

University of Nevada, Reno
Department of Mathematics and Statistics

Ph. D. Program in Mathematics

Handbook of Policies and Procedures
for Current Graduate Students
2020-21



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1 Introduction

The *Ph.D. Program in Mathematics* at the University of Nevada, Reno (UNR) is offered by the Department of Mathematics & Statistics. The department is home of a dynamic group of over 25 award-winning graduate faculty with diverse interests and expertise in pure and applied mathematics and probability, statistics and data science.

Teaching assistantships, research assistantships, as well as department and university-wide scholarships, are available for qualified students. All graduate students accepted to the program with teaching assistantships, receive a stipend, tuition waiver, and a subsidized medical plan.

Faculty of the Department of Mathematics and Statistics are engaged in cutting edge research on topics spanning pure mathematics, applied mathematics, and statistics/probability. They collaborate with other researchers, both locally and at multiple institutions throughout the US and internationally. Their work is interdisciplinary and includes joint projects with experimentalists. Graduate students have the opportunity to be part of these exciting activities. UNR and the Reno business community provide ample opportunities for internships and external research.

Located where the Sierra Nevada mountains meets the Great Basin, the university is 45 minutes from Lake Tahoe and 4 hours from San Francisco and the Napa-Sonoma wine country. Reno offers an excellent living environment, year-round outdoor activities, short commutes, a growing arts community, and an increasingly cosmopolitan flavor.

Contact Information

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2 Program Description

The Ph.D. program in Mathematics is designed to provide training in fundamental methods and concepts of modern mathematics, including interdisciplinary collaborative research. The program builds research skills that will position students to be competitive in pursuing careers in an academic, government, and business environment.

Student learning outcomes

After completion of the Ph.D. in Mathematics program, students will:

1. Attain and demonstrate the appropriate level of expertise in fundamental mathematics areas and in the individual's research field.
2. Demonstrate the ability to do independent original research in mathematics on the level of a Ph.D. dissertation.
3. Demonstrate the ability to communicate the results of the research both orally and in writing.

For more information about the program, please contact

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3 Degree requirements

3.1 Course work

Candidates for the degree of Doctor of Philosophy, must satisfy all general requirements of the Graduate School. These include

- Completion of a minimum of 72 hours of graduate credits, including at least 48 hours of course work.
- At least 30 of the course credits must be at the 700 level, and at most 24 may be dissertation credits.

3.2 Required courses

The following courses or their equivalents must be satisfactorily completed for the doctoral degree in mathematics.

Courses in Pure Mathematics

- MATH 640– Topology (3 units)
- MATH 713 – Abstract and Real Analysis I (3 units)
- MATH 714 – Abstract and Real Analysis II (3 units)
- MATH 715 – Complex Function Theory I (3 units)
- MATH 731 – Modern Algebra I (3 units)

Course in Applied Mathematics and Probability

- MATH 701 – Numerical Analysis and Approximation I (3 units)
- MATH 735 – Advanced Linear Algebra (3 units)
- MATH 751 – Operations Research I (3 units)
- STAT 705 – Probability Theory (3 units)

Dissertation Credits and Approved Electives

- MATH 799 – Dissertation (24 credits required)
- Approved electives, based on research interests (optional, up to 21 credits)
- 12 credit maximum of independent studies (optional).

3.3 Electives and Transfer of MS Coursework

Electives will be approved by the student's Dissertation Committee (Section 5). Appropriate courses outside the Department of Mathematics and Statistics may be approved, depending on the student's research interests.

Students entering with a master's degree may receive up to 30 credits for previous course work (excluding thesis credits), and these credits may satisfy some course requirements with the approval of the Graduate Director.

3.4 Qualifying Exams

After the 1st year, and ideally by the end of their 2nd year, but no later than by the end of their 3rd year, every student must pass three written Qualifying Exams. The purpose of the Qualifying Exams is to verify that the student has acquired the necessary general knowledge, to serve as the basis for her/his dissertation research.

Each Qualifying Exam will be based on a syllabus of topics, available on the department's web page or by request from the Graduate Director. The syllabi are based on material covered in classes relevant to each subject, the classes for each exam are listed below. The syllabi may also include foundational material from the undergraduate curriculum. Each Qualifying Exam is a 3 hour long, written exam, and the exams will be offered at least once per semester. During the semester the student takes her/his last qualifying exam, she/he must be enrolled in MATH 795, the "Comprehensive Exam" course.

