DEPARTMENT OF BIOSTATISTICS GRADUATE PROGRAMS
STUDENT HANDBOOK
2019-20

Welcome to the Department of Biostatistics! The Student Handbook outlines the requirements, policies, and procedures for the operation of our graduate programs. Please keep in mind that policies may change. The department will make every effort to communicate changes in requirements, procedures, or policies.

CONTACT INFORMATION

For all inquiries, please contact

biostat@pitt.edu
412-624-3023
412-624-0184 (fax)

University of Pittsburgh
Graduate School of Public Health
Department of Biostatistics
7135 PUBHL
130 DeSoto Street
Pittsburgh, PA 15261

IF YOU ARE A STUDENT EXPERIENCING A CRISIS, PLEASE CALL 412-648-7930 OR VISIT THE UNIVERSITY COUNSELING CENTER (NORDENBERG HALL-WELLNESS CENTER, 119 UNIVERSITY PLACE) AND STATE THAT YOU ARE IN CRISIS.

More information on services provided by the University of Pittsburgh please visit the University of Pittsburgh Office of Student Affairs.

POLICIES

All Biostatistics students are bound by the policies and regulations below. Students should consult the Graduate and Professional Studies Catalog, Graduate Studies Policies and Regulations of the University of Pittsburgh, and Pitt Public Health Academic Handbook for a complete listing of all policies and regulations.

Independent Development Plan (IDP)

A Graduate Student Career Development Plan, also known as an Independent Development Plan (IDP), is a tool for helping students and advisors outline and discuss short-term and long-term objectives to guide the student's professional development. Biostatistics graduate students and advisors are required to complete an IDP at least annually. The Doctoral Report on Requirements Form for the PhD preliminary (qualifying) examination and dissertation overview includes a checkbox that the committee must use to certify that an IDP has been completed within six months. If an IDP has not been completed within six months, students and advisors must complete a new IDP.

Academic Integrity

All students are expected to adhere to the school's standards of academic honesty. *Cheating/plagiarism will not be tolerated.* The Graduate School of Public Health's policy on academic integrity, which is based on the University policy, is available online in the Pitt Public Health Academic Handbook. The policy includes obligations for faculty and students, procedures for adjudicating violations, and other critical information. Please take the time to read this policy.

The Graduate School of Public Health requires all enrolled students to complete the Pitt Public Health Student Academic Integrity Module. The deadline for new students starting in fall 2019 is October 4, 2019. Students should consult the Guidelines on Academic Integrity for more information on student and faculty obligations and hearing procedures.

Disabilities

The Americans with Disabilities Act of 1990 and Section 504 of the Rehabilitation Act of 1973 prohibit discrimination on the basis of disability and require the University to make reasonable accommodations for those otherwise qualified individuals with a disability who request accommodations. Students requesting reasonable accommodations must do so by registering with Disability Resources and Services as early as possible in the term. Please contact Disability Resources and Services at 412-648-7890, or visit their offices at 140 William Pitt Union.

Nondiscrimination

The University of Pittsburgh, as an educational institution and as an employer, does not discriminate on the basis of disability, race, color, religion, national origin, ancestry, genetic information, marital status, familial status, sex, age, sexual orientation, veteran status or gender identity and expression in its programs and activities.

The University does not tolerate discrimination, harassment, or retaliation on these bases and takes steps to ensure that students, employees, and third parties are not subject to a hostile environment in University programs or activities.

The University responds promptly and equitably to allegations of discrimination, harassment, and retaliation. It promptly conducts investigations and takes appropriate action, including disciplinary action, against individuals found to have violated its policies, as well as provides appropriate remedies to complainants and the campus community. The University is committed to taking prompt action to end a hostile environment if one has been created, prevent its recurrence, and remedy the effects of any hostile environment on affected members of the campus community.

For complete details on the University's policies, procedures, and practices which relate to diversity and inclusion please visit https://diversity.pitt.edu/affirmative-action/policies-procedures-and-practices.

Diversity Statement

The University of Pittsburgh Graduate School of Public Health considers the diversity of its students, faculty, and staff to be a strength and critical to its educational mission. Pitt Public Health is committed to creating and fostering inclusive learning environments that value human dignity and equity. Every member of our community is expected to be respectful of the individual perspectives, experiences, behaviors, worldviews, and backgrounds of others. While intellectual disagreement may be constructive, no derogatory statements, or demeaning or discriminatory behavior will be permitted.

If you feel uncomfortable or would like to discuss a situation, please contact any of the following:

- the course instructor
- the Pitt Public Health Associate Dean for Diversity at 412-624-3506 or nam137@pitt.edu
- the University's Office of Diversity and Inclusion at 412-648-7860 or https://www.diversity.pitt.edu/make-report/report-form (anonymous reporting form).

