



# **APPLIED STATISTICS & STATISTICS**

## **GRADUATE STUDENT HANDBOOK**

**2020-21**

**UC** UNIVERSITY OF CALIFORNIA  
**RIVERSIDE**

# APPLIED STATISTICS & STATISTICS

## GRADUATE STUDENT HANDBOOK

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## MISSION STATEMENT

The Department of Statistics has two primary interrelated objectives as it serves the University, the State, and beyond. First, we aim to provide both undergraduate and graduate students with strong degree programs and excellent instruction in probability, applied statistics, and theoretical statistics. Second, we aim to conduct and publish outstanding research while promoting the solid practice of statistics at the University of California and beyond.

# DEPARTMENT RESOURCES

## GRADUATE FACULTY ADVISOR; ASSOCIATE PROFESSOR

DR. WEIXIN YAO

Email: [weixin.yao@ucr.edu](mailto:weixin.yao@ucr.edu)

Phone: (951) 827-6007

## GRADUATE STUDENT SERVICES ADVISOR

DAWN LOYOLA

Email: [dawn.loyola@ucr.edu](mailto:dawn.loyola@ucr.edu)

Phone: (951) 827-4116

# UNIVERSITY RESOURCES

## GRADUATE DIVISION

[University Office Building](#), Room 141

Phone: (951) 827-3313

## CNAS GRADUATE STUDENT

### AFFAIRS CENTER

[1140 Batchelor Hall](#)

Phone: 951-827-4224

(800) 735-0717

## R'WEB

## STUDENT BUSINESS SERVICES

## TEACHING ASSISTANT DEVELOPMENT PROGRAM (TADP)

## R'PANTRY

## INTERNATIONAL STUDENTS AND SCHOLARS OFFICE FINANCIAL AID OFFICE

## STUDENT HEALTH SERVICES

## HIGHLANDER ONE STOP SHOP (HOSS)

## THE WELL

## STUDENT HEALTH OFFICE

## COUNSELING & PSYCHOLOGICAL SERVICES

## **M.S. STATISTICS**

The Master of Science in Statistics degree emphasizes a broad understanding in Statistics and its application. The M.S. students are required to have fundamental statistical knowledge in probability theory, linear models and experimental design, have the ability to use fundamental statistical techniques to formulate problem and solution in diverse real-world application, the ability to use at least one statistical software package to conduct statistical data analysis and the ability to communicate with researchers in statistical community and other disciplines by using graphical methods to display and interpret information.

### **ADMISSIONS**

Students entering the MS program must have completed a bachelor's degree with sufficient training in Mathematics and a strong background in Statistics or have taken the following undergraduate upper division courses or equivalent, covering basic areas of probability and statistics:

- STAT160A, 160B, 160C, Elements of Probability and Statistical Theory, 4 units each.
- STAT 161, Introduction to Probability Models, 4 units.
- STAT 170A, Regression Analysis, 4 units.
- STAT 170B, Design of Experiments, 4 units.
- STAT 171, General Statistical Models, 4 units.

Students must also meet the other requirements for admissions as specified by the Graduate Division. The program is Plan II (comprehensive examination) described in the Graduate Studies section of the catalog. No foreign language is required.

