

## GENERAL INFORMATION

It is the student's responsibility to be familiar with the requirements and policies of the University and the Department, as stated in the Graduate School Bulletin and these **Axioms** respectively. If a student is in doubt about the application of these policies to his or her own case, the matter should be brought to the attention of the student's advisor, the Graduate Program Director, or the Graduate Affairs Committee.

The student should be aware of the general structure of the program as explained below, including the required coursework and the system of written qualifying examinations (Basic and Advanced). It is the student's responsibility to initiate each step in his or her degree program. Students must also be aware of the statute of limitations, as explained below and in the Graduate School Bulletin.

### Degree Options

Besides the conventional M.S. in Mathematics, there are two formal options open to students seeking a **terminal** Master's degree: Applied Mathematics (leading to the degree M.S. in Applied Mathematics) or Statistics. These two options enable the student to substitute a project, usually involving some computation, for one of the 3 parts of the Basic Exam. However, they do not insure that the student has sufficient mathematical background to proceed to a Ph.D. in Mathematics or Statistics.

There are two options at the Ph.D. level: Mathematics and Statistics. While there is no formal option in Applied Mathematics at the Ph.D. level, there are enough courses and interested faculty to enable a student to design a program with a strongly applied emphasis. This is especially appropriate for students who expect to seek nonacademic employment, but may also be suitable for those interested in teaching.

A student who wishes to transfer from one degree option to another (for example, from the Ph.D. track to a terminal M.S. track) should notify the Graduate Program Director as early as possible. Such a transfer requires the approval of the Graduate Admissions Committee, just as in the case of a new applicant, and will usually involve adjustments in the amount and/or duration of financial support.

### Statute of Limitations

This is the maximum time allowed for completion of a degree. A Ph.D. student has six calendar years from acceptance into the graduate program (or four years if the student already has a master's degree in the same field), and a Master's student three calendar years, to earn the degree. In exceptional circumstances, these limits may be extended with the approval of the Dean of the Graduate School.

### Spring Semester Admissions

Occasionally, students may be accepted into the graduate program beginning in the Spring Semester. Normally, time limits for passing the qualifying exams and limits on financial support will be applied as if the student had entered the program in the previous Fall Semester.

### Graduate Affairs Committee

This committee (called the GAC for short) oversees the graduate program, dealing with general policies as well as individual student problems. It is chaired by the

Graduate Program Director, and consists of 6 or 7 faculty members together with an elected graduate student representative.

## Academic Advisors

One faculty member is designated as Chief Graduate Advisor, to coordinate the academic advising of students. New students are assigned to one of several faculty advisors, depending on the student's expressed interests. After the first year, the student may continue to consult with this advisor or may negotiate with another faculty member to serve as his or her Academic Advisor. (The Chief Graduate Advisor must be notified of any change.) Once the student has chosen a Thesis Advisor, he or she would also serve as the Academic Advisor.

The role of the Academic Advisor is to guide the student through the maze of degree requirements, to help the student organize a reasonable program of courses, and to provide some career guidance. During each semester (November or April) there is a Counseling Week, when students must consult with their Academic Advisors in order to preregister for the following semester. But students should seek advice from their Academic Advisors and other faculty members whenever a problem arises (or even before it arises). Ultimately, of course, it is the student's own responsibility to meet the requirements of the graduate program.

Other kinds of advice are also offered to newer students: New students are paired with older students who act as Peer Advisors. When a teaching assistant first takes charge of a class, a faculty Teaching Advisor is made available.

## Current Information

Students and faculty have mailboxes in the mailroom (1623D). A weekly calendar and other notices are distributed by electronic mail. The bulletin boards in the mail room (including one for graduate student information) should be consulted regularly for notices of colloquia and seminars, sign-up sheets for qualifying exams, etc.

Information on employment opportunities may be found in the Department Head's office (1621E). There is online access to the AMS employment listing and the Chronicle of Higher Education. Students should be on the lookout for notices of internships or summer positions in government or industry. The Campus Career Network can also be consulted.

## Seminars and Colloquia

Not everything is learned in regular courses. The Department has an active Colloquium, usually held on Thursday afternoon at 4:00 after refreshments at 3:30. Our location makes it possible to invite a wide variety of well-known mathematicians and statisticians to visit and speak. Graduate students should be able to benefit from many of these lectures, though some are more advanced than others.

The Connecticut Valley Mathematics Colloquium is an old tradition, shared by Amherst College, Mt. Holyoke College, Smith College and the University. Once a year each of the schools hosts a lecture by an eminent speaker, aimed at a general audience (and followed by a dinner).

Each semester a number of seminars are organized by faculty or graduate students, meeting once or twice a week. The Graduate Student Seminar usually meets late Wednesday afternoon following a special departmental tea. Students often have an opportunity to talk in other seminars. Some of these (e.g., Applied Analysis & Computation, G.A.N.G., Probability & Statistics, Representation Theory) have

developed a continuous existence, while others are organized around current research topics. The Valley Geometry Seminar and Five College Number Theory Seminar are ongoing Five College activities. There is usually a Teaching Seminar in the Spring semester for students preparing to teach their own sections.

