

June 5, 2017

THOMAS LEE, DEPARTMENT CHAIR
Statistics Graduate Program

RE: Statistics Degree Requirements

Enclosed is a copy of the Statistics graduate degree requirements as approved by Graduate Council on June 2, 2017. These degree requirements are now the official requirements for the Statistics Graduate Program and will be posted on the Office of Graduate Studies program webpage:

<https://grad.ucdavis.edu/programs/gsta>

Thank you for your efforts on behalf of graduate education.

Sincerely,

A handwritten signature in black ink, appearing to read "N. Baumgarth". The signature is fluid and cursive, with a large loop at the end.

Nicole Baumgarth, Chair
Graduate Council

c: Amanda Kimball, Graduate Studies Analyst
Pete Scully, Graduate Program Coordinator
Jillian Hancock, Graduate Program Coordinator

STATISTICS Ph.D. AND M.S. DEGREE REQUIREMENTS

Revised: June 11, 2008; April 10, 2014; June 10, 2016

Graduate Council Approval: June 2, 2017

Master's Degree Requirements

1) Admissions requirements:

An undergraduate major in mathematics or statistics is typical for statistics graduate students, but is not required. However, because of the mathematical nature of some of the graduate coursework, students should be able to demonstrate good mathematical ability. The applicant must complete the Office of Graduate Studies online application, with fee, by the stated deadline and include: one official transcript for each school attended, three letters of recommendation, and GRE scores taken within the last 5 years. TOEFL or IELTS scores are also required if the applicant's native language is not English. The program does not accept part-time students.

- a. **Prerequisites:** The prerequisites for entrance into the master's program are as follows: a bachelor's degree with 3.0 overall grade-point average; one year of calculus; a course in linear algebra; facility with a programming language; and upper-division work in mathematics and/or statistics.
- 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.

2) M.S., Plan, II

The program of study will be developed and approved for each student by one of the Graduate Advisers in consultation with the student. This is a M.S. Plan II program (no thesis). A minimum of 44 units is required, of which at least 18 must be at the graduate level (according to university regulations). A comprehensive final examination in the major subject is required of each candidate. No thesis is required. The comprehensive final examination fulfills the capstone requirement.

3) Course Requirements - Core and Electives (total 44 units)

a) Core Courses (total 32 units)

STA200 A	Introduction to Probability Theory	4 units
STA200 B,C	Introduction to Mathematical Statistics	4 units each
STA135	Multivariate Data Analysis	4 units
STA206, 207 & 208	Statistical Methods for Research	4 units each
One of the following 2 courses:		
STA242	Introduction to Statistical Programming	4 units
STA243	Computational Statistics	4 units

Links to course descriptions:

Undergraduate: <http://anson.ucdavis.edu/courses/undergraduate>

Graduate: <http://anson.ucdavis.edu/courses/graduate>

b) Elective Courses (total 12 units)

At least three courses, with at least one course at graduate level, selected from

STA137	Applied Time Series Analysis	4 units
STA138	Analysis of Categorical Data	4 units
STA141B	Data & Web Technologies for Data Analysis	4 units
STA141C	Big Data & High Performance Statistical Computing	4 units
STA142	Reliability	4 units
STA144	Sampling Theory of Surveys	4 units
STA145	Bayesian Statistical Inference	4 units
STA 260	Statistical Practice and Data Analysis	3 units

or any four-unit letter-grade graduate level course in Statistics.

The following courses can be used as substitutes:

- For students who enter the graduate program as Ph.D. students, successful completion of STA 232ABC substitutes for STA 206, 207, 208 as a requirement for the M.S. degree.
- With the permission of one of the Graduate Advisers, an internship coupled with STA 299 can substitute for an elective course.

c) Summary:

32 units of core coursework and 12 units of electives are required for a total of 44 units. Full-time students must enroll for 12 units per quarter including research, academic and seminar units. Courses that fulfill any of the program course requirements may not be taken S/U unless the course is normally graded S/U. Once course requirements are completed, students can take additional classes as needed, although the 12 units per quarter are generally fulfilled with a research class (299) and perhaps seminars, or additional electives, approved by one of the Graduate Advisers. Per UC regulations students cannot enroll in more than 12 units of graduate level courses (200) or more than 16 units of combined undergraduate and graduate level (100, 200, 300) courses per quarter.