Sexual Misconduct, Required Reporting, and Title IX

The University is committed to combatting sexual misconduct. As a result, you should know that University faculty and staff members are required to report any instances of sexual misconduct, including harassment and sexual violence, to the University's Title IX office so that the victim may be provided appropriate resources and support options. What this means is that faculty and staff are required to report any incidents of sexual misconduct that are directly reported to them, or of which they are somehow made aware.

There are two important exceptions to this requirement about which you should be aware:

A list of the designated University employees who, as counselors and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found here: www.titleix.pitt.edu/report/confidentiality

An important exception to the reporting requirement exists for academic work. Disclosures about sexual misconduct that are shared as part of an academic project, classroom discussion, or course assignment, are not required to be disclosed to the University's Title IX office.

If you are the victim of sexual misconduct, Pitt encourages you to reach out to these resources:

- Title IX Office: 412-648-7860
- SHARE @ the University Counseling Center: 412-648-7930 (8:30 A.M. TO 5 P.M. M-F) and 412-648-7856 (AFTER BUSINESS HOURS)

If you have a safety concern, please contact the University of Pittsburgh Police, 412-624-2121.

Other reporting information is available here: www.titleix.pitt.edu/report

DEGREE PROGRAMS

The Department of Biostatistics offers the following graduate programs:

Doctor of Philosophy (PhD) in Biostatistics
Master of Science (MS) in Biostatistics
Master of Science (MS) in Biostatistics with concentration in Health Data Science (HDS)
Master of Science (MS) in Biostatistics with concentration in Statistical and Computational Genomics (SCG)

Requirements for each program are described in on the following pages.

Doctor of Philosophy (PhD) in Biostatistics

The PhD in Biostatistics degree program is for students with a background in mathematics and a strong interest in biology and public health. The program emphasizes statistical theory and methods so that students are prepared to be effective statistical collaborators in interdisciplinary studies; lead the design and execution of studies; and develop biostatistics methodology.

Admission

Application for admission must be made through the Graduate School of Public Health Office of Student Affairs. Prospective students should visit the Graduate School of Public Health admissions page for school-wide admission requirements and the Department of Biostatistics admissions page for department-specific admission requirements. PhD candidates normally complete graduation requirements in four to five years.

Program Competencies

Students successfully completing the PhD Program in Biostatistics will be able to:

- Quantitatively address a novel or complex health problem by developing an innovative statistical methodology or adapting existing methods to a new problem
- Demonstrate mastery of advanced statistical theory and applications
- Understand and implement innovative statistical approaches emerging in the literature to biomedical and public health issues
- Communicate the results of biostatistical analyses to individuals with varying degrees of statistical knowledge
- Recognize strengths and weaknesses of proposed approaches, including alternative designs, data sources, and analytic methods
- Determine the data best suited to address public health issues, program planning, and program evaluation
- Contribute to the body of knowledge in the field of biostatistics by submitting an article for publication in peer-reviewed journal, or preparing a book chapter or book for publication

Requirements

Coursework

A minimum 72 credits are required.

Core Courses

BIOST 2025	Biostatistics Seminar	1 credit	*(3 terms required)*
BIOST 2039	Biostatistical Methods	3 credits	
BIOST 2043	Introduction to Statistical Theory I	3 credits	
BIOST 2044	Introduction to Statistical Theory II	3 credits	
BIOST 2049	Applied Regression Analysis	3 credits	
BIOST 2050	Longitudinal and Clustered Data Analysis	2 credits	
BIOST 2051	Statistical Estimation Theory	3 credits	
BIOST 2054	Survival Analysis	3 credits	
BIOST 2061	Likelihood Theory & Applications	2 credits	
BIOST 2083	Linear Models	3 credits	
BIOST 2086	Applied Mixed Models Analysis	3 credits	
BIOST 2087	Biostatistics Consulting Practicum	1 credit	
BIOST 2093	SAS for Data Management & Analysis	2 credits	
EPIDEM 2110*	Principles of Epidemiology	3 credits	
PUBHLT 2011*	Essentials of Public Health	3 credits	
PUBHLT 2022*	Public Health Grand Rounds	0 credits	*(2 terms required)*

** GSPH Core Course*

Electives

In situations where a student's special interests or needs indicate an alternative course is more appropriate it may be substituted with the permission of the student's academic advisor and department chair.

