

Graduate Student Handbook

Dartmouth Mathematics Department

Effective Fall 2020

Graduate Program Committee

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Abstract

This document represents the department's current summary of policies, deadlines, and procedures to be followed by graduate students in the mathematics graduate program. Any questions that are not suitably answered by this document should always be referred to the GPC (Graduate Program Committee) for clarification. This document is updated as department policy evolves. See the [changelog](#) for details.

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1 General References and Resources

There are a number of online references for graduate students which supplement this handbook.

- [General Information for Graduate Students](#)¹ The landing page for all resources for current graduate students.
- [Department Documents](#)² (Access controlled intranet): Contains Department documents including current committee memberships, TA assignments and mentors, etc.

2 An overview of the graduate program

The mathematics graduate program at Dartmouth College is a small, selective program that serves students who wish to complete a PhD in pure or applied mathematics. The program is structured to serve both those who envision a career involving research and teaching as well as those who wish to continue their research in industry. The program at Dartmouth is a five-year program in which students are enrolled in each of the Summer, Fall, Winter, and Spring terms. Students admitted to the PhD program are offered support through a Dartmouth Fellowship or other grant for up to 5 years provided they continue to make satisfactory progress towards their degree.

During their first year, students develop a strong background in at least three research areas, selected from among algebra, analysis, topology, and two broad areas of applied mathematics which include numerical analysis, stochastic processes and uncertainty quantification, analytic study of PDEs, and general methods in applied mathematics. After their first spring, students take a preliminary exam in either pure or applied mathematics. During their second year the path followed by those in pure mathematics begins to diverge from those in applied mathematics. Students in applied math will be involved in a summer research project whose written summary and extension will be the basis of a presentation and oral exam. Students in pure mathematics form an Advancement Committee and craft an individually tailored Advancement Examination which can take a number of different forms. Students continue to broaden their mathematical knowledge through course work or research projects. By the end of the second year, a student will also complete a seminar which provides training for how to become an effective communicator and classroom teacher, secure an advancement committee consisting of a thesis advisor and two other faculty members, and advance to candidacy for the PhD. Graduate students are appointed as faculty to teach one Dartmouth course independently in each of their 3rd, 4th (and often 5th) years. Most of our graduate students finish the work that comprises their thesis during the 5th year, the last year in which the department offers financial support.

Areas which students have recently chosen for their dissertation research include algebraic number theory, algebraic topology, arithmetic geometry, combinatorics, complex networks/systems, functional analysis, knot theory, logic,

¹math.dartmouth.edu/graduate-students/current/

²math.dartmouth.edu/intranet/dept_docs/

mathematical biology, numerical analysis, Riemannian geometry, set theory, and signal processing. For our recent graduates, review their [thesis abstracts](#)¹ and [advisor and job information](#).² Further online information is at math.dartmouth.edu/graduate-students³.

3 Before you arrive

As part of orientation before the start of fall term, all graduate students arriving at Dartmouth are strongly encouraged to take the preliminary exam in pure mathematics, covering fundamental topics in algebra and analysis (see section 4.8.2). The outcome of this exam can be used to guide what you study in your first year.

For more information about the preliminary exams in both pure and applied math, see section 4.8.

4 The first year of graduate study

In broad strokes, as a first year student, you will take ten courses, including Math 700 (see section 4.2) which fulfills the [Guarini Ethics Training Requirement](#)¹, help TA for courses in two of the Fall, Winter, and Spring terms, and prepare for a preliminary exam. Exams are offered just before the start of summer term, see section 4.8.

The department offers approximately sixteen graduate courses each year, ten of which are considered core courses. The core courses fall into two categories, some with a fixed syllabus and others whose syllabus alternates from year to year, making it possible to take the second offerings in later years to add to the breadth of your mathematical knowledge. Advanced courses are typically topics courses based in part on student interest.

4.1 Advisors

In general, an individual first-year advisor is assigned to each graduate student to help them transition to graduate school and serve as a general advisor until the student has an Advancement Committee more closely aligned with their research pursuits.

These advisors help students work out academic plans (which are supposed to be written and filed with the department, see section 8.5), and be a sounding board and neutral third party to help resolve issues surrounding work as a graduate student. If a graduate student is not compatible with his or her assigned advisor, they can ask for a different one by contacting the Graduate Representative (listed in the first lines of the web page [Information for Current Graduate Students](#)²).

¹math.dartmouth.edu/graduate-students/theses/

²math.dartmouth.edu/graduate-students/recent/

³math.dartmouth.edu/graduate-students/

¹graduate.dartmouth.edu/student-support/training/ethics-training

²math.dartmouth.edu/graduate-students/current

In addition to a student’s personal advisor, there is an Advisor to Graduate Students and a Graduate Representative whose roles are described in the [Appendix](#).

4.2 Math 700: Responsible and Ethical Conduct of Research (Required)

As part of the Guarini School’s [ethics training requirement](#)³, Math 700 covers the responsible and ethical conduct of mathematics research and related matters. Over the course of the term, students will engage in faculty-facilitated discussions regarding issues and considerations mathematicians working in academia, industry and/or government may encounter in various forms during their careers. A goal of this series of conversations is to help integrate students into a professional academic ecosystem, while encouraging a continual examination of its contours and interconnections. Topics covered might include professionalism, authorship and peer review, mentoring, data collection, rigor and reproducibility, intellectual property, and academic freedom. ***Enrollment in and successful completion of this course is required for all first-year graduate students.***

4.3 Pure or Applied — Choosing among research areas

The first thing to note here is that, while there is a clear difference between traditional pure mathematics and traditional applied mathematics, reflected in two different paths for your first two years of graduate study, the two are part of a multi-dimensional continuum. ***You will not actually choose between pure and applied math. You will choose a thesis area that falls somewhere within this continuum.***

During your first year, you may be interested in some areas that are more pure and some that are more applied. You do not have to choose an area of concentration right away. You can keep your options open between pure and applied. To do this, look at the ***courses and advice*** sections for both [pure](#) and [applied](#) math, and discuss with your advisor what you should be doing in the way of attending seminars and searching out possible research projects. When you choose courses, keep in mind that your thesis committee in your eventual area of research will probably require you to fill in any gaps in your course preparation, and do your best to leave as few gaps as possible.

The one choice you must make during your first year is whether to take the “pure math” preliminary exam or the “applied math” preliminary exam. If you are really keeping your options open, you should take enough core courses to cover the material in both exams. Being interested in both pure and applied areas does not mean you can pick an assortment of preliminary exams sampling from both. Passing preliminary exams in applied math, for example, will only reinforce the breadth of background of a student who ultimately writes a thesis in pure math. ***If that student has also taken the core courses in pure math and done well, their thesis committee***

³graduate.dartmouth.edu/student-support/training/ethics-training

is unlikely to object to their having taken the “wrong” preliminary exam.

During your second year, you must begin to narrow your options somewhat. Before the summer that begins your second year, you must decide whether to arrange the summer research project described in the advancement procedure for applied math. Again, doing a summer project in mathematical biology does not rule out eventually writing a thesis in signal processing, or in algebraic combinatorics. However, not doing any summer research project may affect whether applied mathematics faculty members are willing to accept you as a thesis student. You should be talking to prospective thesis advisors and thesis committee members about this.

Note that if you are not following the applied mathematics path by doing a summer research project, then you must follow the pure mathematics path. It is strongly suggested that you take Math 117 during your first summer (the academic year starts in June, so this is the beginning of your year 2). The guidelines for pure mathematics call for you to assemble an advancement committee, including a tentative advisor. You should be working on this during the summer that begins your second year, at the latest. This does not mean you have to choose your thesis area that summer. It is quite possible to include more than one tentative advisor, who may work in quite different areas, on your committee. The committee will help you design a second-year program, and an advancement examination (which may include different options), that will allow you to make a choice closer to the end of your second year. Taking this option does not rule out writing a thesis in an applied area, provided your committee includes a possible advisor in that area who has agreed to your plan.

Once you enter your third year, you should begin work in a specific thesis area. It is difficult, although not impossible, to change areas after your third year, and still have time to complete a quality thesis. The choice of research area is not a lifetime commitment. Many Dartmouth faculty members work now in areas quite different from their thesis research.

4.4 Courses and Advice — Applied Math

Students interested in doing research in applied mathematics, specifically in the areas of computational mathematics, data analysis and assimilation, imaging, or uncertainty quantification, must have a working knowledge of material taught in certain core courses. Courses appearing in traditional applied mathematics programs include numerical analysis, partial differential equations, and methods in applied mathematics. In addition, courses like stochastic processes and uncertainty quantification are more germane to the research interests of current Dartmouth faculty, although they too are becoming more common in applied math programs.

As part of Guarini’s ethics training, you will also be required to enroll in Math 700 during fall quarter of your first year.

4.4.1 Introductory Courses

All students must successfully complete four courses from among 101, 103, 104, 106, 111, 113, 114, 116, 126, 136; see Appendix C.1.1 for more details on requirements for a Master's Degree.

Among the first-year core applied math courses a student should take are:

- Math 106: Stochastic Processes and Uncertainty Quantification
- Math 116: Numerical Analysis
- Math 126: Partial Differential Equations
- Math 136: Methods in Applied Mathematics

Note that the content of Math 116 and Math 106 alternates in even and odd years, so students should take each of these courses twice.

In addition to the courses listed above, there may also be courses of interest in pure mathematics or offered in other departments that should be strongly considered, especially in those topics related to their research application domain. Such course offerings will vary from year to year, so it is a good idea to discuss opportunities with your first-year advisor (or potential thesis advisory committee) each term before registering for classes.

In all, as a first-year student, you will take nine courses, six of which must be classroom courses. Beyond those six, a student may choose other classroom courses of interest, or sign up for supervised reading courses.

4.4.2 Follow-on courses

All students in applied math need to take the alternate topic offerings of Math 106 and Math 116 (in their second year). But even in the first year, there may be courses of interest offered in other departments that should be strongly considered, especially in those topics related to their research application domain. Such course offerings will vary from year to year. It is a good idea to discuss opportunities with your first-year advisor (or potential thesis advisory committee) each term before registering for classes.

4.4.3 Seminars

Applied mathematics students are required to attend the weekly applied mathematics seminar. They are also strongly encouraged to participate in Math 150, which is an applied math topics seminar course.

4.4.4 Research Projects

Students interested in doing research in applied mathematics should seek out opportunities *early* — in their first year — to get involved in ongoing research projects, and should start working on their own (often related) research projects even if ultimately they do something else for their dissertations. The best way to do this is to attend group meetings and learn about various research investigations within the group. Note that applied math faculty are often

interested in collaborative projects, and many group meetings are held with two or more professors, students, and postdocs. The best way to find out about group meetings is to talk with more advanced students and find out what they are working on. Advanced students and postdoctoral fellows are available and encouraged to support first and second-year students as they begin their own investigations. All students have the opportunity to present their research findings at group meetings and at the applied math seminar.

4.4.5 Advanced Planning for the Summer Research/Internship

Part of the advancement procedures for applied students involves a significant summer research experience/internship, and while the actual research will formally occur at the start of the second academic year (the summer between year 1 and year 2), plans need to be made and approved before the end of the spring term of the first year.

While the research project may be supervised by any professor in mathematics, students are strongly encouraged to seek out interdisciplinary opportunities, especially in research labs. *It is imperative that students who wish to do an internship discuss this with either their first year advisor or some potential Advancement Committee member by February 1 of their first year (sooner is better).* The applications for internships are often due by mid February.

The GPC needs to approve each proposed project. Students must submit to the GPC a one-to-two page written research plan, which has been signed and approved by a prospective Advancement Committee (two professors, or by the prospective advisor and the external supervisor). The plan should be submitted to the GPC no later than two weeks before the end of spring term.

Any internship or other (approved) activity that prevents you from taking a classroom course in a given term will automatically cause a reduction of 1 in your classroom requirement for that year. (Since the academic year at Dartmouth begins in June with summer term, an internship in the summer after your first year would result in a change from 4 to 3 in your second-year classroom course requirement.)

If both your internship is external to Dartmouth and you will be paid by another institution (i.e., you have summer employment external to Dartmouth), then please clearly indicate this in your project proposal and be sure to specify the dates of your paid internship as well as you can. To satisfy [Guarini's time away policy](#)⁴ you will be granted a leave of absence by the GPC for these dates. You should coordinate and confirm your stipend/employment plans with the Departmental Administrator. (If your internship is unpaid and you are funded by a Dartmouth Fellowship, your stipend remains in place, with no action required: this external training is considered part of your Dartmouth graduate education.)

Requirements for documenting the outcome of the research experience/internship as well as information concerning how this experience is integrated into the Advancement Exam can be found in the section on the [second-year summer research/internship](#).

⁴graduate.dartmouth.edu/policy/provisional-guarini-school-time-away-policy-and-process

4.5 Courses and Advice — Pure Math

All students must successfully complete four courses from among 101, 103, 104, 106, 111, 113, 114, 116, 126, 136; see Appendix [C.1.1](#) for more details on requirements for a Master's Degree.

While the spectrum of research areas in pure mathematics is far broader than the areas represented by the first-year core courses in algebra, analysis and topology, these six courses form an essential core on which further study builds.

As part of Guarini's ethics training, you will also be required to enroll in Math 700 during fall quarter of your first year.

4.5.1 Basic Courses

The basic courses in algebra, analysis, and topology are:

- Math 101: Linear and multilinear algebra
- Math 103: Metric spaces and measure theory
- Math 104: Differential topology

The subject matter for these courses is aimed at advanced undergraduates and beginning graduate students.

4.5.2 Follow-on Courses

Sequels to the basic courses are:

- Math 111: Abstract algebra
- Math 113: Analysis
- Math 114: Algebraic topology

The content of 111 and 113 will vary from year to year.

These six courses can be supplemented both by approved upper-level undergraduate courses as well as by other graduate courses divided between introductory and advanced topic courses. There is also flexibility to add depth by taking supervised reading courses highly tailored to student interest (see Math 127, 137). A full course load for a graduate student is nine courses per year; there is also a breadth requirement for all students which requires a minimum number of classroom courses each year; that number for first-year students is six.

Choosing courses for the year should be done in consultation with the first-year advisor. He or she can get a sense of the student's background, how prepared they are to take the standard courses, and suggest appropriate courses that get their career off to a solid start while also helping the student look through the options for the entire first year.

4.5.3 Seminars

Students are strongly encouraged to sit in on various research seminars offered by the department. This will give a sense of the kind of research in which various faculty are involved, and what might be areas of interest to pursue. This will also aid in the student's efforts to constitute an Advancement Committee which shepherds the student through the second-year advancement process.

4.6 Internal Course Feedback

In the core first-year graduate courses, students receive both official (College) and internal (departmental) course feedback.

Official course grades are the grades sent to the graduate office. They are:

- **HP: High Pass**, indicating work of quality which is distinctly superior to that normally expected of a graduate student.
- **P: Pass**, indicating work of good quality, worthy of graduate credit. This would be the most common grade denoting satisfactory graduate performance.
- **LP: Low Pass**, indicating work which is acceptable for graduate credit, but in which the student exhibited one or more serious deficiencies.
- **NC: No Credit**, indicating work which is not acceptable for graduate credit.

Two LPs (cumulatively) or one NC automatically places the student on probation and under scrutiny by the Guarini School of Graduate and Advanced Studies. For further information, see the [FAQ on course grades](#) for implications to your status.