Students must pass the Qualifying Exam in

- Analysis (based on MATH 713& 714, or on MATH 713 & 715),

and two Qualifying Exams from this list:

- Algebra (based on MATH 731, 732),
- Topology (based on MATH 641, 741, 742),
- Numerical Analysis and Approximation (based on MATH 701, 702),
- Operations Research (based on MATH 687, 751, 752), or
- Probability (based on STAT 705).

Students will be allowed a maximum of two attempts at each of the exams in the first three years of the Ph.D. program. Each exam can be passed at M.S. level (low pass) or Ph.D. level (high pass). To proceed with the Ph.D. program all exams must be passed at the Ph.D. level. If all exams are passed at least at the M.S. level but not all at the Ph.D. level, and other requirements for the M.S. degree are satisfied, the student will end her/his program with an M.S. degree in Mathematics.

3.5 M.S. degree along the way to Ph.D.

Students in the Ph.D. program in Mathematics may earn an M.S. degree in Mathematics along the way to their Ph.D., by satisfying the current M.S. degree requirements. Students qualify in the semester in which all degree requirements for the master's degree have been met. Students may not receive a master's degree along the way to the Ph.D. if the student has earned a previous master's degree at any time and units from that degree are counted towards the Ph.D.

To satisfy the requirements for the M.S. degree, the student has to in addition to satisfying the course

requirements, either write a Master's Thesis (and take the required 6 thesis credits, which will not count toward her/his Ph.D. degree), or enroll in 1 credit of MATH 795 (the "Comprehensive Exam" course) and pass the Comprehensive Exam (based on four 700-level courses, one of which must be MATH 713).

3.6 Admittance to candidacy

To be admitted into Ph.D. candidacy, after successfully completing the first two years of coursework and passing three written Qualifying Exams, a student must pass the Oral Exam in the area of specialty ([Section 7](#)). Students will be expected to complete their oral exam by the end of their 7th semester. The exam is directed by the student's Dissertation Advisor and Dissertation Committee ([Section 5](#)).

3.7 Ph.D. Dissertation

A student will prepare a Ph.D. dissertation supervised by the Dissertation Advisor and approved by the student's Dissertation Committee, followed by an oral public presentation. The dissertation is then submitted to the Graduate School for approval.

3.8 Graduate School Academic Requirements

Good Standing Each graduate course must be completed with a grade of "C" or better for the credit to be acceptable toward an advanced degree.

In addition, students must maintain good standing with an overall cumulative graduate credit GPA of at least 3.0 on a scale of 4.0. Students must have a minimum GPA of 3.0 in order to meet graduation eligibility. All graduate students must maintain a cumulative graduate GPA of 3.0. If their GPA drops below 3.0, they are either placed on probation or dismissed. Undergraduate courses will not count towards graduate GPA.

Probation If the student's cumulative grade-point total is between 2.31 and 2.99, the student is placed on probation. The student must then raise her/his cumulative graduate GPA to 3.0 by the end of the following semester or the student will be dismissed from graduate standing. Thesis, dissertation, S/U graded credits, and transfer credits have no impact on a student's GPA.

Dismissal If the graduate grade-point total is 2.30 or lower, the student is dismissed from graduate standing, or if the graduate GPA remains below 3.0 for two (2) consecutive semesters, the student is dismissed from graduate standing.

Dismissed students are no longer in a graduate program but may take graduate-level courses as a Grad Special. Students wishing to complete their degree must obtain approval to take graduate-level courses, raise their graduate GPA to at least 3.0 and then re-apply to a graduate program. Any courses taken to raise their GPA will be included in the graduate special/transfer credit limitation (9 credits for master's degrees).

4 Transfer credits

Transfer credits are credits transferred from another institution. Credits completed at UNR in another program or as a graduate special do not need to be transferred. Transfer credit is requested on the [Graduate Credit Transfer Evaluation Request](#) form available on Graduate School website

The form must be signed by the student, major advisor, and graduate director. Transfer credits applied to a master's program must comply with the time limitation on master's work (6 years). Thus, if a student took a course five years prior to admission, they would have to complete the degree within one year for the course to apply to the degree. Credits from a completed master's degree will be exempt from the 8-year time limitation for those students earning a doctoral degree.

