GRADUATE GROUP IN APPLIED MATHEMATICS (GGAM)
Ph.D. AND MS DEGREE REQUIREMENTS
Revised: 3-01-10
Graduate Council Approval: June 7, 2010

MASTER'S PROGRAM

1) Admissions Requirements

Applicants for admission to GGAM must meet the University of California minimum GPA requirement for admission (3.0 overall). Other requirements for admission include:

- Hold a Bachelor’s degree in mathematics, physics, chemistry, engineering, economics, the life sciences, or a related field;
- Graduate Record Examinations (GRE) – General test and Subject (any subject);
- English proficiency examination for international applicants who have not studied at an English-speaking University: TOEFL or other University approved examination. International applicants must meet the Office of Graduate Studies minimum TOEFL score requirement (or equivalent for other University-approved examination);
- Three letters of recommendation;
- Official transcripts with translation, if needed;
- A brief description of upper-division or graduate-level mathematics courses taken, or intended to be taken, before entering the program.

All applicants are encouraged to submit the UC Davis Fellowship Application. The priority deadline for application for admission is January 1st. Although the final deadline is May 31st, all applicants should aim for the January deadline.

a. Prerequisites: Applicants are expected to have completed the equivalent of UC Davis undergraduate courses in calculus (including vector calculus) (MAT 21ABCD), linear algebra (MAT 22A or MAT 67), and ordinary differential equations (MAT 22B). Advanced calculus (introduction to real analysis) (MAT 25) is strongly recommended. Additional background in probability (MAT 135A), partial differential equations (MAT 118AB), and/or numerical analysis (MAT 128ABC), is a plus. **The ability to program in a high-level computer programming language (e.g., C, Fortran, MATLAB, Python, R, etc.), is assumed.**

b. Deficiencies: Students admitted with deficiencies must make up the coursework within the first academic year, and must achieve a grade of at least a B in each course, as approved by the initial adviser responsible for their Study Lists.
2) M.S. Degree, Master’s Plan I (Thesis) and Plan II (Comprehensive Examination):

**Plan I (Thesis).** This plan requires 45 units of adviser-approved, graduate and upper division courses (the 100 and 200 series only) and a thesis. Each of the core courses (MAT 201ABC and MAT 207ABC) must be passed with a grade of at least B.

**Plan II (Comprehensive Examination).** This plan requires 36 units of adviser-approved, graduate courses (the 200 series only). Each of the core courses (MAT 207ABC) must be passed with a grade of at least B. A comprehensive final examination based on MAT 207ABC is required of each candidate. No thesis is required.

3) Course Requirements for Plan I (Thesis) and Plan II (Exam)

a. **Core Courses (24 units total) – Plan I (Thesis):**
   - MAT 201 (Analysis), A, B, C (4 units each) – 12 units total
   - MAT 207 (Methods of Applied Mathematics), A, B, C (4 units each) – 12 units total

b. **Electives - (Plan I, 21 units; Plan II, 24 units)**

   **Plan I (Thesis) – 21 units**
   - Numerics: 8 units of numerics selected from MAT 226ABC (Numerical Methods) and MAT 228ABC (Numerical Solutions of Differential Equations).
   - Field of Application: Minimum of 12 additional units in an applied area, such as, optimization and control, differential equations, probability and statistics, discrete mathematics, mathematical physics, mathematical biology, harmonic analysis and signal processing, etc. Out of this minimum of 12 additional units, at least one course of 3 or more units must be outside of Mathematics. For a list of sample curricula in sample fields, see the GGAM webpage and consult with potential thesis adviser.
   - 1 unit - Attendance at the annual GGAM mini-conference is required in the first or second year, for which 1 unit of 290 will be given in order to document compliance.
   - Exit Seminar – MS Plan I (Thesis) students are encouraged to give a 30-60 minute presentation, open to the public, on their thesis subject. After the seminar, the student’s thesis committee may meet privately with the student to discuss the contents of the thesis.

