

# Graduate Handbook for Master of Science Program

Department of Mathematics

Tufts University



## Current Department Leadership

Department Chair	<a href="#">Kim Ruane</a>
Undergraduate Director	<a href="#">George McNinch</a>
Graduate Director	<a href="#">James Adler</a>

## 1. OVERVIEW

The Graduate School of Arts and Sciences (GSAS) at Tufts maintains a general graduate student handbook, which you can find online here:

<https://asegrad.tufts.edu/academics/graduate-student-handbook>.

The document you are reading supplements this university handbook by providing specific information about the policies of the mathematics department. In particular, this document describes the **formal requirements** for a *full-time master student* to remain in **good academic standing** in the Department of Mathematics at Tufts University. Good academic standing means you are on target to graduate within the expected degree time (typically 2 years) and that you can be considered for funding opportunities if they arise. As such, this handbook describes various elements of graduate study including **rules and funding opportunities**, and it establishes some **suggested course selections** for completion of the Master of Science in mathematics. Part-time students must also adhere to most of these requirements. Part-time student issues are specifically addressed in the Section on **Part-time Students**.

This handbook reflects policy going forward from Fall 2019, some of which may depart from past policies, both formal and informal. There are several layers of rules and regulations for graduate students, coming from the university, the GSAS, and the department. To make the expectations clear and simple we are writing this document in terms of requirements to remain in good academic standing in the program and we will not distinguish between the sources of the rules.

**Violations of Academic Standing.** If a particular student is found to be in violation of Good Academic Standing, an initial meeting is made with the student's advisor to determine if there have been any extenuating circumstances. If not, this is then followed up by a meeting with the student, to explain the reason(s) the student is no longer in Good Academic Standing. Then, a plan is discussed, including timelines, and developed with both the advisor and student in order to help them get back into Good Standing. This plan is then discussed at the next Department Graduate Committee meeting and a vote is made on whether the plan should be carried through.

If this plan is not met and the student remains in violation of Good Academic Standing, the case will be reviewed again, and the student will be referred to the GSAS Executive Committee with a recommendation from the department as to whether the student should be dismissed or further accommodations be made.

## 2. REQUIREMENTS TO REMAIN IN GOOD ACADEMIC STANDING FOR A MASTER STUDENT

There are three overall requirements to remain in good academic standing as a Master student in the Department of Mathematics. Details can be found in the sections below, and note that for several of these rules an exception might be grantable on a case-by-case basis by the Graduate Committee.

- (1) Maintain status as a **Full-time Student** in good academic standing per the **GSAS handbook**;
- (2) Complete and submit **Progress Reports** before the end of each semester;
- (3) Complete the **Required Courses** (and **Thesis** if applicable) within the allotted timeline with grades of B- or better.

Details of these requirements are outlined in the following sections. Entering students are assigned a preliminary advisor to assist in getting to know the system and in choosing courses.

**2.1. Full-Time Status.** Status as a full-time student is not only required for good academic standing but also for international visas, and for college loan deferments. To maintain this status, a student must be enrolled in at least 9 credits each semester *except possibly the last one or two semesters of study*. Students below that level of coursework must register for a special course called **Masters full-time continuation** (Math 402), which is described below in **Section 3.1**. This should only be used during the last one or two semesters of study while the student is finishing the required coursework or a thesis. A student should not register for Math 402 in their first year of study.

**Part-Time Students.** Some students enter the PhD program with part-time or half-time status, or switch at some point for a variety of reasons. To maintain half-time status a student must be enrolled in at least 5 credits each semester. For part-time status, a student must enroll in 2-4 credits each semester or register for a special course called **part-time continuation** (Math 401). This type of status has implications on tuition costs, international student visa issues, and loan deferments. Please consult the [GSAS handbook](#) for further details. While most of this document refers to the requirements of a full-time student, students on part-time or half-time status may remain in good academic standing as long as they satisfy similar requirements. In many cases, the timelines for the requirements would be extended up to a year, but may vary on a case-by-case basis.

