

BIostatistics OPTION: MS/PhD Programs

Overview

The Biostatistics Degree Option (BDO) is a specialization within the Statistics MS/PhD programs that is implemented jointly by the Departments of Statistics and of Biostatistics and Medical Informatics. Students pursue course work in the theory, methodology, and application of statistics. They focus on developments of statistics in biomedical sciences by taking additional biostatistics courses and (for the PhD) an approved biological sciences course, and they fulfill a total credit requirement by taking elective credits from a menu of relevant courses. MS students prove competency through an applied examination. PhD students pursue a faculty-mentored interdisciplinary collaborative research project and thereby become directly engaged in an active biomedical problem. Finally, PhD students pursue and defend original scholarly research in biostatistics.

PhD Requirements

1. Courses:

Seven statistics courses are compulsory: a two-semester course sequence in advanced statistical inference (709/710), a course in advanced probability theory (831), a statistical consulting course (998), a course sequence in linear models (849/850), and a course in clinical trials (641). These cover core topics in probability, mathematical statistics, and statistical methodology, including distribution theory, asymptotic analysis, theory of estimation and testing, general regression techniques, and also specialized statistical methods for clinical studies.

In total *four* additional elective courses (12 credits) must be taken, all from the list of approved PhD electives¹, and containing at least *two* of *three* specialized biostatistics courses: Statistical Methods for Epidemiology (642), Statistical Methods for Survival Analysis (741), and Statistical Methods in Molecular Biology (877).

A *twelfth* course (3 credits) is required, from an approved list of biological sciences courses².

Students may be required to take a course in the responsible conduct of research³.

A grade of B or better must be received in any course used to fulfill the course requirements.

¹ See Elective Graduate Courses, www.stat.wisc.edu/course-listing

² Approved courses include Genetics 466 (General Genetics), Zoology 570 (Cell Biology), Biocore 303 (Cellular/Molecular Biology), Population Health Sciences 795 (Principles of Population Health Sciences), Medical Sciences 622-721 (Neoplastic Diseases). Approval of other biological sciences courses is at the discretion of the Biostatistics Option Committee.

³ Students supported by an NIH training grant are so required.

2. Collaborative research experience: This novel element of the Biostatistics Degree Option provides students with direct experience in interdisciplinary collaborative research activity under the guidance of a faculty trainer. The student must report the results of this activity within an advertised seminar. Students may fulfill this requirement by rotating through directed study/research credits with faculty trainers. Rotations may entail clinical studies, population-based observational studies, laboratory experiments or other scenarios involving the development of biostatistics.

3. Qualifying Exam: Each student must pass a written PhD qualifying exam based on theory covered in the core statistics curriculum. The format of this exam was revamped recently to cover not only advanced inference theory but also aspects of linear model analysis⁴.

4. Mentoring Committee Meeting: Within one year of passing the qualifying exam, the student must convene a meeting of at least three BDO faculty advisors. The student is expected to prepare a short oral report of his/her research activities and of anticipated directions for future research.

5. Preliminary Exam: After selection of a thesis advisor, the PhD student prepares a short paper and presents thesis plans to a faculty committee.

6. Seminars: Students are expected to attend seminars from the Statistics Department (Wednesdays), the BMI Department (Fridays), and selectively others relevant to their research.

7. Final exam: Each student will engage in original scholarly research and prepare a thesis presenting novel developments in biostatistics. A final oral PhD examination will be conducted by a thesis committee.

8. Breadth: For BDO students, the *breadth requirement*⁵ is satisfied by: (1) the biological sciences course and (2) the collaborative research experience.

9. Other: Rules governing courses and timing, operation, and requirements of the qualifying, preliminary, and final exams are as in the parent program⁶, as are criteria for satisfactory progress⁷. Issues specific to the BDO are governed by the Biostatistics Option Committee (BOC) and BDO trainers within the two sponsoring departments.

MS Requirements: For BDO students, the requirements are as in the parent program⁸, except that the six elective credits (2 courses) must include 641 and one of 642, 741, 877.

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⁴ See www.stat.wisc.edu/phd-masters/PhD_Exam_Syllabus

⁵ Formerly the minor requirement

⁶ See www.stat.wisc.edu/phd_masters/PhD_Degree_Regulations

⁷ www.stat.wisc.edu/phd-masters/Criteria_Satisfactory_Progress

⁸ See www.stat.wisc.edu/MS_Degree_Regulations