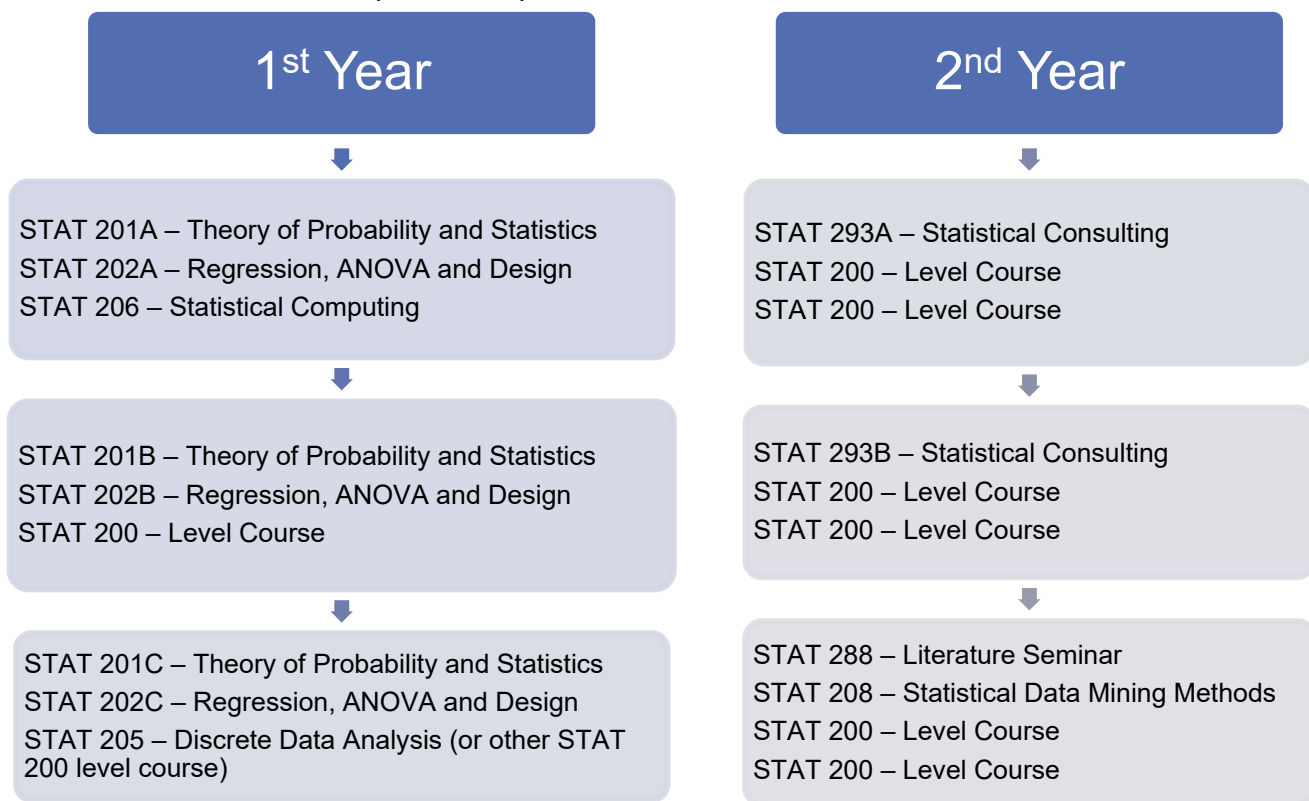
# M.S. REQUIREMENTS

The normative time for completion of the M.S. degree requirements is 6 quarters (2 years). The general requirements of the Statistics Graduate Program include:

- Prerequisite coursework: students must have completed appropriate background courses in mathematics to prepare them for graduate-level work in statistics. Important areas include calculus (at least MATH 009A, MATH 009B, MATH 009C, and MATH 010A or equivalent) and linear algebra (at least MATH 131 or equivalent).
- Course requirements – 41 units
- Completion of written comprehensive exam

## I. COMPLETE COURSE REQUIREMENTS

Students are required to complete a minimum of 41 units that must include STAT 201A, 201B, 201C, STAT 202A, 202B, 202C, STAT 206, STAT 208, STAT 288, and two consecutive quarters of STAT 293. See below a sample course plan:



## II. COMPLETE COMPREHENSIVE EXAMINATIONS

MS students must pass a single MS-level written exam (with no more than two attempts). A program proposal is not required.

The written qualifying exam is offered two times in each year:

- First attempt - Summer quarter
- Second attempt if first attempt is not passed - Fall quarter

Exceptions to these dates can be made based on the approval of Graduate advisor.

If a MS student fails on their 2nd attempt, they will be dismissed from the program (see qualifying exam process policy on page 31). **Students must be enrolled or on Filing Fee status in order to take the exams.**

Students are advised to have command of the following courses: STAT 201A,B,C and 202 A,B,C. However, qualifying exams may include other topics aside from these.

To prepare for the written qualifying examinations, a student can register up to 6 units of STAT 291 (individual studies in coordinated areas) only during the quarters that the student participates in qualifying examinations.

MS students who are interested in taking the PhD exam must consult and receive approval from the Graduate Advisor prior to signing up for the PhD qualifying exam.