4) Special requirements:

N/A.

5) Committees:

- a. **Admissions Committee**: once applications and relevant materials are submitted to the program, they are reviewed by the admissions committee, which consists of four or five faculty members. Once a decision has been made to admit or deny an applicant, the admissions committee chair forwards the committee's recommendation to the Dean of Graduate Studies for approval. The priority application and fellowships deadline for entry in Fall of the next academic year is January 15; applications are accepted through March 1.
- b. **Advising Committee**: there are four faculty members of the advising committee for the Master's program, chaired by the Master Graduate Adviser (see Section 6 below for information on how a study plan is developed).
- c. **Comprehensive Examination Committee**: the Chair of the Graduate Program in Statistics (GPS) will appoint an examination committee that will be responsible for preparing, administering and grading the examination. The same exam will be given to the students simultaneously. This committee will also make the final decision on each student. If the committee does not reach a decision on a student, the GPS executive committee will be responsible for making the pass-no pass decision.

6) Advising Structure and Mentoring:

The Master Graduate Adviser, selected by the Chair of the program from among the Graduate Advisers appointed by the Dean of Graduate Studies, assists M.S. students in developing a study plan, and has signatory authority for the Master's program. A copy of the Statistics Mentoring Guidelines can be found at <http://anson.ucdavis.edu/mentor.pdf>.

7) Advancement to Candidacy:

Plan II M.S. Candidates must file an Advancement to Candidacy form (<http://www.gradstudies.ucdavis.edu/forms>) after completing one-half of their course requirements for their degree requirements (18 units) and at least one quarter before completing all their degree requirements.

8) Comprehensive Examination:

Every M.S. Plan II student needs to pass a comprehensive exam, to continue in the program. The M.S. Comprehensive Examination is a written examination. The examination may include the use of statistical software and may be offered in a computer lab. The examination is taken at the end of the Winter quarter (during Spring Break) upon completion of STA 206 and STA 207. If a student does not attempt the examination upon completion of those courses it will be counted as not passing the comprehensive exam.

Should a student attempt and not pass the comprehensive exam at this time, the student will be offered a second examination during the Spring quarter following the first attempt. If a student does not attempt the second exam, it will be counted as a failure.

Failure to pass the exam at the second attempt will be counted as a failure of the comprehensive exam.

Failure to pass the comprehensive exam will result in a recommendation to the Dean of Graduate Studies for disqualification of the student from the graduate program.

For students who entered the graduate program as Ph.D. students but subsequently change their degree objective to the M.S. program, passing the STA 232AB part of the program's pre-qualifying Ph.D. written exam is considered as passing the comprehensive exam.

9) Normative Time to Degree:

The Normative Time to Degree for the Statistics M.S. program is four to five quarters, although it is possible for a well-prepared student to finish the program in three quarters (one year).

10) Typical Time Line and Sequence of Events:

Course requirements are typically completed in four to five quarters. Graduate Students must be enrolled in a minimum of 12 units every quarter. These 12 units can be made up of both required courses and 299 variable unit courses.

For a well-prepared student it is possible to complete the course requirements by the end of the first year. Students may take longer if they take required electives in the fourth or fifth quarter. The following would be a typical one-year program.

Year One	Fall	Winter (advancement to MS candidacy) (Preliminary/Comprehensive Exam completed)	Spring
	STA200A; STA206; Elective	STA200B; STA135; STA207, Elective	STA200C; STA208; STA242 or 243, Elective

The following would be a typical program for a student requiring two full years.

Year One	Fall	Winter	Spring
	STA106; STA200A; STA141	STA108; STA200B; STA135	STA200C; elective; elective
Year Two	Fall	Winter (advancement to MS candidacy) (Preliminary/Comprehensive Exam completed)	Spring
	STA206; elective; elective	STA207;; elective	STA208; STA242 or 243; elective

11) Sources of funding.

Students may be supported by TA-ships, internships or GSR-ships. However, there is no promise for any support.