Department Electives

Students must complete six of the following courses:

BIOST 2016	Sampling Design & Analysis	2 credits
BIOST 2036	Introduction to Health Data Science	2 credits
BIOST 2040	Elements of Stochastic Processes	3 credits
BIOST 2052	Multivariate Analysis	3 credits
BIOST 2055	Introductory High-Throughput Genomic Data Analysis I: Data Mining & Applications	3 credits
BIOST 2056	Introduction to Diagnostic Test Evaluation & ROC Analysis	3 credits
BIOST 2058	Scientific Communication Skills	2 credits
BIOST 2059	Constrained Statistical Inference with Applications	2 credits
BIOST 2062	Clinical Trials: Methods & Practice	3 credits
BIOST 2063	Bayesian Data Science	3 credits
BIOST 2065	Analysis of Incomplete Data	3 credits
BIOST 2078	Statistical Learning in High-Dimensional Data with Omics Applications	2 credits
BIOST 2079	Introductory Statistical Learning for Health Sciences	2 credits

BIOST 2080	Advanced Statistical Learning	2 credits
BIOST 2094	Advanced R Computing	2 credits
BIOST 2096	Numerical Methods in Biostatistics	3 credits

Outside Electives

Students must complete at least three credits outside of the Department of Biostatistics. In special circumstances, undergraduate credits may be applied to a Pitt Public Health degree with the permission of the advisor. The undergraduate courses must be upper-level courses (1000-1999), with a limit of six total credits. It must be clear that these credits are taken as a graduate student while enrolled at Pitt Public Health and cannot have been taken as an undergraduate or as a non-degree student.

Dissertation Research Credits

Students must complete three credits of BIOST 3010 or one term of FTDR 3999. Please see guidelines for both courses below.

Independent Study (BIOST 2021/3010) Guidelines

Students should give priority to completing core and elective coursework before registering for independent study (BIOST 2021/3010). Specifically, no more than three credits of independent study (BIOST 2021/3010) can be taken in terms when core and elective courses are offered that a student needs take to complete coursework requirements.

Before passing the dissertation overview and comprehensive examination, a doctoral student can register for BIOST 2021 for his/her independent PhD level research. After passing the dissertation overview and comprehensive examination, a student is permitted to take BIOST 3010 that can fulfill the dissertation research credit requirement while providing credits toward the 72-credit requirement for the PhD degree.

In situations where a student's special interests or needs indicate more credits of independent study (BIOST 2021/3010) appropriate approval must be obtained from the student's academic advisor and department chair.

FTDR 3999 Guidelines

Upon enrollment in 72 credits and successful completion of all required coursework, PhD students are required to register for Full-time Dissertation Study (FTDR 3999). FTDR 3999 carries no credits or letter grade, but provides students with full-time status. Students enrolled in FTDR 3999 are assessed a special tuition fee.

Advanced Standing and Credit Transfer

PhD students with previous graduate experience in Biostatistics or a related field may apply to transfer up to 24 credits for graduate-level coursework successfully completed with a grade of B or better. The course credits to be transferred must be reviewed by the student's academic advisor and approved by the Department Chair and Assistant Dean for Student Affairs. Students who receive transfer credits for GSPH Core Courses must complete the GSPH Core Course Exemption Form in addition to the credit transfer paperwork to exempt out of those classes. Students who receive transfer credits for BIOST 2087 must complete the BIOST Course Exemption Form in addition to the credit transfer paperwork to exempt out of those classes. All transfer credit paperwork must be complete by the end of a student's first term.

Biostatistics Course Exemption

Students with sufficient background may exempt out of required core courses and electives by completing the BIOST Course Exemption Form and obtaining approval of the student's advisor, the course instructor and department chair. Exempted courses do not carry any credits.

PhD Student Schedule

This schedule is typical for PhD students who enter the program without a previous graduate degree. Students who obtain a relevant graduate degree from another institution should be advised accordingly to make sure he/she takes two terms of PUBHLT 2022 (0), PUBHLT 2011 (3), and three terms of BIOST 2025 (1) within the first two years.

FALL	**SPRING**
FIRST YEAR	
BIOST 2025 (1)	BIOST 2025 (1)
BIOST 2039 (3)	BIOST 2044 (3)
BIOST 2043 (3)	BIOST 2049 (3)
EPIDEM 2110 (3)	BIOST 2093 (2)
PUBHLT 2022 (0)	PUBHLT 2022 (0)
ELECTIVE	ELECTIVE
SECOND YEAR	
BIOST 2025 (1)	PUBHLT 2011 (3)
BIOST 2050 (2)	BIOST 2054 (3)
BIOST 2051 (3)	BIOST 2061 (2)
BIOST 2083 (3)	BIOST 2086 (3)
PHD QUALIFYING EXAM	
THIRD YEAR	
BIOST 2087 (1)	ELECTIVE
ELECTIVE	ELECTIVE
ELECTIVE	ELECTIVE
ELECTIVE	ELECTIVE
ELECTIVE	ELECTIVE

Remaining year(s) can be used to complete electives and full-time dissertation study.