### **III. Professional Development Requirement**

Two quarters of SAT 293 give students training in (a) the ability to use fundamental statistical techniques to formulate problem and solution in diverse real-world application; (b) the ability to use at least one statistical software package to conduct statistical data analysis; (c) the ability to communicate with researchers in statistical community and other disciplines by using graphical methods to display and interpret information.

### **IV. Satisfactory Academic Progress**

For all students, evaluations of progress are carried out each spring by the Graduate Advisor, who is responsible for making specific recommendations to the Graduate Division concerning the student's progress. Students are notified in writing of the results of the annual evaluation, and copies are forwarded to the Graduate Division and kept in the student file.

### **V. Unsatisfactory Academic Progress**

It is hoped that you will make satisfactory progress in your degree program. Failing to do so will have profound consequences for your career in graduate school. If your GPA drops below the minimum level of 3.00, if you have 12 or more units of "I" grades, or if your advisor feels that you are not advancing as you should, the Graduate Division can and will block your registration. Please reach out early to Dr. Yao and/or Dawn Loyola if you are struggling.

### **VI. Advancement to Candidacy in the MS Program**

The form for [advancement to candidacy](#) is available online on Graduate Division.

Completed applications are returned to [Dawn Loyola](#) and processed through the [Graduate Advisor](#) and Graduate Division for approval. Students cannot graduate with a Grade Delay or Incomplete grades.

## Application to Change Degree Objective from the MS to the Ph.D.

The application to Change Degree Objective is submitted a year in advance and no later than January 5th for consideration to start the Ph.D. the following fall quarter. Please submit your applications [here](#) and contact [Dawn Loyola](#) with any questions. MS students need to compete with new Ph.D. applicants for admissions and financial support. The final admission decision will be made by the department graduate admissions committee.

To file for degree completion, MS students need to submit the Advancement to Candidacy and Graduation forms. For international students, additional forms may include Optional Practical Training (OPT) and Curricular Practical Training (CPT), depending on the individual situation.

Submit the forms to [Dawn Loyola](#) at least two weeks before the deadlines. If forms are submitted less than two weeks before the deadline, approval is not guaranteed. Please avoid delays and submit your forms early.

### Helpful Deadlines

<b>MS advancement to candidacy due:</b>	First day of instruction of graduation quarter. <a href="#">See Graduate Divisions Deadlines</a>
<b>Commencement Petition due:</b>	<a href="#">See Graduate Divisions Deadlines</a>
<b>CPT Application due:</b>	At least two weeks before completion of degree.  <a href="#">Learn more from the International Students and Scholars Office.</a>
<b>OPT Application due:</b>	90 days in advance of your completion date and when you plan to begin work, and up to 60 days after your completion date.  <a href="#">Learn more from the International Students and Scholars Office.</a>

**(These forms will be voided if students do not pass comprehensive exams)**

## PH.D. IN APPLIED STATISTICS

The Doctor of Philosophy degree is awarded in recognition of high scholarly attainment as evidenced by a period of successful advanced study, the satisfactory completion of prescribed examinations and the development of an acceptable dissertation covering a significant, original aspect of statistics.

Ph.D. students are required to demonstrate proficiency in fundamental areas in statistics including probability theory, statistical inference methodologies, statistical computing techniques, multi-disciplinary collaborations and apply such knowledge to address complex problems in Applied Statistics.

Normative time to degree is 15 quarters (5 yrs.).

### ADMISSIONS

Students entering the program must have completed either a bachelor's degree or a master's degree in Statistics, Computer Science, Mathematics, or some other quantitatively-based discipline. Students lacking sufficient preparation for statistics graduate classes must complete preparatory work in Statistics, Computer Science, or Mathematics, depending on their background. Students must meet the general requirements listed in the Graduate Studies section of the catalog.

### PH.D. REQUIREMENTS

The general requirements of the Applied Statistics Ph.D. Program include:

- Completion of coursework
- Completion of written comprehensive exams before the beginning of the third year
- Completion of Oral Qualifying Exam before the beginning of the fourth year
- Completion of three quarters of teaching
- Preparation of the Ph.D. dissertation
- Successful submission of Dissertation Defense

The normative time for Ph.D. completion is fifteen quarters (5 years).

