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 except CPH:6100 and BIOS:7270 must be taken on an A–F graded basis.

Course #	Title	Hours
All of these:		
BIOS:5510/ IGPI:5510	Biostatistical Computing (taken twice for 2 s.h. each; topics should be programming with R and programming with SAS)	4
BIOS:5710/ IGPI:5710	Biostatistical Methods I	4
BIOS:5720/ IGPI:5720	Biostatistical Methods II	4
BIOS:5730/ IGPI:5730	Biostatistical Methods in Categorical Data	3
BIOS:6610/ IGPI:6610	Statistical Methods in Clinical Trials	3
BIOS:7500	Preceptorship in Biostatistics	3
EPID:4400	Epidemiology I: Principles	3
STAT:4100/ IGPI:4100	Statistical Inference I	3
STAT:4101/ IGPI:4101	Statistical Inference II	3

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/ IGPI:6210	Applied Survival Analysis	3
BIOS:6310/ IGPI:6310/ STAT:6550	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/ IGPI:7210/ STAT:7570	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/ IGPI:7310	Longitudinal Data Analysis	3
BIOS:7330	Advanced Biostatistical Computing	3
BIOS:7410/ STAT:7510	Analysis of Categorical Data	3

BIOS:7600/ IGPI: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/ IGPI:4522/ PSQF:4520	Bayesian Statistics	3
STAT:4540/ BAIS:4540/ DATA:4540/ IGPI:4540	Statistical Learning	3
STAT:4580/ DATA:4580/ IGPI:4580	Data Visualization and Data Technologies	3
STAT:6560	Applied Time Series Analysis	3
STAT:7400/ DATA:7400/ IGPI:7400	Computer Intensive Statistics	3
May complete one of these to reach the 5 s.h. minimum:		
BIOL:4213/ GENE:4213/ IGPI: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/IGPI:5110	Introduction to Informatics	3
DATA:6200/ ACTS:6200/ STAT: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/ IGPI:5270/ MMED:5270	Pathogenesis of Major Human Diseases	3
PATH:8133	Introduction to Human Pathology for Graduate Students	2-4

Graduate Education

Graduate education prepares students with advanced knowledge and skills in specialized fields. At the University of Iowa, the Graduate College advocates for student-centered graduate education and supports equitable application of rules and policies across graduate programs.

Academics

University of Iowa graduate credentials are regulated by policies and requirements found in the Graduate College Manual of Rules and Regulations. This includes minimum grade-point average (GPA) requirements for academic standing and degree conferral. The Graduate College sets the minimum requirement. Individual graduate programs may establish higher GPA requirements.

Admissions

Graduate student applicants must meet admission requirements for both the Graduate College and the program to which they have applied. University of Iowa graduate admission requirements are published by the Graduate College and on the Graduate Admissions website.

Financial Support

Graduate students might be eligible for financial support. Several contingencies apply, including degree program and award type, satisfactory progress toward degree, satisfactory completion of all duties related to an appointment, and availability of funding. Graduate students should inquire directly with their program for more information about funding availability. The Graduate Student Employment Standards govern the employment relationship between the University of Iowa and all graduate teaching and research assistants in all matters except wages, which are covered by an existing collective bargaining agreement or the conditions of an applicable federal grant.

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

Four-Year Graduation Plan