# BIOSTATISTICS MAJOR, B.S.P.H.

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

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). The job market for B.S.P.H. biostatistics graduates is outstanding, with previous students employed in a variety of fields including public health, pharmaceuticals, and medicine.

Admission (p. 1) to the program is required.

# **Student Learning Outcomes**

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

- Perform descriptive and inferential data analyses to answer varied research questions (BIOS 500H)
- 2. Interpret data analysis results for a variety of audiences (BIOS 500H)
- Use software appropriately in data collection, data management, and analysis (BIOS 511)
- 4. Demonstrate the use of elementary statistical theory including the use of basic concepts of probability, random variation and common statistical probability distributions (BIOS 650)
- Demonstrate strong quantitative skills through the successful completion of calculus, linear algebra, and discrete mathematics (MATH 233, MATH 347, and MATH 381)

Through the Public Health Core coursework, all B.S.P.H. biostatistics students also meet the Public Health CEPH competencies including:

- Communicate public health information, in both oral and written forms, through a variety of media and to diverse audiences
- · Locate, use, evaluate and synthesize public health information
- Describe health inequities, identify their root causes at multiple levels of the social ecological framework, and discuss approaches to advancing health equity

# Prerequisite Courses Required for Admission

Code	Title	Hours
MATH 231	Calculus of Functions of One Variable I H, F	4
MATH 232	Calculus of Functions of One Variable II H, F	4
MATH 233	Calculus of Functions of Several Variables H,	F 4
BIOL 101 & 101L	Principles of Biology and Introductory Biology Laboratory H, F	4
COMP 116	Introduction to Scientific Programming	3

or COMP 110 Introduction to Programming and Data Science

Total Hours 19

- H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.
- F FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.

#### **Admission**

The Gillings School of Global Public Health offers four undergraduate majors: biostatistics, environmental health sciences, health policy and management, and nutrition. The undergraduate degree offered is the bachelor of science in public health (B.S.P.H.). Enrollment in the B.S.P.H. degree programs is limited, and students must apply for admission. Students typically apply in January of their sophomore year for admission beginning in the fall of their junior year.

For current UNC-Chapel Hill students, the initial step of B.S.P.H. application is available in ConnectCarolina under the "Apply for Majors Change" tab. For additional information on application deadlines and how to apply, please visit the Public Health Undergraduate Majors (https://sph.unc.edu/resource-pages/undergraduate-programs/) website.

Transfer students interested in any of the B.S.P.H. degree programs must apply through the Office of Undergraduate Admissions (https://admissions.unc.edu/apply/types-of-applications/transfer/) using the Transfer Common application.

For high school seniors, our four majors participate in the Assured Enrollment program through Undergraduate Admissions. Assured enrollment programs guarantee students a spot in an undergraduate major within one of Carolina's professional schools or a spot in an accelerated undergraduate/graduate program. For additional information, please visit Undergraduate Admissions: Special Opportunities (https://admissions.unc.edu/explore/enrich-your-education/excelcarolina/).

Students are subject to the requirements in place when they are admitted to the Gillings School of Global Public Health; consequently, the requirements described in this catalog particularly apply to students admitted to Gillings during the 2024–2025 academic year.

# 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 all prerequisite, core, and additional courses required for the major

For more information, please consult the degree requirements section of the catalog (https://catalog.unc.edu/undergraduate/degree-requirements/#requirementstext).