The department has chosen to use **internal course feedback** as a means of conveying a more fine-grained assessment of a student's performance in the ten core graduate courses (101/111, 103/113, 104/114, 106/116/126/136), as well as sometimes to mitigate the formal ramifications of a poor performance in a core course. In particular, when a student has put significant effort into a course, but has done poorly, the department has chosen to use the internal course feedback as the desired means to convey this to the student without placing their standing with the College in jeopardy. Internal course feedback is not officially recorded in the student's record and are discarded upon advancement to candidacy for the PhD.

Internal course feedback may be used by the GPC and a student's Advancement Committee in determining the content of the student's Advancement Examination, especially in the case of students who fail the preliminary exam. In particular, it could be used in determining whether a student who fails to advance will be awarded a master's degree. These comments from the instructor are given to the student in some cases to suggest areas which need work and a path forward.

4.7 TA and grading responsibilities

First and second-year graduate students have two terms of responsibility in which they assist with undergraduate courses. As a TA, the responsibilities generally include staffing walk-in tutorials for two hours three times per week and helping grade all exams. Preparation for each tutorial session is an assumed part of your responsibility. TAs may also have the opportunity to host review sessions prior to midterms. Total weekly time commitment averages ten hours per week.

While the general model is to TA twice in each year, in certain circumstances a student may negotiate to replace one term of TAing for a term of grading homework for an upper-level undergraduate or beginning graduate course. This negotiation is between the student, the course instructor, and the student's first/second-year advisor. In the case that the instructor is the advisor, the Advisor to Graduate Students will serve as the third member. The idea is that all three must agree that this is a mutually beneficial arrangement.

Note that you must register for Math 107 each term you TA. This is the official way in which the department tracks that you have completed this degree requirement. Your grade (pass/fail) in Math 107 is based on the assessment of the instructors for whom you have TAed, and on end-of-term evaluations filled out by the students with whom you have interacted.

Please also see [Reference Sheet for TAs](#) which includes a great deal of information about resources and regulations.

4.8 The preliminary exam

All students are required to take and are expected to pass a preliminary exam in pure or applied mathematics which is offered just before the start of the summer term. During a term in which summer classes start on Thursday, the June preliminary exams are typically offered earlier in that week (Monday through Wednesday).

The preliminary exam in pure math is also offered just before the start of each fall term; in applied math, this exam is only offered in the fall for students who need to retake it. The exams differ in content (see below), and taking this exam is a necessary step before a student may constitute their Advancement Committee. The sections below provide more detail.

4.8.1 The preliminary exam — Applied Math

The preliminary exam in applied mathematics is a three-hour written exam comprised of two questions from each of the core first-year courses taught that year (Math 106, 116, and either 126 or 136).

4.8.2 The preliminary exam — Pure Math

The preliminary exam in pure mathematics spans two days and consists of questions from “algebra” and “analysis”; each part is comprised of 8-10 questions. One part covers linear algebra and abstract algebra while the other covers real analysis and topology as often seen in a real analysis course. Both parts are

aimed at the advanced undergraduate or beginning graduate level. See the [syllabus page](#)⁵ for more details and sample exams.

The exam will be set and graded by an ad hoc Pure Math Preliminary Exam Committee, to include the instructors in Math 101, 103, and 104, and a representative of the GPC. This committee will report the results of the exam to the GPC, who will decide which students have passed the exam.

4.8.3 What if a student fails the preliminary exam?

If a student does not pass the preliminary exam just prior to the start of summer term, the GPC will look at the student's work in the program so far, including their performance on the exam. Most likely, the GPC will take no formal action other than to recommend a path for remediating any deficiencies, and that the student should take the exam again in the fall. In that case, the student should continue their efforts just as if they passed the exam. Talk to your advisor. Pursue your summer research project or take Math 117; begin working on forming an Advancement Committee; talk to prospective thesis advisors, and take their advice about what to work on during the summer. Of course, the student should also spend some time over the summer preparing to retake whatever part of the exam they did not pass. In exceptional cases the GPC may have additional requirements or expectations of the student, or agree to a different course of action.

If a student retakes the exam just prior to fall and still does not pass, the GPC will determine whether it is in everyone's best interest for the student to continue in the program past the end of fall term. In order to continue, the student will need at least two things. One is an Advancement Committee, including at least one person who agrees to supervise the thesis if the student passes the Advancement Examination. The other is a plan for addressing the deficits shown by the exam performance, which must be approved by both the Advancement Committee and the GPC.

5 The second year of graduate study

The goal for all second-year students is to advance to candidacy for the PhD by the end of spring term. Largely this is accomplished through the assembling of an Advancement Committee and passing an individually-tailored Advancement Exam.

Pure and applied math students have many requirements in common, but as students enter their second year — which begins in the summer term — some of the procedures to be followed begin to specialize. We begin by describing specialized procedures followed by ones common to all second-year students.

5.1 Advancement procedures — Applied Math Specific

In addition to course, TA, and pedagogical training requirements noted later in this section, the following describes the outline of expectations for students

⁵math.dartmouth.edu/graduate-students/current/syllabi/

wishing to work in applied math.

5.1.1 Summer Research/Internship and Advancement Committee

Students will participate in a supervised summer research project or internship which was proposed and approved the previous spring. See section 4.4.5 for the planning and approval details.

By the beginning of the summer, the student should have at least partially formed their Advancement Committee, typically the two people who approved their summer research proposal. It is the student's responsibility to keep the department member(s) informed of the progress of the ongoing research.

Very soon after the summer research project is completed, the student should find a third member to fill out their Advancement Committee. That person may be someone who could act as a good resource for extending the summer research project, or who might be a source of research questions moving forward. On the other hand, if the research experience was not in a direction which the student wanted to continue, the third member could be the person with whom the student will ultimately work.

Satisfactory completion of the research project must include a written evaluation by the research supervisor, together with a report by the student approximately five pages long summarizing the research which was conducted. The report should detail the research performed (motivations, experiments performed, conclusions drawn) as well as citations to the relevant literature. This report must be acceptable to the Advancement Committee and will form a part of the student's Advancement Examination. The student should think of and frame the report as the beginning of a paper at least potentially intended for publication.

5.1.2 Fall — Advancement Examination

The student together with their Advancement Committee details what will constitute the Advancement Exam for the student. Once approved by the Advancement Committee, the plan for the Advancement Exam must be submitted by the student to the GPC for approval. The plan may be submitted as early as the student wishes, but must be submitted before the end of the fall quarter of the second year and at least two weeks in advance of the scheduled exam.

As part of the Advancement Examination, the student will give an oral presentation on the summer research project. The first part of this presentation may be public, perhaps as part of the applied math seminar, though the Advancement Committee's presence is required.

Immediately following the public presentation, the general audience will be dismissed and the student's Advancement Committee will continue to ask questions stemming from the research project as well as more fundamental questions in the student's area of focus. Some of the questions asked by the committee will focus on how the student conducted the research, the tools that were used, how the student understands those tools mathematically, what the assumptions of the problem are, and so on, drawing on the concepts learned in the classroom.

If the student's research will no longer be along the lines of summer research, the Advancement Committee may use this time to ask questions that are perhaps less relevant to the research internship, but more relevant to research interests moving forward.

At the conclusion of the exam, each faculty member on the Advancement Committee will fill out a copy of the [Advancement Exam Form](#)¹ (reproduced in the [Figure 5.1](#) below). The outcome (pass or fail) will be by consensus, hence the same on all forms. Individual forms may offer different comments and perspectives. Signatures will confirm agreed upon roles of advisor and secondary advisor, a requirement for advancement to candidacy.

The student must attempt the Advancement Exam before the end of fall quarter of the second year. If a student does not pass, the committee may decide to allow the student a second attempt, which must take place before the end of the winter term of the second year.

5.2 Advancement procedures — Pure Math Specific

In addition to course, TA, and pedagogical training requirements noted later in this section, the following describes the outline of expectations for students wishing to work in pure math. A large part of the process of advancing to candidacy in pure mathematics requires students to pass an individually-tailored Advancement Examination, supervised by a three-person Advancement Committee. The committee needs to be assembled and approved by the GPC by the end of fall term.

5.2.1 Advancement Committee

Each student will assemble an Advancement Committee to aid and assess their preparation for writing a dissertation, including making up for any deficits revealed by the preliminary exam.

The student identifies two faculty members whose research encompasses the student's desired research area(s) who will work with the student to determine the format, content, and requirements of the Advancement Examination. A third faculty member from a different (though perhaps allied) research area is added to complete the Advancement Committee.

While research-active emeriti and postdoctoral fellows are eligible for Advancement Committees, tenured and tenure-track faculty are preferred given their expected long-term status within the department.

5.2.2 Advancement Examination

The student's Advancement Committee is responsible for administering an individually-tailored Advancement Examination. Once approved by the Advancement Committee, the plan for the Advancement Exam must be submitted by the student to the GPC for approval. The plan may be submitted as early

¹math.dartmouth.edu/graduate-students/dept_docs/graduate-handbook-production/images/advexam-form.pdf

as the student wishes, but must be submitted before the end of the fall quarter of the second year and at least two weeks in advance of the scheduled exam.

[Internal course feedback](#) may be used by the GPC and a student's Advancement Committee in determining the content of the student's Advancement Examination, especially in the case of students who fail the preliminary exam.

At the conclusion of the exam, each faculty member on the Advancement Committee will fill out a copy of the [Advancement Exam Form](#)² (reproduced in the figure below). The outcome (pass or fail) will be by consensus, hence the same on all forms. Individual forms may offer different comments and perspectives. Signatures will confirm agreed upon roles of advisor and secondary advisor, a requirement for advancement to candidacy.

²math.dartmouth.edu/graduate-students/dept_docs/graduate-handbook-production/images/advexam-form.pdf

ADVANCEMENT EXAM FORM

This form officially records the outcome of an Advancement Examination; please return to the departmental administrator, the GPC chair, and the student. Each committee member should fill out a separate form (showing the same pass/fail outcome). Feel free to print the form and fill out by hand. If filling out by computer, please do so completely *then* sign it (after signing in Adobe, you can make no further changes).

Date:

Student name:

Committee member name:

Committee member role: Advisor Secondary advisor Third member

Other

Description of exam (e.g. "2 hour oral exam in topology"):

Outcome of Advancement Exam: Pass Fail

Exam summary and comments for the GPC (strengths/weaknesses, advice for the student?):

Signature _____

Figure 5.1 Advancement Examination Form

The student must attempt the Advancement Exam before the end of winter quarter of the second year. If a student does not pass, the committee may decide to allow the student a second attempt, which must take place before the end of the spring term of the second year.

5.2.3 Practical considerations

- The student starts to assemble their Advancement Committee with a choice of two potential advisors. This process should probably begin by the summer, but students are encouraged to build relationships with

faculty working in areas of potential interest throughout their first year. If the student does not yet have a idea of with whom they might want to work, the summer seminar, Math 117, may provide some insight into the research interests of faculty the student has not yet met. In any case, this is another prime opportunity to talk to your first-year advisor who can help sort out your interests and options, and help begin to formulate plans.

- If plans change and a new potential advisor is still one of the other members of the chosen Advancement Committee, no formal changes are needed as the change will be registered when faculty sign onto their roles in the Advancement Examination Form. If the new potential advisor is not currently a member of the committee, a new plan will be called for, and submitted to the GPC for approval.
- Other minor revisions to the plan for the Advancement Exam (e.g., changes to the syllabus that do not substantially change the content) do not need further GPC approval. The goal is to have a reasonably faithful written record of the student's plan for advancement. In case of doubt, just ask the GPC.

5.3 Advancement Procedures — All students

5.3.1 Courses

All full-time students must enroll in three courses each term.

- For second-year students, there is a classroom course requirement of four courses. This means the other courses can (if desired) be chosen from among reading courses (127), independent reading (137) or independent project (158) as appropriate.

Any internship or other (approved) activity that prevents you from taking a classroom course in a given term will automatically cause a reduction of 1 in your classroom requirement for that year.

If you are taking only one reading course in a term, register for Math 127. If two of your courses are reading courses, register for Math 127 and 137. **Note:** the courses (127, 137, 158) require a faculty supervisor and syllabus; grades are reported by the faculty supervisor.

- Remember that students following an applied track need to take 106 and 116 for a second time since the content alternates between even and odd years. Similarly the content of Math 111, 113, and 114 typically alternates and will add considerably to the student's breadth. Students following the pure track normally take the summer seminar, Math 117, unless they are away for the summer (having received GPC approval for this).
- Finally, in the term a student takes DCAL's *Future Faculty Teaching Series*, they should register for Math 147, which will designate that they have completed the theory end of the teaching seminar. Math 147 does not count as one of the four required classroom courses.

5.3.2 TA and grading responsibilities

These responsibilities are exactly the same as in the first year, remembering to register for Math 107 each term in which you TA. Second year students will also serve as natural mentors to the first-year graduate TAs.

Please also see [Reference Sheet for TAs](#) which includes a great deal of information about resources and regulations.

5.3.3 Pedagogical Training and Requirements

Students must successfully complete both theoretical and practical components of pedagogical training as part of their graduation requirements and to be eligible to teach their own courses in the later years of their time at Dartmouth.

Pedagogical Training — theory

For the theoretical portion, students will attend one of the offerings of Dartmouth's Center for the Advancement of Learning's (DCAL) Future Faculty Teaching Seminar, offered at least twice a year. This seminar covers the basic pedagogical literature with an emphasis on application within STEM fields and incorporates brief but rigorous opportunities for lesson design, practice, and feedback. Students should register for Math 147 in a term in which they take the seminar.

Pedagogical Training — Math specific training

To anchor these ideas within the mathematical curriculum, students will participate in a practicum experience mentored by a regular faculty member. Students should register for Math 148 in the term in which they do this training, and it may take several forms. For example, our traditional summer math camp will run whenever faculty are available to mentor and supervise. Other instances fall under the umbrella of a supervised teaching assistant assignment, which has three components.

- First, the student needs to autonomously design (some) curricular elements.
- Second, the student needs to teach these elements to a subset of the students enrolled in the course, typically during x-hours.
- Third, the student must receive feedback from a faculty member and respond to it via revision of the material.

Resources: We note that the department already has in place teaching mentors, which have been used in varying capacities over the years. The teaching mentors should coordinate with the student and course instructor for establishing expectations and goals for the practicum, and should regularly communicate with the student during the term.

Logistics: Students should discuss with their advisor how they might go about fulfilling this requirement. Student teaching assistant assignments must coordinate with course scheduling, so some flexibility is needed. To ensure objective feedback, a representative from DCAL will be asked to

observe graduate student taught classes. A discussion between the graduate student, course instructor, student teaching mentor (if appropriate), and DCAL representative will follow.

Benefits: The plan provides flexibility while also ensuring that our PhD students have plenty of opportunities to interface with students. Moreover, the plan plays to our students' strengths and will allow them to stand out on job applications. The students may also provide a great resource for undergraduates in courses that have not traditionally had TAs, for example, by teaching MATLAB in some of the applied mathematics courses, or running problem solving sessions in some mid-level courses.

5.3.4 Certificate in Mathematical Pedagogy

There is a higher level of pedagogical training — beyond the training required by the graduate program — for those who aspire to secure positions with a significant teaching component.

To facilitate this, we have created a certificate program within the Guarini School of Graduate and Advanced Studies. Upon completion of the requirements, a student receives a certification and notation on their transcript. Students with an interest in this certification should discuss the matter with their advisor.

The requirements for the certificate are included in the form below. To download a copy, use the [download link](#)³.

