (see 1.2.2). The dissertation advisor becomes the student's primary advisor.

The Elementary Mathematics Coordinator advises students on matters related to teaching.

3.2 Evaluation. The mathematics faculty meets at the end of each semester to evaluate the graduate students and a progress letter is sent to students in May. If there are any academic concerns that faculty have after the fall semester, the student will be notified. The academic performance and teaching performance of each student is reviewed. Each faculty member who has had significant contact with the student, in either a class, a reading course, dissertation work, or through undergraduate teaching, reports on the student's performance. Minor problems are handled informally by the Director of Graduate Study or the student's advisor. Major problems result in a letter to the student and a meeting with the Director of Graduate Study. These letters are usually quite serious and warn of the student's possible required withdrawal from the program if performance does not improve.

The following is a summary of requirements for Ph.D. students to maintain good academic standing. Failure to complete them in the suggested period can result in a warning to complete them by a specific date or risk withdrawal. See the relevant section of the handbook for more details (also, please see Appendix B: "Summary of Ph.D. Program Requirements"):

- **First Year Required courses:** Pass or place out of at least two per semester during first year. (See 1.1.)
- **Second Year courses:** Pass Second Year Seminar (See 1.2.1.). Pass two lecture courses each semester (remaining required courses and reading courses can count towards this requirement, the teaching practicum and 2nd year seminar do not).
- **Advisor Selection:** Select research advisor at the end of the second year (See 1.2.2).
- **Third Year courses:** Pass one lecture course each semester (reading courses can count towards this requirement), unless student is registered for 401d research and receives approval from advisor for waiving the course.
- **Major/Minor exams:** Make significant progress on the major or minor exam by the end of the second year. Complete major exam by third year and minor exam by fourth year (at the latest). (See 1.2.4.)
- **Language exam:** Complete by the end of the third year. (See 1.2.5)
- **Teaching:** Take and pass an ELP course if required. Complete the Teaching Apprenticeship Program in spring of first year. Teach when required (at least four semesters). Take the Teaching Practicum each fall when you are teaching. (See 1.4.)
- **Dissertation:** Select an advisor and start a project in third year. Make significant progress by the end of the fourth year. (See 1.3.3.)

3.3 Funding. All students accepted in the Ph.D. program and in good academic standing receive a stipend for all five years (in the annual amount of \$25,000 for the 2021-2022 academic year) as well as health insurance and tuition coverage. Students who are TFs (Teaching Fellows) as part of their teaching requirement receive an additional \$1,950 per semester (for the 2021-2022 academic year). For more information on union negotiated rates, please review the new union contract (Local SEIU 509 for Grad Students) when it becomes available: <https://www.brandeis.edu/human-resources/employee-resources/collective->

[bargaining/index.html](#). **Important Note about Pay:** In order to be paid, students need to be domiciled in the US, which means that they need to be living in the US during the period in which they are being paid.

3.3.1 Funding Beyond the 5th Year. Unless they are on a grant from their advisor, students beyond their fifth year do not receive funding and are responsible for tuition costs. Additionally, students must pay for University health insurance (\$3,509 for 2021-2022) unless they enroll in a qualifying alternative plan and complete the waiver form on the University [Health Plans website](#).

Most 6th year students have completed all program requirements (with the exception of their dissertation/defense) and are considered "continuation" students by the Graduate School. Continuation students are charged \$837 for each fall and spring semester (for 2021-2022). However, 6th year students who have NOT completed all program requirements (with the exception of the dissertation/defense) are counted as "post-resident" students by the Graduate School, which means that the 6th year tuition rate for each fall/spring semester would be \$1,673 (for 2021-2022). (Students in years 1-5 are NOT responsible for their tuition and health insurance costs).

Ph.D. students no longer on funding who are hired as Graders or Teaching Assistants through the Graduate School are typically eligible for tuition scholarships for the semester in which they are performing these duties. Students may also sometimes be hired to teach as an adjunct, in which case, they receive a higher pay rate but do not receive health coverage or a tuition waiver.

