THE MASTER'S PROGRAM

1. Admissions Requirements
An undergraduate major in mathematics or statistics is typical for Biostatistics 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. Students should also demonstrate some exposure to courses in the life sciences (biological, environmental, medical and agricultural sciences). The minimal background for entrance into the master's program is: a bachelor's degree with a 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. Applicants without this minimal background will not be considered for admission in the Graduate Group. Applicants must complete the online Office of Graduate Studies application, and provide three letters of recommendation; applicants whose native language or language of instruction is not English must achieve the minimum TOEFL or IELTS scores listed on the Office of Graduate Studies website. The program does not accept part-time students.

2. Master’s Plan
This is a M.S. Plan II program which requires a comprehensive exam (no thesis). A minimum of 50 units is required (graduate and upper division), of which at least 18 must be graduate courses in the major field (according to university regulations). Not more than 9 units of research (299 or equivalent) may be used to satisfy the 18-unit requirement.

3. Course Requirements (50 units)

A. Required courses (35 units):

<table>
<thead>
<tr>
<th>STA131 A, B, C (4 units each)</th>
<th>STA390 (2 units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>STA135 (4 units)</td>
<td>STA401 (3 units)</td>
</tr>
<tr>
<td>STA141 (4 units)</td>
<td>STA290 (twice) (1 unit)</td>
</tr>
<tr>
<td>STA232 A, B (4 units each)</td>
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</tr>
</tbody>
</table>

The following courses can be used to substitute required courses STA131 A, B, C, STA135, STA141, STA401:

- STA231 A, B, C for STA131 A, B, C;
- STA232C for STA135;
- STA242 or 243 for STA 141;
- a data analysis project conducted under BST299 (independent study) for STA401
If a required course for the M.S. program is substituted in this way, the substituting course cannot be used to simultaneously satisfy any other requirement.

B. Biostatistics core courses (8 units). Two courses chosen from:
   BST222 (Survival Analysis) (4 units)
   BST223 (Generalized Linear Models) (4 units)
   BST224 (Longitudinal Data Analysis) (4 units)
   BST225 (Clinical Trials) (4 units)
   BST226 (Statistical Methods in Bioinformatics) (4 units).

C. Electives (7 units):
   Biostatistics and Methods electives (4 units):
   One course with a substantial biostatistical data analysis component at the upper division or the graduate level. Possible courses include the following (although they may not simultaneously satisfy any other Biostatistics core courses requirement):
   BST222 (4 units)       STA237 A, B (4 units each)
   BST223 (4 units)       STA250 (4 units)
   BST224 (4 units)       STA251 (4 units)
   BST225 (4 units)       STA252 (4 units);
   BST226 (4 units)

   Life Sciences Elective (3 units):
   One course selected from any upper division or graduate offering in biology, epidemiology, environmental, agricultural or medical sciences.

   Further elective units at the upper division or graduate level, although not required, may be taken in the following areas if a student wishes to do so for furthering his or her career objectives:
   (a) Statistics, (b) Fields of Biostatistical application (e.g., epidemiology, genetics).

D. Summary
   A minimum of 50 units is required; 43 units of core and 7 of elective coursework. A minimum course load is 12 units per academic quarter.

4. Special Requirements

   None.

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 three to five faculty members appointed by the Chair of the Graduate Group. 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**: Five faculty members are appointed by the Chair of the Graduate Group to the Committee of Advisers, chaired by the **Master Graduate Adviser**. **Mentors** for each student are chosen from this group and assist the students in the transition through the graduate program. The Master Graduate Adviser meets quarterly with each graduate student and assists graduate students in developing a study plan. In particular, the Master Graduate Adviser must approve all courses to be used to fulfill the requirements. Other members of the Committee of Advisers support the Master Graduate Adviser when needed. All students are expected to enroll in a minimum of 12 units per quarter, which may include a combination of required courses, electives, and research units (BST299).

c. **Comprehensive Examination Committee**: The Graduate Group Chair will appoint two permanent members to the M.S. comprehensive exam committee. The third member is identified by the Master Graduate Adviser in consultation with the student. This committee will be in charge of administering the M.S. comprehensive exam and reporting the result to the chair of the GGB. The chair of the committee is responsible for guiding the student in preparation for the comprehensive exam.