A typical path through the course of training for a student interested in the certification might be:

- **Year 1:** Two terms serving as a Teaching Assistant, typically in calculus courses and (if possible) paired with a more senior student. Attendance of the TA Training Seminar in the Fall term.
- **Year 2:** Two terms serving as a Teaching Assistant, one of which will incorporate a more intensive collaboration with the instructional team. Attendance of the TA Training Seminar in the Fall term. Students will attend the DCAL course for one offering.
- **Year 3:** The student is eligible to teach a section of their own course, likely under the supervision of the faculty member who is the course supervisor.
- **Year 4:** Depending on the student's performance in their first independent teaching experience, the student may have a similar experience in year 4 or be trusted with more autonomy (e.g. with a stand-alone course).
- **Year 5:** Depending on the student's performance in their first two independent teaching experiences, the student may have a similar experience in year 5 or be trusted with more autonomy (e.g., with a stand-alone course).

³math.dartmouth.edu/graduate-students/dept_docs/graduate-handbook-production/images/Graduate-Certificate-Pedagogy.pdf

- **Interspersed throughout:** Students will pursue the other components of the certification.

Graduate Certification in Pedagogy: Mathematics



Departmental Training components (complete all) <ul style="list-style-type: none"> <input type="checkbox"/> Departmental Training for Teaching Assistants <input type="checkbox"/> Departmental Ethics Training <input type="checkbox"/> TA Seminar (with each instance of TA role) <input type="checkbox"/> DCAL Future Faculty Teaching Series 	3 hours 2 hours 5 hours 14 hours
Practicum (complete at least 200 hours) <ul style="list-style-type: none"> <input type="checkbox"/> Serve as a teaching assistant (mandatory) <input type="checkbox"/> Serve as a Graduate Teaching Fellow <input type="checkbox"/> Math Camp <input type="checkbox"/> Outreach in local school system(s) <input type="checkbox"/> DCAL Learning Community for Future Faculty (facilitator) <input type="checkbox"/> Other GPC approved activity 	100 hours 150 hours 100 hours Varies 4 hours per session Varies
Teaching (available once two previous boxes complete) <ul style="list-style-type: none"> <input type="checkbox"/> Term 1 <ul style="list-style-type: none"> o Observation with written reflection (TEC) <input type="checkbox"/> Term 2 <ul style="list-style-type: none"> o Observation with written reflection (TEC) 	200 hours 2 hours 200 hours 2 hours
Professional Development Opportunities (complete 3 over time in program) <ul style="list-style-type: none"> <input type="checkbox"/> DCAL Learning Community for Future Faculty (attende) <input type="checkbox"/> DCAL Teaching Statement workshop series <input type="checkbox"/> DCAL Diversity Statement workshop series <input type="checkbox"/> DCAL Syllabus Design series <input type="checkbox"/> Workshop on Communicating your Research to Broad Audiences <input type="checkbox"/> Other DCAL and Guarini workshops 	14 hours 1.5 hours per session 3 hours 3 hours 6 hours Varies Varies
Teaching Portfolio <ul style="list-style-type: none"> <input type="checkbox"/> Teaching Statement <input type="checkbox"/> Sample Syllabus (if available) <input type="checkbox"/> Annotated sample course materials <input type="checkbox"/> Teaching Evaluations 	6 hours total

Figure 5.2 Checklist for obtaining certification in pedagogy

6 The final three years

6.1 Courses

There is a breadth requirement manifested as a classroom course requirement for all graduate students; it is present to encourage students to enhance their mathematical background. It is the breadth of mathematical knowledge which

allows students to better see connections between different areas of mathematics, and often spawns the most interesting research.

There is also a practical side to this requirement. Teaching a course for the first time requires significantly more preparation time than one for which you already have a good perspective and source materials. Taking good notes in classroom courses provides a wealth of resources.

For first-year students the breadth requirement is six classroom courses; for second-years it is four. Over the course of the last three years, students are required to take a total of six classroom courses. A student whose accumulated total falls below three courses per year must petition the GPC for an exception which is granted only if the student has a viable plan to make up the deficit in the following year.

If you are potentially interested in enrolling in a classroom course but you are focused on finishing your thesis (or you're facing other academic or professional constraints), then you are encouraged to consult with the course instructor to discuss what is required for a passing grade (P). Faculty understand that getting your thesis written is the top priority!

Any internship or other (approved) activity that prevents you from taking a classroom course in a given term will automatically cause a reduction of 1 in your classroom requirement for that year. (Since the academic year at Dartmouth begins in June with summer term, an internship or long MSRI summer course in the summer after your first year would result in a change from 4 to 3 in your second-year classroom course requirement.)

Since full-time students are required to register for three courses each term, once you have advanced to candidacy, you should make up the difference between the 3 course load and classroom courses from among Math 156 (Graduate Research), Math 157 (Thesis Research), and/or Math 158 (Independent Research).

Finally, remember that neither the teaching seminar (Math 147) nor your own teaching assignments count towards this total. Please remember to register for Math 149 each time you teach for the department; this tracks the teaching requirement for graduation.

6.2 Teaching

Graduate students typically teach one course in each of their final three years of study, and these experiences can be quite varied depending upon the level of the course as well as whether it is a multi-sectioned course or not. Students should register for Math 149 in the terms that they teach; Math 149 does not count towards the classroom course requirement.

Graduate student teaching assignments are made after faculty teaching schedules have been settled. Generally what remains is a large pool of courses. Specific teaching assignments are informed by a number of sources: feedback about the student in the teaching seminar and practica, previous TA or teaching evaluations, as well as graduate student requests. The department chair asks for teaching preferences of the graduate students from among the pool of available courses, and just as with faculty, those requests are honored as best they can; assignments of students to courses must satisfy many constraints.

However, if you have a specific request, e.g., if you prefer not to co-teach with your advisor, make that request known to the chair. It may not be possible to honor it, but it never hurts to ask.

6.2.1 Course Supervisor

A *course supervisor* is a faculty member who oversees a course taught by postdocs, junior faculty, or graduate students, but is not actually teaching the course. The course supervisor reviews the syllabus (in its broadest sense), previews all exams, and advises on assignment of final grades.

6.2.2 Course Chairs

A *course chair* is a faculty member who oversees a multi-sectioned course. The course chair sets the syllabus (in its broadest sense). Of course in lower-level courses, the topics syllabus is essentially fixed by department consensus, but there can be some variation in what type of homework is done (e.g., WeB-WorK or written homework) and how the course is evaluated.

There is not always agreement among all faculty teaching a multi-sectioned course about how a course should be constructed and run, but by department policy all sections are subject to common evaluation, so the course chair sets the procedures and syllabus to be followed in that offering of the course.

6.2.3 Teaching Mentors

A *teaching mentor* is assigned to all graduate students who teach. The role of the mentor is especially critical in the first teaching experience, and can vary with subsequent teaching opportunities based upon evaluations of previous teaching.

Graduate students are often fond of thinking they should be in full control of the courses they teach. That is more than a little like someone getting a driver's license and feeling they are an accomplished driver having only passed a road test. There is always more to learn about your profession.

Teaching mentors have many duties which dovetail with that of course supervisors and course chairs. The syllabus is set by the course supervisor or chair. In a multi-sectioned course, exams are drafted in consultation with the teaching faculty, and final decisions left to the course chair. In a single-section course, the faculty member drafts the exam which is then reviewed by the teaching mentor who gives feedback to the instructor. The teaching mentor also reviews final grades to make sure they align with department guidelines and to help the instructor resolve borderline cases. All these roles of the teaching mentor apply uniformly to any graduate student who is teaching.

The role of the teaching mentor can vary depending upon the needs of the instructor as perceived either by the instructor or the mentor. In particular, a teaching mentor is expected to be highly involved with those teaching for the first time, with the degree of involvement negotiable for those who have taught previously and have strong teaching evaluations. To be an effective mentor, they should visit the class two to three times during the term. The

ideal schedule is for a first visit to occur within the second week of term. This has provided time for the instructor to set the tone of the class and develop some rapport. A class is observed and the mentor takes notes. Following the class, the student and mentor meet and discuss the class. Ideally, a mentor starts by asking what were the goals of that day's class and how effective the instructor felt they were in accomplishing those goals. Ideas of things that they thought went well or not are mentioned. Then in that context, the mentor can review how they felt the class went, and make suggestions for different ways to accomplish certain goals. A followup visit should occur in another couple of weeks. If things are going well, there may be no other visits unless requested. If problems still seem apparent, more visits and brainstorming sessions may be needed.

Yes; it is a bit unsettling to have someone in your classroom observing you, but evaluation is a part of life and certainly part of your career. The goal of the mentor is to help you become a better communicator, something from which all parties benefit.

6.2.4 Teaching Evaluation

The department has a teaching evaluation committee whose job it is to visit the classroom of all graduate students, postdocs, and junior faculty members. Their role is to visit a typical class, and following a discussion with the instructor, write a review which often forms a core piece of a teaching letter.

There are often a large number of classes for the committee to visit, and you are best served by getting feedback in the first half of the term, so if a member of the teaching evaluation committee does not contact you about setting up a visit within the first two weeks of the term, contact the chair of the committee to help move things along.

6.2.5 Outline of responsibilities and expected time commitments

The amount of time one commits to teaching varies among instructors, and any faculty member will freely admit that the first time they teach a course, it requires far more time and energy than subsequently. Typically, most graduate students are teaching courses for the first time, and so the preparation will be more demanding than for someone having taught the course before. But the key here is the effort is demanding, but not all-consuming.

Students should place their efforts in perspective. For those who will choose an academic path, their normal responsibilities each term include teaching one or more classes, doing research, advising students, as well as other department duties. Learning to balance those responsibilities is also an essential part of becoming a professional mathematician. Starting now is a good idea.

All this is to say that you cannot make teaching your one class a 40 hour per week job. That kind of time commitment is unrealistic, and not remotely proportional to your responsibilities. Of course you want to do a good job with your class and you should. But you cannot (and should not try to) do everything and try every technique. It takes a long time for someone to develop fully into a good teacher, and some lessons are learned only upon reflection of

hobbled previous efforts.

What are the demands of teaching a course?

- Preparing lectures and handouts
- Writing homework problems, solutions, grading
- Office hours
- Website maintenance, exam writing and grading

In a multi-sectioned course, some of the labor is distributed: one person writes homework problems, another the solutions, still another updates the web pages. If you are on your own, you need to learn to balance. Not everything needs to be TeXed or a Beamer presentation. Handwriting notes, handouts, solutions etc saves an enormous amount of time.

6.2.6 The Honor Principle and your course

The last thing you want to think about when teaching is the possibility of an honor code violation, but be very clear such violations do occur and many are the result of a lack of clarity in how the honor principle applies to your course.

First, you should make a point to read the [academic honor principle](#)¹. Then you should decide how it applies to your course. Can students collaborate on homework? projects? exams? How should credit be attributed? What resources are allowed?

Once you decide how the honor principle should apply to your course, make this very explicit on your course syllabus. Then make sure you talk about it in class. All this reduces the chances that a potential violation is a result of lack of clarity.

Still on occasion, things do occur. Virtually identical [incorrect] answers on exam problems, homework/exam solutions too sophisticated for the student of using notation not seen in the text. For cases in which you think a student's answer was informed by information on the internet (presuming it was not allowed), you can probably find the source online. Still what do you do?

Having read the honor principle, you know you are not to resolve the matter on your own, though asking students for clarification is allowed. Your first action is to bring the matter to your course chair or supervisor who will advise you further. If need be, the department chair can give further opinion.

If it is decided that this is a likely violation of the honor principle, contact the office of [Community Standards and Accountability](#)² which will give you information for how to submit your materials.

¹student-affairs.dartmouth.edu/policy/academic-honor-principle

²students.dartmouth.edu/community-standards/department/community-standards-accountability

6.3 Travel: Conferences, Invited Talks, Interviews

Travel for whatever purpose requires booking flights, making hotel reservations, and planning for local transportation costs and meals. In many instances funding is available to graduate students, but such funding is generally in the form of *reimbursement*, meaning you need to carry the load in the short term.

While there are times you can arrange for the College to pick up some of the interim costs, there can be trade offs, and certainly hotel, local transportation and meals are all expenses you will have to carry until reimbursed. So it makes good sense to start building a travel fund of your own to help smooth out the bumps.

The largest expense generally is travel to and from a conference. If you are taking an authorized professional trip, one option available to you is to book your flight through the College travel office. With Tracy's authorization, the cost in the short term is carried by the department, which you then reimburse when you receive funding from the outside entity.

Note that since this is a corporate booking, it may not be the cheapest option for air travel, which means while the College is carrying the short-term load, more of your reimbursement will go to travel costs. On the other hand, if you want to book your own flight through wing-and-a-prayer air, you are free to do so, but then it is your credit card which is carrying the debt until you receive reimbursement.

6.3.1 Conferences

Conferences are wonderful opportunities to make new and meet old colleagues, learn about the work of others and present your own work. Some of the people you meet eventually may write letters for you, either for jobs or for when you come up for tenure, so keep in mind that conferences are a professional activity.

When you find a conference of interest and want to attend, the first question is whether you are allowed to be away from campus? Is your advisor aware and in agreement that this is a valuable activity? Are you teaching, TAing? How will those responsibilities be handled?

Before attending any conference, the [Graduate Travel Form](#)³ should be completed (located on the department intranet, on the Department Documents page under forms, department).

The following sources of funding should be investigated, pretty much in this order:

- Graduate student support obtained from the conference organizers: More and more conferences offer graduate student support, but you have to apply for it and often obtain a letter recommending you as a viable participant. Such funding can supplement travel, housing and meals, or just some subset of those.
- Sometimes there is money to help defray costs available from the department. Application is made by contacting the graduate representative, and funding is limited.

³forms.gle/12Ey2yyzRBGVV1Ea9

- At least once during your Dartmouth career, the graduate office provides some funding to defray the costs of a professional conference. Most graduate students use this to attend a national meeting of their professional society.

6.3.2 Invited Talks (colloquia/seminars)

You may be invited to give a seminar or colloquium talk. In this situation, most if not all of your expenses will be reimbursed, but you must carry the short-term load, so between booking a flight and waiting for the University to reimburse you, certainly two to three months will elapse. Generally hotel and meals are covered locally and not borne by you.

6.3.3 Interviews

Eventually, you will be interviewing for jobs. Sometimes prospective employers will have you book flights through their travel agents saving you the costs, but not always, so again your credit card could be carrying the load for 2-3 months. And if you are lucky enough to have many interviews, these costs can be significant, so some advanced planning is worth your while. Again meals and hotel are generally handled by the local host, so do not add to your interim costs.

6.4 Language Exam

The formal requirement for a reading knowledge of a foreign language exam has been eliminated.

It should be understood that mathematics is written in many languages, and the need to be able to read papers in languages other than English remains an important tool. Some Advancement Committees may expect students to demonstrate some level of proficiency in reading mathematics written in languages other than English.

7 Chain of communication

Many situations arise in which you will want to seek advice. The issue may be informational, to resolve a conflict, or dealing with a situation with which you have no experience.

Admittedly, it seems natural to first turn to your fellow graduate students, but more times than not this is a source of misinformation or at least information biased by their small window of experience. A definitive source of information about the policies of the graduate program is the Graduate Program Committee (GPC). But there are also many other sources of information, somewhat influenced by the circumstances. We consider a few.

