Biostatistics, MS

Learning Outcomes

Students will:

- summarize current statistical methods and practices used in the health sciences;
- develop statistical designs for a health science investigation;
- write computer programs in SAS and R for the management and analysis of data sets;
- apply quantitative and reasoning skills to analyze data from public health studies; and
- communicate key statistical principles resulting from health science studies to lay audiences.

Requirements

The Master of Science in biostatistics requires a minimum of 38 s.h. of graduate credit.

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 in biostatistics requires the following coursework.

Core Courses

All core courses must be taken on an A–F graded basis.

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	Statistical Inference 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 s.h. selected from the electives listed below. At least 3 s.h. must be in quantitative coursework in biostatistics (courses with prefix BIOS) or statistics (courses prefix STAT).

It is recommended that students consider a biology or public health course as the other elective, particularly if they have not had prior exposure to these areas. Electives must be approved by the advisor and the director of graduate studies; with their permission, courses not listed below may be completed as electives.

Course #	Title	Hours
At least 3 s.h. from these:		
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
STAT:4520	Bayesian Statistics	3
STAT:4540	Statistical Learning	3
STAT:4580	Data Visualization and Data Technologies	3
STAT:6560	Applied Time Series Analysis	3
STAT:7400	Computer Intensive Statistics	3

May complete one of these to reach the 5 s.h. minimum:		
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
HHP:4390	Understanding Human Disease	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

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 University of Iowa 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 must also have mathematical sciences training in methods and techniques of single variable and multivariable differential and integral calculus, and 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 Dec. 1.

Career Advancement

Graduates find career opportunities in many areas, including pharmaceutics, 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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This sample plan is currently being reviewed and will be added at a later date.