3.3.2 Other Funding Opportunities. Ph.D. students are strongly encouraged to apply for fellowships for which they may be eligible. Students from the U.S. may be eligible for graduate fellowships from the NSF and other government agencies offering very generous stipends. Some foreign countries also offer fellowships to nationals for graduate study in the U.S. Students interested in completing a grant application should reach out early on in the process (at least 4 weeks or more before the deadline) to our Grants Administration Office: scipre-award@brandeis.edu.

3.3.3 University Prize Instructorship. Ph.D. students interested in teaching upper-level undergraduate courses should consider applying for a University Prize Instructorship. University Prize Instructorships, sponsored by the Graduate School of Arts and Sciences, awards a \$6,000 stipend to students to design and teach upper-division courses in their field of research. Instructorships are awarded to exceptional doctoral candidates who have made substantial progress toward their degree. Up to six instructorships will be awarded to candidates (across GSAS) who propose courses that contribute substantially to the undergraduate curriculum and candidates who have demonstrated excellence and commitment to teaching. Selection criteria also include the quality of the proposed course (as demonstrated by the syllabus), its relevance to the curriculum, and its potential appeal to undergraduates. Instructors may elect to co-teach and split the stipend equally. In this case, each applicant must fulfill the eligibility criteria and complete all parts of the application. Please see more information here: <https://www.brandeis.edu/gsas/student-resources/upi.html>.

3.4 Student Rights & Responsibilities. The university's [Rights and Responsibilities Handbook](#) sets forth policies governing rules of conduct that apply to all Brandeis students. The Rights and Responsibilities Handbook also explains university policies.

3.4.1 Math Department Responsibilities. Within Brandeis, the Mathematics Department forms a strong community that values research and learning and cultivates an atmosphere of respect and support for fellow students, faculty and staff. As a graduate student in the department, you are responsible for helping maintain that environment.

One aspect of this worth stressing is our dedication to teaching. The graduate students in mathematics have a reputation for sharing their enthusiasm for the subject and providing quality instruction to the undergraduates. We expect you to do your part to maintain that reputation and the strong teaching culture in the department.

On a less lofty note, we have to remember to take care of the physical environment as well as the intellectual one, and keep the shared offices, lounge, and kitchen reasonably clean.

4. Resources for Graduate Students and How to Get Help.

If at any point during your graduate career, if you have questions/concerns or are hitting challenges, there are many people here on campus that are here to help and support you. Before we go into specifics of who to go to for help, please know that the majority of people on campus are “responsible reporters.” This means that they are obligated to share any information that has been disclosed to them regarding discrimination, harassment, or sexual misconduct with the Office of Equal Opportunity. If you are hoping to have a confidential conversation about one of these topics, you will find a list of confidential resources later in this section.

Most issues can be best handled by those closely associated with your graduate program or with Division of Science staff and faculty, so we encourage you to seek out assistance from within this group first. We recognize that sometimes there may be a particular person that you are more comfortable speaking with or that one faculty member may be holding multiple roles/positions, but we suggest that you reach out to for assistance in the following general order (see schematic at the bottom as well):

- **Your Advisor:** Your first stop should be your advisor, if you have chosen one by this point. Your advisor will have the most intimate knowledge of your research/program progress and career goals, and is here to help train and guide you. Advisors usually have regular meetings with their students, and you are encouraged to use this time to talk about anything that's on your mind—not just your latest research results.
- **A member of your Major Exam committee (once you have one):** You are always welcome to reach out to individual faculty on your committee. While not tied to your progress as closely as your advisor, they will be familiar with your progress in your program and will have sufficient background knowledge on your project and your goals to provide personalized support.
- **DGS (Director of Graduate Study):** This faculty member oversees your grad program as a whole and is here to support all students in the program. The DGS will be extremely knowledgeable in the program's requirements and is also tuned in to the current GSAS and University policies. If you are early on in your grad program and have not yet chosen an advisor, the DGS is here to support you. After you have an

advisor, this may be a good place to start if some students in the program have shared concerns that they would like to discuss. The specific faculty member who fills this role may change from year-to-year, so check with your program administrator or check your program website for the current DGS first. In academic year 2021-20222, your Director of Graduate Study/DGS is Omer Offen.