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/>

Ph.D. Degree Requirements

1) Admission Requirements

An undergraduate major in mathematics or statistics is typical for statistics graduate students, but is not required. However, because of the mathematical nature of some of the graduate coursework, students should be able to demonstrate good mathematical ability. The minimal background for entrance into the Ph.D. program is: a bachelor's degree with 3.0 overall grade-point average; facility with a programming language; and upper division work in mathematics and/or statistics; The applicant must complete the Office of Graduate Studies online application, with fee, by the stated deadline and include: one official transcript for each school attended, three letters of recommendation, and GRE scores taken within the last 5 years. TOEFL or IELTS scores are also required if the applicant's native language is not English. **The program does not accept part-time students.**

- a. **Prerequisites:** The prerequisites for entrance into the Ph.D. program are as follows: at least one semester or two quarters of advanced calculus at a level equivalent to **MAT 25 and MAT 125A**; and a quarter of linear algebra at a level equivalent to **MAT 67**.
- 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.

2) Dissertation Plan: Plan A

This degree is offered under Plan A which specifies a five member (minimum) dissertation/final examination committee and a final oral examination (defense of the dissertation); no exit seminar is required.

3) Course Requirements – Core and Electives (52 units)

A Ph.D. student will select an area of specialization and will choose a major dissertation adviser **from Graduate Program in Statistics (GPS) faculty working** in that area, usually in the second or third year of study. The student's program of study will be developed by the student jointly with the major dissertation adviser, with the assistance from any of the program's Graduate Advisers as necessary. **See section 4 for special requirements for the Biostatistics track.**

a) Core courses (34 units total):

STA231 A, B, C (4 units each)	STA260 (3 units)
STA232 A, B, C (4 units each)	STA290 for three quarters (1 unit each)
STA 242 or 243 (4 units)	STA390 (2 units)

b) Elective courses (18 units total):

In addition, five elective graduate courses (at least 18 units total), out of which at least four must be from Statistics. The following gives a list of potential elective courses:

- STA 222, Survival Analysis (4 units)
- STA 223, Generalized Linear Models (4 units)
- STA 224, Analysis of Longitudinal Data (4 units)
- STA 225, Clinical Trials (4 units)
- STA 226, Statistical Methods for Bioinformatics (4 units)
- STA 235A-235B-235C, Probability Theory (4 units each)
- STA 237A-237B. Time Series Analysis (4 units each)
- STA 250, Topics in Applied and Computational Statistics (4 units)
- STA 251, Topics in Statistical Methods and Models (4 units)
- STA 252, Advanced Topics in Biostatistics (4 units)

c) Summary:

All coursework (a total of at least 52 units: 34 required and 18 elective units) and the program of study must be approved by the Graduate Adviser.

4) Special Requirements

The Biostatistics Track

The Graduate Program in Statistics offers the program Ph.D. in Statistics: Biostatistics Track as a subspecialty. Biostatistics may be understood as the application of statistical methods in the biological, medical, agricultural and environmental sciences, as well as the study of statistical methodology concerning problems and statistical areas originating from such scientific fields.

This subspecialty builds on the strong, diverse Statistics program and the UC Davis environment of highly regarded programs in Biological Sciences, Veterinary Medicine, and Agricultural and Environmental Sciences, as well as the School of Medicine. The collective research interests of the GPS faculty include a broad range of topics in Biostatistics.

Students who wish to enroll in the Biostatistics track are encouraged to do so as early as possible. Enrollment may be declared anytime prior to the Ph.D. Qualifying Exam. On the Ph.D. diploma, transcripts and the first title page of the Ph.D. thesis, the program will still be denoted as "Statistics". Completion of this program will be recognized by a letter from the GPS Chair, stating that the student has completed all requirements of the Biostatistics track.

The requirements of Sections 1 and of Sections 4 through 13 of the Ph.D. program apply to this track. Sections 2 and 3 are replaced by the following two paragraphs:

Program of Study

This degree is offered under Plan A which specifies a five member (minimum) dissertation/final examination committee and a final oral examination (defense of the dissertation); no exit seminar is required.

A Ph.D. student in this program will select an area of specialization within Biostatistics and will choose a major dissertation advisor from GPS faculty working in Biostatistics, usually in the second or third year of study. The student's program of study will be developed by the student jointly with the Graduate Adviser.

Required Courses (46 units):

STA 231 A, B, C (4 units each)	
STA 232 A, B, C (4 units each)	STA 260 (3 units)
STA 222 (4 units)	STA 290 for three quarters (1 unit each)
STA 223 (4 units)	STA 390 (2 units)
STA 224 (4 units)	STA 242 or 243 (4 units)

In addition, one life sciences course (non-quantitative biology course) at the upper division or graduate level (4 units) and one elective graduate course from Statistics or Biostatistics (at least 3 units) are required. All coursework (a total of at least 53 units) and the program of study must be approved by the Graduate Adviser.