PhD Preliminary (Qualifying) Examination

The preliminary examination is designed to assess the breadth of the student's knowledge of the discipline, the student's achievement during the first year(s) of graduate study, and the potential to apply research methods independently. The preliminary examination is used to identify those students who may be expected to complete the doctoral program successfully and to reveal areas for improvement in the student's preparation.

The Biostatistics PhD preliminary examination is typically offered annually in June. The examination consists of three separate components: applications, theory, and public health based on epidemiology. In order to pass the preliminary examination, students must receive passing scores for all three components of the examination. Eligible students are permitted to retake the portions of the examination they did not pass when the examination is offered again the following year. Students who do not pass the examination on the second attempt will be dismissed from the PhD Program in accordance with the Pitt Public Health Probation and Dismissal Guidelines.

Once a student passes the preliminary examination, the student may begin working on his/her dissertation. Students should not begin dissertation work before they pass the preliminary examination.

Eligibility

A student is eligible to take the preliminary examination if the student:

1. is enrolled in the Department of Biostatistics PhD Program with good standing (3.00 QPA or greater);
2. did not fail the preliminary examination more than once; and
3. completed the required courses (listed below), or equivalent coursework which the student has obtained transfer credits or exemption for.

Required Coursework

Application (Part 1 of 2)

BIOST 2039	Biostatistical Methods
BIOST 2049	Applied Regression Analysis
BIOST 2050	Longitudinal and Clustered Data Analysis
EPIDEM 2110	Principles of Epidemiology

Theory (Part 2 of 2)

BIOST 2043	Introduction to Statistical Theory I
BIOST 2044	Introduction to Statistical Theory II
BIOST 2051	Statistical Estimation Theory
BIOST 2061	Likelihood Theory & Applications
BIOST 2083	Linear Models

Doctoral Dissertation

Students must write a dissertation that presents the results of a research project carried out by the student. An appropriate research project involves a substantive piece of original and independent research grounded in an appropriate body of literature. The PhD dissertation should consist of material sufficient for at least two publications in peer-reviewed journals. At least one of the manuscripts, based on the dissertation and first authored by the student, must be submitted before the PhD dissertation defense. For PhD students matriculated prior to fall 2015, it is recommended that at least one of the manuscripts be submitted before the PhD dissertation defense. It is the responsibility of the student's dissertation committee to evaluate the dissertation in these terms and to recommend the awarding of the doctoral degree only if the dissertation is judged to demonstrate these qualities.

Before the student's dissertation overview and comprehensive examination, the student's dissertation advisor proposes for the approval of the Department Chair and Assistant Dean for Student Affairs, a doctoral dissertation committee.

Rules for PhD Dissertation Committee Composition:

- The committee must consist of at least four University of Pittsburgh faculty members
- At least two members must be on the core faculty list of some Pitt Public Health department
- The majority of members must have graduate faculty status
- One of the University of Pittsburgh faculty on the committee must not be on the core faculty list from the student's department
- If thesis work includes internship/practica experience, including data and policies, from the Allegheny County Health Department the committee must include a preceptor from the Allegheny County Health Department. If the preceptor is an adjunct faculty member, they count as a faculty member. If they do not hold an adjunct appointment, they must be added in addition to all faculty on the committee.

Dissertation Overview & Comprehensive Examination

Doctoral students must prepare and present a dissertation proposal. The dissertation proposal consists of two parts: (i) a presentation of a dissertation overview to members of the student's doctoral committee and all interested members of the Department of Biostatistics and (ii) a comprehensive examination attended only by the student and his/her doctoral committee. The purposes of the overview and the comprehensive exam are for a student to demonstrate that he/she is prepared to complete a dissertation by showing a general breadth of biostatistical knowledge and deep understanding of particular area(s) of biostatistics, demonstrating the ability to use biostatistical research methods and presenting a carefully formulated plan of novel dissertation research. An announcement advertising the time and location of the dissertation overview should be disseminated to the Department at least one week prior to the presentation. The doctoral committee must unanimously approve the dissertation topic and research plan before the student is admitted to candidacy for the doctoral degree. Approval of the overview does not imply either the acceptance of a dissertation prepared in accord with the overview or the restriction of the dissertation to its original overview. The dissertation overview and comprehensive examination should be passed at least one academic term before scheduling the dissertation defense.

Admission to Candidacy

Admission to candidacy for a doctoral degree constitutes a promotion of the student to the most advanced stage of graduate study and provides formal approval to devote essentially exclusive attention to the research and the writing of the dissertation.