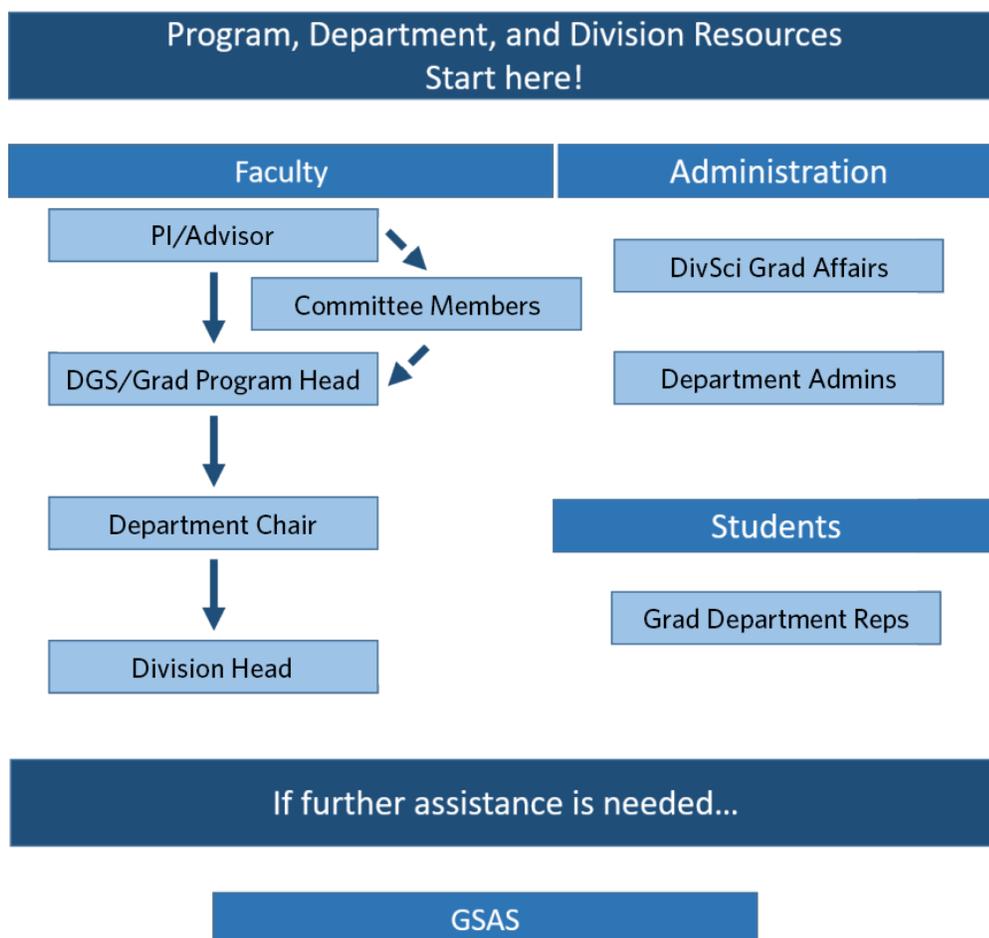
- **Your program's Department Chair:** This faculty member oversees the department that your grad program falls under and is a step above your DGS. If you have concerns that aren't necessarily specific to your grad program but are relevant to the department as a whole, the chair may have good insight. This may be a good person to talk to if concerns are shared with other populations in the department such as staff, postdocs, or undergraduates. The specific faculty member who fills this role may change from year-to-year, so check with your program administrator or check your program website for the current Chair. In academic year 2021-20222, your department chair is Olivier Bernardi.
- **The Head of the Division of Science:** This faculty member oversees the entire Division of Science and works to support all of the departments and graduate programs within the sciences. This would be a good person to have a conversation with if people from different graduate programs or departments have a shared concern or issue that they would like to raise. The head of the Division of Science has frequent meetings with individual program and department chairs, as well as with leaders across the University, so they will be knowledgeable of current Division and University practices. They are here to support and advocate for the entire science community. As with the DGS, the faculty member in this role can change from time-to-time. In academic year 2021-20222, the chair of the Division of Science is Bulbul Chakraborty.

