Johns Hopkins University
Department of Mathematics
Graduate Student Handbook

Welcome to the Johns Hopkins Mathematics Department. In these pages, we will present an introductory description of the academic side of your stay at Hopkins.

The level of the mathematical material that you must learn to control will inevitably rise. Even the way you regard the subject will likely change, perhaps several times. In the end, your research level will be assessed more by what you do, and can be predicted to do, than by what you know. However, you will need to attain a suitably high level of understanding in order to function at the frontiers of mathematics. It is best to view the initial phases of your studies (course work, preparation for qualifying exams) as preliminary to research. In particular, you should aim to acquire an active understanding of, and facility with, the material at hand.

The ability to do research in mathematics is imperfectly correlated with the ability to understand known mathematics. The only way to find out what you are capable of accomplishing is to get started on it. In general, even for established mathematicians, research proceeds rather slowly, and often one wonders in the end why it took so long to figure out something so "obvious". It is for this reason that we recommend that you get the qualifying exams and language exam out of the way as soon as is reasonably possible.

We consider 5 years to be the normal amount of time needed to complete the degree. We guarantee that a student who is progressing reasonably and performing the T.A. duties faithfully will have his or her support continued through the end of the fifth year.

The graduate program is designed primarily to prepare students for research and teaching in mathematics. It is naturally centered on the research areas of the faculty, which include algebraic geometry, differential geometry, global analysis, harmonic analysis, number theory, partial differential equations, topology, several complex variables, and representation theory. The program may be supplemented (with departmental approval) in applied directions by courses in theoretical physics, computer science, mechanics, probability and statistics, offered in other departments of the School of Arts and Sciences and the School of Engineering.

Program Information

Requirements for the Ph.D.

The departmental requirements for the Ph.D. degree are:

1. Candidates must show satisfactory work in Algebra (110.601-602), Real Variables (110.605), Complex Variables (110.607), Algebraic Topology (110.615), and one additional mathematics graduate course in their first year. The seminars and qualifying exam preparation course cannot be used to fulfill this requirement. The algebra and analysis requirements can be satisfied by passing the corresponding written qualifying exam in September of the first year; these students must complete at least 2 courses each semester. Students having sufficient background in topology can substitute an advanced topology course for 110.615, with the permission of the instructor.

2. Candidates must pass written qualifying exams by the beginning of their second year in Analysis (Real & Complex) and in Algebra. Exams are scheduled for September and May of each academic year, and the dates are announced well in advance. More information as well as old exams and syllabi can be found at: http://www.mathematics.jhu.edu/new/exams/.

3. Candidates must show satisfactory work in at least 2 mathematics graduate courses each semester of their second year, and if they have not passed their oral qualifying exam, in the first semester of their third year.

4. Candidates must pass an oral qualifying examination in the student's chosen area of research by April 8th of the third year. The topics of the exam are chosen in consultation with the faculty member who has agreed (provisionally) to be the student's thesis advisor, who will also be involved in administering the exam.

5. There is no longer a Math Department foreign language requirement. With the vast majority of articles written nowadays in English, the importance of having the capability of reading another language has diminished. However, important earlier literature in certain areas of mathematics may be written in French, German or Russian; moreover, some articles are still being written in French. It is now at the discretion of the student's thesis advisor whether to impose a language requirement.

6. Candidates must produce a written dissertation based upon independent and original research.

7. Candidates will have teaching experience in mathematics as a teaching assistant for undergraduate courses. The student will be under the supervision of both the faculty member teaching the course and the Director of Undergraduate Studies. First-year students are given a reduced TA workload in the Spring Semester (this is related to item #2 above).

8. After completion of the thesis research the student will defend the dissertation by means of the Graduate Board Oral exam. **The exam must be held at least three weeks before the Graduate Board deadline which the candidate wishes to meet**. Click here to view the Graduate Board's calendar.

Further Information and Advice

Students should aim to become actively involved in research as early as possible. During the second year the student should find a potential thesis advisor from among the full-time faculty in the department. The advisor will help prepare the student for research in her/his area, and test this in the oral exam. The advisor then helps to find a reasonable research project, guides the student through the relevant literature, and checks on the student's progress.

Students are expected to contribute to the intellectual life of the department. This includes participating in and attending the department seminars.