**Plan II (Exam) – (24 Units)**
- Numerics: 12 units of numerics selected from MAT 226ABC (Numerical Methods) and MAT 228ABC (Numerical Solutions of Differential Equations).
Advanced Mathematics: Additional 12 units of 200-level Mathematics courses whose course numbers are 279 or less. One mathematics-oriented graduate course outside of Mathematics, could be substituted but only with prior approval by GGAMEXEC.

c. **Summary** – A total of 45 units are required for Plan I (Thesis) and 36 for Plan II (Comprehensive Exam). Students must enroll for 12 units per quarter including research, academic and seminar units.

Students must maintain a GPA of 3.0 overall. A grade of B or higher is required in all core courses (201ABC and 207ABC). If the GPA falls below 3.0, the student is placed on academic probation. If a student is on academic probation for more than three quarters, the student is subject to disqualification upon recommendation of the Chair of GGAM to the Dean of Graduate Studies.

4) **Special Requirements**: MAT 390 (Teaching Assistantship Training) is required for a Teaching Assistantship in the Department of Mathematics, but does not count toward degree units.

5) **Committees**:
   a. **Admission Committee**
      Once the completed application, all supporting material, and the application fee have been received, the application will be submitted to the Admissions Committee. The Admissions Committee consists of the five members of the GGAM Executive Committee (GGAM EXEC). Based on a review of the entire application, a recommendation is made to accept or decline an applicant’s request for admission. That recommendation is forwarded to the Dean of Graduate Studies for final approval of admission. Notification of admissions decisions will be sent by Graduate Studies. Applications are accepted through May 31st (but the optimum submission deadline is January 1st) for the next Fall entering class.

   b. **Course Guidance/Advising/Thesis Adviser Selection**
      GGAM EXEC members serve as initial advisers for incoming students until such time as the student has selected a major professor/thesis adviser. Initial advisers help students in selecting 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, which can include required courses, 290s, and 390). Advisers are required to review and sign these Lists, which are then reviewed by the 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 Program conducts an Annual Progress Review which includes completion of the Graduate Studies Annual Progress Report, the student’s updated Academic Plan, 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 Chair. If there are significant academic and/or time-to-degree issues, the Chair will address them in the support letters (and at any other time in the academic year, as needed).
c. Thesis Committee (Plan I)

The student, in consultation with his/her major professor/thesis adviser, nominates three faculty to serve on the Thesis Committee. The major professor/thesis adviser serves as Chair of the thesis committee and must be a member of GGAM. These nominations are submitted to the Office of Graduate Studies for formal appointment in accordance with Graduate Council policy (DDB 80, Graduate Council B.1.).

d. Comprehensive Examination Committee (Plan II)

Although the GGAMEXEC has overall responsibility for the exam, the instructors of the previous year’s MAT 207 ABC are expected to contribute questions and to grade.

6) Advising Structure and Mentoring

For MS-Plan II (Exam), the Initial Adviser assists incoming students toward graduation. For incoming students to MS-Plan I (Thesis), an Initial Adviser is also assigned, but only serves until the student has selected a Major Professor/Thesis Adviser, who then supervises the student’s course work, research and thesis. The Major Professor/Thesis Adviser also serves as the Chair of the Thesis Committee. The GGAM Chair serves as the Graduate Adviser, has signature authority on Office of Graduate Studies forms and is a resource for information on academic requirements, policies and procedures, and registration information. Links to the program’s Mentoring Guidelines, as well as the Graduate Council’s Mentoring Guidelines, can be found on our web site: http://www.math.ucdavis.edu/grad/handbook

7) Advancement to Candidacy

Every student must file an official application for Candidacy for the Degree of Master of Science after completing one-half of their course requirements and at least one quarter before completing all degree requirements. Therefore, during the Spring quarter of their first year, they should be able to submit the Candidacy form. The Candidacy for the Degree of Master form can be found online at: http://www.gradstudies.ucdavis.edu/forms/. A completed form includes a list of courses the student will take to complete degree requirements. If changes must be made to the student’s course plan after s/he has advanced to candidacy, the Graduate Adviser (GGAM Chair) must recommend these changes to Graduate Studies. For Plan I (thesis option), students will list their three committee members for Office of Graduate Studies approval. Students must have their Graduate Adviser (GGAM Chair) and thesis committee Chair (Plan I) sign the candidacy form before it can be submitted to Graduate Studies. Additionally, we request that the student have each member initial their name on the form. If the candidacy is approved, the Office of Graduate Studies will send a copy to the Thesis Committee Chair, the appropriate graduate staff person, and the student. For Plan II (exam option), students do not need to provide names of the exam committee members.