In parallel to these program-level and Division-level faculty resources, there are non-faculty resources within the Division who you can go to for help. The following are good places to go to for help, you should go there first with administrative questions:

- **The Division of Science Graduate Affairs Office:** This office is the administrative home for most of the graduate programs within the Division of Science, including yours. The staff here work closely with grad students and with faculty to administratively oversee those graduate programs and student progress. The staff in this office know your program's faculty, are well-versed in your program's requirements and policies, and are up-to-date with the other sources of support on-campus. If you are unsure about whom to talk to first, the DivSci is often a good place to start as they can help you decide whom to approach and how to have that conversation.
- **Your Department Administration:** These staff work in your department's office and are here to help their entire department community. These staff may be a bit less familiar with your graduate program requirements, but they know your department's faculty and any non-grad-program details about your department well.
- **The DivSci Pre-Award Office:** If you are applying for grants or fellowships, please loop these staff in. They may be able to provide guidance and help you navigate the submission process.
- **Your program's Grad Department Representatives (GDRs):** These graduate students were elected to represent the student body. One of the roles of the GDR is to bring concerns from students as a whole to the program faculty or to GSAS, so if you

have a concern that you are comfortable discussing with your GDR, it's a good idea to let them know. They cannot bring these concerns to the faculty to advocate for all students if they don't know about them, and there may be other students with similar concerns. Your GDRs may hold a student "town hall" once a semester or year to bring up issues, and this is a good forum to discuss some topics that may be weighing on your mind.

Only if you have not made sufficient progress in those discussions, you could then escalate the conversation above the Division of Science by speaking with the [Graduate School of Arts and Sciences \(GSAS\)](#). GSAS oversees all graduate programs within the school of Arts & Sciences at Brandeis and is invested in the success of all graduate students in these programs. Depending on the topic that you have raised with faculty or administrative staff, they may have already contacted GSAS for advice/assistance on how to help or to handle the next steps. If you'd like to reach out to GSAS for help, we recommend that you connect with Kate Slater, Assistant Dean of Student Affairs.



Outside of the general hierarchy of places to go to for help there are various other entities on campus here to support students. These resources on campus are dedicated to supporting graduate students:

- [Graduate Student Affairs](#) (now called **Office of Graduate Affairs**) This office is a home and source of support for all graduate students at Brandeis, including those

studying at the Heller School, the Rabb School, or the International Business School. Graduate Student Affairs provides students with information and events about graduate life at Brandeis and community resources. If you'd like to reach out to this group, we recommend that you contact Jessica Basile, Assistant Dean of Graduate Student Affairs or Steve Weglinski, Assistant Director of Graduate Student Affairs.

- **[The Graduate Student Association \(GSA\)](#)**: Supported by Graduate Student Affairs, the GSA is an independent student body that represents all graduate students and provides a platform for graduate students to raise issues and concerns and build community. If you have a concern about an issue affecting graduate students that extends past your program, department, and the Division of Science, the GSA is a good group to talk to. To connect with them, visit their website to see the current year's grad student executive committee.

