BIOSTATISTICS MAJOR, B.S.P.H.

Contact Information

Department of Biostatistics
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Biostatistics is a discipline concerned with the improvement of human health through the application and advancement of statistical science. The curriculum consists of a strong mathematical foundation; advanced coursework in statistical applications, theory, and computing; and an understanding of the public health sciences.

The Department of Biostatistics in the Gillings School of Global Public Health was the first undergraduate program in the country to offer an undergraduate degree in biostatistics. The undergraduate major in biostatistics prepares students to apply quantitative methods to design studies, implement methods, analyze data, and interpret results across a range of disciplines. The degree provides an excellent foundation for continued studies (primarily graduate school in biostatistics, statistics, data science, or medical school) and a strong foundation for employment for highly qualified students interested in quantitative methods applied to a variety of fields not limited to public health or medicine.

Admission (http://catalog.unc.edu/undergraduate/schools-college/public-health/#admissiontext) to the program is required.

Student Learning Outcomes

Upon completion of the biostatistics program, students should be able to:

- Demonstrate familiarity with elementary statistical theory
- Formulate and perform a descriptive and inferential analyses of a public health or other study using software
- Interpret the findings from a moderately complex analysis
- Design an experiment or observational study
- Design survey sampling schemes appropriate for public health or other disciplines and demonstrate skills to analyze a survey
- Demonstrate knowledge of environmental sciences, health policy management, health behavior and health education, and epidemiology

Requirements

In addition to the program requirements listed below, students must:

- attain a final cumulative grade point average of at least 2.0
- complete a minimum of 45 academic credit hours earned from UNC–Chapel Hill courses
- take at least half of their major course requirements (courses and credit hours) at UNC–Chapel Hill
- earn a C (not C-) or better in prerequisite, core public health, and department-required courses

For more information, please consult the degree requirements section of the catalog (http://catalog.unc.edu/undergraduate/general-education-curriculum-degree-requirements/#degreerequirements#text).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td></td>
<td><strong>Core Requirements</strong></td>
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<tr>
<td></td>
<td>Public health core courses:</td>
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<tr>
<td>ENVR 600</td>
<td>Environmental Health</td>
<td>3</td>
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<tr>
<td>EPID 600</td>
<td>Principles of Epidemiology for Public Health</td>
<td>3</td>
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<tr>
<td>HBEH 600</td>
<td>Social and Behavioral Sciences in Public Health</td>
<td>3</td>
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<td>HPM 600</td>
<td>Introduction to Health Policy and Management</td>
<td>3</td>
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<td></td>
<td>Other core courses:</td>
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<tr>
<td>BIOS 500H</td>
<td>Introduction to Biostatistics</td>
<td>3</td>
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<tr>
<td>BIOS 511</td>
<td>Introduction to Statistical Computing and Data Management</td>
<td>4</td>
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<td>BIOS 545</td>
<td>Principles of Experimental Analysis</td>
<td>3</td>
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<tr>
<td>BIOS 550</td>
<td>Basic Elements of Probability and Statistical Inference I</td>
<td>4</td>
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<tr>
<td>BIOS 664</td>
<td>Sample Survey Methodology</td>
<td>4</td>
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<td>BIOS 668</td>
<td>Design of Public Health Studies</td>
<td>3</td>
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<tr>
<td>BIOS 691</td>
<td>Field Observations in Biostatistics</td>
<td>1</td>
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<tr>
<td></td>
<td><strong>Additional Requirements</strong></td>
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<tr>
<td>BIOL 101</td>
<td>Principles of Biology</td>
<td>4</td>
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<tr>
<td>&amp; 101L</td>
<td>and Introductory Biology Laboratory [^1, H]\</td>
<td>4</td>
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<tr>
<td>COMP 110</td>
<td>Introduction to Programming [^1, H]\</td>
<td>3</td>
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<tr>
<td>or COMP 116</td>
<td>Introduction to Scientific Programming</td>
<td>3</td>
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<tr>
<td>MATH 231</td>
<td>Calculus of Functions of One Variable I [^1, H]\</td>
<td>4</td>
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<tr>
<td>MATH 232</td>
<td>Calculus of Functions of One Variable II [^1, H]\</td>
<td>4</td>
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<tr>
<td>MATH 233</td>
<td>Calculus of Functions of Several Variables [^1, H]\</td>
<td>4</td>
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<tr>
<td>BIOL 201</td>
<td>Ecology and Evolution [^2, H]\</td>
<td>4</td>
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<tr>
<td>or BIOL 202</td>
<td>Molecular Biology and Genetics</td>
<td>4</td>
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<tr>
<td>MATH 381</td>
<td>Discrete Mathematics [^H]\</td>
<td>3</td>
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<tr>
<td>or STOR 215</td>
<td>Foundations of Decision Sciences</td>
<td>3</td>
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<tr>
<td>MATH 521</td>
<td>Advanced Calculus [^H]\</td>
<td>3</td>
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<tr>
<td>or MATH 528</td>
<td>Mathematical Methods for the Physical Sciences I</td>
<td>3</td>
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<tr>
<td>MATH 547</td>
<td>Linear Algebra for Applications</td>
<td>3</td>
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<td><strong>Total Hours</strong></td>
<td>66</td>
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</table>