7.1 General Questions

If you are a first or second-year student, natural choices of people from whom to seek advice are your first-year advisor, the advisor to graduate students, the GPC and the department chair.

For students who have advanced to candidacy, your first-year advisor and advisor to graduate students is generally replaced by members of your Advancement Committee.

7.2 Issues with your advisor

If you find yourself at odds with your primary thesis advisor, you should first consult your secondary advisor or other member of your Advancement Committee to get their read on the situation. Having heard your side of things, they will probably chat with your advisor and get their perspective on the matter at hand, and then get back to you to help resolve the issue.

In the event that informal means do not resolve your issue to your satisfaction, there are more formal procedures for resolving issues which gradually escalate. Please refer to the section devoted to [Grievances](#).

7.3 How to handle a possible honor-code violation

One of the last things anyone who is teaching wants to encounter is a suspected honor code violation. Review the statement of the [academic honor principle](#),¹ and see the section [above](#) for details on how to handle the situation.

8 Deadlines and benchmarks by year

8.1 Year 1

- Each term, formally check in with the graduate office and register for your courses within the first week of the term. Failure to do so can have financial consequences.
- In fall term, enroll in Math 700.
- File your signed and approved annual planning document/progress report with the department administrator. See [Subsection 8.5](#) for details.
- Take nine courses including at least 6 classroom courses; fill in with (supervised) Math 127, 137, 158 as needed to maintain required three course load each term. This includes the summer term between Year 1 and Year 2.
- TA for two courses, registering for Math 107 in each term you TA.
- Get involved with seminars and see what various research groups are doing.

¹student-affairs.dartmouth.edu/policy/academic-honor-principle

- As you look ahead to the formation of your Advancement Committee, you may want to establish informal relationships with faculty. They can give you an early indication of what preparation they expect of students who wish to work with them. These expectations generally will shape your Advancement Examination.
- Applied Math students should plan for their summer research project/internship for the coming summer. It is imperative that students who wish to do an internship discuss this with either their first-year advisor or a potential committee member by February 1 since application deadlines for internships are often due by mid-February. Students also need to submit a plan for the summer project which has been approved by the two-person advisory committee to the GPC for approval by the end of spring term.
- Pure Math students are strongly encouraged to take the summer seminar Math 117, and should be thinking about the formation of their Advancement Committee who will help guide the student through the second year advancement process.
- Take preliminary exam in either pure or applied math.

8.2 Year 2 — Applied Math

- Each term, formally check in with the graduate office and register for your courses within the first week of the term. Failure to do so can have financial consequences.
- File your signed and approved annual planning document/progress report with the department administrator. See [Subsection 8.5](#) for details.
- Take nine courses including at least 4 classroom courses; among these should be the second offerings of Math 106 and 116 as well as other topics courses; fill in with (supervised) Math 127, 137, 158 as needed to maintain required three course load each term, including the summer term between Year 1 and Year 2.
- TA for two courses, registering for Math 107 each term you TA.
- Written report of your summer research, to be followed by oral presentation and exam in the fall.
- Complete theoretical and practical aspects of pedagogical training. Register for Math 147 when taking the DCAL seminar and Math 148 when satisfying the practicum requirement. Be aware of ongoing requirements if a certificate in pedagogy will be sought.

8.3 Year 2 — Pure Math

- Each term, formally check in with the graduate office and register for your courses within the first week of the term. Failure to do so can have financial consequences.
- File your signed and approved annual planning document/progress report with the department administrator. See [Subsection 8.5](#) for details.
- Take nine courses including at least 4 classroom courses; among these could be second offerings of Math 111, 113, and 114 as well as other topics courses; fill in with (supervised) Math 127, 137, 158 as needed to maintain required three course load each term, including the summer term between Year 1 and Year 2.
- TA for two courses, registering for Math 107 each term you TA.
- Assemble your three-person Advancement Committee, formulate the details of your Advancement Exam and submit the approved plan to the GPC by the end of fall term.
- Complete all the requirements of the Advancement Exam by the end of winter term; exceptions must be granted by the GPC.
- Complete theoretical and practical aspects of pedagogical training. Register for Math 147 when taking the DCAL seminar and Math 148 when satisfying the practicum requirement. Be aware of ongoing requirements if a certificate in pedagogy will be sought.

8.4 Years 3 to 5

- Each term, formally check in with the graduate office and register for your courses within the first week of the term. Failure to do so can have financial consequences.
- File your signed and approved annual planning document/progress report with the department administrator. See [Subsection 8.5](#) for details.
- Take at least 6 classroom courses over the three-year span, keeping your average to 2 courses per year; fill in with (supervised) Math 156, 157, 158 as needed to maintain required three course load each term.
- Register for Math 149 each time you are teaching for the department.
- Continue your research, write up results and post to the arXiv, attend seminars and relevant conferences.

8.5 Annual Graduate Student Planning/Progress Reports

At the start of every fall term, graduate students should write a 1-2 page progress/planning document containing

- a short progress summary (a paragraph or two on what you have been up to, nothing for students in year 1), and
- a plan indicating what you will be doing in the next year (courses, how your research is progressing, possible summer plans, etc.).
- Be sure to count your classroom courses and indicate your plan to address the classroom course requirement (six courses in year 1, four courses in year 2, six in years 3-5).

The purpose of this document is to provide an opportunity to formulate and record your intentions and goals for the year, in consultation with your advisors.

There is no template for these reports. Of course the plan does not fix anything in place, and you may change your plans as the year progresses, keeping in touch with your advisors.

Graduate students should prepare a first draft of this plan, then meet with their advisors to discuss their plan and obtain their signatures. For students in years 1 and 2, this means your primary advisor and the graduate advisor; for students in years 3-5, this means your primary and secondary advisor. ***This should be completed by mid-October, and then the signed plan should be emailed to the departmental administrator.***

9 Master's Degree

All students who advance to candidacy and who satisfy the requirements (see Appendix C.1.1) will receive a Master's Degree at the end of the second year.

If a student in pure math fails the Advancement Exam or a student in applied math fails to do a satisfactory job in their oral presentation of summer research, the student's committee may still recommend to the GPC that the student be granted a master's degree.

Students who decide that they do not wish to try to advance may choose instead to assemble a committee for the sole purpose of determining whether they should be granted a master's degree.

Formal requirements for the Master's Degree are listed in Appendix C.1.1 and the Department's amplification of those requirements are listed in Appendix C.2.

10 Work-life balance

This section is included at the request of graduate students. It should be viewed more as an editorial piece though it contains many statements of fact.

The phrase "work-life balance" is at best a misnomer in academics. The profession you want to enter demands passion, a passion for your work that

can sustain you through the disproportionate requirements of time needed to succeed in this profession. Time demanded of you by your career can often not be predicted nor easily partitioned from the time devoted to things outside your career. Complicating an interpretation of the phrase “work-life” even more are that there are many who equate work and life, or more pointedly, there are many mathematicians for whom doing math is life.

To get down to some specifics, your work-life balance is influenced by your goals and aspirations as well as the requirements of your job. As a professional mathematician, your motivation for a heavy investment in your career may be job security, such as tenure and promotion (even fame, rarely fortune); as a graduate student the motivation is probably to get a degree and a “good” job. But unlike an undergraduate finishing and getting a job which might be their end goal, for you this is simply a first step, but a critical one.

So part of the work-life balance is a matter of choice. For you this balance is also influenced somewhat by your advisor whose job it is to train you to the best of their ability and enable as many opportunities as they can. Styles by which faculty train graduate students vary dramatically, from a virtual hands-off approach (ask me questions if you have them), to those who want weekly progress reports, to those who are even more prescriptive. Students who are supported on research grants or are in research collaboration with their advisor often have additional pressures. Especially grants in applied mathematics are awarded in expectation of deliverables with deadlines. Missing deadlines can result in a loss of funding, which could have obvious effects for graduate student funding. Extra effort is often required to help finish research close to a projected timeline.

Presumably you are aware of your advisor’s proclivities before signing on. Perhaps a good conversation is to ask what a prospective advisor’s plans are for you as their student? What are your own plans and aspirations? The job market is highly competitive with one measure of the strength of a job applicant given by their productivity. It should also be clear that the quality and strength of the letter of recommendation which your advisor can write is directly related to your success and productivity as a student. Pressure to work hard should come from you; this is your chosen profession.

Let’s think about various aspects of the career of a professional mathematician. Here we talk about the work aspects, leaving to you to discern how life fits into this picture.

Success in research is certainly influenced by the amount of time devoted to it, but not determined by it. And in the absence of brilliant insight, you work long, hard hours to catch a glimpse of possible approaches to a problem. And let’s not forget that grants are important to everyone’s career. Most applied mathematicians are expected to generate revenue in terms of grant dollars, and research universities expect faculty to obtain grants as evidence of the value of their research. And of course writing grants takes time, but more importantly you are writing a grant which makes promises on which you need to deliver if you expect to get future grants.

For many, perhaps most, of you there will be a teaching side to your career. Components include lecture writing, creation and grading of homework and exams, perhaps overseeing a research group, mentoring undergraduates and

graduate students outside of classroom courses, and committee work.

Depending upon the type of department you are in, different weights are assigned to each of the research-teaching tasks, but taken all together, these tasks require a huge amount of time.

The bottom line is that the life of a professional mathematician can be an incomparably wonderful experience, but you should be well aware of the costs as manifested in a work-life balance. In particular, doing (at least most of) the jobs that comprise your career should be a passion; without such a passion, devoting huge amounts of time to your career will not prove satisfying.

11 Frequently Asked Questions

The questions below have been posed by graduate students at various stages of their careers. They are either of a technical nature or they ask about topics perceived to be beyond the written policies of the department.

The remarks below represent an interpretation of current policies by the Graduate Program Committee (GPC). Just as our own court system constantly refines its interpretation of laws, the interpretations below can and no doubt will change with time.

First, we state just all the questions for the sake of compactness, and the give links to their answers.

- ***The most important question:*** Who or what is the definitive source for answers about policies affecting my status in the graduate program? [*Answer/Opinion*](#)
- ***Registering for classes:*** What is the department policy on signing up for independent studies, taking classes outside the department? What does it mean to sign up for thesis research versus graduate research versus a reading course versus independent research versus supervised teaching, etc.? What classes count towards the 15-course requirement for a master's degree? [*Answer/Opinion*](#)
- ***Late registration:*** Can I drop a class or add a class late? [*Answer/Opinion*](#)
- ***Retaking a course:*** Can I retake a course I have already taken? [*Answer/Opinion*](#)
- ***Opting out/auditing of required courses:*** What do I do if I don't want to take one of the core courses in my first year (e.g., because you've already seen the material)? Can I audit a class? [*Answer/Opinion*](#)
- ***Accommodations:*** I think I might require accommodations (e.g. additional time on exams, ability to record lecture) to succeed in the program. How do I figure this out? [*Answer/Opinion*](#)
- ***Grades in classes:*** How do grades in graduate classes work? What does it actually mean if you get a low pass (LP)? [*Answer/Opinion*](#)

- **Holidays:** Do graduate students have classes on days that undergrads get off? [Answer/Opinion](#)
- **Advancement Committee — third members:** What is the purpose and role of the third member of the Advancement Committee? [Answer/Opinion](#)
- **Advancement Examination:**
 - Is the Advancement Exam always an oral exam?
 - Can I change the members of my Advancement Committee?
 - I don't think I will be able to make a deadline. What should I do?

[Answer/Opinion](#)

- **Travel funding:** What kinds of funds are available for graduate students to attend conferences? How do I request funding? What are examples of the kinds of things that have and haven't received funding? [Answer/Opinion](#)
- **Teaching seminar:** What happened to the teaching seminar? [Answer/Opinion](#)
- **Teaching:** What are my responsibilities as an instructor? Am I in charge of my own courses? [Answer/Opinion](#)
- **Seminars:** What seminars exist in the department? Should I attend them if I haven't picked a research area yet? How do I find out about seminar talks? What about colloquia? What's the point of going to talks if they are boring or I get lost all the time? [Answer/Opinion](#)
- **Being away from the department:** ... for a day, a week, a month, or forever — when does going on vacation count as a leave of absence? What do I do if my (potential) advisor tells me to go to a conference, but the professor teaching your course says I shouldn't? If I don't get GPC approval before leaving to do something math-related, what happens? What's department policy on leaving campus during Dartmouth breaks? [Answer/Opinion](#)
- **How much trouble am I in?:** If you're not on probation, do you automatically count as a student in good standing? [Answer/Opinion](#)
- **Outside funding and tutoring:** Can I receive outside funding? Can I get a tutoring job? Can I get paid by a summer workshop or REU? [Answer/Opinion](#)
- **I've advanced to candidacy, now what?:** [Answer/Opinion](#)
- **Choosing an advisor and an Advancement Committee:** [Answer/Opinion](#) What are good strategies for finding an advisor and secondary advisor (as part of my Advancement Committee)? What about the third person on the committee?

- ***Advancing to candidacy:*** Where do you get the forms? To whom do you turn them? *Answer/Opinion*
- ***Having trouble with a thesis advisor?:*** What do you do if you're having a problem with your thesis advisor? What do you do if you want to change thesis advisors? What's the department policy on interdisciplinary work and thesis advisors outside the math department? What about thesis advisors at other schools? *Answer/Opinion*
- ***Language exam:*** When is the language exam supposed to be taken? *Answer/Opinion*
- ***Thesis defense:*** What happens if you don't finish your thesis on time or need to reschedule your thesis defense? *Answer/Opinion*
- ***Teaching issues:*** What are the policies on using other people's problems or tests? What's the procedure if you're going to fail someone? What do you do if you have problems with your evaluation by the teaching committee? What happens if the department is unhappy with your teaching? *Answer/Opinion*
- ***Fifth year teaching:*** If I want to do something other than teach in my fifth year, how do I propose a project and to whom? What are some possibilities for what to do? *Answer/Opinion*
- ***Which faculty can comprise a thesis defense committee? Where are the dissertation forms and guidelines?*** *Answer/Opinion*
- ***Who's who:*** What are the roles of the GPC, the Graduate Student Representative, the Graduate Student Advisor, Advisor to First Year Graduate Students, Head of the Graduate Program, the Graduate Admissions Committee, Department Administrator, Department Secretary, etc.? What kinds of questions do each group or person handle? *Answer/Opinion*
- ***Tea:*** How do I handle tea (getting the card, setting up, cleaning up, turning in receipts), plus what to do if you forget or lose the card? *Answer/Opinion*

11.1 The most important question:

Who or what is the definitive source for answers about policies affecting my status in the graduate program?

Answer/Opinion: If you have any question about whether an action or inaction on your part will have repercussions for your graduate career, the Graduate Program Committee (GPC) is the definitive source for answers. The GPC formulates policy; this formulation is considered, modified, and then approved by the department; and finally the GPC carries out that policy.

The GPC controls your stipend, gives (or declines to give) extensions to deadlines, sets the terms for you to regain good standing should you fall out,

and so on. (However, the GPC does not control all aspects of the graduate program, for example teaching assignments are made by the chair and vice chair).

The members (and chair) of the GPC changes from year to year, but membership is listed in the [committee assignments](#)¹ list which can be found on the department website via the [Department Documents](#)² page.

11.2 Registering for classes:

What is the department policy on signing up for independent studies, taking classes outside the department? What does it mean to sign up for thesis research versus graduate research versus a reading course versus independent research versus supervised teaching, etc.? What exactly counts as a classroom course? And what classes count towards the 15-course requirement for a master's degree?