5 Ph.D. Dissertation Advisor and Committee Selection

Each student must secure a Doctoral Thesis Advisor (Dissertation Advisor, Advisor), and a Dissertation Committee. The student should choose the Advisor according to her/his research interests and the field of mathematics where she/he wishes to pursue writing a dissertation. Typically the Advisor is a faculty member with whom the student has interacted previously, for instance by having taken classes with her/him. The student should identify an Advisor as early as possible, ideally during their first two years in the program, but no later than by the end of their 3rd year.

The Dissertation Committee, chosen in communication between the student and her/his Advisor, serves as an advisory board to the student during her/his doctoral program career, on issues such as class selection, research work, Oral Exam, dissertation preparation and defense. The student is encouraged to form their committee as early as possible, but not later than the end of their 3rd year.

The Dissertation Committee must consist of a minimum of 5 graduate faculty members, including the Advisor, who functions as the committee's chair. At least 2 faculty members must be from the student's major department/program, and at least 1 faculty member of the committee must be from another department in a field related to the student's major. Additionally, at least one Graduate School representative must serve on the committee. Formal approval of committee is made by the Graduate Dean.

6 Oral Exam

By the end of their 5th semester, and no later than by the end of their 7th semester, every doctoral student must pass an Oral Exam. The purpose of the Oral Exam is to determine whether the student has mastered the necessary specialized knowledge required to carry out dissertation research. Students will be allowed a maximum of two attempts at passing the Oral Exam.

The Oral Exam consists of an oral presentation given by the student to her/his Dissertation Committee (lasting approximately 45-60 minutes), followed by a period of questions from the committee (also lasting approximately 45-60 minutes). The topic for the presentation shall be chosen by the student's Dissertation Advisor and shall be related to the research area the student intends to pursue in her/his dissertation. The Advisor may ask the student to read a relevant body of work, or to fully master one or several articles in said area of research, as a basis for the oral presentation. Another possibility,

particularly suited for students working in applied mathematics, is to embark on and present the outcomes of a significant programming project. Deviations from the abovementioned formats for the oral exam are possible and will be approved on a case by case basis by the Graduate Director in communication with the student's Dissertation Advisor.

7 Timeline for degree completion

7.1 Recommended timeline

- Take 6-9 graduate credits per semester. For example, to reach the needed 72 credits for graduation in 10 semesters, you may take 9 credits for 4 of the 10 semester, and 6 credits for the remaining 6 semesters.
- Between the 2nd and 6th semester, complete all three Qualifying Exams (Section 3.4).
- As early as possible, but no later than by the end of the 6th semester in the program, secure a Dissertation Advisor and a Dissertation Committee (Section 5), and begin formulating a dissertation topic.
- By the end of the 4th semester, and no later than by the end of the 6th semester, complete the [Ph.D. Program of Study](#) form, confirm with Advisor, and secure Dissertation Committee signatures. Start working on the dissertation with Advisor.
- By the end of 7th semester, complete the Oral Exam (Section 6).
- By the no later than the 7th semester, begin dissertation draft.
- By the 8th semester, complete dissertations draft, discuss dissertation draft with Dissertation Committee, and finalize dissertation according to committee recommendations.
- By the end of the 10th semester, defend dissertation.

7.2 Forms required for graduation

Forms that are required to be submitted to the Graduate School during the progression to your terminal degree, can be found on their [Forms](#) web page. They include these forms (listed with a timeline for their submissions):

- [Declaration of Advisor, Major Advisor, Committee Chair](#)
 - For doctoral and MFA students, completed form must be submitted to Graduate School by the end of the student's 3rd semester.
- [Program of Study](#)
 - For doctoral and MFA students, completed form must be submitted to Graduate School by the end of the student's 4th semester.
- [Doctoral degree admission to candidacy](#) (Doctoral Programs only)
 - For doctoral students who completed all requirements except for the dissertation.
- [Graduation Application](#)
 - Must be submitted to the Graduate School several weeks in advance. Check their [website](#) for exact dates.
- The Notice of Completion form should be submitted after all requirements for the degree have been met.
 - [Notice of Completion: Doctoral Degree](#)

- Optional [Exit Survey](#), to be completed upon graduation. This survey is voluntary, confidential, and takes about 5 minutes.

8 Dissertation requirements

Each student must prepare a Ph.D. dissertation guided by his/her adviser. The adviser must be selected from the graduate faculty members of the Department of Mathematics and Statistics. The details of thesis preparation and presentation should be discussed with adviser.