Eligibility
To qualify for admission to candidacy a student must:

1. be in full graduate status
2. have satisfied the requirement of preliminary examination
3. have completed all required coursework with a minimum quality point average (QPA) of 3.00
4. shown proficiency in a research or investigative tool
5. have received approval of the proposed dissertation subject and plan following successful completion of the dissertation overview and comprehensive examination requirements

Students are informed of admission to candidacy by written notification from the Assistant Dean for Student Affairs.

Admission to candidacy should occur at least one academic term before the defense of the dissertation in order to provide an opportunity for the dissertation committee members to review, criticize, and monitor the proposed research.

Meetings of the dissertation committee and student must occur at least annually from the time the student gains admission to doctoral candidacy. During these meetings, the dissertation committee should assess the student's progress toward the completion of degree requirements and discuss objectives for the following year and a timetable for completing degree requirements.

Doctoral Dissertation Defense

The final oral examination in defense of the doctoral dissertation is conducted by the student's dissertation committee. One copy of the dissertation must be submitted to each member of the dissertation committee at least two weeks before the scheduled doctoral defense. The defense may not be scheduled earlier than two weeks following submission of the dissertation, but must be held at least two weeks before the degree is conferred.

At least one month before the scheduled defense, the student must provide the department registrar with the defense time, date, place, dissertation title and abstract for school-wide advertisement. The student must also provide these details to the University Times for advertisement at least one month before the scheduled defense. More information on defense announcement guidelines can be found by viewing the complete instructions for announcing your defense.

The final copy of the dissertation must be prepared and submitted according to Detailed Essay, Thesis, and Dissertation Rules. Additional information regarding dissertations can be found by visiting the essays, theses, and dissertations section of the Pitt Public Health graduation site.

Defense Scheduling and Meeting Procedures

1. Students should schedule a date and time (typically 2 hours) for their defense
2. Once a date and time have been set students should contact Renee Valenti for room scheduling
3. Students are required to provide their dissertation title and abstract to Renee Valenti at least one month before the scheduled defense
4. The department registrar will provide the Committee Chair the Report on Requirement Form for completion
5. Students are responsible for bringing all other required paperwork as outlined on the Pitt Public Health Graduation page to their defense
6. Please note that all paperwork require original signatures – students are responsible for obtaining non-Pitt faculty signatures in a timely manner

Graduation

All PhD students must register for at least one credit during the term in which they intend to graduate. Please visit the Pitt Public Health Graduation page for detailed information on applying for graduation and graduation requirements.

Statute of Limitations

The purpose of the statute of limitations is to ensure that a graduate degree from the University of Pittsburgh represents mastery of current knowledge in the field of study.

From the student's initial registration for graduate study, all requirements for the PhD degree must be completed within a period of ten years or eight years if the student has received credit for a master's degree appropriate to the field of study. Please note that the statute of limitations is the same for both full- and part-time students.

Under exceptional circumstances, a candidate for an advanced degree may apply for an extension of the statute of limitations. The request must be approved by the department or departmental doctoral monitoring committee and submitted to the dean for final action. Requests for an extension of the statute of limitations must be accompanied by a departmental assessment of the work required of the student to complete the degree as well as documented evidence of the extenuating circumstances leading to the requested extension. Students who request an extension of the statute of limitations must demonstrate proper preparation for the completion of all current degree requirements.

Master of Science (MS) in Biostatistics

The MS in biostatistics degree program is for students with a background in mathematics and a strong interest in biology and public health. The program emphasizes statistical theory and methods so that students are prepared to be effective statistical collaborators in interdisciplinary studies; and lead the design and execution of studies.

Admission

Application for admission must be made through the Graduate School of Public Health Office of Student Affairs. Prospective students should visit the Graduate School of Public Health admissions page for school-wide admission requirements and the Department of Biostatistics admissions page for department-specific admission requirements. Full-time students normally complete graduation requirements for the MS degree within three to five terms (18 to 24 months).

Program Competencies

Students successfully completing the MS Program in Biostatistics will be able to:

- Address health problems by appropriate problem definition, study design, data collection, data management, statistical analysis, and interpretation of results
- Demonstrate mastery of the theory underlying statistical methods
- Implement and utilize appropriate statistical methods
- Effectively communicate results of biostatistical analyses to scientific and lay audiences
- Apply research design principles to problems in public health
- Recognize strengths and weaknesses of approaches, including alternative designs, data sources, and analytic methods
- Determine the data best suited to address public health issues, program planning, and program evaluation

Requirements

Coursework

A minimum 40 credits are required.