Evaluation of Student Progress, and Continuation of Support

Each year the faculty of the department meets to discuss the continuation of financial support for graduate students. Progress is gauged in the following way:

Pre-Thesis Requirements:
The student must pass written and oral qualifying exams according to the schedule. Course requirements are: satisfactory work, which is likely to include problem sets or exams, in at least two graduate Mathematics courses each semester in the first year; three semester graduate Mathematics courses in the second year and until the oral is passed; one graduate Mathematics course each semester after passing the oral exam.
Research Requirements:
For 4th-year support: sufficient involvement in research.
For 5th-year support: satisfactory progress in research.
For 6th-year support (if warranted): clear expectation of finishing the thesis by the end of the 6th year.

The M.A. Degree

Students are generally not admitted solely to achieve a Master's Degree. However, the Department will award a Master's degree in Mathematics once a Ph.D. candidate has fulfilled the following requirements:

- 4 graduate courses given by the Hopkins Mathematics Department;

- 2 additional courses at the graduate or 400 level, other than 110.401 and 110.405, given by the Hopkins Mathematics Department, or with the permission of the Graduate Program Director, graduate mathematics courses given by other departments or universities.

All courses used to satisfy the requirements must be completed with a grade of B- or better. (Advanced graduate courses completed with a grade of P can also be used to satisfy the requirements.)

Graduate Board Oral

Graduate Board Oral Examinations may be held at any time during the year. The examination committee is approved by the chair of the department and forwarded to the Graduate Board Office for approval of the committee and selection of the chair of the committee. Alternates to the five members must be designated before the department chair approves the committee. These alternates may be used in the event one of the five approved members cannot participate in the exam.

The Guidelines for the Preparation of Dissertations and Thesis are available here: http://library.jhu.edu/services/cbo/guidelines.html. Dissertations not conforming to the Johns Hopkins University guidelines will not be accepted in fulfillment of the University requirements. Dissertations must be submitted before the deadlines published in the Graduate Board Calendar. The dissertation should be distributed to members of the Graduate Board Oral Committee two weeks before the exam date. All dissertations must be in the library by the deadline dates on the schedule. For the 2007-2008 academic year all oral examinations must be completed by March 21st for graduation in May.

The Graduate Board Oral Examination for candidates for the Ph.D. degree has three major objectives:

1. To assess a candidate's proficiency in the discipline.
2. To give a student the benefit of a critical examination of his or her work by scholars outside the department or program committee.
3. To provide a means for extra-departmental monitoring of the academic quality of departments and committees sponsoring candidates.

Further information regarding the policies and procedures of the Graduate Board Oral Exam can be found at the Graduate Board website

Job Market

When applying for positions in academia, the student must recognize that in the U.S. mathematics job market, the decisions to hire at some universities start in November. You could lose out on opportunities if you wait too long to apply.

Also, you should keep in mind that a recommender may well need time to assess your work; allow at least one month for that. Inquire with your thesis advisor and the graduate chair about proper procedure for submitting job applications. In deciding when, and even whether, to apply, it is not expected that you have satisfied all requirements for the Ph.D. at the time of application, only that it be clear that you will finish (even by the end of the summer). It is best to wait until you have sufficient solid results that the final content of the dissertation can be envisioned by the advisor.

As the academic job market has grown more difficult, mathematics departments have become more demanding of job candidates. Teaching ability has been emphasized, far more than in the past, even by many research-oriented institutions. It may no longer be enough to have produced a very good thesis to get a good job; a solid teaching record is essential. Since teaching is, in part, judged by undergraduate students, international students should be aware that their perceived command of English can influence the decision whether or not to hire.

Fortunately, the restriction of academic horizons has been simultaneous with the broadening of possibilities in other sectors. This matter has been discussed at some length in past issues of the Notices of the American Mathematical Society, and we recommend that our students read these articles. Mathematical training, of itself, is valued by certain companies. Some additional skills that the student may wish to acquire are facility with computers and some background in applied fields.

Teaching Information

Teaching Responsibilities

The most important responsibility of the teaching assistant is conducting section meetings. This includes preparation for the meetings and conducting the sections in a professional manner. The main purpose of the sections is to answer students' questions about the course material. (You should not work out in section homework problems that are still due.)

Teaching Assistants may ask the department to reserve a room for activities relevant to the course(s) they are assisting with. Because of the number of requests, a room request for exams must be given one week in advance. A room request for a review session is also needed one week before the session. All other requests must be submitted in writing (emails are preferred) as early as possible. The Requests and Questions link on the left side of the Mathematics website will open a request form for room reservations.