**2.2. Progress Reports.** Each semester progress reports are collected from each student in all graduate degree programs in Mathematics. These reports are filled out by the student and checked over by the student's academic advisor. The student's advisor is expected to meet with the student prior to signing this report, and is encouraged to add any confidential remarks to the Graduate Committee about the student. Information on the Progress Reports include: progress made in required courses, including any grades below B-, Incompletes, or Withdrawals; progress toward masters thesis and defense (if applicable); and expected graduation date.

These reports are then collected by the Graduate Director, who reviews each one and then calls a meeting with the entire Mathematics Graduate Committee, where these reports are discussed. For each student, it is assessed whether or not they remain in Good Academic Standing, as defined by both the GSAS Student Handbook and by the Department's own academic standing guideline. In addition to these reports, students **must also turn in their unofficial transcripts** along with their progress report before each semester begins to check for Incomplete grades, grades below B- or excessive withdrawals, so course/program changes can be made before the semester begins.

Progress reports can be found at the following link, and will be completed online. The reports also give the students the opportunity to request grading or other funding opportunities.

Progress Report Links: <http://math.tufts.edu/graduate/progressreports.htm>

**2.3. Course Requirements.** The Master of Science in Mathematics provides the student with core graduate coursework in mathematics. Masters students can choose courses to design a program of study that suits their future academic or professional goals. The requirements also allow a Masters student to take at least two approved courses outside the department in related fields in order to tailor the degree to their interests. A student has the option to graduate with a Master of Science with a concentration in a specific area (see II. below). The coursework prepares the student for employment in a mathematics profession either in academia, in government, in business and industry, or to pursue further graduate education.

A student can either take at least 9 courses or take at least 7 courses and write a thesis to complete the degree. Under both options, a student must accumulate at least **30 credit hours**. If the 9 (or 7) courses do not add up to 30 credits, the student may take any Math or mathematically-significant related fields course above 100 toward the degree to reach the credit limit. Completion of the program requires **grades of B- or better in all courses**. More specifics are given below.

Of the 9 required courses, **at least 4 must be math courses numbered above 200**. A passing grade on a corresponding Ph.D. qualifying exam would satisfy one of the 200 level course requirements, but note that the 9 course credits are still needed for the degree. Unless otherwise stated, the following courses are excluded from counting towards the course requirements: Math 192, 193, 195-196, 291-292, 295-298. The nine courses are broken down into three categories:

#### I. Mathematical Breadth

- 3 regularly offered Math courses numbered above 120.
- 1 of these courses must be at the 200 level.
- Each of the three courses must be in a separate discipline, indicated by the second digit of the course numbering.
- Special topics courses and reading courses in a given area must be approved by the Graduate Committee for it to satisfy this requirement.

#### II. Concentration

- 4 regularly offered Math courses numbered above 120.
- In consultation with the student’s adviser and with approval from the graduate committee, students may choose the four courses such that they form a concentration in a sub-discipline of mathematics. This will then be indicated on the student’s transcript. Concentrations may be as broad as “Computational Mathematics” or “Topology”, but also very specific if there are courses to match. A student can choose predetermined concentrations, choose their own, or not choose one at all. Please see [examples](#) of such themes at the end of this handbook.
- Special topics courses and reading courses in a given area must be approved by the Graduate Committee for it to satisfy this requirement.

#### III. Electives

- 2 courses, which can be any Math courses numbered above 100 or any related fields courses with approval. This could include mathematically-significant courses numbered above 100 in CS, Physics, Economics, or other departments Please see the list of courses that have already been approved in this category [here](#). If a course is not listed there, then a student can ask the Graduate Committee to approve it as an elective course.

Any two grades below B- in any courses will result in automatic loss of good academic standing. Additionally, students should **avoid** excessive *withdrawing* or *incompletes* from required courses. If a student does not complete 4 courses with a grade of B- or better by the end of their first year, they will lose good academic standing.

**Masters Thesis Option.** A student fulfills this requirement by writing an expository paper on a specific topic in mathematics under the direction of a full-time member of the department (the thesis advisor), and upon completion, presenting it before a committee of three or more faculty members and a public audience.

