

Biostatistics, MS

Learning Outcomes

Students will:

- demonstrate a broad knowledge and understanding of current statistical theory, methods, and practices in the health sciences;
- effectively collaborate on a research team;
- develop statistical designs and implement analyses for health science investigations;
- develop computer programs for the management and analysis of data sets;
- prepare reports and publications resulting from health science studies; and
- effectively communicate key statistical principles to a nonstatistical audience.

Requirements

The Master of Science program in biostatistics requires a minimum of 38 s.h. of graduate credit. Students must maintain a cumulative grade-point average of at least 3.00. Those who receive a grade of C on 7 s.h. of coursework may be dismissed from the program.

The program provides training in the design of experiments and in analysis of data related to biomedical or public health problems. It emphasizes mathematical, statistical, and computer methods for dealing with quantitative information and provides opportunities for students to gain statistical consulting experience with a variety of problems.

MS students are required to complete an in-depth preceptorship under the direction of a departmental faculty member and a final comprehensive-style examination.

The MS with a major in biostatistics requires the following coursework.

Core Courses

Course #	Title	Hours
All of these:		
BIOS:5510	Biostatistical Computing (taken twice for 2 s.h. each; topics should be programming with R and programming with SAS)	4
BIOS:5710 & BIOS:5720	Biostatistical Methods I-II	8
BIOS:5730	Biostatistical Methods in Categorical Data	3
BIOS:6610	Statistical Methods in Clinical Trials	3
BIOS:7500	Preceptorship in Biostatistics	3
EPID:4400	Epidemiology I: Principles	3
One of these sequences:		
STAT:4100-STAT:4101	Mathematical Statistics I-II	6
STAT:5100-STAT:5101	Statistical Inference I-II (required for students who intend to earn a PhD)	6

Public Health Requirement

Course #	Title	Hours
This course:		
CPH:6100	Essentials of Public Health	2

Responsible Conduct of Research Training

Course #	Title	Hours
This course:		
BIOS:7270	Scholarly Integrity in Biostatistics	1

Electives

Students complete a minimum of 5–6 s.h. of electives with at least 3 s.h. in quantitative coursework (statistics or biostatistics). It is recommended that students consider a biology/public health course as the other elective, particularly for those who have not had prior exposure to these areas. Electives must be approved by the advisor and the director of graduate studies.

Course #	Title	Hours
BIOS:6210	Applied Survival Analysis	3
BIOS:6310	Introductory Longitudinal Data Analysis	3
BIOS:6420/EPID:6420	Survey Design and Analysis	3
BIOS:6650/EPID:6655	Causal Inference	3
BIOS:6720	Statistical Machine Learning for Biomedical and Public Health Data	3
BIOS:6810	Bayesian Methods and Design	3
BIOS:7110	Likelihood Theory and Extensions	4
BIOS:7210	Survival Data Analysis	3
BIOS:7230	Advanced Clinical Trials	3
BIOS:7240	High-Dimensional Data Analysis	3
BIOS:7250	Theory of Linear and Generalized Linear Models	4
BIOS:7310	Longitudinal Data Analysis	3
BIOS:7330	Advanced Biostatistical Computing	3
BIOS:7410	Analysis of Categorical Data	3
BIOS:7600	Advanced Biostatistics Seminar (topics include statistical methods in bioinformatics, model selection, spatial modeling, statistical analysis of network data)	1-3
BIOS:7700	Problems/Special Topics in Biostatistics	1
BIOL:4213	Bioinformatics	4
BME:5335	Computational Bioinformatics	3
CBH:4105	Introduction to Health Promotion and Disease Prevention	3

CPH:5100	Introduction to Public Health	3
CS:5110	Introduction to Informatics	3
DATA:6200	Predictive Analytics	3
GENE:7191	Human Molecular Genetics	3
HMP:4000	Introduction to the U.S. Health Care System	3
ISE:4172	Big Data Analytics	3
OEH:4240	Global Environmental Health	3
PATH:5270	Pathogenesis of Major Human Diseases	3
PATH:8133	Introduction to Human Pathology for Graduate Students	2-4
STAT:4520	Bayesian Statistics	3
STAT:4580	Data Visualization and Data Technologies	3
STAT:6560	Applied Time Series Analysis	3
STAT:7400	Computer Intensive Statistics	3

Admission

Applicants to the MS program in biostatistics must apply through the Schools of Public Health Application Service (SOPHAS). After the SOPHAS application is verified, the applicant pays a supplemental Graduate College admission fee to the University of Iowa Office of Admissions. For detailed application information, visit Requirements and How to Apply to Biostatistics on the Department of Biostatistics website.