During the second academic year, students are encouraged to complete the passing of the written comprehensive exam.

After passing the comprehensive exam, students should start thinking about their research project and identify a major professor to have sufficient time to prepare for the oral qualifying exam.

Most coursework and preparation for written and oral qualifying examinations is expected to be completed during the first two years.

The remaining 2-3 years are devoted to research, the writing and defense of the Dissertation, participation in graduate seminars, and additional coursework.



## **Achieve the following goals:**

1. Maintain a 3.0 GPA in order to retain fellowship and TA/GSR employment.
2. Pass the written and oral qualifying examinations before the beginning of fourth year.
  - International students must advance to candidacy before the beginning of the 10th quarter to qualify for the Non-Resident Tuition waiver. If not advanced by this time, NRT is paid by the student or PI until student advances to candidacy.
3. Prepare an original written dissertation proposal.
4. Produce and submit the dissertation by the end of the fifteenth academic quarter.

## **I. COMPLETE COURSE REQUIREMENTS**

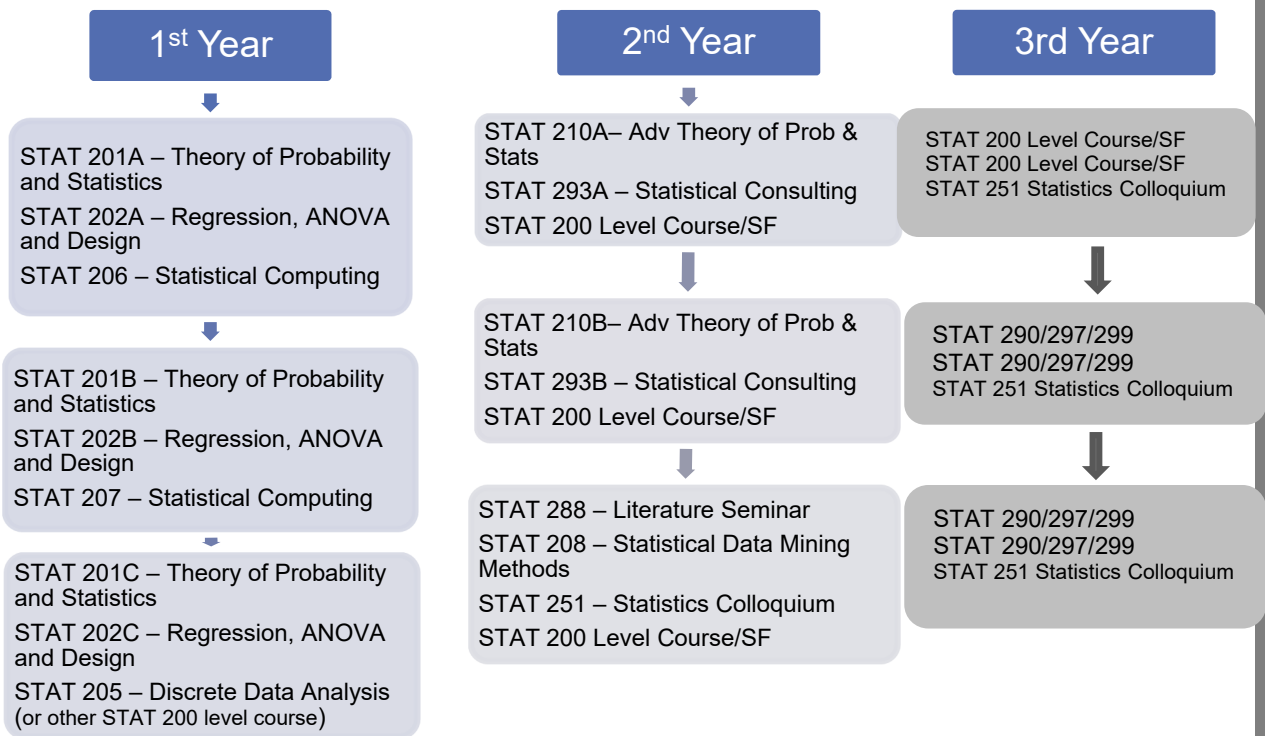
1. Core Requirements:
  - STAT 202 A/B/C: Regression, ANOVA, and Design - 12 units.
  - STAT 206 Statistical Computing - 4 units
  - STAT 207 Statistical Computing - 4 units
  - STAT 208 Statistical Data Mining Methods (previously STAT 209A) - 4 units
  - STAT210A/210B Advanced Theory of Probability and Statistics - 8 units
  - STAT 288, Literature Seminar, 1 unit
  - STAT 293 Statistical Consulting and Data Analysis. Two consecutive quarters, total 8 units
2. 20 units of additional 200 level Statistics courses not graded S/NC, excluding STAT201A/B/C and STAT231A/B.
3. Substantive Field: 4 units (or equivalent) in Substantive Field(s) with a minimum GPA of 3.00 appropriate to the student's interest. The requirement may be waived if the student already has the background in the Substantive area. Any of these courses will meet this requirement:

