

# MATHEMATICS M.A. and Ph.D. DEGREE REQUIREMENTS

Revised: December 2007

Approved by Graduate Council: December 12, 2007

## MASTER'S DEGREE REQUIREMENTS

1. **Admissions requirements.** For admission to the graduate program, applicants should have completed a strong undergraduate major in mathematics (including courses in both advanced calculus and abstract and linear algebra) that is comparable to the major in mathematics at the University of California, Davis. On our campus, these courses would be 25, 125AB, 150ABC, 22A, and 67. A minimum cumulative/overall GPA (grade point average) of 3.0 is required. Those with superior records and recommendations are sometimes admitted even if they have covered less subject matter, but in such cases they are expected to complete the required undergraduate courses by the end of their first year at Davis. To receive optimum consideration, applications should be received by January 15<sup>th</sup>. Late applications will be received through May 31st.
2. **Specify the master's degree: MA, Plan II (Comprehensive Examination).**
3. **Course Requirements – Core and Elections (see attached Progress Checklist).**
  - a. The candidate must complete at least 36 upper division or graduate units, of which at least 18 must be at the graduate level in mathematics. No more than nine of these 18 units may be in research courses. To satisfy the department requirement, the candidate has three options:
    - i. Complete 201ABC (Analysis – graduate level), MAT 250AB (Algebra – graduate level), and a program of additional courses approved by the graduate adviser to complete at least 36 units.
    - ii. Complete MAT 201ABC (Analysis – graduate level), MAT 150ABC (Algebra – undergraduate level), and a program of additional courses approved by the graduate adviser to complete at least 36 units.
    - iii. Pass the Master's Comprehensive Examination upon entering the program. Complete MAT 201ABC (Analysis – graduate level), an additional full year graduate sequence of no less than 9 units (excluding 290, 298 and 299), and a program of additional courses approved by the graduate adviser to complete at least 36 units.
  - b. No more than 6 units of MAT 210ABC (Topics in Mathematics) may be counted toward the M.A. Courses at the 300-level do not count toward the unit requirement of the M.A. degree. While it is possible to complete the course requirements for the M.A. in 3 quarters, most candidates take 4 to 5 quarters.
4. **Special requirements – None.**
5. **Committees:**
  - a. **Admission Committee** – The five faculty members of the Graduate Program Committee (GPC) automatically serve as the Admission Committee, with the chair of the GPC acting as chair. The committee reviews all complete files and makes recommendations for admission,

which are then recorded on the “blue memo” sent to the Dean of Graduate Studies for final approval of admission. Notification concerning admissions will be sent by Graduate Studies.

- b. **Course Guidance or Advising Committee** – GPC members serve as initial advisers for incoming MA students. Each quarter, students are required to complete a Study List which lists that quarter’s registration plan (which must include at least 12 units per quarter). Advisers are required to review and sign these Lists, which are then reviewed by the GPC chair prior to filing in each student’s record in the main office. Both the program of study and any changes to the program must have the approval of the adviser. The Department conducts an Annual Progress Review which includes completion of the Graduate Studies Annual Progress Report and a financial support evaluation form. Support letters (detailing support plans for the following academic year) are generated as a result of this review and are signed by the GPC Chair. If there are significant academic and/or time-to-degree issues, the GPC chair will address them in the support letters (and at any other time in the academic year, as needed).
- c. **Comprehensive Examination Committee** – The GPC, in consultation with the instructors of the previous year’s core courses on which the examinations are based, creates and grades the MA examination.

**6. Advising Structure and Mentoring -**

- a. The Graduate Advisers (with signature authority on Graduate Studies’ forms) are the GPC Chair and the Department Chair.
- b. The Master Adviser is almost always the “initial adviser” role assigned to GPC members. The GPC Chair can serve this function as well, as needed. Graduate Council’s Mentoring Guidelines are posted on our website, here: <http://www.gradstudies.ucdavis.edu/gradcouncil/mentoring.pdf>

**7. Advancement to Candidacy** – Students are instructed to file for advancement to candidacy according to the deadlines posted by Graduate Studies.

**8. Comprehensive Examination requirements** – This is a written exam which comprises advanced undergraduate and graduate material, as covered in the following courses: 201ABC and 150ABC. Although the GPC has overall responsibility for the exam, the instructors of the previous year’s courses are expected to contribute questions and to help grade. The examination must be taken before the end of the 6<sup>th</sup> quarter of study. The department offers this twice a year, normally at the beginning of Fall and Winter quarters.