## **Centers and Special Facilities**

### **Center for Applied Mathematics**

The Center involves faculty members and graduate students who are interested in research and instruction in applied mathematics and scientific computation. The Center supports a research seminar series, “Applied Analysis and Computation”, and an applications-oriented seminar series, “Industrial Mathematics”. In addition, the center manages the Master’s Degree Program in Applied Mathematics, a two-year professional degree intended for students who seek industrial employment.

### **Center for Geometry, Analysis, Numerics, and Graphics (GANG)**

The Center is a computational laboratory using interactive scientific graphics and numerical computation as tools in studying geometric interface problems and other nonlinear variational problems that arise in the physical sciences. GANG creates a research environment in support of pure and applied mathematics and a wide range of interdisciplinary research (with the departments of Computer Science, Polymer Science, and Chemistry). The weekly GANG seminar brings in outstanding mathematicians from throughout the world, and also provides a forum for students affiliated with GANG to present their work and learn about the work of others.

### **Research Computing Facility (RCF)**

The Research Computing Facility (RCF) provides computing facilities for the department. These facilities may be used by faculty and students as a tool for research and academic purposes. The facility is mainly UNIX based and consists of many high-end graphics workstations and servers. All of the systems are networked, and support connections to the campus network and the Internet. Electronic mail is used extensively within the department as a means of communication. In addition, the facility supports several of the more common mathematics and statistics packages such as Mathematica, MACsyma and SAS. The RCF supports text processing and printing via TeX, LaTeX, AMSTeX and several laser-printers. There are also PC, Macintosh, and NeXT machines available for use. A full-time staff and several graduate students provide support and consulting services to the community.

### **Statistical Consulting Center**

This center involves a number of our faculty, and offers a full range of statistical services for clients both inside and outside the University. Among other things, the center provides an opportunity for graduate students to complement traditional studies with exposure to real world problems involving the statistical analysis of data.

## COURSEWORK

Normally, a graduate student's program consists of 3 courses (9 credits) per semester. The 9-credit load is required of all students supported as Teaching or Research Assistants. Taking fewer courses can be justified only under very unusual circumstances, and requires the prior approval of the student's Academic Advisor as well as the Graduate Program Director. Occasionally a well-prepared student may elect to take four courses, but this should be attempted only after consulting with the Academic Advisor.

Graduate courses are numbered 600 and above: students are generally expected to take at least 2 courses at this level each semester in the Department. Students are encouraged to take courses in other departments, provided the level and content are appropriate: permission to do this must be obtained in advance from the Graduate Program Director.

There are a number of courses at the 500 level, which are open to both undergraduates and graduate students. Some—but not all—of these courses are normally permitted to be used as part of the graduate program (e.g., Math 511, 512, 523, 532, 534, 545, 563), following GAC guidelines. Such courses are typically at a lower level than the introductory graduate courses, and are useful primarily for students seeking a Master's degree. (Please note that the degree requirements below limit the number of 500 level courses which can be used.)

Basic courses in mathematics and statistics are described below. They are offered every year, often as two-semester sequences, and cover much of the material required for the written qualifying exams. A variety of "special topics" courses are offered each semester, reflecting both student requests and faculty research interests. Descriptions of all these courses are written up in a brochure distributed at preregistration time. (Graduate School Bulletin descriptions are usually shorter and less up to date.)

### Basic Courses

Basic graduate courses and qualifying exams are centered on five areas: Algebra, Analysis, Applied Mathematics, Geometry and Topology, Statistics. The corresponding basic courses are as follows (see course descriptions later in the **Axioms**):

Algebra: Math 611–612

Analysis: Math 623–624, Math 621

Applied Mathematics: Math 645, Math 651, Math 731

Geometry and Topology: Math 671, Math 703–704

Statistics: Stat 605, Stat 607–608, Stat 705–706, Stat 725

## Independent Study

Students seeking a Master's degree will spend most of their time taking standard courses (with a couple of exceptions noted below). But students seeking a Ph.D. may be permitted, after completing their basic coursework and qualifying exams, to pursue independent study with the guidance of some faculty member (in place of 3 or 6 hours of regular courses). The student should obtain a special form in Room 1521E, to be signed by the supervising faculty member and to be approved by the Academic Advisor and the Graduate Program Director. Only in unusual cases can independent study be approved for a student who has not yet passed the Advanced Exam.

## Introduction to the RCF

During their first Fall semester in the program, all graduate students must take a 1-credit course, Math 697C: Introduction to the RCF, which will familiarize them with the Research Computing Facility of the Department.

## Grades

The only grades which graduate students may earn are A, AB, B, BC, C, F. Grades below B are generally regarded as indicating substandard performance, as reflected in our degree requirements below. According to Graduate School policy, a student whose average falls below 2.8 (where A=4, B=3, C=2) in any two semesters (consecutive or not), is subject to academic dismissal upon recommendation of the Graduate Program Director to the Dean of the Graduate School. But in more down-to-earth terms, a student who is unable to maintain a B average in the first two years of graduate work cannot expect to earn even a Master's degree in our Department. **Only in exceptional circumstances will a student whose average falls below B in any semester receive financial support.**

## Language Requirement

English is currently the international language of mathematics, so all graduate students are expected to have a good mastery of English—both written and spoken. Students whose first language is not English must of course show adequate reading comprehension as measured by the TOEFL exam. But fluency in the spoken language is also essential, for participation in courses and seminars or for employment as a teaching assistant. Students who have difficulty with the spoken language are expected to enroll in a conversation course or the equivalent.