5) Committees

- a. **Admissions Committee:** once applications and relevant materials are submitted to the program they are reviewed by the admissions committee, which consists of four to five faculty members. Once a decision has been made to admit or deny an applicant, the admissions committee chair forwards the committee's recommendation to the Dean of Graduate Studies for approval. The application and fellowships deadline for entry in Fall of the next year is January 15.
- b. **Advising Committee:** there are four faculty members of the advising committee, chaired by the Master Graduate Adviser. The Master Graduate Adviser is selected by the Chair of the program from the list of appointed Graduate Advisers appointed by the Dean of Graduate Studies, assists graduate students in developing a study plan, and has signatory authority for the Master's and Ph.D. programs.
- c. **Pre-qualifying Written Examination Committee:** The Chair of the Graduate Program in Statistics (GPS) will appoint an examination committee that will be responsible for preparing, administering and grading the examination. This committee will forward its recommendation to the GPS, which will make the final decision on each student.
- d. **Qualifying Examination Committee:** the examining committee will be appointed in accordance with the policies of the Graduate Council and Office of Graduate Studies at the recommendation of the Graduate Adviser who consults with the student prior to making the recommendation. The major professor is not eligible to serve as chair of the examining committee (see Section 8 below for more information regarding the examination requirements).

- e. **Dissertation Committee:** the student, in consultation with their major professor, nominates five qualified faculty members to serve on the Dissertation Committee. 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.). The major professor serves as Chair of the committee.

6) Advising Structure and Mentoring

The major professor is the faculty member who supervises the research and dissertation; this person serves as the Chair of the Dissertation Committee. The Master Graduate Adviser is identified by the chair of the program from among the appointed Graduate Advisers, assists graduate students in developing a study plan, and has signatory authority for the Master's and Ph.D. programs. A copy of the Statistics Mentoring Guidelines can be found at <http://anson.ucdavis.edu/mentor.pdf>.

7) Advancement to Candidacy

The student is eligible for advancement to Candidacy for the Ph.D. degree upon completion of all course requirements, having maintained a GPA of, at least, 3.0 in all coursework (except those graded S/U), and after passing the Ph.D. Qualifying Examination; this is typically in the fifth quarter (or earlier).

8) Examination and Dissertation Requirements

a) Ph.D. Pre-qualifying Written Examination

The Ph.D. Pre-qualifying Written Examination will be given at the beginning of each Spring Quarter and also at the beginning of each Fall Quarter. Students in the Ph.D. program must attempt the exam in the Spring Quarter immediately after they complete both the STA 231AB and STA 232AB core course series. If a student does not attempt the examination at this time, it will be recorded as a 'no pass'. Every Ph.D. student needs to pass the examination in a maximum of two attempts. In case of not pass at the first attempt, the second attempt must take place at the next time the examination is offered, and if a student does not attempt the exam at that time, it will be counted as a failure. Two 'not passes' of the examination will result in a recommendation to the Dean of Graduate Studies for discontinuation of the student in the Ph.D. program.

The Ph.D. Pre-qualifying Written Examination is a written exam with two separate parts: a theoretical part and an applied part. The duration of each part is about 3-4 hours. The applied part may be offered in a computer lab and may include the use of statistical software. If at the first attempt one part is passed but the other is not, only the part which was not passed must be repeated at the next attempt.

The Chair of the Graduate Program in Statistics (GPS) will appoint an examination committee that will be responsible for preparing, administering and grading the examination. This committee will forward its recommendation to the GPS, which will make the final decision on each student.

b) Ph.D. Qualifying Examination

The Ph.D. Qualifying Examination (QE) is an oral exam whose purpose is to determine if the student is capable of independent research. The QE will be composed of a forty-five minute presentation given by the student and is followed by a question period which covers a special research topic as well as coursework in general. A student who passes the QE is eligible for advancement to candidacy for the Ph.D. degree. The QE is expected to be attempted within one year from the quarter in which the student passes the Ph.D. Pre-qualifying Written Examination, but no later than the end of the student's third year of the Ph.D. program. In consultation with the Dissertation Adviser, the student will submit to the Graduate Advising Committee (GAC) a date for the exam and a dissertation proposal.

