Biostatistics Major – M.S., M.P.H., Ph.D

The University of Minnesota, School of Public Health, Division of Biostatistics has an international reputation for excellence in methodological and applied research and training. Biostatistics students enjoy small classes and individual faculty attention, state-of-the-art computing facilities, proximity to a large academic health center, a strong record in job placement, teaching and research assistantships, and opportunities for work experience in clinical trials and other areas of research.

Master’s Program Curriculum

There are two master’s programs: the M.S. and M.P.H. The entrance requirements are the same for both. The M.S. program takes two years for full-time students. The M.P.H. can also be completed within two years, but may require more time because of additional coursework.

M.S. Degree Program

The M.S. requires 7 core courses, 4 electives, and a final project. The first year consists of three courses in Biostatistics methods, two semesters of statistical theory, plus a Health Science elective course. After the first year, there is a written exam covering the two theory and three methods courses. In the second year are courses in clinical trials, and analysis of survival data, plus three Biostatistics electives. Students complete the final project during their final semester.

A typical schedule for the M.S. is shown below.

Year One:

Fall Semester
- Biostatistics: Regression (PubH 7405, 4 credits)
- Theory of Statistics I (Stat 5101, 4 credits) or (Stat 8101, 4 credits)
- One Health Science elective (3 credits)

Spring Semester
- Biostatistics: ANOVA and Design (PubH 7406, 4 credits)
- Analysis of Categorical Data (PubH 7407, 3 credits)
- Theory of Statistics II (Stat 5102, 4 credits) or (Stat 8102, 4 credits)

May (After Finals)
- M.S. Written Examination

Year Two

Fall Semester
- Survival Analysis (PubH 7450, 3 credits)
- Two Biostatistics electives

Spring Semester
- Clinical Trials (PubH 7420, 3 credits)
- Biostatistics Master’s Project (PubH 7494, 3 credits)
- One Biostatistics elective

The Plan B project should involve a combined total of approximately 120 hours of work. There are three requirements for the Plan B project: a written report, a 25 minute oral presentation of the project, followed by a final oral examination, and registration for 3 credits of PubH 7494.

Contact Information

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Requirements are subject to change for each incoming class, without prior written notice to applicants. Contact a Major Coordinator for specific information.

Biostatistics Electives

- Statistical Learning and Data Mining (PubH 7475, 3 credits)
- Latent Variable Models (PubH 7435, 3 credits)
- Statistical Methods for Correlated Data (PubH 7430, 3 credits)
- Statistics in Genetics and Molecular Biology (PubH 7445, 3 credits)
- Introduction to Bayesian Data Analysis (PubH 7440, 3 credits)
- Statistics for Translational and Clinical Research (PubH 7470, 3 credits)
- Modern Non-parametrics (PubH 8422, 3 credits)
- Applied Multivariate Methods (Stat 5401, 3 credits)
- Nonparametric Methods (Stat 5601, 3 credits)
M.P.H. Degree Program

The Master of Public Health program has different course requirements than the M.S. program. In place of the four elective courses (1 in health science and 3 in Biostatistics) which are required in the M.S. degree, the M.P.H requires five public health courses (administration, behavioral science, environmental health, epidemiology, ethics). The M.P.H program also requires students to complete a field experience in addition to a written master's project. Unlike the M.S. degree, the M.P.H does not have a comprehensive written exam requirement.

M.P.H. students must complete a minimum of 42 credits, including the required courses mentioned above. Additional credits needed to total 42 may be taken from any of the following: graduate-level courses related to Biostatistics, Statistics, or Public Health, PubH 7494 (Master's Project), and PubH 7496 (Field Experience). M.P.H. students intending to take more Biostatistics electives or continue with a Ph.D. may need more time to complete both their required coursework and the Ph.D. prerequisites. For these reasons, the majority of students in the Biostatistics program choose the M.S. program instead of the M.P.H.

Ph.D. Program Curriculum

The Ph.D. program requires 5 core courses and 4 electives, PubH 7420 Clinical Trials, PubH 7450 Survival Analysis, a preliminary written examination, a preliminary oral examination, writing the dissertation, and defending the dissertation in a final oral examination.

Preparatory Year:
Students entering the program with an undergraduate degree or an MS in a field other than statistics or biostatistics generally complete preparatory coursework in the first year and then follow the same curriculum as students entering the program with a Masters’ degree in statistics.

A typical schedule for the Ph.D. is shown below.

Preparatory Courses (1 year):
- Math 5615H Mathematical Analysis I 4
- PubH 7405 Biostatistics: Regression 4
- Stat 8101 Theory of Statistics I 4
- PubH 7406 Biostatistics: Design and ANOVA 4
- PubH 7407 Categorical Data Analysis 3
- Stat 8102 Theory of Statistics II 4
- Year 1 Written Exam to be taken after finals of Spring Semester*

Year One:
Fall Semester
- Survival Analysis (PubH 7450, 3 credits)
- Mathematical Statistics I (Stat 8111, 4 credits)
- Probability Models (PubH 8432, 3 credits)
- Linear Models (PubH 8401, 4 credits)

Spring Semester
- Clinical Trials (PubH 7420, 3 credits)
- Mathematical Statistics II (Stat 8112, 4 credits)
- Bayesian Decision Theory (PubH 8442, 3 credits)
- Elective (1-4)

Mid-August
- Preliminary written exam

Year Two:
Three Biostatistics elective courses chosen from the following:
- Topics: Statistical Genetics (PubH 8400, 3 credits)
- Longitudinal Data Analysis (PubH 8452, 3 credits)
- Advanced Survival Analysis (PubH 8462, 3 credits)
- Modern Non-parametrics (PubH 8422, 3 credits)
- Sequential Analysis (PubH 8462, 3 credits)
- Spatial Biostatistics (PubH 8472, 3 credits)
- Latent Variable Models (PubH 8435, 3 credits)
- Statistics for Human Genetics and Molecular Biology (PubH 8445, 3 credits)
- Statistical Learning and Data Mining (PubH 8475, 3 credits)
- At least one elective course from outside of Biostatistics is needed to fulfill the 12-credit requirement for a supporting field or minor, which may include the 10 credits of required Statistics courses.

Years Three & Four:
- Preliminary oral examination
- Writing the dissertation
- Defending the dissertation in a final oral examination
- Complete at least 24 thesis credits (PubH 8888)

Admission Preferences
Admission requires a baccalaureate degree or higher from an accredited college or university. Admissions committees in each major review applicants according to their personal statements, background and experience, record of academic achievement, demonstrated academic potential, letters of recommendation, compatibility of interests with program faculty, and other factors.

Test scores and GPAs provide competitive points of reference for admission but are not alone decisive in the admissions review.

M.S. and M.P.H. Preferred Performance Levels
○ GPA of 3.10 (3.40 for quantitative courses)
○ GRE scores of 450 (verbal), 650 (quantitative)
○ TOEFL scores of 600 on the paper test or 250 on the computer-based test or 90 on the internet based (iBT) test for applicants whose native language is not English

Prerequisites:
○ Mathematics through multivariable calculus (three semesters or four quarters)
○ Linear algebra
○ One course in applied statistics
○ One course in computer programming using a standard procedural language such as FORTRAN or C

Ph.D. Preferred Performance Levels
○ Fulfillment of the master’s degree requirements
○ Bachelor’s or master’s degree in mathematics, statistics, or biostatistics

Application Deadline
○ December 1

Admission Decisions
Applications are reviewed by the admissions committee beginning in January. Applicants are notified of the admission decision in mid-February.