The thesis replaces 1 concentration course and 1 elective course in the course requirements above. A thesis student will take courses numbered 295 and 296 in place of these and **MUST** enroll in them during the last two semesters of their Masters degree if choosing the thesis option. These two courses account for 5 credits each towards the 30 required credits, but not toward the 7 total courses needed on top of the thesis.

The Masters thesis must be written using a format required by Tufts. There is no length requirement for Masters theses. The thesis is read and approved by a committee of three or more members put together by the advisor and the student. The department provides a LaTeX template designed to help students meet the Tufts formatting requirements with basic instructions for setting up the document. This is currently available on the OGSMS Resources page: <https://sites.google.com/site/tuftsogsm/resources>.

In the last term before graduation, the student and advisor will schedule a Masters defense, which is announced to and open to the whole department and to visitors invited by the candidate. The standard format is a presentation by the Masters candidate followed by questions from the audience. The general audience is then asked to leave, and questions from the committee follow.

*Deadlines:* Most students graduate in the Spring term, in which case the thesis is due for electronic submission in mid-March. Exact deadlines, including dates for graduating in other terms, can be found in the [GSAS Handbook](#). This also includes instructions on how to file for graduation and where to submit the thesis.

### 3. OTHER IMPORTANT INFORMATION

3.1. **Special Course Numbers.** Here are special course numbers that all students should be aware of:

- **Full-time continuation:** Any full-time Masters student not meeting the requirements of [full-time status](#) can enroll in this course, numbered **402**, *during the last semester or two of study*. **This course cannot be used in the first two semesters of study.** There is no grade assigned to this course and its credit is variable; it is automatically set at the level needed to get up to full-time status. There is also a course numbered 401 which is part-time continuation, which is used for part-time students in an analogous way.
- **Reading course:** A student and professor can agree to do a one-on-one reading course. The course number is **293** in this case. A one-on-one course form may be found [online](#) and needs to be filled out by the student and professor. A grade is assigned to this course and it will appear on the transcript. Such courses need to be approved by the Graduate Committee to count towards the degree.
- **Thesis course:** A Masters student that is doing the thesis option should sign up for the **295/296** courses as their two thesis credit courses - **this happens in the last two terms of study in the program.** They are worth 5 credits each, which counts toward the 30 credits needed.

3.2. **Cross-Registration.** In addition to local classes, Tufts students can benefit from our location in the mathematically rich Boston area to take classes at a range of other local universities, like Brandeis, Boston University, MIT, Harvard, and Boston College. Typically professors at these other places will welcome Tufts students as auditors, and it is an excellent opportunity to get to know other leading mathematicians.

Students can also register for courses officially at Boston College, Boston University, or Brandeis through Tufts and tuition waivers may apply. Please be aware that you will need to contact the professor and the host institution itself in a timely fashion in order to meet their deadlines and file any necessary forms.

Cross-Registration Info: <http://students.tufts.edu/registrar/what-we-do/course-registration-and-scheduling/register-classes/cross-registration>

### 4. OTHER ELEMENTS OF GRADUATE STUDY

4.1. **What to Expect When You Arrive.** It is a good idea to plan to arrive in the Medford/Somerville area at least a week or two before the start of school.

The graduate school organizes a small array of orientations in the week before classes start, such as a Matriculation Ceremony, International Student Orientation, and Library Orientation. There are many opportunities to meet the other incoming graduate students from our program and from other programs.

The Department orientation is much more informal, but always includes introductions and food in the conference room as a chance to meet the new faculty and staff.

Academic Calendar: <http://students.tufts.edu/registrar/what-we-do/course-registration-and-scheduling/academic-calendars>

4.2. **Funding Opportunities.** The department often has opportunities for Masters students to get paid for grading or other duties. These are not guaranteed each term, but there may be similar opportunities other departments. There are also opportunities for Masters students to get funded through the University College for programs that run in the summer. If you are interested in any of these opportunities, you should indicate this on your progress report each term.