Graduate School forms and resources related to thesis and dissertations:

- [Doctoral Dissertation Filing Guidelines](#)
- [Dissertation Title Form](#)

Once all requirements have been met, students need to submit a Final Review Approval and Notice of Completion form in order to graduate.

- [Final Review Approval](#) – Obtain sign-off from advisory committee chair
- [Notice of completion](#) – completed form should be submitted after all requirements have been met.

9 Graduate Assistantships

Teaching Assistantships award a stipend for the academic year plus a tuition and fee waiver and a subsidized medical plan. Teaching assistants will be expected to perform specific teaching and grading duties. Normally this will not exceed teaching 6 credit hours per semester or the academic equivalent. Awards are based on academic credentials submitted with the Graduate School application. Research Assistantships are sometimes available as well.

Teaching Assistantships (TA-ships) are also subject to the following guidelines

1. TA-ship support for Ph.D. students is normally approved for 8 semesters subject to normal degree progress if entering with a Bachelor's degree, and 4 semesters if entering with a Master's degree. To get TA-ship support beyond this period requires special semester-by-semester approval by the Graduate Committee.
2. Students being supported by a TA-ship are expected to enroll in at least 6 credits of approved graduate coursework. The courses Grad 701 and Math 899 do not count toward this 6-credit requirement.

All graduate students holding an assistantship are considered Nevada residents for tuition purposes. Non-resident tuition is only waived for the duration of the assistantship. To be eligible for an assistantship, students must be admitted to a degree-granting program and be in good academic standing. The student must have an overall GPA of at least 3.0 and must be continuously enrolled in at least 6 graduate level credits (600-700 level courses) throughout the duration of the assistantship.

State-funded assistantships (GTA/GRA) may be held for a maximum of three (3) years for master's degree students, and five (5) years for doctoral degree students.

Information on graduate assistantships can be found on the Graduate School's website at these links:

[General information](#)

[Assistantship handbook](#)

10 Health insurance

All domestic degree seeking graduate students, who are enrolled in 6 or more credits (regardless of the course level) in a semester, will be automatically enrolled and billed for the university sponsored health insurance for each term they are eligible (fall & spring/summer). If a student has other comparable coverage and would like to waive out of the student health insurance, it is the student's responsibility to complete the [University online waiver form](#) prior to the deadline. If approved, a health insurance waiver is good for the current academic year only. A new waiver must be submitted each academic year. All international graduate students are required to carry student health insurance, and the cost will be automatically added to your student account. Any international graduate students with insurance questions must contact the [Office of International Students and Scholars \(OISS\)](#) directly.

11 Leave of Absence

Continuous Enrollment To maintain "good standing" all graduate students are required to enroll in a minimum of three (3) graduate credits each fall and spring semester until they graduate. International students may be required to enroll in nine graduate credits each fall and spring semester depending on the requirements of their visa. All students holding assistantships (whether teaching or research assistantships) are required to enroll in a minimum of six (6) graduate credits each semester they hold the assistantship.

Leave of Absence Students in good standing may request a leave of absence by completing a [Leave of Absence Form](#) available on the Graduate School's website, during which time they are not required to maintain continuous registration. Usually, a leave of absence is approved for one or two semesters. The leave of absence request may be extended by the student filing an additional leave of absence form. Students applying for a leave of absence should not have any "incomplete" grades which could be changed to "F" and have a detrimental impact on their cumulative GPA. Requests for leave of absences must be received by the Graduate School no later than the last day of enrollment for the semester the leave is to begin.

Reinstatement to Graduate Standing When a student has been absent for one semester or more without an approved leave of absence, she or he may request reinstatement via the [Notice of Reinstatement to Graduate Standing Form](#). This form allows the program the option to recommend the student be re-admitted to their graduate program based on their previous admission, or require the student to re-apply for admission which would require students to submit a new application for admission and pay the application fee. The Notice of Reinstatement to Graduate Standing must be received by the Graduate School no later than the last day of enrollment for the semester the reinstatement is to begin.

12 Graduate Student Association

The [Graduate Student Association \(GSA\)](#) represents all graduate students and promotes the welfare and interests of the graduate students at the University of Nevada, Reno. The GSA works closely with appropriate university administrative offices, including the Graduate School and Student Services and reports to the President of the University. The GSA government functions through the Council of Representatives, Executive Council and established committees.