Answer/Opinion: According to official requirements (see [ORC](#)³ and Appendices [C.1](#) and [C.2](#), students must take at least fifteen courses of graduate quality to qualify for a master's degree, with a limit of at most five replaced by approved research or special study (i.e., *non-classroom* courses). (Courses numbered ≥ 100 are those 'of graduate quality'; exceptions for courses numbered < 100 are infrequent, requiring permission of the GPC and submission of an Add/Drop Course form to the Guarini School of Graduate and Advanced Studies, see the [Course Changes Policy](#)⁴).

Additionally, as a requirement for the master's degree, students must register for and successfully complete three courses per term in order to be considered a full-time student, a necessary condition to receive a stipend. (These can be classroom or non-classroom courses). Before the end of the first year, students are expected to take at least six classroom courses, including at least four of the following core courses: 101, 103, 104, 106, 111, 113, 114, 116, 126, 136. (Beyond the six classroom courses, a student may choose other classroom courses of interest or sign up for supervised reading courses to get to a total of at least nine courses in the first year.) In the first three terms, students are required to take two classroom courses per term even if they have been exempted (by the advisor to graduate students) from some of the standard courses listed above; we still generally advise that students in their first year take advantage of our offerings by enrolling in three classroom courses each term.

Beyond the core classroom courses, the department offers other topics courses: see the [ORC graduate course descriptions](#)⁵ and the department's [course offerings](#)⁶. A tip to understanding the numbering system in math is that courses numbered above 20 are generally categorized by their last digit: courses ending in

¹math.dartmouth.edu/intranet/dept_docs/Committee_Assignments.pdf

²www.math.dartmouth.edu/intranet/dept_docs

³dartmouth.smartcatalogiq.com/en/current/orc/Departments-Programs-Graduate/Mathematics

⁴graduate.dartmouth.edu/policy/course-changes

⁵dartmouth.smartcatalogiq.com/current/orc/Departments-Programs-Graduate/Mathematics/MATH-Mathematics

⁶math.dartmouth.edu/courses/list_course_offerings/

- 0 correspond to probability and statistics
- 1 correspond to algebra
- 2 correspond to geometry
- 3 correspond to analysis
- 4 correspond to topology
- 5 correspond to number theory
- 6 correspond to applied mathematics
- 7 (reading, research, teaching courses)
- 8 correspond to combinatorics
- 9 correspond to logic and set theory

Math 117 (First Year Graduate Seminar), typically taken in the summer between Year 1 and Year 2, counts as a classroom course.

In addition to these classroom courses, students can sign up for a supervised reading course (Math 127), which may be repeated in successive terms. To take two reading courses in a term (not recommended), sign up for Math 127 and 137. In a reading course, a student pursues a topic of interest outside the usual course offerings. Each reading course must have a faculty supervisor who agrees to it; please send this information to the advisor to graduate students.

In all cases, course selection should be done in consultation with a student's advisor; as appropriate, it should be reviewed at the beginning of each term.

Students may take courses outside the department in the first two years, but only when that content clearly advances the student towards their scientific goals. Such goals could include pursuing a mathematically-inclined course in computer science, physics, engineering, or another allied field. After advancement to candidacy, the student's thesis advisor should concur that such a course advances the student's research program. Students with an Advancement Committee will have such classes approved by their committee. Otherwise, an course outside the department should be approved by the student's advisor and the GPC chair.

In the second year of study, students must take at least four classroom courses. After the first two years, students taking (the expected) five years to complete the degree are required to take a minimum of six *classroom* courses during years 3 – 5. The courses 127 and 137 are typically taken prior to advancement to candidacy. In the summer after advancement to candidacy, students register for 137 or 156 (independent reading or graduate research, as appropriate). For subsequent terms — remembering that students are required to enroll in three courses per term (including summer term) — the default if no classroom courses are being taken is 156, 157, and 158, with 158 replaced by 147 when the student takes DCAL's *Future Faculty Teaching Series* and by 149 in the term in which the student teaches (or does their fifth-year teaching experience).

11.3 Late registration:

Can I drop a class or add a class late?

Answer/Opinion: Students should register for courses promptly when requested by the Registrar/Graduate Office. Adding courses late (and dropping courses) cause numerous problems for the department. The graduate program is small and graduate course enrollments are correspondingly small. The Dean's office reviews the (official) enrollments of all courses in the first week of each term, and those with an enrollment of less than five are subject to immediate cancellation. Cancellation of a course means the student will no doubt have to learn this material on their own, perhaps finding a viable alternative course to replace the canceled course. It also creates problems for the faculty member who was scheduled to teach that course.

Moreover, according to the [Course Changes Policy](#)⁷ of the Guarini School of Graduate and Advanced Studies and as amplified by Gary Hutchins:

Courses may be added or dropped at any time during the first two weeks of a term.

The graduate school does not allow students to drop a course after the second week. If there are extenuating circumstances and the student is passing with at least a grade of P at the time of the request, the graduate school will generally allow the drop and a grade of WC is recorded on their transcript. Such exceptions require the joint approval of the instructor, the student's advisor or graduate committee (depending on the program) and the Guarini School of Graduate and Advanced Studies' Registrar.

Absent of approved extenuating circumstances, a student dropping a course after the second week will receive a grade of NC which immediately puts them on probation.

11.4 Retaking a course

Can I retake a course I have already taken?

Answer/Opinion: Many courses like those numbered 11X (and numerous applied courses) often alternate topics from year to year, so retaking a course with the same number but new material is certainly permitted.

Retaking a course whose content is essentially the same as a course you have previously taken requires the approval of the student's advisor and the GPC.

11.5 Opting out/auditing of required courses:

What do I do if I don't want to take one of the core courses in my first year (e.g., because you've already seen the material)? Can I audit a class?

Answer/Opinion: The core courses are good preparation (or review) for the preliminary exam. Students who have seen and indeed mastered the material in these courses should talk to their advisor about possible substitution. The typical recommendation is to first try the course anyway to see if it will help you to deepen your understanding.

⁷graduate.dartmouth.edu/policy/course-changes

Auditing graduate courses is possible, subject to the instructor's discretion, but it is not encouraged: reduced enrollments on the Registrar's records both endangers the existence of the course, and generally diminishes the appearance of activity in the program, something which is actively monitored. Instead, the (advanced) student is encouraged to discuss the details of course requirements (attendance, homework, exams, etc.) with the instructor at the start of the course.

11.6 Accommodations:

I think I might require accommodations (e.g. additional time on exams, ability to record lecture) to succeed in the program. How do I figure this out?

Answer/Opinion: The Guarini school has resources to help you! See [Students with Disabilities](#)⁸ for more information and the right person to contact.

11.7 Grades in classes:

How do grades in graduate classes work? What does it actually mean if you get a low pass (LP)?

Answer/Opinion: Requirements for a class are entirely the purview of the instructor, so there may well be all manner of requirements including attendance, homework, exams, required x-hours, and so on. There may be a distinction between the requirements for undergraduates and graduate students enrolled in the same course. There may be times graduate students have extra responsibilities; there may be times that students who have advanced to candidacy or who are in other special circumstances will have fewer requirements. All these variations are entirely normal.

Grades come in two flavors and have distinct consequences. First, there are the formal grades turned into the Registrar: HP, P, LP, NC. The grade P (pass) is a standard grade; many instructors rarely use HP (high pass) as there is no notion of a GPA for graduate courses, and it is your certification process and thesis which carry the significant weight. On the other hand, LP (low pass) and NC (no credit) are grades taken very seriously by the Graduate Office. Two LPs (cumulatively) or one NC automatically places the student on probation and under scrutiny by the Guarini School of Graduate and Advanced Studies: see the [Satisfactory Progress Policy](#)⁹. In this situation, there must be significant measurable positive progress in the next term to return to good standing. Failure to return to good standing jeopardizes your receipt of a stipend.

Second, the department also uses a system of [internal feedback](#) in core courses intended to convey to you a finer-grained assessment of your progress, based on individualized comments from the instructor. This feedback is only meant for purposes internal to the department and are not part of your official graduate record.

⁸graduate.dartmouth.edu/diversity/overview/students-disabilities

⁹graduate.dartmouth.edu/policy/satisfactory-progress

11.8 Holidays:

Do graduate students have classes on days that undergrads get off?

Answer/Opinion: Holidays (as provided by the [Dartmouth term calendars](#)¹⁰) are the same for undergraduate and graduate students.

11.9 Advancement Committee — third members:

What is the purpose and role of the third member of the Advancement Committee?

Answer/Opinion: By requiring that one of the Advancement Committee members be from a “different (though usually allied)” research area, we hope to achieve multiple objectives. First, faculty can keep track of what other faculty are doing across areas: this helps provide some consistency and allows for potential interdisciplinary contact. Second, the student and the committee have an incentive to keep breadth in the material covered. Third, having someone at arm’s length from the material allows alternate perspectives, and provides someone outside the area that the student can turn to for advice. Finally, this helps to ensure that the distribution of faculty on such exam committees is more equidistributed.

The student and the Advancement Committee may decide on the precise role of the third member. The flexibility is intentional, and can include participation in many ways (coming from ‘outside’ the field). For example, a third member’s “nonexpert” point of view can be considered a benefit when asking questions in an oral examination.

11.10 Advancement Examination:

- Is the Advancement Exam always an oral exam?
- Can I change the members of my Advancement Committee?
- I don’t think I will be able to make a deadline. What should I do?

Answer/Opinion: There are detailed sections on the Advancement Exam in this Handbook which gives the general parameters. See Section 5.1 and Section 5.2 for details.

Some answers to the specific questions:

The Advancement Exam is not required to be a single oral exam. The Advancement Committee could require the student to take certain courses, complete a written literature review, present a research proposal, etc. There does not even have to be any oral component to the exam, though we expect that there will be one in the great majority of cases. Calling it an Exam stresses that whatever the format, there must be a specific point in time when the Advancement Committee determines that the student has either passed the exam, or failed it.

Students may certainly change the composition of their Advancement Committee, but that change may mean the proposal for their Advancement Exam

¹⁰www.dartmouth.edu/reg/calendar/term/

changes. If that is the case, a new plan, approved by the new committee, must be submitted by the student to the GPC for approval at least two weeks prior to scheduling the exam.

Keeping track of deadlines is the responsibility of the student. Advanced planning usually keeps deadlines at bay, but life does not always go according to plan. First you should discuss the matter with your (proposed) advisor, then be in touch with the GPC. You may have to petition the GPC for an extension of your deadline. It is far better to warn the GPC of a potential problem, then for GPC to notice that you have missed a deadline.

11.11 Travel funding:

What kinds of funds are available for graduate students to attend conferences? How do I request funding? What are examples of the kinds of things that have and haven't received funding?

Answer/Opinion: Conferences are an integral part of every professional mathematician's career. They are places to present your work to the community, gain a sense of the vista in your own field, meet new colleagues whose work you have seen online, and gain new perspectives or new insights on problems that are part of your research program. As such they are most appropriate when your own research program is underway, or at least burgeoning — though there are notable exceptions.

For graduate students in their first and second year, there are often workshops appropriate for those who are “still looking”. For example, as an institutional member of MSRI, the department can often send two graduate students for summer workshop spanning a week or two; see the calendar tab at the [MSRI summer graduate schools](#)¹¹ web site. Other research institutes will offer workshops and solicit applications for funding for graduate students. Even small conferences will often have funding available to those who apply early. As you advance in your graduate career, conferences related to your research will become relevant. At the very least, you should probably attend the Joint Math Meetings in January of your fifth year since you will be on the job market and many prospective employers will be there. In your fourth or fifth year, it would be ideal to give a talk at a research conference to begin to make yourself known to other researchers in the field; perhaps a prospective letter writer will be among your new acquaintances.

Assuming that your schedule permits you to attend (e.g., classes, tutorials, teaching responsibilities), you can go to essentially any conference you like. Before attending any conference, the [Graduate Travel Form](#)¹² should be completed (located on the department intranet, on the Department Documents page under forms, department).

Getting funding is of course the trick. You should solicit financial support in the following order:

1. Request funding from the conference itself: often a conference will have some external funding, in many cases directed specifically at graduate

¹¹www.msri.org/web/msri/scientific/workshops/summer-graduate-school

¹²forms.gle/12Ey2yzyzRBGVV1Ea9

students and junior faculty. You should apply for it. Often this funding provides for travel expenses, sometimes hotel, generally not food. In fact, you have a reduced chance of getting funding from Dartmouth unless you can document your failure to receive external funding. (We want to know you tried first at the source).

2. Your advisor or a faculty member in your group may have travel funding through a grant.
3. If you are giving a talk at a conference, you can receive a one-time allotment of up to \$1000 from the Guarini School of Graduate and Advanced Studies: see their [Travel Awards](#)¹³.
4. Depending on how department resources look, graduate students can request funding from the department. This is always after all other sources of support have been exhausted. The Graduate Representative and Department Administrator will review each request.

If you are presenting a paper at a conference (and meet the other departmental criteria), you can reasonably expect to receive support for one conference per year from the department. If you are just an attendee, your priority is a good deal lower, and funding will be highly dependent on the availability of resources.

5. There may also be a new bit of funding available from the College Graduate Student Council, but this will be available only after all the above sources of money have been exhausted. We have at least one graduate student representative to the council, so ask around for who it is to get more information.

11.12 Teaching seminar:

What happened to the teaching seminar?

Answer/Opinion: See the sections on [pedagogical training](#), [teaching](#), and [graduate certification in pedagogy](#) in this Handbook.

11.13 Teaching:

What are my responsibilities as an instructor? Am I in charge of my own courses?

Answer/Opinion: If you are in your first or second year, then you are a TA and your responsibilities are indicated by the instructor of your course.

After you pass through the pedagogical training and requirements, you will have at least two and typically three teaching opportunities as part of the graduate program, one in each of your third, fourth, and fifth years. (In the fifth year, there is also the possibility of a more flexible teaching experience described below.) As with all temporary and junior faculty in the department, you will have a course supervisor (see [Subsection 6.2](#)), for each course you

¹³graduate.dartmouth.edu/admissions-financial-aid/awards-grants/travel-awards

teach, with whom you must discuss and obtain agreement on your choice of textbook, syllabus, and grading scheme. In addition, you must show your course supervisor drafts of all exams (prior to them being given), and consult with them about the assignment and distribution of final grades. Hopefully you will also take advantage of your supervisor's experience to engage in broader discussions should unexpected issues arise in the class.

Beyond the formal oversight by the course supervisor, you will also have a teaching mentor whose job is to advise and assist you to develop as a teacher. For students teaching their first course, the teaching mentor should at a minimum review the first week's worth of lesson plans and visit at least three classes throughout the term. Classroom visits will be preceded by a review and discussion of the objectives and lesson plan for the day and followed by a discussion of how the class went. The teaching mentor may also (if they and the course supervisor wish) replace the course supervisor in reviewing drafts of syllabi, exams and so forth. You should also make a point to ask the Teaching Evaluation Committee to visit your class (optimally in the second week), both for feedback for you, and to write a formal review which can be used for part of a teaching letter when you apply for jobs.

11.14 Seminars:

What seminars exist in the department? Should I attend them if I haven't picked a research area yet? How do I find out about seminar talks? What about colloquia? What's the point of going to talks if they are boring or I get lost all the time?

Answer/Opinion: There are numerous seminars in the department supplemented by weekly colloquia and special lectures series at various times in the year. The starting point for learning about them is the [activities](#)¹⁴ page on the department web page. There you will see links to the aforementioned items. You may also subscribe to math events in your calendar: go to the [math calendar](#)¹⁵ page for links.