\[^H]\ Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

\[^1\] Required before matriculation into the program

\[^2\] Have prerequisites, BIOL 101 and CHEM 101 or CHEM 102

Sample Plan of Study

Sample plans can be used as a guide to identify the courses required to complete the major and other requirements needed for degree completion within the expected eight semesters. The actual degree plan may differ depending on the course of study selected (second major, minor, etc.). Students should meet with their academic advisor to create a degree plan that is specific and unique to their interests. The sample plans represented in this catalog are intended for first-year students entering UNC–Chapel Hill in the fall term. Some courses may not be offered every term.
### Course Title Hours

#### First Year
- **BIOL 101** Principles of Biology 4
- **& 101L** and Introductory Biology Laboratory H 4
- **MATH 231** Calculus of Functions of One Variable I H 4
- **MATH 232** Calculus of Functions of One Variable II H 4

#### Total Hours 12

#### Sophomore Year
- **COMP 110** Introduction to Programming H 3
- **or COMP 116** or Introduction to Scientific Programming 3
- **MATH 233** Calculus of Functions of Several Variables H 4

#### Junior Year
- **Fall Semester**
  - **BIOS 500H** Introduction to Biostatistics (fall only) 3
  - **BIOS 511** Introduction to Statistical Computing and Data Management (fall only) 4
  - **MATH 381** Discrete Mathematics H 3
  - **or STOR 215** or Foundations of Decision Sciences 3
  - **HBEH 600** Social and Behavioral Sciences in Public Health 3

#### Hours 7

#### Spring Semester
- **BIOS 545** Principles of Experimental Analysis (spring only) 3
- **MATH 521** Advanced Calculus I H 3
- **or MATH 528** or Mathematical Methods for the Physical Sciences I 3
- **EPID 600** Principles of Epidemiology for Public Health 3

#### Hours 9

#### Senior Year
- **Fall Semester**
  - **BIOS 550** Basic Elements of Probability and Statistical Inference I (fall only) 4
  - **BIOS 691** Field Observations in Biostatistics (fall only) 1
  - **MATH 547** Linear Algebra for Applications 3
  - **ENVR 600** Environmental Health 3

#### Hours 11

#### Spring Semester
- **BIOS 664** Sample Survey Methodology (spring only) 4
- **BIOS 668** Design of Public Health Studies (spring only) 3
- **BIOL 201** Ecology and Evolution H 4
- **or BIOL 202** or Molecular Biology and Genetics 4
- **HPM 600** Introduction to Health Policy and Management 3

#### Hours 14

#### Total Hours 66

H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

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### Special Opportunities in the Department of Biostatistics

#### Dual Bachelor’s–Master’s Degree Program

Undergraduate students with appropriate math and biostatistics backgrounds have the opportunity to pursue a dual bachelor’s–graduate degree. This dual B.S.P.H.–M.S. program identifies a coherent course of study for students to complete some of the M.S. degree requirements in biostatistics while pursuing a B.S.P.H. degree with a major in biostatistics. More information is available on the department Web site (http://sph.unc.edu/bios/faqs-undergraduates-2).

#### Honors in Biostatistics

The Department of Biostatistics offers an honors program in which undergraduates can pursue individualized study and undertake a special project. Students who have a grade point average of 3.3 or higher are eligible to participate in honors research and write an honors thesis. Faculty members’ readiness to guide the students in their honors work governs the final selection of those allowed to enter the program. Students completing an honors program must register for BIOS 693H and BIOS 694H.

#### Experiential Education

The required course, BIOS 664, fulfills the General Education experiential education requirement. In addition, students are required to take BIOS 691 (usually during the fall semester of the senior year). This course consists of an orientation to and observation of six or more major nonacademic institutions in North Carolina’s Research Triangle Park area that employ biostatisticians, including contract research organizations and nonprofit companies. BIOS 691 does not fulfill the General Education experiential education requirement.

#### Laboratory Teaching Internships and Assistantships

Students are encouraged to investigate part-time employment during the academic year and full-time employment during the summer after their junior year with members of our faculty and their collaborators on current research and service projects.

#### Study Abroad

Students are encouraged to participate in the University’s study abroad programs in the summers or before matriculating to the B.S.P.H. in biostatistics program. Identification of a study abroad program early in the student’s career is necessary for course planning purposes.

#### Undergraduate Awards

The Theta Chapter of Delta Omega honors up to two students among the department’s graduates with an award of excellence. Awards are presented in the spring as part of the biostatistics awards ceremony. Among the recent graduates, a notable proportion of students have been inducted into Phi Beta Kappa.

#### Undergraduate Research

Students are encouraged to consider doing senior honors research and should consult individual faculty members for opportunities. However, some students choose to take advantage of the myriad part-time employment opportunities with our faculty members on their research and service projects or opportunities within nearby Research Triangle Park.