Every effort will be made so that your TA section assignments will not conflict with mathematics courses being offered. This is primarily done by not assigning math courses when discussion sections are held. On the other hand, we can not schedule around courses that other departments offer. If you have conflicts with such courses, it is *your* responsibility to find a suitable TA who will trade sections with you. This change of scheduling must be approved by the professors involved and by the Chair and Director of Undergraduate Studies. If you cannot find a suitable substitute, you will not be allowed to take the outside course and must TA the section that you have been assigned.

Preparation

Since the main purpose of the section is to answer students' questions, it is essential that teaching assistants know how to do and explain all assigned homework exercises. It is therefore necessary that all teaching assistants prepare solutions to all assigned exercises in detail before section meetings, and have a plan as to how to explain these solutions to the student. It is inexcusable for a teaching assistant to be asked a homework question and not know how to solve it, or to waste time fumbling through calculations, which should have been worked out during preparation.

Professional Conduct

A teaching assistant cannot be effective in the classroom if he or she appears to regard his or her duties lightly. We expect you to act as dedicated professionals. This includes arriving at your assigned sections a few minutes before your scheduled time, and keeping the students occupied for the full scheduled time. In your preparation for your section you should also prepare extra examples and activities for the class in the event that they do not have enough questions to fill the time.

Lack of preparation and unprofessional conduct damage the reputation of the entire department. We are working hard to maintain the image of our teaching staff as being capable and professional. There simply is no room for poor teaching due to lack of preparation or unprofessional conduct. The Director of Undergraduate Studies and the Chair will investigate

reports and complaints by students of lateness, rudeness, or being unprepared. Substantiated neglect of duty can, as in the past, result in full or partial rescinding of the teaching assistantship.

Grading Responsibilities

The other main responsibility of the teaching assistant is to grade work done by the students, and to record and keep those grades. This includes being available to help proctor and grade exams for the course that you are assisting. We expect teaching assistants to be on time for all grading sessions, proctoring assignments, and other meetings scheduled by the instructors, If for some reason you are unable to attend a grading session you must find a suitable replacement. Check your mailbox and e-mail regularly so as to stay in contact with the instructor, including before a section.

When English is a Second Language

An international student with a Teaching Assistantship is usually assigned to be a full-time grader during her or his first year in the Department. Such students must enroll in the course 370.601 "Communication Strategies in the American Classroom" in the fall. Students must demonstrate communication skills sufficient to conduct sections in the fall of the 2nd year. This will be judged at the end of the 370.601 course. Failure to meet this requirement will affect the student's status in the department.

Students, who are judged to need to elevate their level of spoken English, before they can benefit from 370.601, are advised to take 370.600 "Oral Skills" in the fall instead, and take 370.601 in the spring.

Emergencies

If an emergency prevents you from meeting any of your scheduled obligations, you must find a substitute who is a TA in the Mathematics Department; or if that is not possible, notify the department (516-4178 or 516-8232) as soon as possible, but no later than 30 minutes before the scheduled time.

TA Training

The Center for Educational Resources has the TA Training Program online at its website. Included are videos of presentations from the TA Training conducted each fall.

Department Information

Department Web Pages

The URL for the Department home page is:

http://www.math.jhu.edu

Please check the web pages for general information. Information can also be found on the bulletin boards located along the fourth floor hallway, both mail rooms (209 and 409), the second floor hallway (undergraduate & graduate information) and the third floor hallway (math news).

Computers and E-mail

All students are assigned a default email address on the University's email server, JHEM. The Department's staff and faculty will use email to communicate with students, and students are responsible for checking their email on JHEM on a regular basis.

The Department also has a LINUX server, called "chow", and an NT server. Please contact Sabrina Raymond or Jian Kong if you wish to have an account on these servers. (Continuing students can use their existing chow email account for departmental communications, but should also check their JHEM mail for university notices.)

Copying and Printing

Copiers are located in Krieger 409 and 209. We ask for your assistance in keeping these areas neat and organized. If you experience a problem with either machine, please inform the department staff immediately so that a service call may be made. Samples of bad copies prompting a service call should be left on top of the copiers to aide the repair technician. Please see a staff member if the copier is jammed. Do not attempt to clear the jam yourself.

Fax Machine

A fax machine is available in the department mailroom, Krieger 409, for receiving and transmitting work-related faxes. See the staff if you have questions regarding the use of the department fax machine. The fax number is 410-516-5549.

Keys

Charlene Poole issues keys to offices and common rooms. In order to be issued keys, all recipients must sign for receipt of keys and agree not to have them duplicated and not to lend them to persons outside of the department. All keys must be returned upon departure from the Department. There is a $15 replacement fee for each lost or missing key ($30 for Inteli-keys).