There are some offices on campus that specialize in specific topics and who will almost always be the best resource for those topics:

- **[The Office of Research Administration \(ORA\)](#)**: ORA, which reports to the [Vice Provost for Research](#), can help with issues related to research integrity and compliance. If you want to discuss the possibility of research misconduct, you may wish to report things there directly.
- **[The International Students and Scholars Office \(ISSO\)](#)**: ISSO supports all of Brandeis' international students and scholars. This office determines visa eligibility and prepares and issues visa documents. If you ever have any questions about your Visa or any of the associated regulations (e.g. travel, CPT, OPT), you should reach out to your ISSO advisor. They can advise students on rights and responsibilities and provide guidance regarding issues that may impact your legal status. Their website also has a collection of useful information for international students.
- **[Student Accessibility Support](#)**: If you are a student with a disability and in need of academic or non-academic accommodations, this office can support you and help you navigate this process. The definition of a person with a disability is broad, and may students who do not think of themselves as students with disabilities may qualify for support under the law. Even if are you not sure if you will quality, you are encouraged to reach out to SAS.

As mentioned at the start of this section, there are some topics that responsible reporters on campus cannot keep confidential, and those are issues of discrimination, harassment, or sexual misconduct. The office on campus that addresses these issues is the **[Office of Equal Opportunity \(OEO\)](#)**. OEO provides information regarding support resources, information about taking action (internal resolution processes and criminal action), inquiries and investigations into concerns, processes to address grievances, and training for the Brandeis community. Please visit their website for contact information and steps (and an online form) to file a report. You are welcome to contact a resource listed above for support or advice about these topics, but they will be obligated to share the issue with OEO.

If you would like to have a *confidential* conversation with someone on campus, the following are our on-campus confidential resources:

- **[The Brandeis Counseling Center \(BCC\)](#)**: The BCC provides counseling for students in times of stress, and encourages them to ask for help with their most immediate concerns. Counseling is available to all students regardless of whether they have the

Brandeis student health insurance plan or not. If you are struggling and need someone to talk to, we encourage you to reach out to the BCC.

- **[The Prevention, Advocacy, and Resource Center \(PARC\)](#)**: PARC provides education, empowerment and support related to sexual assault, sexual harassment, dating/domestic violence and stalking. This group is a confidential, student-centered resource serving all members of the Brandeis community who have been impacted by violence.
- **[The University Ombuds](#)**: This office is a confidential, independent, impartial, and informal resource for all members of the Brandeis community. They provide a safe space to talk confidentially and off-the-record about difficult situations and offer conflict resolution support.
- **[The Chaplains in The Center for Spiritual Life](#)**: The Brandeis chaplains offer counseling, support, and community to students of all faiths. They oversee on-campus worship and student religious life while also offering community support in times of joy and crisis.

1. Appendix A: Contact Information

- Department Chair: Olivier Bernardi (bernardi@)
- Director of Graduate Study: Omer Offen (offen@)
- Graduate Committee: Mark Adler (adler@), Thomas Fai (tfai@), Olivier Bernardi, Omer Offen
- Elementary Mathematics Coordinator: Rebecca Torrey (rtorrey@)
- Math Department Administrator: Catherine Broderick (cbroderi@)
- Academic Administrator: Emily Palmer (emilydpalmer@) / (scigradoffice@)
- Grad Student Representatives: Shujian Chen (shujianchen@), Rebecca Rohrlich (rebeccarohrlich@brandeis.edu), Alex Semendinger (alexsemendinger@brandeis.edu)

Language Examiners:

- French: Bellaiche or Daniel Ruberman (Ruberman@)
- German: Omer Offen (offen@)
- Russian: Kleinbock (kleinboc@)

Placement Examiners:

- Algebra I (131a): Bernardi
- Algebra II (131b): Kiyoshi Igusa (igusa@)
- Geometry of Manifolds (140a): Danny Ruberman (ruberman@)
- Real Analysis (141a): Rahul Krishna (rahulkrishna@)
- Complex Analysis (141b): Mark Adler (adler@)
- Topology I (151a): Ruth Charney (charney@)
- Topology II (151b): Ruth Charney (charney@)
- Advanced Bifurcation Analysis (161a): Jonathan Touboul (jtouboul@)
- Numerical Methods (162a): Thomas Fai (tfai@)