Core Courses

BIOST 2025	Biostatistics Seminar	1 credit	
BIOST 2038	Foundations of Statistical Theory	3 credits	
BIOST 2039	Biostatistical Methods	3 credits	
BIOST 2049	Applied Regression Analysis	3 credits	
BIOST 2050	Longitudinal and Clustered Data Analysis	2 credits	
BIOST 2066	Applied Survival Analysis	2 credits	
BIOST 2081	Mathematical Methods for Statistics	3 credits	
BIOST 2087	Biostatistics Consulting Practicum	1 credit	
BIOST 2093	SAS for Data Management & Analysis	2 credits	
BIOST 2099	Capstone	2 credits	
EPIDEM 2110*	Principles of Epidemiology	3 credits	
PUBHLT 2011*	Essentials of Public Health	3 credits	
PUBHLT 2022*	Public Health Grand Rounds	0 credits	*(2 terms required)*

** GSPH Core Course*

Electives

Students must complete BIOST elective credits to bring the total number of course credits to 40. In situations where a student's special interests or needs indicate an alternative non-BIOST course is more appropriate it may be substituted with the permission of the student's academic advisor and department chair.

Biostatistics Seminar – BIOST 2025

MS students are required to register for one term of Biostatistics Seminar (BIOST 2025). Biostatistics Seminar (BIOST 2025) credits cannot fulfill elective credit requirements.

Advanced Standing and Credit Transfer

MS students with previous graduate experience in Biostatistics or a related field may apply to transfer up to six credits for graduate-level coursework successfully completed with a grade of B or better. The course credits to be transferred must be reviewed by the student's academic advisor and approved by the Department Chair and Assistant Dean for Student Affairs. Students who receive transfer credits for GSPH Core Courses must complete the GSPH Core Course Exemption Form in addition to the credit transfer paperwork to exempt out of those classes. Students who receive transfer credits for BIOST 2087 must complete the BIOST Course Exemption Form in addition to the credit transfer paperwork to exempt out of the class. All transfer credit paperwork must be complete by the end of a student's first term.

In special circumstances, undergraduate credits may be applied to a Pitt Public Health degree with the permission of the advisor. The undergraduate courses must be upper-level courses (1000-1999), with a limit of six total credits. It must be clear that these credits are taken as a graduate student while enrolled at Pitt Public Health and cannot have been taken as an undergraduate or as a non-degree student.

Biostatistics Course Exemption

Students with sufficient background can exempt out of required core courses and electives by completing the BIOST Course Exemption Form and obtaining approval of the student's advisor, the course instructor and department chair. Exempted courses do not carry any credits.

MS Student Schedules

Eighteen-Month Schedule

Fall 1st Year

BIOST 2038	Foundations of Statistical Theory	3 credits
BIOST 2039	Biostatistical Methods	3 credits
BIOST 2081	Mathematical Methods for Statistics	3 credits
EPIDEM 2110	Principles of Epidemiology	3 credits
PUBHLT 2022	Public Health Grand Rounds	0 credits

Spring 1st Year

BIOST 2049	Applied Regression Analysis	3 credits
BIOST 2093	SAS for Data Management & Analysis	2 credits
PUBHLT 2011	Essentials of Public Health	3 credits
PUBHLT 2022	Public Health Grand Rounds	0 credits
ELECTIVE(S)		

May of 1st Year	*MS Comprehensive Exam*

Fall 2nd Year

BIOST 2025	Biostatistics Seminar	1 credit
BIOST 2050	Longitudinal and Clustered Data Analysis	2 credits
BIOST 2066	Applied Survival Analysis	2 credits
BIOST 2087	Biostatistics Consulting Practicum	1 credit
BIOST 2099	Capstone	2 credits
ELECTIVE(S)		

Two-Year Schedule

Fall 1st Year

BIOST 2038	Foundations of Statistical Theory	3 credits
BIOST 2039	Biostatistical Methods	3 credits
BIOST 2081	Mathematical Methods for Statistics	3 credits
EPIDEM 2110	Principles of Epidemiology	3 credits
PUBHLT 2022	Public Health Grand Rounds	0 credits

Spring 1st Year

BIOST 2049	Applied Regression Analysis	3 credits
BIOST 2093	SAS for Data Management & Analysis	2 credits
PUBHLT 2011	Essentials of Public Health	3 credits
PUBHLT 2022	Public Health Grand Rounds	0 credits
ELECTIVE(S)		

May of 1st Year	*MS Comprehensive Exam*

Fall 2nd Year

BIOST 2025	Biostatistics Seminar	1 credit
BIOST 2050	Longitudinal and Clustered Data Analysis	2 credits
BIOST 2066	Applied Survival Analysis	2 credits
ELECTIVE(S)		

Spring 2nd Year

BIOST 2087	Biostatistics Consulting Practicum	1 credit
BIOST 2099	Capstone	2 credits
ELECTIVE(S)		

MS Comprehensive Examination

MS students must pass a written comprehensive examination offered annually at the end of the first year of study in early May. The MS comprehensive examination will cover applied methods as well as theoretical concepts given in a 3-hour exam. The examination is a proctored closed book exam.