If the Office of Graduate Studies determines that a student is not eligible for advancement, the department and the student will be told the reasons for the application’s deferral. Some reasons for deferring an application include: grade point average below 3.0, outstanding “I” grades in required courses, or insufficient units.
8) Comprehensive Examination and Thesis Requirements

a) Thesis Requirements (Plan I)

The M.S. thesis should be:

a. A scholarly piece of theoretical or experimental research.

b. Rigorous in approach (design, methodology, and analysis), but not as extensive as a Ph.D. dissertation.

The topic of the thesis should be acceptable to all members of the committee when they agree to serve and a joint meeting of committee members and the student should be held at that time. For the thesis to be acceptable for the degree, all committee members must sign the title page. Instructions on preparation of the thesis and a schedule of dates for filing the thesis in final form are available from Graduate Studies; the dates are also printed in the UC Davis General Catalog.

b) Comprehensive Examination (Plan II)

The comprehensive examination is given at the beginning of the Fall and Spring quarters. Students will take the comprehensive exam in the Fall quarter of year 2 (4th quarter). If they do not pass at that time, they can take the exam for a second time in the Spring quarter of year 2 (6th quarter). Failure to pass will result in a recommendation to the Dean of Graduate Studies for disqualification of the student from the graduate program. The comprehensive exam is a three-hour written exam which comprises material covered in MAT 207ABC. The Chair will ask two members of GGAM Faculty to compose the exam problems in consultation with the previous year’s 207ABC instructors. These exam problem sets are forwarded to the Chair, who then selects the final exam problems. The previous year’s 207ABC instructors grade the exams, the Chair evaluates the grades, recommends the pass/fail status, and submits to GGAMEXEC for final approval.

9) Normative Time to Degree

The Normative Time to Degree for the M.S. program is six quarters (two years).

10) Typical Time Line and Sequence of Events

Key to the following abbreviations and terms:

FOA - Field of Application: Minimum of 12 additional units, in a field of application, of which at least one course of 3 or more units is outside of Mathematics.

Adv Math - Advanced Mathematics: Four 200-level math courses whose course numbers are 279 or less. One mathematics-oriented graduate course outside of Mathematics, may be substituted, but only with prior approval by GGAMEXEC.

Numerics – 8 units (Plan I) or 12 units (Plan II) from MAT 226ABC and MAT 228ABC
Year 1: Plan I (Thesis)

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<td>MAT 201A (4)</td>
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<td>MAT 207A (4)</td>
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<td>MAT 290s</td>
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<td>MAT 390</td>
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Advancement to candidacy in Spring

Year 2: Plan I (Thesis)

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<td>MAT 290s</td>
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<td>Thesis Prep/Completion</td>
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Year 3 (Optional): Plan I (Thesis)

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Thesis preparation and completion

Year 1: Plan II (Exam)

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Advancement to candidacy in Winter or Spring

Year 2: Plan II (Exam)

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<td>Numerics (4)</td>
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Other courses as needed to meet 12-unit minimum requirement

MS Comprehensive Exam (offered twice a year at start of Fall or Spring)

11) **Sources of funding.**
Faculty research grants, TA/AIships, and fellowships, upon availability.

