BIOSTATISTICS, SCM

The Johns Hopkins Department of Biostatistics ScM program (https://publichealth.jhu.edu/academics/scm-dept-of-biostatistics/) is intended for individuals who have demonstrated excellence at the undergraduate level in quantitative or biological sciences and prepares them for a career as a professional statistician. Typically, ScM graduates assume positions in research or professional settings as scientific project coordinators and data analysts where they:

- Design research studies of human health and disease.
- Design and implement data management systems, pipelines and tools.
- Design and implement tabular and graphical displays of quantitative information.
- Draw inferences from quantitative data.
- Use statistical reasoning and theory to deal effectively with non-standard statistical problems.
- Perform major statistical analyses to address public health or statistical research questions.
- Assist statistical researchers in the conduct of original, methodologic research.

More detailed information is available below, in the Department of Biostatistics Student Handbook, and in the School's Policies and Procedures Memorandum for the ScM degree.

Program Overview

The ScM program typically takes two years, with the first year spent in didactic coursework and the second year spent working closely with a departmental faculty member in a master's thesis project and completing elective courses that are in line with the individual student's interests.

Program Requirements
Student Evaluations

The Department is committed to providing every opportunity for its ScM students to successfully complete this academic program. To support students in progressing toward the degree, a comprehensive written examination is given at the end of the first year.

Seminars

The Department offers a weekly seminar program (https://publichealth.jhu.edu/departments/biostatistics/news-and-events/current-seminars/) featuring recent work by outstanding statistical scientists from around the world. Attendance is required for all graduate students.

In addition, first year graduate students are required to complete the Current Topics in Biostatistics Research course, where faculty, postdocs and senior students from the Department present their research, with a focus on the public health and scientific questions driving the work, why the research makes a difference for the subject area and how to translate the research into practice.

Course location and modality is found on the BSPH website (https://publichealth.jhu.edu/courses/).

Cells to Society Courses (CEPH Core Requirements)

Students are required to take the eight 552.xxx online 0.5 credit courses listed below. Students must complete these eight courses by the end of Year Two; however, we recommend that students complete these during Year One. Note that several of the 552.xxx courses may be offered in August; if you take courses during this time, you will register for the .80 summer section and the credits will show up as 1st term credit hours. Further, given the course load for first term, we recommend completing at most 2 552.xxx courses during the first term, one per each half term. For example, 552.601 (in 1st term) followed by 552.603 (in 2nd term). Students unable to complete all eight of the 552.xxx courses in Year One must do so in Year Two. The required eight courses and course offering times are listed in the table below.

Code	Title	Credits
PH.552.601	Foundational Principles of Public Health	0.5
PH.552.603	The Role of Qualitative Methods and Science in Describing and Assessing a Population's Health	0.5
PH.552.607	Essentials of Environmental Health	0.5
PH.552.608	Biologic, Genetic and Infectious Bases of Human Disease	0.5
PH.552.609	Psychological and Behavioral Factors That Affect A Population's Health	0.5
PH.552.610	The Social Determinants of Health	0.5
PH.552.611	Globalization and Population Health	0.5
PH.552.612	Essentials of One Health	0.5

Recommended Curriculum

Course	Title	Credits
First Year		
First Term		
PH.140.651	Methods in Biostatistics I [+]	4
PH.140.646	Essentials of Probability and Statistical Inference I: Probability [+]	4
PH.140.776	Statistical Computing [****]	3
PH.140.840	Special Studies and Research Biostatistics (Credits as needed in order to get to at least 16 credits total)	1 - 22
PH.140.860	Current Topics in Biostatistics Research [***]	1
PH.260.621	Introduction to the Biomedical Sciences I	2
PH.340.721	Epidemiologic Inference in Public Health I	5
PH.550.860	Academic & Research Ethics at BSPH [*****]	0
	Credits	**20-41**
Second Term		
Cells to Society required course(s) [**]		
Electives		
PH.140.630	Introduction to Data Management	3
PH.140.647	Essentials of Probability and Statistical Inference II: Statistical Inference [+]	4
PH.140.652	Methods in Biostatistics II [+]	4
PH.140.777	Statistical Programming Paradigms and Workflows [****]	3
PH.140.840	Special Studies and Research Biostatistics (Credits as needed in order to get to at least 16 credits total)	1 - 22
PH.140.860	Current Topics in Biostatistics Research [***]	1