1. The dissertation proposal should be between three and five pages in length and should contain an outline of the general context of the thesis research, a description of the special problem(s) to be addressed, and an indication of the methods and techniques to be used.
2. A draft version of the proposal must be submitted to the GAC for the purpose of determination of the composition of the QE committee at least 6 weeks before the proposed date of the exam. The student must submit a final version of the proposal to the QE committee a week before the exam date.
3. Based on the proposal, the GAC will recommend the appointment of a committee of five examiners to Graduate Studies (in consultation with the student and the student's Dissertation Adviser). Normally the exam committee will be composed of four members from the Department of Statistics. Per Graduate Council guidelines, at least one member must be external to the Graduate Program in Statistics. The **student's intended** Dissertation Adviser (and/or co-adviser) is not eligible to serve on the Qualifying Examination committee.

A student who passes the Ph.D. Qualifying Examination is eligible for Advancement to Candidacy for the Ph.D. degree. The student must file the appropriate paperwork with the Office of Graduate Studies and pay the candidacy fee to be promoted to Candidacy for the Ph.D. degree.

c) Final Examination

Defense of the dissertation before the dissertation committee will constitute the final examination for the Ph.D. degree. **The final examination must be passed within four years after promotion to Candidacy, unless a special exception is granted.** Pass or no pass is determined by a vote of the dissertation committee. Title and abstract of the Ph.D. Defense presentation will be distributed to all faculty and students of the Graduate Program in Statistics, who are invited to attend the presentation portion of the examination. **The subsequent question period is a closed session between the student and the committee.**

d) Dissertation

The doctoral dissertation is **an essential** part of the Ph.D. program. A topic will be selected by the student, under the advice and guidance of a major professor (thesis adviser) and the dissertation committee chaired by the major professor. Students are encouraged to begin some research activity as early as possible during the second year of their graduate studies. The dissertation must contain an original contribution of publishable quality to the knowledge of statistics that may expand the theory or methodology of statistics, or expand or modify statistical methods to solve a critical problem in applied disciplines. Acceptance of the dissertation by three designated members of the dissertation committee follows Graduate Studies guidelines (Plan A with defense). The dissertation must be completed and **submitted to the dissertation committee** prior to taking the final examination. Students should be guided on matters of style by the chair and members of the thesis/dissertation committee. Graduate Studies is not concerned with the form of the bibliography, appendix, footnotes, etc. as long as they are done in some acceptable, consistent and recognized manner approved by your committee. (See <https://grad.ucdavis.edu/current-students/academic-services-information/filing-thesis-or-dissertation>)

9) Normative Time to Degree

The normative time to degree is four to five years.

10) Typical Time Line and Sequence of Events

Every full-time student at UC Davis is required to take 12 units of coursework per quarter. In addition to the coursework outlined below, students will take Statistics 290 and generally will take additional electives later on, in consultation with their major professor.

The following track will be a typical program for a well-prepared student seeking a Ph.D. degree.

Year One	Fall	Winter	Spring (Preliminary Exam completed)
	STA 231A STA 232A STA 390 STA 290	STA 231B STA 232B STA 141 STA 290	STA 231C STA 232C STA 260 STA 290 <i>Ph.D. Pre-qualifying Written Exam</i>
Year Two	Fall	Winter (advancement to Ph.D. candidacy)	Spring
	Statistics Elective Statistics Elective Statistics Elective	STA 242 Statistics Elective Statistics Elective <i>Ph.D. Qualifying Exam</i>	Dissertation Research
Years Three-Four	Complete requirements for the Ph.D. degree, including Dissertation and Defense		

11) Sources of Funding.

Funding for each student is specified when students are offered to join the program, and the funding itself can vary from student to student. An offer letter sent to the student will spell out the individual funding. Typically such funding consists in a combination of stipends and TA-ships. After the students have gained some more experience, they typically will also receive funding through a Graduate Student Researcher (GSR) position.

12) PELP, In Absentia, and Filing Fee Status

Information about PELP, In Absentia, and Filing Fee status can be found in the Graduate Student Guide: <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 for that degree (see masters requirements). Students may use the Change of Degree Objective form available from the Registrar's Office:
<http://registrar.ucdavis.edu/PDFFiles/D065PetitionForChangeOfGraduateMajor.pdf>