12) **PELP, In Absentia and Filing Fee status.**
Information about PELP (Planned Educational Leave), In Absentia (reduced fees when researching out of state), and Filing Fee status can be found in the Graduate Student Guide: [http://www.gradstudies.ucdavis.edu/publications/](http://www.gradstudies.ucdavis.edu/publications/)
PH.D. PROGRAM

1) Admissions Requirements

Applicants for admission to GGAM must meet the University of California minimum GPA requirement for admission (3.0 overall). Other requirements for admission include:

- Hold a Bachelor’s degree in mathematics, physics, chemistry, engineering, economics, the life sciences, or a related field;
- Graduate Record Examinations (GRE) – General test and Subject (any subject);
- English proficiency examination for international applicants who have not studied at an English-speaking University: TOEFL or other University approved examination. International applicants must meet the Office of Graduate Studies minimum TOEFL score requirement (or equivalent for other University-approved examination);
- Three letters of recommendation;
- Official transcripts with translation, if needed;
- A brief description of upper-division or graduate-level mathematics courses taken, or intended to be taken, before entering the program;
- All applicants are encouraged to submit UC Davis Fellowship Application;
- The priority deadline for application for admission is January 1st. Although the final deadline is May 31st, all applicants should aim for the January deadline.

a. Prerequisites: Applicants are expected to have completed the equivalent of UC Davis undergraduate courses in calculus (including vector calculus) (MAT 21ABCD), linear algebra (MAT 22A or MAT 67), and ordinary differential equations (MAT 22B). Advanced calculus (introduction to real analysis) (MAT 25) is strongly recommended. Additional background in probability (MAT 135A), partial differential equations (MAT 118AB), and/or numerical analysis (MAT 128ABC), is a plus. The ability to program in a high-level computer programming language (e.g., C, Fortran, MATLAB, Python, R, etc.), is assumed.

b. Deficiencies:

If any course work deficiencies have not been completed prior to admission, they must be completed by the end of the first year in the program by earning a letter grade of “B” or better, as approved by the initial adviser responsible for their Study Lists.

2) Dissertation Plan – Plan B.

Plan B. Three member (minimum) dissertation committee, an optional final oral examination (made on an individual student basis by the dissertation committee), and an exit seminar.
3) **Course Requirements**
   a. **Core Courses (24 units total):**
      - MAT 201 (Analysis), A, B, C (4 units each) – 12 units total
      - MAT 207 (Methods of Applied Mathematics), A, B, C (4 units each) – 12 units total
   
   b. **Electives - (40 units total)**
      - Numerics: 8 units of numerics selected from MAT 226 ABC (Numerical Methods) and MAT 228ABC (Numerical Solutions of Differential Equations).
      - Field of Specialization: Minimum of 15 units in a field of specialization, such as, optimization and control, differential equations, probability and statistics, discrete mathematics, mathematical physics, mathematical biology, harmonic analysis and signal processing, etc. Out of this minimum of 15 units, at least one course of 3 or more units must be outside of Mathematics. For a list of sample curricula in sample fields, see the GGAM webpage and consult with potential thesis adviser.
      - Advanced Mathematics: Minimum of 16 units, in four 200-level math courses whose course numbers are 279 or less.
      - 1 unit - Attendance at the annual GGAM mini-conference is required in the first or second year, for which 1 unit of 290 will be given in order to document compliance.
   
   c. **Summary** – A total of 64 units are required. Students will enroll for 12 units per quarter including research, academic and seminar units.

   Students must maintain a GPA of 3.0 overall. Each of the core courses 201ABC and 207ABC) must be passed with a grade of at least B. If the GPA falls below 3.0, the student is placed on academic probation. If a student is on academic probation for more than three quarters, the student is subject to disqualification upon recommendation of the Chair of GGAM to the Dean of Graduate Studies.

4) **Special Requirements - Teaching Skills**
   The Program has a commitment to develop outstanding teaching skills in its Ph.D. students. MAT 390 (Teaching Assistantship Training) is required for a Teaching Assistantship in the Department of Mathematics, but does not count toward degree units. All Ph.D. students are required to be teaching assistants for at least one quarter. Exceptions require approval of the GGAMEXEC. Students beyond their first year are encouraged to apply for positions as Associate-Instructors to develop and improve their lecturing skills. The Program 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**
      Once the completed application, all supporting material, and the application fee have been received, the application will be submitted to the Admissions Committee. The Admissions Committee consists of the five members of the
GGAM Executive Committee (GGAMEXEC). The graduate group chair (Chair), is the chair of GGAMEXEC and has signature authority on Office of Graduate Studies forms. Based on a review of the entire application, a recommendation is made to accept or decline an applicant’s request for admission. That recommendation is forwarded to the Dean of Graduate Studies for final approval of admission. Notification of admissions decisions will be sent by Graduate Studies. Applications are accepted through May 31st (but the optimum submission deadline is January 1st) for the next Fall entering class.