## **PHD DEGREE REQUIREMENTS**

1. **Admissions requirements.** For admission to the graduate program, applicants should have completed a strong undergraduate major in mathematics (including courses in both advanced calculus and abstract and linear algebra) that is comparable to the major in mathematics at the University of California, Davis. On our campus, these courses would be 25, 125AB, 150ABC, 22A, and 67. A minimum cumulative/overall GPA (grade point average) of 3.0 is required. Those with superior records and recommendations are sometimes admitted even if they have covered less subject matter, but in such cases they are expected to complete the required undergraduate courses by the end of their first year at Davis. To receive optimum consideration, applications should be received by January 15<sup>th</sup> . Late applications will be received through May 31st.
2. **Dissertation Plan B.**
3. **Course Requirements (see attached Progress Checklist).**
  - a. Students must acquire proficiency in mathematics by passing twelve graduate courses (MAT 280 and below). Three of these may be taken outside of mathematics if they are related to the student's area of specialization.
  - b. Required courses are 201ABC, 250AB, and 205. Similar courses completed at another institution may substitute for all or part of the Math 201, Math 205, and Math 250 sequences, if the GPC gives its approval.
4. **Special requirements: Teaching Skills.** The department has a commitment to develop outstanding teaching skills in its Ph.D. students. All Ph.D. students are required to be teaching assistants for at least one quarter. Exceptions require approval of the Graduate Program Committee. Students beyond their first year are encouraged to apply for positions as Associate Instructors to develop and improve their lecturing skills. The department makes every effort to give all students exhibiting solid teaching skills the opportunity to serve at least one quarter as an Associate Instructor.
5. **Committees:**
  - a. **Admission Committee** – The five faculty members of the Graduate Program Committee (GPC) automatically serve as the Admission Committee, with the chair of the GPC acting as chair. The committee reviews all complete files and makes recommendations for admission, which are then recorded on the “blue memo” sent to the Dean of Graduate Studies for final approval of admission. Notification concerning admissions will be sent by Graduate Studies.
  - b. **Course Guidance or Advising Committee** – GPC members serve as initial advisers for in-coming Ph.D. students until such time as a student has selected a thesis adviser. Each quarter, students are required to complete a Study List which lists that quarter's registration plan (which must include at least 12 units per quarter). Advisers are required to review and sign these Lists, which are then reviewed by the GPC chair prior to filing in each student's record in the main office. Both the program of study and any changes to the program must have the approval of the

adviser. The Department conducts an Annual Progress Review which includes completion of the Graduate Studies Annual Progress Report and a financial support evaluation form. Support letters (detailing support plans for the following academic year) are generated as a result of this review and are signed by the GPC Chair. If there are significant academic and/or time-to-degree issues, the GPC chair will address them in the support letter (and at any other time in the academic year, as needed).

- c. **Dissertation Committee** – The student, in consultation with their major professor, nominates three faculty to serve on the Dissertation Committee. The student may nominate a fourth person, but, if approved, all four signatures are required. These names are submitted to the GPC Chair for approval. Once approved, these nominations are then submitted to the Office of Graduate Studies for formal appointment in accordance with Graduate Council Policy (DDB 80. Graduate Council B.1.). The major professor serves as Chair of the committee.
- d. **Examination requirements:**
  - i. **The Ph.D. Preliminary Examination** is a written exam, which comprises graduate material in analysis and algebra, as covered in the following five graduate courses: 201ABC and 250AB. The exam is written and administered by the GPC. The exam is offered twice yearly, normally at the beginning of the Fall and Winter quarters. Students in the Ph.D. program must pass the Preliminary Exam by the beginning of the student's 7<sup>th</sup> quarter.
  - ii. **The Ph.D. Qualifying Examination (QE)** must be passed by the beginning of the student's 9<sup>th</sup> quarter. This is the final requirement for the advancement to candidacy, all other requirements must be completed, and a Dissertation Adviser selected, before a student can petition for this examination.
    1. The purpose of this examination is to determine if the student is capable of independent research. In consultation with the Dissertation Adviser, the student proposes to the GPC a date for this exam, the material to be included, and a committee of five examiners. Normally four of the members are members of the Department of Mathematics. Per Graduate Council guidelines, at least one member must be external to the Department. The Dissertation Adviser can be a member of the committee but cannot be chair.
    2. The dissertation proposal should be between one and three pages in length and should contain an outline of the general context of the thesis research, a description of the specific problem(s) to be addressed, and an indication of the methods and techniques to be used.
    3. The proposal must be submitted to GPC for their approval at least 6 weeks before the proposed date of the exam. After approving the proposal, the GPC will recommend the appointment of the QE Committee to Graduate Studies.

4. Normally the QE is given in the form of a seminar talk on the candidate's proposed research topic, in which the committee members have the opportunity to ask in-depth background questions and evaluate the breadth of the candidate's knowledge. The talk should last no longer than 45 minutes, but, the entire QE could last up to three hours.
5. If a student does not pass the QE on the first attempt, then, at the recommendation of the QE Committee, and subject to the approval of Graduate Studies, the student may repeat the exam once, within six months of the first attempt. Failure to pass on the second attempt disqualifies the student from continuing in the Ph.D. program.