BIOL201, BMSC252, BPSC234, CS227, CS229, CS234, CS235, CS 238, ECON205C, ECON285E-K, EDUC212, EDUC213, EDUC218, EDUC234, EDUC287, GEN220, GEN 234, GEN240A, GEN240B, GEN 242, MGT202, MGT203, MGT205, MGT211, MGT233, MGT235, PSYC211, PSYC212, SOC203B.

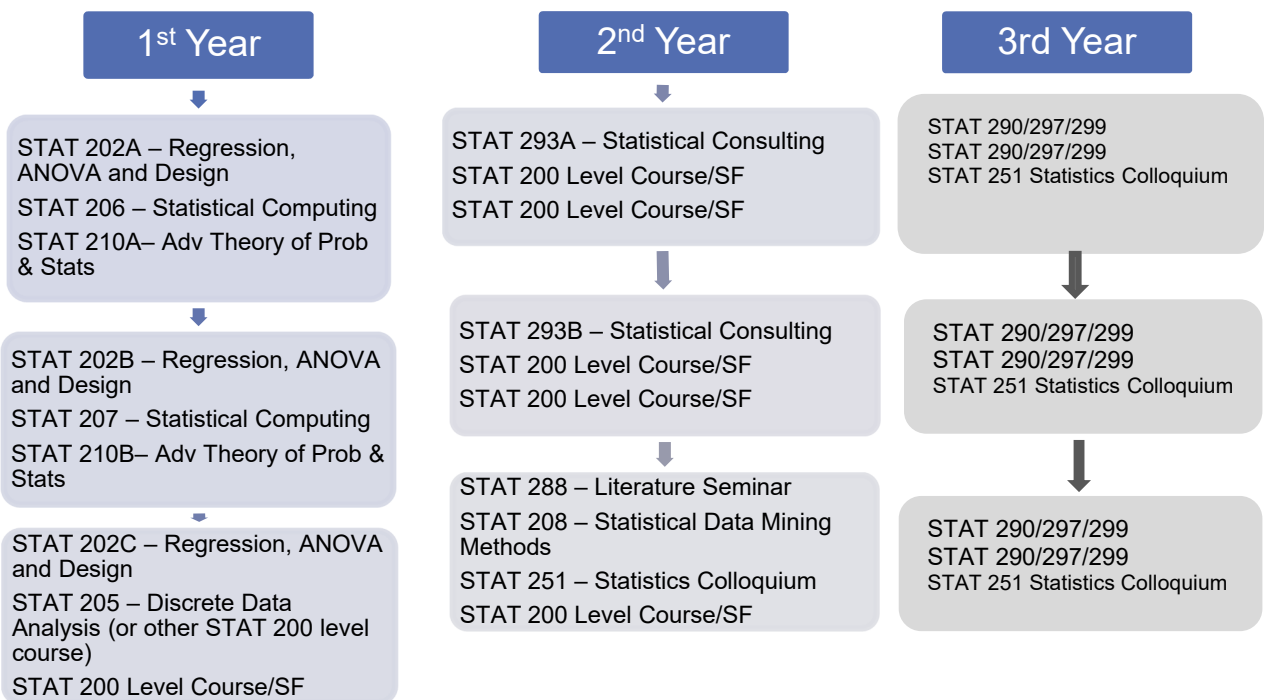
Courses outside of the suggested list above require approval of the Graduate Advisor.