b. **Course Guidance/ Advising/Thesis Adviser Selection**

GGAMEXEC members serve as initial advisers for incoming students until such time as the student has selected a thesis adviser/major professor. Initial advisers help students in selecting a thesis adviser/major professor. Each quarter, students are required to complete a Study List which lists that quarter’s registration plan (no less than 12 units per quarter, which may include required courses, 290s, and 390). Advisers are required to review and sign the Study List, which are then reviewed by the 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 Program conducts an Annual Progress Review which includes completion of the Graduate Studies Annual Progress Report, the student’s updated Academic Plan, 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 Chair. If there are significant academic and/or time-to-degree issues, the Chair will address them in the support letters (and at any other time in the academic year, as needed).

c. **Ph.D. Preliminary Examination Committee**

This committee consists of the GGAMEXEC, in consultation with the instructors of the previous year’s core courses (MAT 201ABC and MAT 207ABC).

d. **Qualifying Examination (QE) Committee**

The student, in consultation with his/her dissertation adviser, nominates 5 faculty to serve on the QE Committee. As required by Graduate Council policy, at least one member must be outside of the GGAM and the major professor/proposed Dissertation Committee chair may not serve as chair of the QE Committee. These nominations are submitted to GGAMEXEC for review. Once approved, the GGAM Chair signs the form and the nominations are submitted to the Office of Graduate Studies for formal appointment in accordance with Graduate Council policy (DDB 80. Graduate Council B.1.).

e. **Dissertation Committee**

The student, in consultation with their Major Professor/Dissertation Adviser, nominates three faculty to serve on the Dissertation Committee. The student may nominate a fourth person, but, if approved, all four signatures are required. The Major Professor/Dissertation Adviser serves as the Chair and must be a member of GGAM. These names are submitted to the GGAM Chair for
approval and signature. Once approved, these nominations are then submitted to the Office of Graduate Studies for formal appointment in accordance with Graduate Council Policy (DDB80.Graduate Council B.1).

6) Advising Structure and Mentoring
An Initial Adviser (member of GGAMEXEC) is assigned to each incoming student and helps guide the student in how to select a Major Professor/Dissertation Adviser. The Major Professor/Dissertation Adviser is the GGAM faculty member who supervises the student’s research and dissertation; this person serves as the Chair of the Dissertation Committee. The GGAM Chair serves as the Graduate Adviser, has signature authority on Office of Graduate Studies forms and is a resource for information on academic requirements, policies and procedures, and registration information. Links to the program’s Mentoring Guidelines, as well as the Graduate Council’s Mentoring Guidelines, can be found on our web site, here:
http://www.math.ucdavis.edu/grad/handbook

7) Advancement to Candidacy
The student is eligible for Advancement to Candidacy after successful completion of all graduate program degree requirements and after passing the Qualifying Examination. A student entering with a baccalaureate is expected to advance to candidacy before the end of their third year. If entering with a master’s, we expect them to advance before the end of their second year. The student must file the appropriate paperwork with the Office of Graduate Studies and pay the candidacy fee in order to be officially promoted to Ph.D. Candidacy. Additional details on the Doctoral Qualifying Examination can be found on the Graduate Council website.