Eligible students who fail either part of the examination on the first attempt are permitted to take that part of the examination a second time during the summer. The summer examination is only for eligible first-year students who did not pass the examination on the first attempt in order not to delay graduation or decisions about continuation in the program. Eligible students who fail the examination on the first attempt may also choose to wait until the following May to retake the exam. Students who do not pass the examination on the second attempt will be dismissed from the MS Program in accordance with the Pitt Public Health Probation and Dismissal Guidelines.

Once a student passes the comprehensive examination, the student may take Capstone (BIOST 2099) to work on his/her thesis. Students cannot register for Capstone before they pass the comprehensive examination.

Eligibility

A student is eligible to take the comprehensive examination if the student:

1. is enrolled in the Department of Biostatistics MS Program with good standing (3.00 QPA or greater)
2. did not fail the comprehensive examination more than once
3. completed the required courses (listed below) with a B or better, or equivalent coursework which the student has obtained transfer credits or exemption for

Required Coursework

BIOST 2038	Foundations of Statistical Theory
BIOST 2039	Biostatistical Methods
BIOST 2049	Applied Regression Analysis
EPIDEM 2110	Principles of Epidemiology

BIOST 2099: Capstone – MS Thesis Requirement

MS students must register for Capstone (BIOST 2099) after successful completion of the MS Comprehensive Examination requirement. Capstone is a required two-credit course that meets the master's thesis requirement. Capstone credits cannot fulfill elective credit requirements. MS students are required to write and defend a master's thesis. The master's thesis must be in accord with specifications stipulated in the Pitt Public Health Detailed Essay, Thesis, and Dissertation Rules. Thesis work, including analysis, writing, defending and presenting is done within Capstone.

Capstone is a heavily directed, mentored, fast-paced and intense data analysis/writing course with the goal of producing an ETD-formatted thesis document containing rigorous analytic methods, appropriately summarized analysis results with logical, statistically and scientifically valid conclusions. Capstone projects are based on student work with a faculty member, access to a dataset with a research question from an outside source, or work done on a student internship. In addition, if none of these options apply to an individual student, open access datasets from previously funded research projects in the department or open access databases will also be available for students to use. All projects must have a public health focus.

Because of the fast pace and rigor necessary to complete Capstone within one term, it is critical that students prepare in advance of the course. In the semester prior to taking the course but only after passing the MS Comprehensive exam, students must meet with one of the course directors to discuss possible data sets, potential

research questions and Pitt faculty members who are not on the Biostatistics faculty core to serve as an external reviewer as required by Pitt Public Health.

In the first two weeks of Capstone, students finalize their data set, complete a project prospectus and write thesis research question(s). Also during this time, the Capstone director requests approval from the Department Chair and Assistant Dean for Student Affairs, for a master's thesis committee for each student enrolled in Capstone. This committee will be the instructors of Capstone, the thesis advisor, if applicable, as well as a Pitt faculty member who is not on the Biostatistics faculty core. Students may select a Biostatistics faculty member other than Capstone instructors as their thesis advisor. This is not required, but if a different thesis advisor is selected, the faculty member must sign a memo of understanding in which they agree to adhere to the pace of the course. It will be the students' responsibility to gain the faculty members signature.

The MS thesis committee will judge the adequacy of the MS thesis by the final oral presentation/examination covering the subject of the thesis, which will occur in the final week of Capstone. Successful completion of the MS thesis requires unanimous agreement by the MS thesis committee.

It is required that all students follow the Pitt Public Health Detailed Essay, Thesis, and Dissertation Rules and work in the ETD template when they start to write their thesis. The final copy of the thesis must be prepared and submitted according to University Guidelines for Electronic Theses and Dissertations (ETD).

Graduation

All MS students must register for at least one credit during the term in which they intend to graduate. Please visit the Pitt Public Health Graduation page for detailed information on applying for graduation and graduation requirements.

Statute of Limitations

The purpose of the statute of limitations is to ensure that a graduate degree from the University of Pittsburgh represents mastery of current knowledge in the field of study.

All requirements for MS degrees must be completed within a period of four consecutive calendar years from the student's initial registration for graduate study. Please note that the statute of limitations is the same for both full- and part-time students.