All graduate students should attend the graduate student seminar. This seminar consists of talks by graduate students for graduate students; faculty are not in attendance. Oh, there is also free food.

The general departmental expectation is that you should attend colloquia: make it a habit. When you are a newbie, sit in the back and bring something to work on for when you get lost. Sometimes you will get lost in the first ten seconds, sometimes the first ten minutes, sometimes not at all. As you learn more, it will (usually) take a longer time to get lost.

What's the point of coming if you get lost all the time? A very good question with at least three answers.

- The first is that mathematics is about making connections, and really interesting mathematics comes from making connections among ideas that appear quite disparate. All of a sudden in a colloquium (which are supposed to be aimed at a "general" audience) you find the speaker talking

¹⁴www.math.dartmouth.edu/activities/

¹⁵math.dartmouth.edu/calendar/calendar-full.php

about something which you have seen in a very different context. Following that connection can often lead to an interesting research problem.

- Second, you will be giving many talks in your life (seminar talks, thesis defense, job interview talks), and attending colloquia allows you to form strong opinions about what constitutes a good or bad talk including what styles and approaches are most effective. This can be even more impactful when the speaker is not necessarily talking about something you're automatically interested in.
- And last, but not least, is that these speakers have been invited by someone in the department to speak to us. Common courtesy suggests the hosts show up! A good turn out reflects well on how the department is viewed by the outside which can have all manner of positive effects.

The schedule of colloquia is available on the department's [activities](#)¹⁶ page. If an upcoming talk looks particularly interesting, you can ask the colloquium chair who invited the speaker and ask to meet with the speaker or ask to go out to dinner with the speaker and other faculty.

Research seminars are often more specialized, but just as often they will have periods in which talks are given which are intended to introduce a more general audience to aspects of the field. Usually the web pages for these seminars (see the [activities](#)¹⁷ link) gives information about the subject. Find out who the speaker is and see if they think you will understand. If you are not sure on what area you would like to work in, a seminar can be an excellent vehicle to observe not only the types of problems people in the department like to work on, but also the personalities of prospective advisors. A large part of success is just showing up; moreover, many faculty appreciate and take notice students who participate in seminar.

Often at the beginning of each term, emails will be sent to the entire department asking if you want to be on a mailing list for announcements and giving organizational information. The mailing lists are low volume and usually contain an abstract of the upcoming talk.

11.15 Being away from the department:

... for a day, a week, a month, or forever — when does going on vacation count as a leave of absence? What do I do if my (potential) advisor tells me to go to a conference, but the professor teaching your course says I shouldn't? If I don't get GPC approval before leaving to do something math-related, what happens? What's department policy on leaving campus during Dartmouth breaks?

Answer/Opinion: Well this is a broad spectrum of questions! To begin, graduate students in this program are supported 12 months out of the year, whether it be (partially) through a grant or entirely from a Dartmouth Fellowship. The official policy from the Associate Dean of the Sciences is that aside from College holidays (e.g., Christmas, New Years, Fourth of July, etc.), students on twelve-month contracts receive a total of four weeks of vacation,

¹⁶www.math.dartmouth.edu/activities/

¹⁷www.math.dartmouth.edu/activities/

which can be twice as much as you would get starting a job in the “real” world. For example, if you take one week off between each term, that constitutes your four weeks of vacation. The rest of the time is “on the clock.”

Certain activities are generally construed not to count as vacation, e.g., attending a week-long conference, though attendance presupposes that there are no conflicts with ongoing obligations. The scenario of a conflict between a potential, future advisor telling you that you should go to a conference and your course instructor saying you should not is probably a bit distorted. One could easily see a potential advisor suggesting it might be useful for you to go to a conference, but realistically if you are still taking core courses, it is probably better to focus on one thing at a time and extract the most out of your courses. In the rare event of real conflict, the student should take themselves out of the discussion and let the two faculty members work it out. Perhaps there is some extraordinary reason the student should attend that the other faculty member would acknowledge supersedes the need for your presence in his or her course, or some other relevant factor? It is better to let them work it out to find out what would be in your best interests.

If you leave campus for an extended period without consent of the GPC, you are in breach of contract and you can have your stipend suspended. The reason for your absence is of little consequence if it has not been officially approved. Leaving for an emergency would of course be approved. But the bottom line is that you are paid to be here; if you are not here, you don't get paid. (For perspective, faculty are paid a nine-month salary and so have a commitment to be on campus for only nine months out of the year. While many faculty remain on campus for much of the year, there is no contractual obligation, and no matching financial compensation afforded them, to do so.)

Finally, just as a faculty member on sabbatical cannot be paid by another institution, a graduate student on stipend cannot receive salary which supplements his or her income.

11.16 How much trouble am I in?:

If you're not on probation, do you automatically count as a student in good standing?

Answer/Opinion: The normal status of a graduate student is to be in good standing, meaning you are currently meeting all deadlines and satisfactorily completing all requirements of the program. To not be in good standing represents a broad spectrum of noncompliance with a correspondingly broad set of responses, some of which are internal to the department and some of which come to the attention of the graduate office.

Doing poorly in your courses quickly comes to the attention of the graduate office and can immediately place you in a position in which your stipend is in jeopardy. For example, if a student fails a course (NC) or (cumulatively) receives two low passes (LPs), the graduate office automatically places the student on probation. As a consequence, the department must be able to provide concrete evidence that the student has made significant progress towards remediating these deficiencies. Failure to do so could easily result in a suspension of stipend and conditions and deadlines issued to avoid separation from the

program.

A student who gets a low pass in one course will probably get a letter of concern from the graduate office and one from the GPC. The letter will require a response: what went wrong? how will you recover?, etc. If this is the first such stumble, probably no further action will be taken. If the spiral continues downward (e.g., now a missed qual deadline in addition to a LP), concern is growing and the student is now changing status to not be in good standing. The GPC will no doubt issue a letter expressing increased concern and ask for more detailed input for how and when you will get back on track and perhaps for a note of support from a faculty member with whom you are working to remedy your deficiencies. Further downward spiral suggests you are reaching a point from which recovery is becoming problematic. At this point, deadlines may be imposed by the GPC and failure to meet those deadlines will result in a suspension of stipend. If a stipend is suspended, no doubt one last set of deadlines will be imposed after which you would be separated from the program. There are other variations on this scenario, depending on the nature of the spiral.

The GPC and the department in general are here to help you stay in good standing. Talking to your advisor and the GPC when any difficulty arises is a good idea. As you can see from above, it takes several steps to be separated from the program, but if you get caught in a downward spiral, things tend to happen quickly.

11.17 Outside funding and tutoring:

Can I receive outside funding? Can I get a tutoring job? Can I get paid by a summer workshop or REU?

Answer/Opinion: Financial support for graduate students comes from Dartmouth Fellowships, faculty research grants, departmental grants, and from grants and scholarships obtained by students themselves (e.g., NSF graduate fellowship). Students are encouraged to apply for any external fellowship for which they may be eligible. Outside fellowships sometimes pay more than Dartmouth Fellowships, and it is certainly something notable to put on your vita. In addition, outside fellowships supplement the limited pool of internal resources, allowing more flexibility in the size of our graduate program.

In terms of graduate students receiving salary in addition to their stipend, we quote from the [Employment Policy](#)¹⁸ (effective January 1, 2016) from the Guarini School:

Graduate students who are fully supported (a full tuition scholarship and a full stipend) cannot receive additional payment from Dartmouth College for services rendered and cannot accept employment outside the College while enrolled.

See also the exclusions and exceptions listed.

¹⁸graduate.dartmouth.edu/policy/employment-policy

11.18 I've advanced to candidacy, now what?:

Answer/Opinion: All graduate students are strongly encouraged to read the (58 page) document written by a former graduate student (PhD 2002) who posed precisely this question: See [Mark Tomforde's guide](#)¹⁹ which offers a great deal of insight into the entire process of choosing an advisor, successfully writing your thesis, and thoughts for how to sustain a research program.

11.19 Choosing an advisor and an Advancement Committee:

What are good strategies for finding an advisor and secondary advisor (as part of my Advancement Committee)? What about the third person on the committee?

Answer/Opinion: Reread the first part of [Mark Tomforde's guide](#)²⁰ described in the previous answer.

The choice of a secondary advisor is less critical than that of the advisor. Each year you and your primary and secondary advisor sit down and discuss your progress. Typically you have provided a written summary of where you think you are in the thesis process in advance of the meeting. You all discuss this document, then the advisor discusses where they think you are. The secondary advisor freely asks questions of both the student and primary advisor. The goal is for the advisor to produce a document which gives a reasonable assessment of where you are and which (hopefully) makes a case for your continued financial support. Stipends are renewed annually based on continued good progress, but need not be otherwise.

In rare cases where there may be some disagreement between student and advisor, the secondary advisor acts as a mediator.

Choosing an advisor in another department or from another institution is very complicated and case sensitive. No general advice is offered here. Talk to the GPC, graduate advisor, graduate representative or department chair as a starting point.

The third person on the committee is supposed to be from a different (though perhaps allied) research area. Their role is to provide balance and another perspective on your advancement process to complement those of the other two as potential advisors. There are no hard-and-fast rules about the composition of these committees, and we hope that they will be formed in a manner which allows for a purposeful and mathematically meaningful second year, setting the student up for a successful outcome with their Advancement Examination.

11.20 Advancing to candidacy:

Where do you get the forms? To whom do you turn them?

Answer/Opinion: The advancement to candidacy form is available from the Department Administrator. Have your advisor and secondary advisor sign it, which indicates they are aware of their roles going forward. Then return it to the Department Administrator and the GPC will review things from there.

¹⁹www.math.dartmouth.edu/graduate-students/current/guide/

²⁰www.math.dartmouth.edu/graduate-students/current/guide/

11.21 Having trouble with a thesis advisor?:

What do you do if you're having a problem with your thesis advisor? What do you do if you want to change thesis advisors? What's the department policy on interdisciplinary work and thesis advisors outside the math department? What about thesis advisors at other schools?

Answer/Opinion: A student-advisor relationship is always an important one, and can sometimes be a difficult one, which is why one of the criteria you hopefully applied in choosing your advisor was the ability to communicate easily with them. Often tensions arise between student and advisor because of differences in expectations. The advisor believes you should be capable of X , while you are thinking along the lines of $X/\log X$ as being great. Perhaps you don't understand what your advisor wants. Perhaps your advisor doesn't understand why you can't push through.

The first course of action is to talk; try to explain that you perceive some tension and try to explore expectations together. If you still feel you are getting nowhere, engage your secondary advisor for counsel. Maybe they can more easily see both sides of the issue and act as an intermediary.

You think you want to change advisors? This is clearly a major step and it is strongly recommended you consult your advisor, secondary advisor, and other faculty whose opinion or insight you value. Other graduate students probably do not have the life experience to advise you accurately, so you should weigh the advice you get accordingly. The underlying issues may be broad. For example, maybe you hate the problem you are working on, but are content with the general area. Your advisor may be happy and able to get you started in a new direction. Maybe you hate the field in general and want to make a large-scale change. Changing advisors generally means that significant retooling will be required, and you are going to lose not only the time up to this point, but the additional time to retool before you can make forward progress again. Compounding this, you have at most five years of funding from Dartmouth. So if you can do anything to avoid changing advisors, do so, or at least do so early in the game. All this amplifies the importance of trying to make a good decision in the first place.

11.22 Language exam:

When is the language exam supposed to be taken?

Answer/Opinion: Trick question! The language exam is no longer a requirement, but don't be surprised if your advisor expects you to refer to papers written in some language other than English.

11.23 Thesis defense:

What happens if you don't finish your thesis on time or need to reschedule your thesis defense?

Answer/Opinion: From time to time, something happens which precludes a student from defending a thesis before the deadline in the spring. We'll presume here that your results are in hand, but the thesis is not quite written or a committee member is unable to make it before the College's deadline.

You have to check the details with the graduate office, but you can maintain your status as a student (without stipend) and defend in the summer, with your degree granted at the end of summer. You may also be able to walk at graduation with your class. Of course if the results are not in hand, you may need to apply for a leave of absence formally to give the time needed to complete the thesis. College regulations come to bear in such an instance. For example, the [Residence Requirements Policy](#)²¹ states:

Candidates for the Master's degree must spend at least three terms (one academic year) in residence at Dartmouth [Note the Math Department requires more]; for PhD candidates the requirement is six terms (two academic years). However, to prevent unduly prolonged residence, it is expected that the requirements for the PhD degree will be completed *no later than seven years after initial enrollment*, unless the student enters with a Master's Degree in his or her field of proposed study, in which case the student is expected to complete the doctorate in five years.

11.24 Teaching Issues:

What are the policies on using other people's problems or tests? What's the procedure if you're going to fail someone? What do you do if you have problems with your evaluation by the teaching committee? What happens if the department is unhappy with your teaching?

Answer/Opinion: The department's course web pages [course web pages](#)²² are a tremendous source of teaching material. They often include homework assignments, syllabi, practice or actual exams and so on. Such materials are free for you to use (and web sites to steal) with the caution that copies of homework or exam problems may exist in fraternity or sorority files.

Asking what the procedure is if you're going to fail someone raises all sorts of flags. In particular, your course supervisor has been kept up-to-date on the situation and in reviewing grades for submission agrees that the student should fail. The more pressing issue is that you have created a paper trail warning the student of their poor progress throughout the term, and alerted the appropriate class dean much earlier in the term of the ongoing problem. In particular, it is strongly encouraged to use the [Dartmouth Student Academic Support Application \(DSASA\)](#)²³ to report students who are struggling allowing enough warning so that they can take corrective action. Aside from someone zeroing out the final exam, the expectation of a D or E should not be a surprise to the student, their parents, the class dean, or anyone else.

From another point of view, what if the department is unhappy with your teaching? You will be visited by the teaching evaluation committee for each course you teach here. If you are not contacted about a visit, contact the chair of the teaching evaluation committee, listed in the department's [committee assignments](#)²⁴.

²¹graduate.dartmouth.edu/policy/residence-requirements

²²math.dartmouth.edu/courses/by-course/

²³students.dartmouth.edu/undergraduate-deans/resources-support/faculty

²⁴math.dartmouth.edu/intranet/dept_docs/Committee_Assignments.pdf

Teaching is part of the degree requirements and we hope to train you to be as good a teacher as possible. Taking the teaching seminar/DCAL will not make you perfect and even if there were perfect teachers, they too would have terrible days from time to time. The person from the teaching evaluation committee is there to help you hone your skills. If there are issues, they will be discussed, tactics planned, and your class will be revisited to see how well they worked. The process repeats until things are going smoothly.

11.25 Fifth year teaching:

If I want to do something other than teach in my fifth year, how do I propose a project and to whom? What are some possibilities for what to do?

Answer/Opinion: In their fifth year, at the discretion of the department chair in consultation with the GPC, students should expect to teach a course in the department. They should know what their responsibilities will be by the end of the spring term in their fourth year. Students teaching in their fifth year need only register for Math 149 in the appropriate term.

In unusual circumstances, a student may gain more benefit from an alternative fifth-year teaching experience. In such a circumstance, the student is required to petition the GPC for permission; this is accomplished in two steps.