PH.260.622	Introduction to the Biomedical Sciences II	2
	Credits	**18-39**
Third Term		
PH.140.653	Methods in Biostatistics III [+]	4
PH.140.648	Essentials of Probability and Statistical Inference III: Theory of Modern Statistical Methods [+]	4
PH.140.860	Current Topics in Biostatistics Research [***]	1
PH.140.631	The SAS Statistical Package: A Survey for Statisticians	3
PH.140.628	Data Science for Public Health I	4
Cells to Society required course(s) [**]		
Electives		
PH.140.840	Special Studies and Research Biostatistics (Credits as needed in order to get to at least 16 credits total)	1 - 22
	Credits	**17-38**
Fourth Term		
PH.140.654	Methods in Biostatistics IV [+]	4
PH.140.649	Essentials of Probability and Statistical Inference IV [+]	4
PH.140.860	Current Topics in Biostatistics Research [***]	1
PH.140.629	Data Science for Public Health II	4
Cells to Society required course(s) [**]		
Electives		
PH.140.840	Special Studies and Research Biostatistics (Credits as needed in order to get to at least 16 credits total)	1 - 22
	Credits	**14-35**
Second Year		
First Term		
PH.140.776	Statistical Computing (if not taken in first year)	3
PH.550.860	Academic & Research Ethics at BSPH (if not taken in first year) [1]	0
PH.340.721	Epidemiologic Inference in Public Health I [3]	5
Electives [2]		
"Cells to Society" modules, if applicable [3]		
PH.140.820	Thesis Research Biostatistics (credits as needed in order to get to at least 16 credits total)	
PH.140.840	Special Studies and Research Biostatistics (credits as needed in order to get to at least 16 credits total)	
	Credits	**8**
Second Term		
PH.140.777	Statistical Programming Paradigms and Workflows	3
Electives [2]		
"Cells to Society" modules, if applicable [3]		
PH.140.820	Thesis Research Biostatistics (credits as needed in order to get to at least 16 credits total and/or)	

PH.140.840	Special Studies and Research Biostatistics (credits as needed in order to get to at least 16 credits total)	
	Credits	**3**
Third Term		
PH.140.643	Practice of Statistical Consulting [4]	3
Electives [2]		
"Cells to Society" modules, if applicable [3]		
PH.140.820	Thesis Research Biostatistics (credits as needed in order to get to at least 16 credits total and/or)	
PH.140.840	Special Studies and Research Biostatistics (credits as needed in order to get to at least 16 credits total)	
	Credits	**3**
Fourth Term		
Electives [2]		
"Cells to Society" modules, if applicable [3]		
PH.140.820	Thesis Research Biostatistics (credits as needed in order to get to at least 16 credits total)	
PH.140.840	Special Studies and Research Biostatistics (credits as needed in order to get to at least 16 credits total)	
	Credits	**0**
	Total Credits	**83-167**

[+]   The sequences *Methods in Biostatistics I – IV* (140.651-654) and *Essentials of Probability and Statistical Inference I – IV* (140.646-649) are required course sequences for the 1st year. Per school policy, for students to remain in satisfactory academic standing students must meet the minimum grade threshold of a C in required courses.

[*]   The credits of this course count toward the first term.

[**]   See "Cells to Society Courses" section, above.

[***]   This is a 1-credit required seminar for our 1st year ScM and PhD students.

[****] This year, the department will offer two introductory statistical computing courses, 140.776 in 1st term and 140.777 in 2nd term. The 1st term course is an introduction to statistical programming in R and is highly recommended for students except those with existing training/experience with computing in R, C/C++, perl, java, python, etc. The second term will focus on statistical programming paradigms and workflows. Students should consult with the 140.776 course instructor, their advisor, or Dr. Taub for guidance.

[*****] Although this course is offered in subsequent terms, incoming students are required to take this during their first term and will not be able to register for 2nd term until they have done so.

[1]   Although this course is offered in subsequent terms, continuing students who have not previously taken the course are required to take this during 1st term and will not be able to register for 2nd term until they have done so.

[2]   Note that Survival Analysis (140.641, highly recommended), Analysis of Multilevel and Longitudinal Data (140.655, highly recommended), Statistical Machine Learning (140.644), Advanced Data Science (140.711, requires faculty approval or 140.628-9) and Statistics for Psychosocial Research: Measurement (330.657) will be taught in term 1; Introduction to

Data Management (140.630), Multilevel and Longitudinal Data Analysis Workshop (140.656, if completed 140.655), Advanced Data Science (140.712, if completed 140.711), Risk Prediction and Precision Medicine (140.742) and Statistics for Psychosocial Research: Structural Models (140.658) will be taught in term 2; Causal Inference (EN.601.677) in 1st semester (terms 1 and 2) at Homewood; SAS Statistical Package: A Survey for Statisticians (140.631), Statistical Methods for Sample Surveys (140.640), Statistical Computing, Algorithm and Software Development (140.778), Power & Sample Size for the Design of Epidemiological Studies (340.694) and Design of Clinical Experiments (140.642) will be taught in term 3, Causation (260.844) in terms 2 and 4, Causal Inference in Medicine and Public Health (140.664) in terms 3 and 4, Data Science for Public Health (140.628-9) in terms 3 and 4. Please consult the BSPH course search engine (http://www.jhsph.edu/courses (http://www.jhsph.edu/courses/)) to identify additional Biostatistics electives that are available.

3   Students are required to complete Epidemiologic Inference in Public Health I (340.721) and the eight 552.xxx on-line 0.5 credit courses listed in the Cells to Society section, above. Students must complete these eight courses by the end of Year Two. The Cells to Society section also provides a link to the course offering times.