6. **Advising and Mentoring**

Five faculty members are appointed by the Chair of the Graduate Group to the Committee of Advisers, chaired by the **Master Graduate Adviser**. **Mentors** for each student are chosen from this group and assist the students in the transition through the graduate program. The Master Graduate Adviser assists graduate students in developing a study plan, and has signatory authority for all paperwork to be submitted to the Office of Graduate Studies. Other members of the Committee of Advisers support the Master Graduate Adviser when needed. The **Mentoring Guidelines** may be found online (http://biostat.ucdavis.edu/pages/program/mentoring%20guidelines.pdf).

7. **Advancement to Candidacy**

Plan II M.S. Candidates must file an advancement to candidacy form (http://www.gradstudies.ucdavis.edu/forms) prior to taking the M.S. comprehensive examination. Candidates must have taken at least half of the required coursework for their degree requirements (25 units). Students are expected to apply for advancement to candidacy by the end of the third quarter in the program, and then advance by the end of the 6th quarter. 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 Master Graduate Adviser must recommend these changes to Graduate Studies. Students must have the Master Graduate Adviser sign the candidacy form before it can be submitted to Graduate Studies. If the candidacy is approved, the Office of Graduate Studies will send a copy to the program and the student. If the Office of Graduate Studies determines that a student is not eligible for
advancement, the program 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 Exam

Students in the M.S. program must attempt the exam at the end of all coursework, typically in the last quarter in the program. If a student does not attempt the exam at that time, it will be recorded as a failure. Every M.S. student needs to pass the exam in a maximum of two attempts. If a student fails the first attempt, the second attempt must be done before the end of the next quarter; if the first attempt is made in Spring, the second attempt must be made over the summer. Two failures to pass the exam will result in a recommendation to the Dean of Graduate Studies for disqualification of the student in the graduate program.

The Graduate Group Chair will appoint two permanent members to the M.S. comprehensive exam committee. The third member, who will be named the Chair of the committee for a given student, is identified by the Master Graduate Adviser in consultation with the student. This committee will be in charge of administering the M.S. comprehensive exam and reporting the result to the chair of the GGB. The chair of the committee is responsible for guiding the student in preparation for the exam. The M.S. Comprehensive Examination consists of a written report and an oral defense on a scientific project involving Biostatistical data analysis. This project should be well written and should have the potential to be publishable in a scientific journal. The chair of the committee will provide the student with a scientific project involving data analysis. The student will have at most three weeks to complete the project and write the written report. After the report is submitted, the committee will schedule an oral examination with the candidate in which the candidate presents the project and answers questions about the work. After this oral examination, the committee will make a decision on whether to pass the candidate. Each student will receive a written evaluation on the performance on the examination, which will be discussed with the Biostatistics Master Graduate Adviser.

9. Normative Time to Degree

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

10. Typical Time Line and Sample Study Plans

Course requirements are completed by the end of year two, and the M.S. Comprehensive Examination may be attempted in the fifth or sixth quarter. 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. In addition to the coursework outlined below, students will take STA 290 for any two quarters.
The following would be a typical program for a student seeking an M.S. degree

### Year 1:

<table>
<thead>
<tr>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistics 131A</td>
<td>Statistics 131B</td>
<td>Statistics 131C</td>
</tr>
<tr>
<td>Statistics 106 or 108</td>
<td>Elective</td>
<td>Statistics 135</td>
</tr>
<tr>
<td>Statistics 141</td>
<td>Statistics 106 or 108</td>
<td>Mathematics 167</td>
</tr>
<tr>
<td>Statistics 390</td>
<td>Statistics 390</td>
<td>Statistics 390</td>
</tr>
</tbody>
</table>