University College: <https://universitycollege.tufts.edu/>

4.3. **Visas and Immigration.** Tufts has an [International Center](#) whose staff can help you learn about your options for visas and immigration. Most international students are here on J visas, but individual circumstances may vary.

Resources for International Students: <https://global.tufts.edu/tufts-international-center>

Graduate International Orientation: <https://global.tufts.edu/international-center/orientations>

**4.4. Personal Leave.** Students may take a personal/medical leave for any reason, and this will not count against their academic clock. In this case, a strong plan for resuming the degree program should be established between student and advisor prior to the start of the leave term. There is a form to be signed by student, advisor, and [Department Chair](#). The first time a student requests a leave, the approval is essentially automatic. Further leaves after the first will receive more scrutiny.

GSAS forms (bottom of page): <http://asegrad.tufts.edu/current-graduate-students>

**4.5. Continuation Fees.** Students will be charged continuation tuition each semester after their expected degree completion period. Expected degree completion periods are 2 years for Masters students. Continuation tuition for the 2018-2019 academic year was \$800. In cases in which a student is charged continuation tuition and graduates in February, the Spring charge will be removed. Tuition scholarships do not cover continuation tuition. Also, note that there may be student activity fees each academic year, which typically run around \$35.

**4.6. Miscellaneous Other Resources.** It is a good idea to cultivate strong relationships with several faculty in the department and to feel comfortable contacting the [Department Chair](#), [Undergraduate Director](#), and [Graduate Director](#) in cases of need.

The Tufts AMS Chapter, or Organization of Graduate Students in Math ([OGSM](#)), is a venue to get advice and community from other graduate students, and for grads to advocate for information or new policies. For instance, if there is demand for a certain kind of class, OGSM can notify the [Department Chair](#) or [Undergraduate Director](#) with a request. The department also has chapters of [SIAM](#) (Society for Industrial and Applied Mathematics) and the [AWM](#) (Association for Women in Mathematics). Additionally, the department has a range of active [research seminars](#), and the other local schools have an enormous array of seminar options. Besides keeping you acquainted with the frontiers of research, these give you a chance to meet mathematicians from all over the world.

Outside the department, Tufts has an excellent “Group of Six” cultural centers: the [Africana Center](#), [Asian-American Center](#), [International Center](#), [Latino Center](#), [LGBT Center](#), and [Women’s Center](#). They maintain very strong programming and are open to all. We also have a [Center for STEM Diversity](#) tackling issues specific to underrepresented minorities in math and science, which runs a wide range of symposia and mentoring events. They welcome graduate student participation and this is highly encouraged!

Finally, the university maintains an [Equal Opportunity Handbook](#) detailing Tufts policy on non-discrimination, disabilities, sexual harassment/misconduct/assault, consensual relationships, and more.

## 5. SAMPLE COURSE TIMELINES

Here are some examples of possible coursework to obtain the Masters degree with various concentrations. When we write 2X0 we mean a topics course where the  $X$  specifies a particular area of mathematics. FT stands for Full-Time.

## I. Concentration in Pure Mathematics. Appropriate for someone considering a Ph.D. program.

Fall Year 1	Spring Year 1	Fall Year 2	Spring Year 2
171	136	185	236
190 (topics)	175	235	Elective
245	246	FT Continuation	2X0 (grad topics)

## II. Concentration in Applied Mathematics. Appropriate for someone considering a Ph.D. program.

Fall Year 1	Spring Year 1	Fall Year 2	Spring Year 2
135	136	235	236
155	156	255	Elective
225	226	Elective	2X0 (grad topics)

## III. Concentration in Applications of Math to Physics.

Fall Year 1	Spring Year 1	Fall Year 2	Spring Year 2
121	158	190 (topics)	253
225	226	255	2X0
153	Physics Course	FT Continuation	Physics Course

## IV. Concentration in Mathematical Aspects of Data Science.

Fall Year 1	Spring Year 1	Fall Year 2	Spring Year 2
123	190 (topics)	2X0 (grad topics)	229
165	166	CS Course	CS Course
225	226	FT Continuation	FT Continuation