4. Nine units of STAT 251 Statistics Colloquium before graduation.

Default sample course plan (applicable to majority of students):



STAT 201ABC may be waived if students have taken mathematical and statistics courses using the book by Casella and Berger (or higher level). If the waiver is approved by the graduate advisor, students can use the following sample course plan.



## II. TEACHING REQUIREMENT

A minimum of three quarters of service as a Teaching Assistant is required, regardless of whether financial support comes from Fellowship or Research Assistantships, etc. All students will participate in the Graduate Division Teaching Assistant Development Program (TADP).

All new UCR Teaching Assistants must attend the mandatory new TA orientation. Failure to attend the orientation will make you ineligible to serve as a TA at UCR. See the [TADP website](#) for schedules and contact information.

Each quarter, Statistics Department Teaching Assistants are required to attend a mandatory TA orientation conducted by the department. Failure to attend this orientation may result in the loss of your TA position. All Teaching Assistants are required to be available for work from the first day of the quarter through the last day of the quarter (last day of Final Exams week).

## VERSANT TEST

All international students must take the VERSANT test and obtain a passing grade before they can be appointed as a TA. Students receiving a “clear pass” on the test have no further requirements and can be appointed to TA positions. Students receiving a “conditional pass” can be appointed as a TA and are required to take an English then retake the test. The TA appointment is on a probationary basis with the approval of the Graduate Dean.

Students receiving a “no pass” may not be appointed as a TA until they have retaken the test and obtained a clear or conditional pass. Contact the UCR Extension Center for more information regarding the test: (951) 827-1701 ([esl@ucx.ucr.edu](mailto:esl@ucx.ucr.edu)).

## III. COMPLETE WRITTEN QUALIFYING EXAMINATIONS

Ph.D. students must pass a single Ph.D. level qualifying exam.

The written qualifying exam is offered twice each year, the first attempt in Summer Quarter and the second in Fall quarter. The second exam can only be taken by the students who failed their 1<sup>st</sup> attempt. Exceptions can be made based on the approval of the Graduate Advisor.

No more than 2 attempts are allowed in order to pass the written exam. If a Ph.D. student fails their 2<sup>nd</sup> attempt but passed the MS exam in either their 1<sup>st</sup> or 2<sup>nd</sup> attempt and has not received an MS degree in Statistics or a related field from another institution, they can complete the program with a MS degree. Otherwise, the student will end the program without a degree (see the qualifying exam process policy on page 31). Students must be enrolled or on Filing Fee status in order to take the exam.

Students are advised to have command of the following courses: 210AB and 202ABC. However, qualifying exams may include other topics aside from these.

To prepare for the written qualifying examinations, a student can register up to 6 units of STAT 291 (individual studies in coordinated areas) only during the quarters that the student participates in qualifying examinations.

Immediately after passing the written exam students must identify a major professor and will work with them to prepare for the oral qualifying examination. Advancing to Candidacy takes place when the student completes the course requirements for the Ph.D. program and passes the written and oral exams. Students are expected to pass the written exams before the beginning of the third year and oral exams before the beginning of the fourth year.

#### **IV. ORAL QUALIFYING EXAM**

The oral qualifying examination is conducted by the Qualifying Committee in accordance with the regulations set forth in the [UC Riverside Graduate Division Regulation and Procedures](#). The Qualifying Committee, consisting of at least five members, is nominated in consultation of the Graduate Advisor and the student's Major Professor, and is officially approved by the Graduate Dean. The committee must be approved at least two weeks before the scheduled exam date.

The Major Professor is the chair of the Qualifying Exam Committee. One member of the committee is designated as the outside member and cannot be affiliated with the Applied Statistics Graduate Program.

The committee reads and evaluates the research proposal and conducts the examination. Oral exams typically last two to three hours, consisting of a short (50 minute) presentation of the research proposal by the student, followed by a question and answer period. No more than two attempts to pass the oral examination are allowed. (See Oral Qualifying Exam Procedures)

#### **V. WORK ON THE DISSERTATION**

The dissertation committee is chaired by the student's major professor. Typically, three members of the committee are selected from the faculty who were on the oral qualifying committee (an additional member may be added if desired). The student is required to submit a written dissertation proposal to the dissertation committee for comments and approval. Normally, it is in the format of an appropriate funding agency (e.g., NIH, NSF, etc.) and includes detailed descriptions of the proposed research. For more information on the dissertation format, and how to submit an electronic copy, visit [Graduate Division's online checklist](#).