Code	Title I	Hours			
Core Requirements					
Public health core	e courses:				
SPHG 351	Foundations of Public Health	3			
SPHG 352	Public Health Systems and Solutions	4			
EPID 600	Principles of Epidemiology for Public Health	3			
Biostatistics courses:					
BIOS 500H	Introduction to Biostatistics	3			
BIOS 511	Introduction to Statistical Computing and Data Management	4			
BIOS 645	Principles of Experimental Analysis	3			
BIOS 650	Basic Elements of Probability and Statistical Inference I	3			
BIOS 664	Sample Survey Methodology	4			
BIOS 668	Design of Public Health Studies	3			
BIOS 691	Field Observations in Biostatistics	1			
Additional Requir	rements				
BIOL 101	Principles of Biology	4			
& 101L	and 🌼 Introductory Biology Laboratory <sup>1, H, F</sup>				
COMP 110	Introduction to Programming and Data Science 1, H	e 3			
or COMP 116	Introduction to Scientific Programming				
MATH 231	Calculus of Functions of One Variable I 1, H, F	4			
MATH 232	Calculus of Functions of One Variable II 1, H, F	4			
MATH 233	Calculus of Functions of Several Variables 1, H,	F 4			
BIOL 103	How Cells Function F	3			
or BIOL 104	Biodiversity				
MATH 381	Discrete Mathematics <sup>H</sup>	3			
or STOR 215	Foundations of Decision Sciences				
MATH 347	Linear Algebra for Applications	3			
MATH 521	Advanced Calculus I H	3			
or MATH 528	Mathematical Methods for the Physical Sciences	<u> </u>			
Total Hours		62			

- H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.
- FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.

# 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.

First Year First-Year Foundation Courses			
IDST 101		1	
ENGL 105	College Thriving	3	
or	English Composition and Rhetoric	3	
ENGL 105I	or 🚇 English Composition and Rhetoric (Interdisciplinary)		
	ninar or First-Year Launch (https://catalog.unc.edu/	3	
	e/ideas-in-action/first-year-seminars-launches/)	4	
	nta Literacy (https://catalog.unc.edu/ e/ideas-in-action/triple-i/)	4	
Global Language through level 3 (https://catalog.unc.edu/ undergraduate/ideas-in-action/global-language/)			
Major Courses			
BIOL 101	Principles of Biology	4	
& 101L	and Wintroductory Biology Laboratory H, F		
MATH 231	© Calculus of Functions of One Variable I H, F	4	
MATH 232	© Calculus of Functions of One Variable II H, F	4	
Hours	Calculus of Functions of One Variable II	23	
Sophomore Ye	par	23	
COMP 110	Introduction to Programming and Data Science	3	
or	H Programming and Data Science	ŭ	
COMP 116	or Introduction to Scientific Programming		
MATH 233	Calculus of Functions of Several Variables H, F	4	
Hours		7	
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 <sup>H</sup>	3	
or STOR 215	or 🤃 Foundations of Decision Sciences		
SPHG 351	Foundations of Public Health	3	
EPID 600	Principles of Epidemiology for Public Health <sup>1</sup>	3	
Hours	Hours 16		
Spring Semes		•	
BIOS 645 MATH 521	Principles of Experimental Analysis (spring only)  Advanced Calculus I H	3	
or	or Mathematical Methods for the Physical	3	
MATH 528	Sciences I		
SPHG 352	Public Health Systems and Solutions	4	
BIOL 103	How Cells Function F	3	
or BIOL 104	or <sup>©</sup> Biodiversity		
Hours		13	
Senior Year			
Fall Semester			
BIOS 650	Basic Elements of Probability and Statistical Inference I (fall only)	3	

<sup>&</sup>lt;sup>1</sup> Required before matriculation into the program

BIOS 691	Field Observations in Biostatistics (fall only)	1
MATH 347	Linear Algebra for Applications	3
Hours		7
Spring Semester		
BIOS 664	Sample Survey Methodology (spring only)	4
BIOS 668	Design of Public Health Studies (spring only)	3
Hours		7
Total Hours		73

- H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.
- F FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.
- <sup>1</sup> EPID 600 strongly recommended in the junior year, but may be taken in the senior year.

# **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 website (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 research project in their senior year. 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 thesis must register for BIOS 693H and BIOS 694H.

#### **Experiential Education**

The required course, BIOS 664, fulfills the experiential education Gen Ed requirement in the Making Connections curriculum. 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 one student 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.

### **Contact Information**

#### **Department of Biostatistics**

Visit Program Website (http://www.sph.unc.edu/bios/) 3103 McGavran-Greenberg Hall, CB# 7420 (919) 966-7256

#### Chair

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