If anyone requests that you open a door for him or her because "they've forgotten their keys", they should be referred to the department office. If you lose your keys, please report it as soon as possible.

Kitchen Areas

The kitchen areas (including refrigerators) should be kept clean and neat at all times. In the past, the department has had problems with bugs in these areas because of the lack of care taken to clean up. The department expects everyone to clean up after him or herself when using these areas. Be certain to mark containers of food with your name; the refrigerators are cleaned out at the end of each week. If your name is not on your food, the food and container could be thrown away. Please wipe up all spills, wash your dishes, and dry off counter tops.

Mail Room

A mailbox has been provided for each member of the department. Faculty and staff mailboxes are located in Krieger 409; graduate student mailboxes are located in Krieger 209. Stamps for personal use may be purchased from the Post Office in Gilman Hall. Mailrooms should be kept closed and the door locked at all times! We have had instances of theft in the past. Personal mail should be sent to your home address. The department cannot be responsible for personal mail. TA's must not tell students to place homework papers or any other papers in TA mailboxes; rather, students should be told to write their TA's name on the papers, and then put the papers through the mail slot in the door of Krieger 209. The combination for unlocking the homework box is 404.

Offices

The department assigns offices to graduate students on a yearly basis. Usually, at the end of an academic year, students whose advisors are based on the 4th floor may be moved to Krieger 411 or 415 depending upon the availability of space. You are expected to treat your office with the care you would take when using another person's property. Please keep floor areas clear of debris and books and papers in order. If you find that your office is not conducive to your studies, you may apply to be moved to a different office at the end of that academic year. No students will be permitted to move their office during the semester. If your office assignment changes, please be reminded that you need to clear out your desk *completely* and that any old exams or other student papers need to be transferred to the Department Office. You may also request a temporary study area in the MSE Library from the Charlene Poole. These studies are to be used by the graduate student requesting the space only and may be utilized for up to one month depending upon availability.

Payroll

Paychecks are issued semi-monthly, on the 15th and last day of the month. All students should sign up for direct deposit to prevent lost or missing paychecks.   If payday falls on a weekend, checks will be issued the Friday before. If payday falls on a holiday, checks will be issued before the holiday. Direct deposit forms are available for any participating bank. You will not receive a paycheck unless the Form I-9 (Employment Eligibility) has been received by the Student Payroll office. Please see Charlene for the completion of the I-9 and withholding forms. (Foreign students must visit the Office of International and Visa Services, 3103 N. Charles St. to complete the Form I-9.) Questions concerning taxes should be directed to the tax manager at 443-997-8442. Information may also be found at the Tax Office web site: http://www.controller.jhu.edu/tax/home.html

Returning After a Break

In the past, some graduate students leaving Baltimore during a break have returned to the department late for classes and/or teaching. It has become department policy that graduate students return to the department at least one day prior to the beginning of a new semester. The student is responsible for obtaining plane/train/bus tickets and for renewing your visa for return. Failure to adhere to this policy may result in a penalty.

Upon your arrival, you first need to meet with the professor/s for whom you will TA/grade. They will have plans and information to give you prior to the beginning of class. You will also need to meet with the professors with whom you have signed up to take classes. Most class meeting times and days will be pre-set (before the beginning of the semester). However, there is always the possibility that a professor will change the day/time at the last minute.

Security

Please keep offices locked when not occupied and keep your personal valuables locked up. (There have been quite a few problems in the past with larceny.) Please make certain that the doors to the common rooms are completely closed when leaving them. Computer rooms and mailrooms should be kept locked and the doors closed at all times!

The Security Department phone numbers follow:

Emergency - x 6-7777
Non-Emergency - x 6-4600
Escort Service - x 6-8700

Telephones

Telephones for mathematics graduate student use are located in Krieger 209. The extension is 6-7572. Outgoing calls are limited to campus and local calls.

University Information

Registration

You are required to register for courses each semester. Auditing a course does not count toward the completion of your degree. Support in terms of stipend, fellowships, or tuition assistantships is contingent on this. Please make an appointment with your advisor prior to registration each semester to discuss your schedule. Your advisor or the Department Chair will release the electronic hold on your account so you can register.

Financial Aid

Financial aid situations will vary to the degree that the student situations vary. Specific question concerning student loans should be directed to the financial aid office. Copies of the Graduate Student Financial Assistance Brochure may be obtained from the Student Financial Services Office. You may call them at 410-516-8724 to discuss individual needs.