- The petition consists of three documents submitted to the GPC in the Spring term of their fourth year. First, the student submits a one-page proposal detailing the proposed teaching experience, the role of the faculty sponsor, and the student's role, including an estimate of their time commitment. Generally, students are expected to spend time comparable to the time necessary to teach their own course. Second, the student submits a letter from the faculty sponsor endorsing the proposal and indicating its pedagogical value to the student. Third, the student submits a letter of support from the student's thesis advisor. At this point, the GPC approves (or denies) the project, giving the student advice on how to improve and revise the proposal. If the proposal is denied, the student will most likely teach a course in the next year.
- Subsequently, at least two weeks before the end of the term preceding the term in which the teaching experience is to take place, or the beginning of the Winter term of the fifth year (whichever is sooner), the student submits a detailed revision of the proposal to the GPC. The revision should address any concerns raised by the GPC and highlight any evolution of the proposal since its initial approval. This allows time for the GPC to review the proposal and ask for modifications, if necessary.

Some previous fifth-year projects include:

- Participation in the NSF-sponsored GK-12 program: Martinez (2012-2013), Kinnaird (2013-2014), Engberg (2013-2014).
- Participation in the NSF-sponsored Graduate Research Opportunities Worldwide (GROW) program: Wolff (Summer, 2014)

11.26 Which faculty can comprise a thesis defense committee? Where are the dissertation forms and guidelines?

Answer/Opinion: Many of the rules governing theses are determined by the Guarini school, including their procedure for the composition of a [thesis committee](#),²⁵ as well as [thesis forms and guidelines](#).²⁶

For the purposes of the Guarini school, the department's GPC chair serves as Graduate Chair of the department. In this capacity, the GPC chair signs the form requesting approval of a student's proposed PhD Examining Committee.

11.27 Who's who:

What are the roles of the GPC, the Graduate Student Representative, the Graduate Student Advisor, Advisor to First Year Graduate Students, Head of the Graduate Program, the Graduate Admissions Committee, Department Administrator, Department Secretary, etc.? What kinds of questions do each group or person handle?

Answer/Opinion: The [Department Documents](#)²⁷ page contains the Department Reference Guide, Course Supervisor lists, and Committee Assignment lists. The committee list tells you the members of various committees and the course supervisor list tells you what you think it should.

The responsibilities of each of these roles is spelled out in [Appendix A](#).

11.28 Tea:

How do I handle tea (getting the card, setting up, cleaning up, turning in receipts), plus what to do if you forget or lose the card?

Answer/Opinion: One signs out the department credit card by talking to the department administrator. They will tell you the budget, which differs for regular or high teas. If you lose the card, it is really serious, so don't, but should it happen report its loss immediately to the department administrator or administrative assistant; or if neither are available, to the department chair.

The graduate students are responsible for the traditions and logistics of tea, in particular for deciding who does what, for buying items, and then for setting up and cleaning up. Tea has typically been held from 3:30–4:00 p.m. daily, so it should be set up by 3:30 and cleaned up promptly after tea ends. If you are going to a colloquium, just remember to clean up after the talk. Take care of dirty dishes, etc.

²⁵graduate.dartmouth.edu/policy/procedure-setting-thesis-defense-committee

²⁶graduate.dartmouth.edu/academics/graduate-school-forms/thesis-and-dissertation-forms

²⁷www.math.dartmouth.edu/intranet/dept_docs/

A Committees and Advisory Personnel

A.1 Graduate Advisor

The Advisor to Graduate Students acts as a mentor to graduate students not yet advanced to candidacy, gives them help and guidance, and advocates on their behalf with the Graduate Program Committee. The Advisor also is responsible for approving course selection.

- Keep in touch with all the graduate students, and with instructors of graduate courses. Know who is doing well, who is in trouble, and who is interested in what field. Try to make sure graduate students know and are comfortable with you.
- Together with the graduate program representative, meet with incoming graduate students, as a group and individually, to discuss the grad program in general and course choices in particular. Make sure the students file a report with their plans for the first year.
- Discuss course choices with graduate students before registration. Sign registration cards (at least for all grad students who do not yet have a thesis advisor.)
- Approve “permission only” courses, which include all reading and independent study courses. Taking a reading or independent study or research course means finding a faculty member to supervise the effort, and who will provide a pass/fail grade at the end of term.
- Discuss advancement plans with students. Push them to anticipate deadlines and be proactive about constituting a committee. Remind the applied students that applications for summer internships are often in mid February.
- Be the GPC’s source of information on student progress, especially at evaluation time. Keep the Graduate Program Representative informed about important and/or problematic issues.
- Be the graduate students’ representative, as needed, in their relations with the GPC, with the Graduate Office, with their instructors and students, with the department as a whole.

A.2 Graduate Program Committee (GPC)

The Graduate Program Committee evaluates graduate student progress on a regular basis, makes decisions on issues such as leave of absence and advancement schedules, and entertains changes in graduate program practice or policy.

- At the start of fall term, remind graduate students (in all years) to meet their advisors and file their yearly report with the department (see [Subsection 8.5](#))

- Evaluate the progress of all graduate students at least once a year. This can include reviewing the yearly reports and contacting advisors for more information, as needed.
- Be up to date on students' progress on meeting deadlines. Take action regarding those who fall behind, warnings first, action later.
- Evaluate students for advancement to candidacy. Generally, if they have secured a primary and secondary advisor (part of their Advancement Committee), they will have satisfied all requirements of the advancement committee.
- Make decisions and send official letters regarding student requests for leave of absence, extension of deadlines, questions of academic status (e.g., probationary status), other special requests.
- Make decisions on a fifth year of support. Students who seem to be floundering at the end of the third year should be reminded that a fifth year of support does depend on making reasonable progress (ask the thesis advisor whether a nudge is in order). The occasional exceptional student to whom we might want to give a sixth year of support should be referred to the department as a whole for a decision; the Graduate Program Representative needs to ask the Graduate Office for permission if the support is to come from a Dartmouth Fellowship, and permission will probably not be granted.
- Entertain suggested changes in graduate program policy and practice. Make decisions on small items; refer larger items (including anything reflected in the ORC, and any change in requirements) to the department for a vote.

A.3 Graduate Representative

The Graduate Program Representative basically runs the graduate program. Specifically, the GPR is the liaison among the various relevant committees, and to the department chair and the office of the Dean of Graduate Studies.

- Be the official “Graduate Program Representative” listed with the Graduate Office. Make sure they know this every year.
- Be the one to consult with the Graduate Office, as necessary, about issues such as incompletes (when the course instructors don't handle incompletes themselves), leaves of absence, etc.
- Make sure the Graduate Office gets all the paperwork it needs. It needs copies of letters about leaves of absence, letters about academic status, other official letters.
- Assign tutoring and teaching jobs to graduate students. Consult with the department chair about which classes get TA's and what slots are available for graduate student teachers, consult with the advisor to graduate

students, teaching course instructors and graduate students themselves (and read files of incoming grad students) to determine graduate student interests and abilities. Make sure everybody in sight is informed about assignments and expectations. (TA assignments: Course instructors/chairs, department chair, department staff, TA's. Teaching assignments: Course supervisors, department chair, department staff, grad student teachers.) Remind the chair as necessary to assign teaching mentors to all grad student teachers.

- Consult with the department chair on the scheduling of graduate courses.
- Keep in touch with the Administrative Assistant about grant support for graduate students.
- Keep the stipend projection spreadsheet updated. Consult with the department chair and the Admissions Committee chair about how many students to admit each year.
- Accompany the Admissions Committee Chair and the Administrative Assistant to the annual meeting with the Graduate Dean about admissions, etc. Be informed about progress of current graduate students and projected admissions targets for this meeting.
- Be in close touch with the Graduate Program Secretary; this varies from being an unofficial job supervisor in some areas to getting the secretary's advice and approval in others.
- Be the backup for graduate students having difficulties with the Advisor to Graduate Students.
- Oversee the graduate program portions of the department's web page.
- Stay in the loop and informed about everything having to do with the graduate program.

A.4 Teaching Evaluation Committee

The Teaching Evaluation Committee regularly evaluates the teaching of all new and visiting faculty and the teaching and tutoring of graduate students. As such it is an important committee which is active throughout the year.

Ideally, a prearranged classroom visitation should occur within the first few weeks of the term (when modifications can still be made if needed), but after the the instructor has had a chance to develop some rapport with his/her class, say after 3-4 lectures. Based upon the visit, members give feedback to the instructor and prepare a written evaluation which is included in their file. For graduate students this goes to the department AA and for faculty it goes to the department administrator. A copy should also be given to the chair.

These evaluations provide a valuable resource especially for JWYs and graduate students who will need a teaching letter among their application materials for a new job, and are an excellent means of catching any problems which may

be brewing while there is still time to make changes. They are also used by the graduate program representative in deciding on future teaching assignments.

It is also the intention that the teaching evaluation committee evaluate the performance of graduate student TA's each term they tutor. We are now using TA evaluations to help in this regard.

The harder part of the job is to remember to do this at the beginning of each term, and not just in the fall. Obviously instructors who have not been contacted about a visit and desire or need one, should contact the teaching evaluation committee chair.

B TA Reference Sheet: Resources and Regulations

Your job as a teaching assistant assigned to a mathematics class is to help the instructor teach and to help the students learn.

Exactly what this means will depend on the class and the instructor. This document attempts to outline general department policies and College regulations that apply to all TAs, as well as to pinpoint some resources and contacts that might be useful to you.

B.1 Department Policy

1. Gaining experience as a teaching assistant is part of the requirements for the degree.
2. Every graduate student who is not yet advanced to candidacy as of the beginning of fall term is given a teaching assistant assignment during two quarters of that academic year.
3. TA assignments are made by the Graduate Program Representative. Graduate students may make requests, which will be considered along with all the other factors in making assignments.
4. A TA assignment should generally take from 8 to 12 hours per week, on average, including preparation time.
5. The role of a TA complements those of course instructor and homework grader.
6. Teaching assistants are acting on the behalf of the department and, as such, should maintain the highest standards of professionalism.
7. The [Department Reference Guide](#)¹ contains information about the conduct of courses with TAs.

¹math.dartmouth.edu/intranet/dept_docs/department-reference-guide-3.0/output/pdf/department-reference-guide.pdf

B.2 College Policy

This is a small selection of items of College policy a teaching assistant should be aware of.

1. No action to resolve a suspected honor code violation can be taken by any individual instructor (or teaching assistant).

Interpretation: It is appropriate for you to give feedback to students about what behavior is or is not consistent with the honor code, but make sure you understand the professor's expectations (e.g., how much collaboration on homework is acceptable) before you do so. If you suspect an honor code violation, the department expects you to inform the course instructor. It is the instructor's responsibility to decide what further steps, if any, should be taken.

Please read the statement of the Honor Principle, which can be found in numerous places, including the Graduate Student Handbook. A quote from that document: "In the presence of an undoubted violation of the Honor Principle, to stand by and do nothing is to threaten the spirit and effectiveness of the principle."

Link to the [The Honor Principle](#)².

2. Accommodations for students with disabilities, and for students with other commitments (ranging from football practice to physics lab), are determined by the instructor.

Interpretation: This means you are off the hook, in most cases; refer students with questions to the instructor. An exception is when students want you to accommodate their schedule conflicts with tutorials. This is still ultimately up to the instructor, but as you are seen as the tutorial authority, you should be as helpful as you can. You can refer the student to the instructor's office hours, or if the tutorial schedule is inconvenient for many students, you can offer to talk to the instructor about changing it. If the instructor wants you to hold office hours (this is not usually part of a TA's job, but occasionally it may be) then you can try to adjust your hours to students' schedules.

3. College faculty members should not disclose student education records to any unauthorized person.

Interpretation: This means you must not give information about students that you acquire as a TA — this includes such things as grades, progress, conduct, your assessment of mathematical ability, and even schedules — to anybody except the student him or herself, the course instructor, and other instructors and TAs who legitimately should have this information to do their jobs.

Parents are not on the list of people to whom you should give information. Students are adults, and not all parents are entitled to have access to

²students.dartmouth.edu/community-standards/policy/academic-honor-principle

confidential information. You can be friendly and polite and offer to have the instructor contact them.

If you contemplate giving information about students to anyone else (for example, sometimes contacting a class dean is appropriate), talk to the course instructor first.

4. Graduate students who are fully supported (a full tuition scholarship and a full stipend) cannot receive additional payment from Dartmouth College for services rendered and cannot accept employment outside the College while enrolled. Any exception must have the written approval of the graduate student's advisor, the Graduate Program Committee, and the Dean of Graduate Studies.

Interpretation: In particular, you may not be paid for individual tutoring.

There are also other reasons not to provide individual tutoring to students, particularly students in courses you are TAing. You should not provide time or resources to any student unless you offer the same to all similarly-circumstanced students in your course. Doing so is both unfair and unprofessional.

5. Sexual (and other) harassment is strictly prohibited.

Interpretation: Making social overtures to somebody who may feel pressured to accept them (because, for example, the person making the overtures helps grade the other's exams) can constitute harassment. Furthermore, professional standards require that you, as a teaching assistant, avoid both conflict of interest and the appearance of conflict of interest. This means that it is equally inappropriate for you to accept social overtures from students in your course as to make them.

An official definition of sexual or gender-based harassment can be found on the [Title IX](#)³ website. You should be well aware of the Guarini School of Graduate and Advanced Studies's statement on [consensual relations](#)⁴.

6. The [Graduate Student Resource Guide](#)⁵ contains many regulations that apply to graduate students.

B.3 Department Oversight

1. The course instructor is responsible for supervising TAs and helping them as needed.
2. Any questions or difficulties, in particular difficulties between an instructor and a TA, can be brought to the Graduate Program Representative.

³sexual-respect.dartmouth.edu/compliance/dartmouth-sexual-and-gender-based-misconduct-policy/definitions

⁴graduate.dartmouth.edu/policy/consensual-relationships-and-conflict-interest

⁵graduate.dartmouth.edu/student-support/health-and-wellness-support/graduate-student-council-resource-guide

You can talk to the Advisor to Graduate Students — or the Graduate Program Representative — for advice on dealing with difficulties. The Graduate Program Representative is responsible for TA assignments, and is the person to go to if you want to request intervention of some sort, or would like to make suggestions about TA policy.

3. Complaints from parents, inquiries about department policy, and anything else that should be handled on an official level can be referred to the Department Chair.

B.4 Information and Regulations online

1. [Department Reference Guide](#)⁶

If the link becomes broken, the current path starts from the main department page, under Quick Links to Intranet, select Department Documents. You will need an account on gauss to gain access to the intranet.

2. [\(Undergraduate\) Student Handbook](#)⁷.
3. [Graduate Student Council Resource Guide](#)⁸. See also the [Student Support](#)⁹ tab on the Guarini School of Graduate and Advanced Studies homepage.
4. [Faculty Handbook](#)¹⁰.

B.5 Resources Regarding Infrastructure

1. **Textbooks:** Department administrative staff can give you a copy of the textbook for the course you are TAing. You will sign for the book and return it at the end of term.
2. **Classroom Scheduling:** The course instructor should have reserved a classroom for tutorials. If you want to schedule a classroom for an extra exam review session, for example, the official procedures are:

Classrooms can be scheduled by using the “Room Scheduling Links” option on [BannerStudent](#)¹¹. When the scheduling window opens, click on “CONF (Conferences and Events Office) Virtual EMS.” Along the right-hand side of the screen, you can see all of the different categories of classroom sizes that can be reserved. Click on the size you are looking for, and then you can pick the specific classroom that you would like to reserve. Conferences and Events staff do not work on weekends. A minimum of 24 weekday hours is required to process a basic classroom

⁶math.dartmouth.edu/intranet/dept_docs/department-reference-guide-3.0/output/pdf/department-reference-guide.pdf

⁷www.dartmouth.edu/student-handbook/

⁸graduate.dartmouth.edu/student-support/health-and-wellness-support/graduate-student-council-resource-guide

⁹graduate.dartmouth.edu/

¹⁰faculty.dartmouth.edu/dean/governance-service/faculty-handbook

¹¹www.dartmouth.edu/bannerstudent/

scheduling. A minimum of fourteen (14) days are required for any room booking with AV, table rentals, or any additional support.