### Year 2:

<table>
<thead>
<tr>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistics 232A</td>
<td>Statistics 232B</td>
<td>Statistics 401</td>
</tr>
<tr>
<td>Biostatistics 222</td>
<td>Biostatistics 223</td>
<td>Statistics 223</td>
</tr>
<tr>
<td>Elective</td>
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<tr>
<td>Elective</td>
<td>Elective</td>
<td>Elective</td>
</tr>
</tbody>
</table>

11. Sources of Funding

The main sources of funding include TA-ships (from the Department of Statistics), GSR positions, and GGB Block Grant.

12. PELP, *In Absentia* & 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)
THE PH.D. PROGRAM

1. Admission Requirements
An undergraduate major in mathematics or statistics is typical for Biostatistics 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. Students should also demonstrate some exposure to courses in the life sciences (biological, environmental, medical and agricultural sciences).

The minimal background for entrance into the Ph.D. program is: a bachelor's degree with a 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. Applicants without this minimal background will not be considered for admission in the Graduate Group. Applicants must complete the online Office of Graduate Studies application, and provide three letters of recommendation; applicants whose native language or language of instruction is not English must achieve the minimum TOEFL or IELTS scores listed on the Office of Graduate Studies website. The program does not accept part-time students.

a) Prerequisites
In addition, applicants are expected to have the equivalent of the following UC Davis courses:
MAT25 and MAT125A and MAT167

b) Deficiencies
Course work deficiencies should be made up by the end of the first academic year following initial enrollment by earning a letter grade of “B” or better.

2. Dissertation Plan
This is a Plan C program which specifies a three member (minimum) dissertation/final examination committee, a final oral examination, and no exit seminar.

3. Course Requirements (58 units)

A. Required Statistics courses (39 units):
   STA231 A, B, C (4 units each) STA401 (3 units) twice
   STA232 A, B, C (4 units each) STA290 (1 unit) for three quarters
   STA141 (4 units) STA390 (2 units)

B. Biostatistics Core Courses (12 units):
   BST222 (4 units)
   BST223 (4 units)
   BST224 (4 units)

C. Electives (7 units)
   Biostatistics or Methods Electives (4 units):
One course from BST225 (Clinical Trials), BST226 (Statistical Methods for Bioinformatics), BST252 (Advanced Topics in Biostatistics), STA250, STA251, STA237 AB, STA235 AB.

Life Sciences Courses (3 units):
One course at the upper division or the graduate level in Biology or Life sciences. This course should be approved by the graduate advisor. The intention is to provide a base of knowledge in molecular, cellular, organismal, and population biology, epidemiology or environmental sciences. The students are strongly encouraged to take more courses in Biology, Life Sciences or Environmental Sciences that are relevant to their research. Selection of such courses should be made in consultation with the thesis adviser.

D. The following courses may be used to substitute the STA141 course requirement: STA242 or 243. If STA141 is substituted in this way, the substituting course cannot be used to simultaneously satisfy any other requirement.

E. Summary
A minimum of 58 units is required; 51 units of core and 7 of elective coursework. A minimum course load is 12 units per academic quarter.

4. Special Requirements

Practicum
Students will complete a practicum in the form of an interdisciplinary applied data analysis project. They will work in collaboration with any UC Davis faculty researcher (not required to be a member of the Graduate Group) who conducts studies or experiments which generate data in the medical, biological, veterinary medical, epidemiological, agricultural or environmental sciences, and who will serve as a mentor. The practicum will last a minimum of six weeks sometime before completion of the dissertation and will involve the analysis of original data. The student will prepare or substantially contribute to a project report. The practicum may be conducted as part of employment as a Graduate Student Researcher or as part of the dissertation research.

A report based on an internship of a duration of at least six weeks at a facility, government health office, institute or company outside of UC Davis focusing on biological or medical research can also be used to satisfy this requirement. In this case the mentor will reside at the institution where the internship is carried out.