#### **VI. DISSERTATION DEFENSE**

Before the dissertation is given final approval, the student must meet with the dissertation committee for a public oral defense in accordance with the regulations of the Graduate Division.

#### **VII. MAINTAINING SATISFACTORY ACADEMIC PROGRESS**

Normative time for the Ph.D. degree in Applied Statistics is fifteen academic quarters (five years). Normative time is defined as the period of full-time registration required to earn the degree, assuming that the student enters with a bachelor's or master's degree and has no course deficiencies.

Students approved to change degree objective from the MS to the Ph.D. typically finish in six additional quarters. The individual student's program of study is planned in consultation with the Graduate Advisor, who supervises the student's progress prior to the appointment of the major professor. After the student advances to candidacy, the dissertation committee oversees progress in the final stages of the degree program. Students are expected to advance to candidacy by passing the written and oral qualifying examinations before the beginning of the fourth year.

The annual evaluation of progress is carried out each spring quarter by the Graduate Advisor, who is responsible for making specific recommendations to the Graduate Division. Students are notified in writing of the results of the annual evaluation, and copies are forwarded to the Graduate Division.

The Graduate Advisor may also approve exceptions to the normal time schedule occasioned by unusual circumstances.

### **Unsatisfactory Academic Progress**

It is hoped that you will make satisfactory progress in your degree program. Failing to do so will have profound consequences for your career in graduate school and opportunities for receiving funding become severely limited. If your GPA drops below the minimum level of 3.00, if you have 12 or more units of "I" grades, or if your advisor feels that you are not advancing as you should, the Graduate Division can block your registration. Please reach out early to Dr. Yao and/or Dawn Loyola if you are struggling.

## **VIII. PROFESSIONAL DEVELOPMENT REQUIREMENT**

1. STAT 293 gives students training in (a) the ability to use fundamental statistical techniques to formulate problem and solution in diverse real- world application; (b) the ability to use at least one statistical software package to conduct statistical data analysis; (c) the ability to communicate with researchers in statistical community and other disciplines by using graphical methods to display and interpret information.
2. **Pedagogy:** Ph.D. students are required to enroll in Teaching Assistant Development Program (TADP) Orientation to TA and enroll in STAT 302 during every quarter they are appointed as a teaching assistant. Three quarters of TA experience required.
3. **Obtaining the MS Degree while in the Ph.D. program:** Students who have satisfied all requirements for the MS degree while completing the Ph.D. may apply. Please see Dawn Loyola for forms and to discuss requirements.
4. **Change of Degree Objective:** Students terminating the Ph.D. and satisfying the MS degree requirements can leave the program with the MS degree. Please see Dawn Loyola to complete a petition to change degree objective to graduate with an MS degree.

# **ADVANCING TO CANDIDACY**

## **PH.D. IN APPLIED STATISTICS**

### **ORAL QUALIFYING EXAM PROCEDURES**

#### **Nominating Qualifying Committee**

The committee is comprised of five members, a majority of whom are affiliated with the program. All members are usually voting members of the UC Academic Senate. Exceptions must be supported by a memo of justification from the Graduate Advisor.

One member is designated as the “Outside Member” not holding an appointment in the Applied Statistics graduate program. Their role is to ensure fairness as ‘third party’ and may be unrelated to the student’s field of study and other committee members.

#### **Notify Dawn Loyola**

Please refer to the STAP Qualifying Exam Process at the end of this handbook.

The Qualifying Committee must be approved by the Graduate Advisor and the Graduate Division prior to the Oral Qualifying Examination.

- Note: International students must advance to candidacy by the first day of instruction of fall quarter of the fourth year to qualify for non-resident tuition waiver. Otherwise, non-resident tuition will need to be paid each term until student advances to candidacy.

Dawn Loyola will prepare the Report of the Qualifying Examination Form 3 and give the form and the student’s academic file to the chair of the student’s qualifying exam committee a few days before the oral exam.