8) Dissertation Requirements:
Before advancing to candidacy for a doctoral degree, a student must have satisfied all requirements set by the graduate program, maintained a minimum GPA of 3.0 in all course work undertaken (except those courses graded S or U), passed the PhD Preliminary Examination, and passed the Qualifying Examination before a committee appointed to administer that examination.

a) The Ph.D. Preliminary Examination is a written examination covering MAT 201ABC and MAT 207ABC. The exam is offered at the beginning of Fall and Spring quarters every year. PhD students are required to pass this examination before the end of their second year in the Applied Mathematics program (and if they entered with a Master’s, by October of their second year). They may take the examination multiple times; what matters is when they pass, not how many attempts. The results of this examination will be used by the GGAMEXEC to determine whether the student can enter or continue in the Ph.D. program. Samples of previous exams are posted on the GGAM web page. Details on how this exam is created and evaluated will be posted on our web page, here: http://www.math.ucdavis.edu/grad/ggam/exams.

b) The Qualifying Exam - Students must complete the course requirements before taking their Qualifying Examination (QE). The QE will consist of a written research
proposal and oral examination. Approximately six weeks before the date of the proposed QE, the research proposal, along with the QE Application, is submitted to GGAMEXEC for approval. Once approved and required signatures obtained, the QE Application will be forwarded to the Office of Graduate Studies for final approval. The QE should be taken by the sixth quarter and no later than the end of the ninth quarter after admission to the Ph.D. program. According to university policy, graduate students cannot hold an academic title (e.g. Teaching Assistant, Research Assistant) for more than 9 quarters before passing their QE. Passing the QE makes the student eligible for advancement to candidacy.

1) **The Written Portion of the Qualifying Exam (QE).**
   The written portion of the QE exam consists of the research proposal which may be, but is not restricted to, an independently prepared proposal of 5-10 pages describing the student's dissertation-specific research aims, progress to date, and approach. The research proposal should first be reviewed by the Dissertation Adviser and the proposed members of the QE committee, well enough in advance of the deadline to submit to GGAMEXEC (which is 6 weeks prior to the actual QE date).

- Concepts within the research proposal can be discussed with others (such as the student's major professor and peers), but the writing of the proposal should be the student's work as the proposal will serve as evidence of the student's proficiency in scientific writing.

- The QE committee will be responsible for assessing that the student's writing proficiency is satisfactory before advancement to candidacy. Furthermore, the research proposal will provide information that may be discussed during the oral exam.

2) **The Oral Portion of the Qualifying Exam (QE).**
   The oral portion of the QE is intended to demonstrate the student's critical thinking ability, powers of imagination and synthesis, and broad knowledge of the field of study.

- The committee will evaluate the student's general qualifications for a respected position as an educator or leader as well as the student's preparation in a special area of study based upon relevant portions of the student's and the student's potential for scholarly research as indicated during the examination.

3) **QE Outcomes**
   A QE committee, having reached a unanimous decision, shall inform the student of its decision as “Pass” (no conditions may be applied to this decision), “Not Pass” (the Chair’s report should specify whether the student is required to retake all or part of the exam, list any additional requirements, and state the exact timeline for completion of requirements to achieve a “Pass”), or “Fail”. If a unanimous decision takes the form of “Not Pass” or “Fail”, the Chair must
include in his/her report a specific statement, agreed to by all members of the committee, explaining its decision and must inform the student of the decision. Having received a “Not Pass” the student may attempt the QE one additional time. After the second examination, a vote of “Not Pass” is unacceptable; only a “Pass” or “Fail” is recognized. Only one retake of the QE is allowed; those students who “Fail” on the second attempt or do not attempt a second time will be recommended to the Dean of Graduate Studies for disqualification from the program.

c) The doctoral dissertation is an essential part of the Ph.D. program. A topic will be selected by the student, under the guidance of the Dissertation Adviser. Students are encouraged to begin their research activity as early as possible. The dissertation must contain an original contribution of publishable quality to the knowledge of applied mathematics. Acceptance of the dissertation by the dissertation committee must follow Graduate Studies guidelines (Plan B). The program does not have any program-specific requirements, such as length or presentation format. Instructions on preparation of the dissertation and a schedule of dates for filing the thesis in final form are available from Graduate Studies; the dates are also printed in the UC Davis General Catalog.

- **Exit Seminar**: PhD students are required to give a 60-minute seminar presentation, open to the public, on their dissertation subject.
- **Optional Final Oral Examination (at the discretion of the Dissertation Committee)**: After the exit seminar, the student’s dissertation committee may meet privately with the student to discuss the contents of the dissertation and ask additional questions. Satisfaction of this requirement must be verified by the Dissertation Committee Chair.