**6. Advising Structure and Mentoring -**

- a. The Graduate Advisers (with signature authority on Graduate Studies' forms) are the GPC Chair and the Department Chair.
- b. Once a Thesis Adviser has been identified (prior to the QE), that person signs off on Study Lists (prior to this it was the "initial adviser" assigned to the student upon entering the program ), participates in the Annual Review, guides the student in QE preparation and, ultimately, the dissertation.
- c. Graduate Council's Mentoring Guidelines are posted on our website, here: <http://www.gradstudies.ucdavis.edu/gradcouncil/mentoring.pdf>

**7. Advancement to Candidacy** – Students entering with a BA or BS should advance to candidacy by the beginning of the 9<sup>th</sup> quarter. Students entering with a MA or MS or equivalent should advance to candidacy by the beginning of their 7<sup>th</sup> quarter.

**8. Normative Time and Time to Degree** – Students entering with a BA or BS should accomplish their PhD by the end of their fifth year. Students entering with a MA or MS should accomplish their PhD by the end of their third year.

**9. Dissertation Requirements:** Ph.D. candidates will complete a written dissertation that represents an original and significant contribution to the scientific body of knowledge. The dissertation committee will evaluate when this dissertation requirement has been met. We do not have any program-specific requirements, such as length or presentation format. Although candidates are encouraged to give oral presentations of their research material throughout their career here, an Exit Seminar per se is not a requirement.

**Graduate Program, Department of Mathematics University of California, Davis**

**M.A. and Ph. D. Progress Checklist<sup>1</sup>**

*Student Information*

Name: \_\_\_\_\_  
E-mail address: \_\_\_\_\_  
Degree objective: \_\_\_\_\_  
Date entered program: \_\_\_\_\_  
Degree upon entering: BS/BA  MS/MA  from (enter school): \_\_\_\_\_

All courses are from Mathematics, unless otherwise indicated. For courses outside of Mathematics, enter the course title in the comments field. If a course requirement has been waived, indicate such in the comments field. Note that all waivers must be requested in writing and approved by the Graduate Program Committee (GPC).

For complete information and more details about the degree requirements, see the Graduate Program brochure at (<http://www.math.ucdavis.edu/grad>).

0. *Methods of Teaching Mathematics*

All students in the Ph.D. program are required to be TAs for at least one quarter unless excused by the GPC.

Course TA'd	Instructor	Quarter	Comments

The Department of Mathematics requires every student who accepts a TA-ship to complete MAT 390, taught every Fall quarter. Most students take this course in their first year, even if they are supported by a fellowship.

Course	Units	Quarter	Grade	Comments
390	3			

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<sup>1</sup> Procedures implemented beginning Fall 2001

I. *Requirements for MA Degree in Mathematics*

**Course Requirement: Check if completed one of the following three options:**

1.

Course	Units	Quarter	Grade	Comments
201A	4			
201B	4			
201C	4			
250A	4			
250B	4			

2.

Course	Units	Quarter	Grade	Comments
201A	4			
201B	4			
201C	4			
150A	4			
150B	4			
150C	4			

3.

**Pass Masters Exam upon entering the program. Check if Passed on entry.**

Course	Units	Quarter(s)	Grade(s)	Comments
201A	4			
201B	4			
201C	4			
Additional full year graduate course				

**Other courses: Check if completed.**

Total of 36 units required. At least 18 at the graduate level. At most 6 units from MAT 210. MAT 390 does not count. No more than 9 units in research seminars (290, 299, etc.)

Course Number	Units	Quarter	Grade	Comments

**Master's Examination: Check if Passed.**

This written examination tests real analysis and algebra. It must be taken before the end of the 6<sup>th</sup> quarter of study.

II. Requirements for the Ph.D. Degree in Mathematics

**Required courses: Check if Passed.**

Course	Units	Quarter	Grade	Comments
201A	4			
201B	4			
201C	4			
250A	4			
250B	4			
205	4			

**Additional Course Requirements: Check if completed.** Students must pass twelve (quarter long) graduate courses. Three of these may be taken outside of mathematics if they are related to the student's area of specialization.

**Ph.D. Preliminary Exam: Check if Passed.** To be passed by the beginning of the 7<sup>th</sup> quarter in the graduate program at Davis, i.e. within two years.  
Date(s) taken: \_\_\_\_\_

**Ph.D. Qualifying Examination:**  
To be passed by the beginning of the 9<sup>th</sup> quarter in the graduate program at Davis (6<sup>th</sup> quarter if student entered with an MA/MS degree). Student must have a dissertation advisor before taking the exam. Proposal for the exam must be submitted to the GPC at least six weeks before the exam.  
Date proposal submitted: \_\_\_\_\_

**Advisor Confirmed.** Name of advisor: \_\_\_\_\_

**Qualifying Examination passed.** Examination date: \_\_\_\_\_  
Exam committee members (5 members, at least 1 from outside the Dept.):  
\_\_\_\_\_  
\_\_\_\_\_

**Dissertation: Completed and filed.**  
Title: \_\_\_\_\_ Date filed: \_\_\_\_\_

**Copy delivered to Graduate Coordinator.**

**Archived** (give arXiv reference): arXiv: \_\_\_\_\_