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 three to five faculty members appointed by the Chair of the Graduate Group. 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
is January 15 and the final application deadline is May 31 for admittance to the following fall quarter.

b. **Advising Committee:** Five faculty members are appointed by the Chair of the Graduate Group to the Committee of Advisers, chaired by the Master Graduate Adviser. Mentors for each student are chosen from this group and assist the students in the transition through the graduate program. The Master Graduate Adviser meets quarterly with each graduate student and assists graduate students in developing a study plan. In particular, the Master Graduate Adviser must approve all courses to be used to fulfill the requirements. Other members of the Committee of Advisers support the Master Graduate Adviser when needed. All students are expected to enroll in a minimum of 12 units per quarter, which may include a combination of required courses, electives, and research units (BST299).

c. **Qualifying Examination Committee:** the examining committee consists of five members, at least three but no more than four of which are members of the GGB. Members 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 may serve on the QE committee but is not eligible to serve as chair of the committee.

d. **Dissertation Committee:** the student, in consultation with their Major Professor, nominates three faculty to serve on the Dissertation Committee, one of which is the Major Professor who serves as Chair of the 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.).

6. **Advising and Mentoring**

Five faculty members are appointed by the Chair of the Graduate Group to the Committee of Advisers, chaired by the Master Graduate Adviser. Mentors for each student are chosen from this group and assist the students in the transition through the graduate program until advancement to candidacy. The Master Graduate Adviser assists graduate students in developing a study plan, and has signatory authority for all paperwork to be submitted to the Office of Graduate Studies. Other members of the Committee of Advisers support the Master Graduate Adviser when needed. A Ph.D. student will select an area of specialization and will choose a dissertation adviser (Major Professor) from the Graduate Group in Biostatistics faculty working in that area, usually in the second or third year of study. The Mentoring Guidelines may be found online (http://biostat.ucdavis.edu/pages/program/mentoring%20guidelines.pdf).

7. **Advancement to Candidacy**

The student is eligible for advancement to Candidacy for the Ph.D. degree upon completion of all course requirements and after passing the Ph.D. Qualifying Examination, usually within two quarters of passing the Ph.D. Preliminary Written
Examination. For well-prepared students, with sufficient statistical/biostatistical background prior to enrollment in the Graduate Group, they are expected to advance to candidacy by the end of the fourth quarter in the program. Otherwise, students are expected to advance to candidacy by the end of the eighth quarter in the program. Students 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.

8. Qualifying Examination and Dissertation Requirements

a) Preliminary Written Examination
The Ph.D. Preliminary 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, BST222 and BST223 core course series. A well-prepared student will take this exam during the first year of the program. Otherwise, they are expected to take the exam during the second year of the program. If a student does not attempt the examination at the first time they are eligible to take the exam, it will be recorded as a failure. Every Ph.D. student needs to pass the examination in a maximum of two attempts. In case of failure 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 second failure. Two failures to pass the examination will result in a recommendation to the Dean of Graduate Studies for disqualification of the student in the Ph.D. program.

The Ph.D. Preliminary Written Examination is a written exam with two parts: a statistical theory part and a biostatistics part. The duration of each part is about 3-4 hours. The exam committees in charge may be different for each part of the exam. Pass or fail is determined separately by the exam committees for the statistical theory part and the biostatistics part of the exam. The chair of the GGB will appoint an exam committee that will be responsible for preparing, administering and grading the examination for the Biostatistics part of the exam. This committee will forward its recommendation to the chair of the GGB.

b) Qualifying Exam
The Ph.D. Qualifying Examination is an oral exam. The exam will be attempted as soon as the Ph.D. Preliminary Written Examination has been passed and all required coursework for the Ph.D. degree in Biostatistics has been completed. In accordance with university rules, students are requested to take their qualifying examination, within two quarters of passing the Ph.D. Preliminary Written Examination, but no later than the end of the third year (9th quarter) to remain eligible for academic appointments such as GSI. Advisers must submit the Application for the Qualifying Exam four weeks prior to the exam date; exams
taken before receiving Office of Graduate Studies approval, may be deemed null and void. Students must be registered during the quarters in which they take any portion of their Qualifying Examination. To be eligible for the Qualifying Examination, the student must have:

- A “B” average in all work done in graduate standing;
- Satisfied all departmental or group requirements; and
- Removed all academic deficiencies

The preparation for the exam will be done by working closely with a faculty mentor (independent study) who is a regular member of the GGB. The exam committee consists of five faculty members, at least three but no more than four of which are members of the GGB. The Major Professor can be one of the members of the committee, but not its Chair. The Ph.D. Qualifying Examination examines a student on the breadth and depth of knowledge expected from the coursework taken, and a special research topic assigned by the committee. The primary purpose of the QE is to validate that the student is academically qualified to conceptualize a research topic, undertake scholarly research and successfully produce the dissertation required for a doctoral degree. A forty-five minute presentation given by the student is followed by a question period which covers the special research topic as well as coursework in general. The examining committee will be appointed by Graduate Council at the recommendation of the Master Graduate Adviser who consults with the student prior to making the recommendation.

Graduate Studies guidelines for Ph.D. Qualifying Examinations apply. A student who passes the Ph.D. Qualifying Examination is eligible for Advancement to Candidacy for the Ph.D. degree. Title and abstract of the Ph.D. Qualifying Examination presentation will be distributed to all faculty and students of the Graduate Group in Biostatistics, 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. 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) Qualifying Exam: Outcomes

A committee, having reached a unanimous decision, shall inform the student of its decision as “Pass” (no conditions may be appended 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 of the QE committee
must include in its report a specific statement, agreed to by all members of the committee, explaining its decision and must inform the student of its decision. Having received a “Not Pass” or “Fail”, the student may attempt the QE one additional time. After a second exam, a vote of “Not Pass” is unacceptable; only “Pass” or “Fail” is recognized. Only one retake of the QE is allowed. A student who fails the QE on the second attempt will be recommended to the Dean of Graduate Studies for disqualification from the program.

d) The 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 a 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 Biostatistics that may expand the theory or methodology of Biostatistics, or expand or modify Biostatistical 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 C). The dissertation must be completed and submitted to the dissertation committee prior to taking the final examination described in Section 8 (e).

e) Final Examination
The entire dissertation committee will conduct a final oral examination, which will deal primarily with questions arising out of the relationship of the dissertation to the field of Biostatistics. The final examination will be conducted in two parts. The first part consists of a one hour presentation by the candidate followed by a brief period of questions pertaining to the presentation; this part of the examination is open to the public. The second part of the examination will immediately follow the first part; this is a closed session between the student and the committee and will consist of a period of questioning by the committee members. Title and abstract of the oral presentation will be distributed to all faculty and students of GGB, who are invited to attend the presentation portion of the examination.

9. Normative Time to Degree
The normative time to degree is four to five years.

10. Typical Time Line and Sample Study Plans
Every fulltime 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 1:**

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<tr>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
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<tbody>
<tr>
<td>Statistics 231A</td>
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*Ph.D. Preliminary Written Exam*

**Year 2:**

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<tr>
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<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elective</td>
<td>Dissertation Research</td>
<td>Dissertation Research</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Statistics 141</td>
<td></td>
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<tr>
<td>Statistics 401</td>
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</table>

*Ph.D. Qualifying Exam*

**Years 3, 4:** Complete requirements for the Ph.D. degree, including Dissertation and Defense

**11. Sources of Funding**

The main sources of funding include TA-ships (from the Department of Statistics), GSR positions, and GGB Block Grant.

**12. PELP, In Absentia & 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 Ph.D. Requirements**

Should a student leave the program prior to completing the requirements for the Ph.D., they may still be eligible to receive the Master’s if they have fulfilled all the requirements (see Master’s 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)