Upon completion of the exam, the committee chair obtains the committee members’ signatures and the Graduate Advisor’s signature on the Form 3 and returns it to Dawn, who then forwards it to the Graduate Division. This must be done within 48 hours after the exam is completed. The advancement is then processed. Once complete, the student is charged an advancement to candidacy fee.

Also, the dissertation committee chair (and the rest of the committee, if known) must be appointed at the time of the Oral Qualifying Examination using the same Form 3 to avoid a registration hold.

# COMPRHENSIVE WRITTEN QUALIFYING EXAM POLICY

## Process Policy

All graduate students must demonstrate their proficiency in statistical theory, methods, and applications by passing a comprehensive written qualifying exam. Students must be enrolled or on Filing Fee status to take exams.

There is a single written qualifying exam that each student must pass: PhD level qualifying exam for PhD students and a MS level exam for MS students. The MS level qualifying exam is a proper subset of the PhD level qualifying exam. Questions for the exams are composed by a written qualifying exam committee within the Department.

Both MS and PhD comprehensive written qualifying exams are offered twice each year, the first in Summer and the second in Fall quarter.

Dawn will send out communication about signing up for the written qualifying exam. If a student needs to withdraw from the exam, the student will need to inform Dawn and the graduate advisor at least one week in advance and obtain approval from the graduate advisor.

If a student fails the first attempt at the exam (either Not Pass or MS Pass for Ph.D. students and Not Pass for MS students), they can take the entire exam one more time. No more than two attempts are allowed to pass the written exams. If a PhD student fails on their 2nd attempt but received MS pass on either the first or the second attempt (and has not previously received an MS degree in statistics or a closely related field), they can file for the MS degree, but not continue in the Ph.D. program. If an MS student fails on the 2nd attempt, they will be dismissed from the program without a degree.

MS students who are interested in changing the degree objective from MS to PhD can choose to take the PhD qualifying exam with prior approval from the Graduate Advisor.

PhD students can opt to take the MS written qualifying exam if they plan to change degree objective from PhD to MS within two years of entering the PhD program.

## Feedback Policy

The written qualifying exam committee reads the exams and makes a Pass or Fail determination for each student.

Students will be informed by the Graduate Advisor whether they passed or failed at MS or PhD level.

Students can request a meeting with a suitable faculty member to discuss their performance on the qualifying exam. Particularly in cases where a student has failed the exam, the Department encourages the meeting so the student can understand what areas of the exam were poorly performed. The student's completed exam is permanently retained electronically as part of the student file.

## Appeal Policy

Graduate students who have failed an exam on the second attempt may appeal the failed decision. However, valid grounds for appeal are limited to three areas:

- 1) Evidence of a procedural error.
- 2) Evidence of non-academic criteria being used to evaluate academic work, including personal bias and violations of the campus nondiscrimination policy.
- 3) Evidence of medical and/or family hardships that interfered with their preparation and/or performance during the exam.

Students who wish to appeal should submit a written request for appeal, along with pertinent evidence that justifies the request, to the Graduate Advisor or the Department Chair within 6 weeks after the exam.

The written appeal request should, at a minimum, clearly specify the grounds for the appeal request. Additional supporting documentation, as pertinent, should be included in the appeal request.

The standing appeals committee including graduate advisor and two department faculty appointed at the start of each academic year, will review the appeal request within 7 days of the submission date and vote on Accepting or Rejecting the appeal request.

In the cases where the appeal addresses areas (1) or (2) above, the Graduate Advisor or the Department Chair will immediately inform the student of the decision that was reached. If the appeal is approved, the student will be granted an opportunity to take either the next offering of the exam, or the offering after that. If the appeal is rejected, the student will be advised they have the right to appeal the decision to the Graduate Dean.

In the case where the appeal addresses area (3) above, the Graduate Advisor or the Department Chair will immediately inform the student and the Graduate Division of the Department recommendation that was reached. The student will also be informed that the Graduate Division will review and consider the Department recommendation and render a final decision on the appeal. If the Graduate Division approves the appeal, the student will be granted an opportunity to take the exam either at the next offering of the exam, or the offering after that. If the Graduate Division does not approve the appeal, the appeal process terminates.