Important Offices:

- Math Department: Goldsmith 218, 781-736-3050
- Division of Science Graduate Affairs Office: Ros-Kos Connector Room 3-RK02, 781-736-2369 (Emily)/ 781-736-2352 (main line), scigradoffice@brandeis.edu
- [Graduate School](#): Bernstein Marcus Administration Building (in the basement), 781-736-3410, gradschool@brandeis.edu. Your primary contacts there will be: Kate Slater, Assistant Dean of Graduate Student Affairs (kateslater@brandeis.edu) and Lizz Kurian, Budget Administrator (she manages the finances for PhD students) (kurian@brandeis.edu)
- [Registrar](#): Kutz 121, 781-736-2010, registrar@brandeis.edu
- [ISSO](#): Kutz 215, 781-736-3480, isso@brandeis.edu
- [GSAS's Center for Career and Professional Development](#): Your primary contact there will be Assistant Director Marika McCann (marika@brandeis.edu)

2. Appendix B: Summary of Ph.D. Program Requirements

****NOTE**:** ALL Students MUST be enrolled in at least 12 credits to be considered a full-time student.

1) First Year Program:

- Four core courses: 131a (Algebra I), 141a (Real Analysis), 141b (Complex Analysis), 151a (Topology I)
- One or two of the remaining three required courses*

2) Second Year Program:

- Two lecture courses in the fall and two in the spring (reading courses and remaining Required Courses count, but the Teaching Practicum and Second Year Seminar do NOT)
- 204a Teaching Practicum (taken in the fall when teaching; the 4 semester teaching requirement may be filled starting in the second year onwards)
- 200a Graduate Seminar (spring semester)
- Select advisor and begin working on major or minor exam
- Foreign Language Exam (may also be completed in 3rd year)
- Division of Science Responsible Conduct of Research (RCR) Workshop

3) Third Year Program:

- One additional lecture course (reading courses may count, but the Teaching Practicum does not).
- Minor Exam (may also be completed in 4th year)
- Major Exam
- NOTE: if taking 401D Dissertation Research, your advisor may waive the lecture course requirement.

4) Fourth Year Program:

- 401D Dissertation Research (12 Credits)
- It is recommended to take one additional elective course.

5) Fifth Year Program: 401D Dissertation Research (12 Credits)

* In addition to the four core courses, students are required to take at least three of the following seven courses: 131b (Algebra II), 151b (Topology II), 140a (Geometry of Manifolds), Math 161a (Advanced Bifurcation Analysis), Math 162a (Numerical Methods), Math 165a (Probability), and Math 164a (Partial Differential Equations).

3. Appendix C: Summary of Graduation Procedures

- 1) Application to graduate: <https://www.brandeis.edu/registrar/forms/graddegree.html> .
- 2) Schedule defense and reserve a room: email scigradaffairs@brandeis.edu.
- 3) Fill out and return the [GSAS Defense Calendar Submission Form](#) at least two weeks prior to the defense.
- 4) [Dissertation defense form](#) (DUE day of defense): Email the completed form to the Division of Science Graduate Affairs Office and to the Registrar's Office: registrar@brandeis.edu and scigradoffice@brandeis.edu.
- 5) [Revisions Form](#) (if necessary, due date depends on type of revision): Email the completed form to the Division of Science Graduate Affairs Office and give the original to the Registrar's Office.
- 6) Submit dissertation through ProQuest.

If you have any questions related to this checklist and graduation requirements, please contact Emily Palmer in the Division of Science Graduate Affairs Office (Emilydpalmer@brandeis.edu / scigradoffice@brandeis.edu / 781-736-2369).