The biostatistics faculty considers several factors when evaluating applications for admission, including grade-point averages, letters of recommendation, intent and motivation for graduate study, and research interests.

All applicants must hold a bachelor's degree and have a cumulative grade-point average of at least 3.00.

All biostatistics applicants are required to have strong written and oral communication skills.

All applicants must be competent in at least one computer programming language. They also must have mathematical sciences training in methods and techniques of single variable and multivariable differential and integral calculus, and in linear algebra. Previous coursework or experience in statistical methods or data analysis is preferred.

Applicants must meet the admission requirements of the Graduate College; see the Manual of Rules and Regulations on the Graduate College website.

Students may enter in the fall; the priority application deadline is December 1.

Financial Support

A limited number of teaching and research assistantships are available. Assistantships offer financial support and tuition assessed at the resident tuition rate along with a tuition scholarship. They also provide valuable on-the-job training experience. For information regarding graduate student employment, tuition scholarships, and benefits refer to Graduate Student Employment Standards.

For information on financing education through jobs, grants, and loans, contact the university's Office of Student Financial Aid.

Career Advancement

Graduates find career opportunities in many areas, including pharmaceuticals, health care, research companies and institutions, consulting firms, universities, and government agencies.

Academic Plans

Sample Plan of Study

Sample plans represent one way to complete a program of study. Actual course selection and sequence will vary and should be discussed with an academic advisor. For additional sample plans, see MyUI.

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Course	Title	Hours
Academic Career		
Any Semester		
38 s.h. of graduate level coursework must be completed; graduate transfer credits allowed upon approval. More information is included in the General Catalog and on department website. ^a		
Maintain at least a 3.00 cumulative GPA.		
Exam: (substitutes for the Final Exam) Written Master's Core Exam focused on required biostatistics and statistics coursework; taken in summer of Year 1 after completion of BIOS:5710 Biostatistical Methods I, BIOS:5720 Biostatistical Methods II, BIOS:5730 Biostatistical Methods Categorical Data and STAT:4100 Mathematical Statistics I, STAT:4101 Mathematical Statistics II		
Hours		0
First Year		
Fall		
STAT:4100 or STAT:5100	Mathematical Statistics I ^b or Statistical Inference I	3
BIOS:5710	Biostatistical Methods I	4
BIOS:5510	Biostatistical Computing ^c	2
BIOS:5510	Biostatistical Computing ^c	2
CPH:6100	Essentials of Public Health	2
Hours		13
Spring		
STAT:4101 or STAT:5101	Mathematical Statistics II ^d or Statistical Inference II	3
BIOS:5720	Biostatistical Methods II	4
BIOS:5730	Biostatistical Methods in Categorical Data	3
BIOS:7270	Scholarly Integrity in Biostatistics ^e	1
Hours		11
Summer		
Exam: Master's Core Exam		
Hours		0
Second Year		
Fall		
EPID:4400	Epidemiology I: Principles	3
BIOS:7500	Preceptorship in Biostatistics	3
Approved biostatistics elective ^f		3
Hours		9

Spring

BIOS:6610	Statistical Methods in Clinical Trials	3
Approved biostatistics elective ^f		3
Approved biostatistics elective ^f		2 - 3
Final Exam - verify results from Master's Core Exam		
Hours		8-9
Total Hours		41-42

- a Students must complete specific requirements in the University of Iowa Graduate College after program admission. Refer to the Graduate College website and the Manual of Rules and Regulations for more information.
- b STAT:5100 is required if pursuing a PhD.
- c Complete two sections of BIOS:5510, Programming in R and Programming in SAS.
- d STAT:5101 is required if pursuing a PhD.
- e Required for Graduate Research Assistants (GRA) or potential GRAs.
- f Work with faculty advisor to select appropriate graduate elective coursework. More information can be found in the General Catalog and department website.