You can contact Conferences and Events at (603) 646-2923.

3. **Unlocking classrooms:** If you show up for evening tutorial and find the room locked, either your department key or your ID card should get you in. If that doesn't work, you can contact Safety and Security (646-4000). Also, let your instructor know about the problem to get to the root cause.
4. **Classroom problems:** If the ceiling in your classroom is leaking, or there is another physical problem, ask the Department Administrator to e-mail Work Control.

For EMERGENCIES during the work day, call Work Control at 603-646-2508.

For OFF-HOUR EMERGENCIES, call the Troubleshooters at 603-646-2344 or Safety & Security at 604-646-4000.

5. **Computer problems:** If the computer in your classroom is broken, e-mail (using your phone if needed) the Department Administrator.

For resolving problems of an immediate nature: Classroom Technology staff, are available for academic support from 8:00am through 8:00pm weekdays while the term is in session.

Audio visual systems are powered off automatically every night at 11:15 pm to ensure that the equipment is not left on for extended periods between uses.

Computers and laptops (setup for portable audio visual solutions) are scheduled to power on for 6:30am and powered off for 11:30pm Monday through Friday. All computers are powered off for the weekends.

Immediate audio visual help is available during class hours. Call 603-646-2999. A Class Tech, Classroom Specialist may be able to resolve the issue over the phone, or will be dispatched to your classroom location.

6. **Making copies:** You can use the copiers in the math department (there are copiers on the first and third floors of Kemeny) for copying connected with your course. If the copier is malfunctioning, tell the Administrative staff.
7. **Other problems:** If you have other problems and don't know who to ask, start with the department administrative staff; they are likely to be able to point you in the right direction.

B.6 Resources Regarding Students

1. **General Information:** All kinds of information about resources available to undergraduates can be found in the [\(Undergraduate\) Student Handbook](#)¹².

¹²www.dartmouth.edu/student-handbook/

2. ***Student Accessibility Services:*** [Student Accessibility Services](#)¹³ is located in the Collis Center. Any student who suspects they may have a disability and wants to be tested, who wants to have a documentation of their disability (learning or otherwise) placed on file, or who needs other information, should be referred to this office.

Any questions about accommodating disabilities in the math course you are TAing should be referred to the course instructor.

3. ***Extra help:*** A student who needs more individual tutoring on a regular basis than evening tutorial and office hours can supply can find an individual tutor through the Tutor Clearinghouse via the [Academic Skills Center](#)¹⁴ in the 224 Baker. Because there are a limited number of tutors, students should request tutors as soon as possible. For students on financial aid, tutoring is available at no charge.

[Tutor Clearinghouse FAQ](#)¹⁵

The [Academic Skills Center](#)¹⁶ also can help students with strategies for organizing their studying, taking exams, dealing with test anxiety or anxiety about participating in class, and other such things.

4. ***Counseling:*** A student who is looking for non-academic counseling should be referred to the [counseling center](#)¹⁷, part of the [Dartmouth College Health Service](#)¹⁸.

If you are concerned about a student's immediate health or safety, call Safety & Security, 646-4000 (non-emergency number) or in an emergency call 911. See Dartmouth Safety and Security's [Emergency Procedures](#)¹⁹ for more information.

B.7 Emergency Contact Information

Emergency Phone numbers:

- 911 (Police, Fire, etc)
- 646-2508 (Emergency Work Control)

B.8 Quasi-Emergency Contact Information

Phone numbers:

- 646-4000 (Safety and Security)
- 646-2999 (Classroom Technology Services)

¹³students.dartmouth.edu/student-accessibility/students/services

¹⁴students.dartmouth.edu/academic-skills/

¹⁵students.dartmouth.edu/academic-skills/tutor-clearinghouse/about-tutor-clearinghouse/frequently-asked-questions-faq

¹⁶students.dartmouth.edu/academic-skills/

¹⁷students.dartmouth.edu/health-service/counseling/about/counseling-center-staff

¹⁸students.dartmouth.edu/health-service/

¹⁹www.dartmouth.edu/security/information/emergency/index.html

C Formal Policies

C.1 Formal (ORC) Department Degree Requirements

Dartmouth College offers programs of graduate study leading to the PhD and A.M. degrees in mathematics. With rare exceptions, the A.M. is the first step in the PhD program. The PhD program is designed to meet the need for mathematicians who are highly qualified in both teaching and scholarship. The College provides an environment in which a doctoral candidate can pursue professional study in mathematics and prepare to be an effective teacher.

C.1.1 Degree Requirements for Master's Degree (A.M.)

In addition to the general College requirements for the master's degree, the department requirements for the A.M. in mathematics are as follows:

- Satisfactory completion of four courses from among 101, 103, 104, 106, 111, 113, 114, 116, 126, 136. (See Note (1))
- Successful completion of the Advancement Examination at a Master's level.
- Non-course requirements which parallel those for students continuing in the PhD program. In particular, students must receive credit for Mathematics 107 twice during each year while enrolled.
- Completion of at least five terms in good standing. (See Note (2))
- Note (1): Normally this requirement for the A.M. is completed in the first year. Study may be extended into the second year, only if approved. Syllabi for these ten courses are available from the Department of Mathematics.
- Note (2): In addition to five terms in residence, students must obtain credit in fifteen courses of graduate quality with a limit of at most five replaced by approved research or special study.

C.1.2 Degree Requirements for the Doctor's degree (PhD)

The requirements for the PhD degree in mathematics are as follows:

- Successful completion of the A.M. degree (described above).
- Successful completion of the Advancement Examination at the PhD level.
- Admission to PhD candidacy by the departmental Graduate Program Committee as a result of its review, which takes place at the end of the spring term of the second year of graduate study. This review will take account of all the relevant information that the Graduate Program Committee can gather, such as the student's record in courses and seminars, the student's performance during the advancement process, and an estimate of the student's ability to write an acceptable thesis.

- Completion of a doctoral thesis of acceptable quality, and its defense in an oral examination.
- Successful completion of the teaching seminar and teaching two courses in the three years after passing to candidacy. Preparation for the teaching seminar includes such activities as TAing in the years before admission to candidacy. This requirement is met by receiving credit for Mathematics 107 twice during each year preceding admission to candidacy, credit for Mathematics 147, and credit for Mathematics 149 twice during the three years following admission to candidacy.

C.2 Departmental Amplification of Degree Requirements

The following statements represent current department policy. While policy does change from time to time based upon votes of the faculty, any exceptions to this policy must be explicitly approved by the GPC.

1. Every graduate student is required to register and complete three courses per term. Before the end of the first year, students are expected to take at least six classroom courses, including at least four of the following core courses: 101, 103, 104, 106, 111, 113, 114, 116, 126, 136. (Beyond the six classroom courses, a student may choose other classroom courses of interest or sign up for supervised reading courses to get to a total of at least nine courses in the first year.) In addition, each student should register for 107 each term they serve as a teaching assistant.

Students should take at least four classroom courses during their second year [noting that the content of 106, 116, 111, 113, and 114 often alternate topics in even and odd years].

A student taking five years to complete the degree is required to take a minimum of 6 classroom courses during years 3-5, with a running average of approximately 2 classroom courses per year. Deficits in one year are to be made up in the next.

Students are expected to register for Math 147 when taking DCAL's Future Faculty Teaching Seminar during their second year, and must also complete math-specific pedagogical training (Math 148) that year in order to be eligible to teach in subsequent years. Finally, students must register for Math 149 in each teaching term (see also item 6).

Students who supplement standard coursework with reading courses (127, 137) must have a supervisor for each such course. While these are expectations for typical graduate students, the Advisor to Graduate Students may grant alternate course plans at his/her discretion.

2. Students must take a preliminary exam at just before the start of their first summer in the program. The pure math exam covers topics in algebra, analysis, and topology, while the applied math exam covers three of four topics covered by 106, 116, 126, and 136. For students who do not pass the exam at the start of summer, it is expected that they will retake the exam at the start of fall term.

The path for second year students differs in fine detail for pure and applied students, but roughly speaking all students will form an Advancement Committee and must successfully complete an individually tailored Advancement Examination at a level appropriate for a PhD as a prerequisite to advancement to candidacy.

3. Advancement to Candidacy: On the basis of all available information, the Graduate Program Committee decides whether it is in the student's best interest and Dartmouth's best interest for a student to continue studying towards a PhD degree at Dartmouth. The largest part of this process is the successful completion of the Advancement Exam at a level appropriate for a PhD. Another essential part is the selection of a thesis advisor, a secondary advisor, and the approval of the Graduate Program Committee. The primary and secondary thesis advisors indicate their acceptance of the student by signing the Advancement Examination form.
4. Students whose native language is not English may be required to take an ESL (English as a Second Language) course offered through the Graduate Studies Office prior to teaching for the department.
5. The Graduate Office establishes requirements for the composition of a dissertation committee and for the presentation and submission of the thesis.

No student may schedule their thesis defense until all other requirements for the degree have been satisfied.

6. Students prepare for the teaching seminar through activities such as TAing in the years before admission to candidacy. Students receive credit for Math 107 for acceptable performance in two quarters of TAing each year before admission to candidacy. They receive credit for Math 147 by completing DCAL's Future Faculty Teaching Seminar and for Math 148 for completing the math-specific pedagogical training. They receive credit for Math 149 for acceptable performance in one quarter of teaching each year after admission to candidacy. The Graduate Program Committee may occasionally approve substitution of other professional activities to meet TAing or teaching requirements, subject to the proviso that each student must earn credit for Math 107 at least twice, credit for Math 147, and credit for Math 149 at least twice.

C.3 Grievances

Here are departmental guidelines about what you should do if you have a grievance.

First of all, what is a grievance? You may have a grievance if you feel that you are being treated unfairly or inappropriately, whether by a faculty member, a fellow student, or anyone else with whom you interact as a graduate student. These grievances can be anything from alleged violations of the terms of agreements and guidelines, to more subtle disputes about the fairness of an advisor's oversight, perceived issues of departmental favoritism, remuneration,

joint publication, bias concerning gender, race, sexual orientation, et cetera, or concerns about personal conduct.

The first thing to do with a possible grievance is to try to solve it informally within, or with the help of, the department. Two important points about this are:

- We will maintain your confidentiality to the utmost of our abilities.
- If you try for an informal resolution and are not satisfied, you can then go on to formal procedures.

Here are the steps we suggest you follow:

- Try to resolve the issue with the other person or people directly involved. If you can't do this, or it seems too risky to attempt it, then go on to the next step.
- Consult your advisor, the Advisor to Graduate Students or the Graduate Program Representative. You should feel free to talk to any of these people with whom you feel comfortable and who you feel has enough distance from the problem to be an effective advisor. If this person can't help you reach an effective resolution, go on to the next step.
- Talk to the Department Chair or to the Graduate Program Committee. The department chair or the GPC may be able to suggest some appropriate action by the department that will resolve the situation. This is still an informal resolution, and if you are still dissatisfied, it is time to take matters out of the department.
- Talk to the Assistant Dean of Graduate Studies (Gary Hutchins.) He will try once again to help you reach an informal resolution, and if that fails, will be able to tell you what formal action to take. This may be to request a hearing from the Dean of Graduate Studies, to approach the Office of Institutional Diversity & Equity, or to follow some other formal procedure.

Addendum from the Office of Graduate Studies

If the Dean, working together with the aggrieved student and appropriate faculty member(s) or representatives of the mathematics graduate program, is unable to reach a satisfactory resolution, the student can request in writing a formal hearing and ruling by the Dean of Graduate Studies and the Committee on Student Grievances. Formal hearings are conducted as described in the Graduate Handbook (see sections titled "Committee on Student Grievances" and "Formal Hearing" under Academic and Conduct Regulations).

Please note that reports of scientific misconduct, violations of the academic honor principle, and certain issues of professional and personal conduct (sexual harassment, discrimination, and others described in the graduate handbook under code of conduct — non-academic regulations) are handled in the Graduate Office as described in the graduate handbook. Graduate students are encouraged to use the informal channels described in their program's grievance

policy to discuss these issues, to clear up possible misunderstandings, to clarify potential grievances, and to decide whether further steps are necessary. A student who after such discussion feels there may be a violation or a grievance requiring some action should report this to the Graduate Office.

D Changelog

D.1 2024 Fall

Updated requirement for TAs to enroll in Math 107 each term instead of enrolling after TAing twice.

Updated conferences section (section [6.3.1](#)) with travel form requirement to match the travel funding section (section [11.11](#)).

Added mention of Guarini's requirement for first years to enroll in Math 700 in their first term.

Reduced the number of typos in the document.

D.2 2023 Fall

Updated travel funding section (section [11.11](#)) with current Guarini allotment and added travel form requirement.

D.3 2023 Summer

Updated applied prelim description and applied track recommendations, since only three applied core courses are offered each year.

D.4 2022 Fall

Updated classroom course requirements (section [6.1](#)): it is now six courses in years 3-5 (instead of eight).

Updated references from internal grades to internal course feedback, as we now do not give a numerical score, but instead ask for comments.

Added Guarini link for student accommodations (section [11.6](#)).

D.5 2022 Summer

Clarified course requirements: that the three course requirement also holds over summer, and that Math 117 counts as a classroom course.

In section [4.4.5](#), clarified that external employment (as part of an external internship) should be handled with a leave of absence.

D.6 2022 Spring

Clarified requirements for Master's degree (see [Section 9](#)), and distinguished Math 148 as the course which represents satisfaction of the Department's math-specific pedagogical training, leaving Math 158 as the preferred choice for an independent project.

D.7 2022 Winter

No source changes other than to update to new standards for PreTeXt and convert to the newer CLI (command line interface).

D.8 2021 Spring

Changed the core course requirement for a Master's degree, which implicitly defines many requirements for the first two years of graduate study. The changes were made to add more flexibility into the program, for example to facilitate those who are exploring interests in both pure and applied mathematics.

The old requirements were "satisfactory completion of three out of five pairs of core courses: (101, 111), (103, 113), (104, 114), (106, 116), (126, 136)."

The new requirements are "satisfactory completion of four courses from 101, 103, 104, 106, 111, 113, 114, 116, 126, 136."

Sections impacted are [Section 4](#) concerning the first year of graduate study and [Appendix C](#) governing formal policies.

D.9 2021 Winter

Major changes

- [Section 4.4.5](#): Clarified the description of "Advanced Planning for the Summer Research/Internship" as part of the advancement procedures for students working in applied mathematics.
- [Section 4.5](#): Updated "Courses and Advice — Pure Math."
- [Section 4.6](#): Added new section describing internal grades in graduate courses.
- [Section 4.8.2](#): Updated the description of the preliminary exam in pure math.
- [Section 5](#): Clarified the process for forming an Advancement Committee and holding an Advancement Examination.
- [Section 8.5](#): Added new section concerning the content of annual graduate student progress reports.
- [Section 11](#): Formerly standalone FAQ added to handbook and linked to from website. Content of FAQs updated.