4   The Practice of Statistical Consulting (140.643) is the only required course for the 2nd year. Per school policy, for students to remain in satisfactory academic standing students must meet the minimum grade threshold of a C in required courses.

Additional Notes and Requirements
First Year
- Students must enroll in a minimum of 16 credits per term. The 16 credits can be reached by enrolling for special studies credit (PH.140.840 Special Studies and Research Biostatistics). These special studies must have a clearly defined objective.
- By the end of the first year, students MUST have earned 12 credits in non-Biostatistics courses (of which 6 credits must come from SPH courses). Special studies (800-level) courses in another department do NOT count toward this requirement.

- All students must attend the departmental seminar series.
- There will be a qualifying exam (multi-hour in-class exam followed by a 3-day take-home data analysis project) during the first half of June of the 1st year.
- Please consult the Master's Student Academic Standing Guide (https://my.jhsph.edu/sites/biostat/students/DocumentLibrary/ScM_MHS_academic_expectations.pdf) for more detailed information about academic requirements and expectations.

Second Year
The second year curriculum is considerably less course-intensive than the first, as thesis development becomes a priority during this year. However, students are encouraged to avail themselves of the array of biostatistical electives that are available (see Electives below) and to be mindful of completing the School's extra-departmental course requirements.

ADDITIONAL NOTES AND REQUIREMENTS
- Students must enroll for a minimum of 16 credits per term. The 16 credits can be reached by enrolling for special studies credit. These special studies must have a clearly defined objective.

- Students are required to attend the departmental seminar series.
- Students should immediately start the process of identifying a thesis topic/adviser.
- In order for ScM students to graduate from the Bloomberg School of Public Health: Students MUST have earned 12 credits in non-Biostatistics courses (of which 6 credits must come from SPH courses). Special studies (800-level) courses in another department do NOT count toward this requirement. The courses 550.860 Academic and Research Ethics at JHSPH and 552.602 do NOT count toward this requirement.
- A timetable for completion of ScM requirements during the 2025-26 academic year is available here (https://my.publichealth.jhu.edu/Offices/StudentAffairs/RecordsRegistration/MastersCandidateInformation/Documents/DueDatesScM%20MBe%202025-26.pdf).

Master's Student Policies

Below covers policies regarding academic performance of master's students that are specific to the Department of Biostatistics. Students also must satisfy the academic standing requirements of the University and Bloomberg School of Public Health. Master's students are expected to maintain a grade point average of no less than 2.75 throughout their studies, to meet the minimum grade threshold of a C in required courses, and to complete academic requirements within established deadlines.

For a full list of program policies, please visit the ScM in Biostatistics (https://publichealth.jhu.edu/academics/scm-dept-of-biostatistics/) page, where students can find a link to our ScM-MHS Student handbook.

Departmental Master's Comprehensive Exam

The Departmental master's exam is taken at the end of the first year of study (typically in early June). The Departmental master's exam is administered only once a year.

The grading of the Departmental exam is as follows. Passing scores are determined by exam writers after grading with examiners blinded from student names. Students who pass all sections of the exam pass the exam. Students failing one or more sections will be discussed by the faculty as a whole. This discussion will include exam and course performance in the first year. Possible resolutions include: declaring the student as passing the exam, declaring the student as having failed the exam, take-home remediation of sections of the exam or a full retake (only available if it is the student's first attempt at the exam).

In the event of a retake of the exam, students are allowed one retake. Student retakes typically occur in the following year, with exceptions occurring when mitigating circumstances are present, such as a leave of absence. In the event of a failure in the retake, the student will be asked to leave their master's program or switch to another program (for example from ScM to MHS).

Students who fail the exam are not eligible to receive the 75% tuition reduction for their second year of study. Failing the exam typically results in at least one extra academic year without the tuition reduction.

Often students who will not receive the 75% tuition reduction in their second year consider switching to part-time status. Such a switch must be discussed and approved by the graduate committee. Further, it should

be noted that part-time status is often not an option for foreign students due to visa issues and residency requirements.

Upon successful completion of the Master of Science in Biostatistics, students will have mastered the following competencies:

- Apply the probabilistic and theoretical basis for the current methods used in statistical analysis.
- Perform estimation, testing and interpretation for single group summaries such as means, medians, variances, correlations and rates, and two group comparisons such as odds ratios, relative risks and risk differences.
- Formulate a scientific question about the relationship of a response variable Y and predictor variables X in terms of the appropriate linear, logistic, log-linear or survival regression model. Use indicator variables, linear and cubic regression splines, and interaction terms to represent major scientific questions in terms of a regression model.
- Write a methods and results section for a substantive journal, correctly describing the regression model in scientific terms and the method used to specify and estimate the model.
- Develop foundational insights for applying biostatistical theory and methodology to solve public health and scientific problems.
- Apply knowledge and skills of research methodologies to collaborate with substantive investigators.

According to the requirements of the Council on Education for Public Health (CEPH), all BSPH degree students must be grounded in foundational public health knowledge. Please view the list of specific CEPH requirements by degree type (https://e-catalogue.jhu.edu/public-health/ceph-requirements/).