9) **Normative Time to Degree**
Measured from the time a student begins graduate study, with no prior graduate experience, the normative time to degree is approximately 5 years.

10) **Typical Time Line and Sequence of Events**
Course requirements are generally completed by the end of the second year. The Qualifying Exam is normally completed by the end of the second year, for students entering with a master’s, and no later than the end of the third year for students with no prior master’s.

**Key to the following abbreviations and terms:**

- **FOS - Field of Specialization**: 15 units in a field of specialization, of which at least one course of 3 or more units is outside of Mathematics.

- **Adv Math - Advanced Mathematics**: Four 200-level math courses whose course numbers are 279 or less.

- **Numerics**: 8 units from MAT 226ABC and MAT 228ABC
PHD STUDENT WITHOUT PRIOR MASTER’S DEGREE

Year 1 (without prior Master’s degree):

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<td>MAT 207A (4)</td>
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<td>MAT 290s</td>
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<td>FOS (4) or Adv Math (4)</td>
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<td>MAT 390</td>
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Year 2: (without prior Master’s degree):

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<td>PhD Preliminary Examination – Start of Fall quarter, or, last opportunity, Spring quarter.</td>
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Possible Advancement to Candidacy in Spring

Year 3 (without prior Master’s degree)

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<tr>
<td>Numerics (4)</td>
<td>Numerics (4)</td>
<td>Numerics (4)</td>
</tr>
<tr>
<td>FOS (4)</td>
<td>FOS (4)</td>
<td>MAT 290s</td>
</tr>
</tbody>
</table>

Must Advance to Candidacy no later than Spring

Year 3-5 (without prior Master’s degree)

Research and Completion of Dissertation – Quarterly, 12 units of 299D
PHD STUDENT WITH PRIOR MASTER’S DEGREE

Year 1 (with Master’s degree prior to entering PhD program):

<table>
<thead>
<tr>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>PhD Preliminary Examination – Start of Fall or Spring quarters</td>
<td></td>
<td></td>
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<tr>
<td>MAT 201A (4)</td>
<td>MAT 201B (4)</td>
<td>MAT 201C (4)</td>
</tr>
<tr>
<td>MAT 207A (4)</td>
<td>MAT 207B (4)</td>
<td>MAT 207C (4)</td>
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<td>MAT 290s</td>
<td>FOS (4)</td>
<td>FOS (4)</td>
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<tr>
<td>MAT 390</td>
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<td></td>
<td>MAT 290s</td>
<td>MAT 290s</td>
</tr>
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</table>

Year 2: (with Master’s degree prior to entering PhD program):

<table>
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<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>PhD Preliminary Examination – Start of Fall, last opportunity</td>
<td></td>
<td></td>
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<tr>
<td>Numerics (4)</td>
<td>Numerics (4)</td>
<td>Numerics (4)</td>
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<tr>
<td>FOS (4)</td>
<td>FOS (4)</td>
<td>MAT 290s</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Must Advance to Candidacy no later than Spring</td>
</tr>
</tbody>
</table>

Year 3-4 (with Master’s degree prior to entering PhD program):

Research and Completion of Dissertation – Quarterly, 12 units of 299D

11) Sources of funding.
   Faculty research grants, TA/AIships, and fellowships, upon availability.

12) PELP, In Absentia and Filing Fee status.
   Information about PELP (Planned Educational Leave), In Absentia (reduced fees when researching out of state), and Filing Fee status can be found in the Graduate Student Guide: [http://www.gradstudies.ucdavis.edu/publications/](http://www.gradstudies.ucdavis.edu/publications/)

13) Leaving the Program Prior to Completion of the PhD Requirements.
   Should a student leave the program prior to completing the requirements for the PhD, they may still be eligible to receive the Masters if they have fulfilled all the requirements (see Masters section). Students can use the Change of Degree Objective form available from the Registrar’s Office: [http://registrar.ucdavis.edu/PDFFiles/D065PetitionForChangeOfGraduateMajor.pdf](http://registrar.ucdavis.edu/PDFFiles/D065PetitionForChangeOfGraduateMajor.pdf)