Under exceptional circumstances, a candidate for an advanced degree may apply for an extension of the statute of limitations. The request must be approved by the department and submitted to the dean for final approval and action. Requests for an extension of the statute of limitations must be accompanied by a departmental assessment of the work required of the student to complete the degree as well as documented evidence of the extenuating circumstances leading to the requested extension. Students who request an extension of the statute of limitations must demonstrate proper preparation for the completion of all current degree requirements.

Master of Science (MS) in Biostatistics with concentration in Health Data Science (HDS)

The MS in Biostatistics with area of concentration in Health Data Science (HDS) is an academic degree program for students with a background in mathematics/programming and a strong interest in biology, public health and data science. The HDS concentration emphasizes biostatistical theory and statistical computational methods for analyzing, processing and interpreting large-scale data sets so that students are prepared to clean, store, manage, manipulate, visualize and process high dimensional data as well as be effective statistical collaborators in interdisciplinary studies; and lead the design and execution of studies.

Admission

Application for admission must be made through the Graduate School of Public Health Office of Student Affairs. Prospective students should visit the Graduate School of Public Health admissions page for school-wide admission requirements and the Department of Biostatistics admissions page for department-specific admission requirements. Full-time students normally complete graduation requirements for the MS degree with concentration in HDS within four terms (2 years).

Program Competencies

In addition to the core MS in Biostatistics competencies, student in the HDS concentration will be able to:

- Apply data curation and data management techniques such as data munging, data scraping, sampling, and cleaning in order to construct informative, usable, and manageable data sets for meaningful analyses
- Apply methods for big data and machine learning to reveal patterns, trends and associations including visualization
- Effectively use a programming language (such as R and/or Python) for data management and statistical analysis

Requirements

Coursework

A minimum 40 credits are required.

Core Courses

BIOST 2025*	Biostatistics Seminar	1 credit	
BIOST 2036	Introduction to Health Data Science	2 credits	
BIOST 2038*	Foundations of Statistical Theory	3 credits	
BIOST 2039*	Biostatistical Methods	3 credits	
BIOST 2049*	Applied Regression Analysis	3 credits	
BIOST 2079	Introductory Statistical Learning for Health Sciences	2 credits	
BIOST 2081*	Mathematical Methods for Statistics	3 credits	
BIOST 2087*	Biostatistics Consulting Practicum	1 credit	
BIOST 2094	Advanced R Programming	2 credits	
BIOST 2099*	Capstone	2 credits	
EPIDEM 2110†	Principles of Epidemiology	3 credits	
INFSCI 2710	Database Management	3 credits	
PUBHLT 2011†	Essentials of Public Health	3 credits	
PUBHLT 2022†	Public Health Grand Rounds	0 credits	*(2 terms required)*

** BIOST MS Core Course*

† GSPH Core Course

HDS Electives

Students must complete HDS elective credits to bring the total number of course credits to 40. In situations where a student's special interests or needs indicate an alternative course is more appropriate it may be substituted with the permission of the student's academic advisor and department chair.

BIOST 2063	Bayesian Data Science	3 credits
BIOST 2080	Advanced Statistical Learning	2 credits
BIOST 2093	SAS for Data Management and Analysis	2 credits
INFSCI 2160	Data Mining	3 credits
INFSCI 2410	Introduction to Neural Networks	3 credits
INFSCI 2415	Information Visualization	3 credits
INFSCI 2711	Advanced Database Management	3 credits
INFSCI 2809	Spatial Data Analytics	3 credits
PHARM 5834	Python for Data Management and Analytics	3 credits

Biostatistics Seminar – BIOST 2025

MS students are required to register for one term of Biostatistics Seminar (BIOST 2025). Biostatistics Seminar (BIOST 2025) credits cannot fulfill elective credit requirements.

Advanced Standing and Credit Transfer

MS students with previous graduate experience in Biostatistics or a related field may apply to transfer up to six credits for graduate-level coursework successfully completed with a grade of B or better. The course credits to be transferred must be reviewed by the student's academic advisor and approved by the Department Chair and Assistant Dean for Student Affairs. Students who receive transfer credits for GSPH Core Courses must complete the GSPH Core Course Exemption Form in addition to the credit transfer paperwork to exempt out of those classes. Students who receive transfer credits for BIOST 2087 must complete the BIOST Course Exemption Form in addition to the credit transfer paperwork to exempt out of the class. All transfer credit paperwork must be complete by the end of a student's first term.

In special circumstances, undergraduate credits may be applied to a Pitt Public Health degree with the permission of the advisor. The undergraduate courses must be upper-level courses (1000-1999), with a limit of six total credits. It must be clear that these credits are taken as a graduate student while enrolled at Pitt Public Health and cannot have been taken as an undergraduate or as a non-degree student.

Biostatistics Course Exemption

Students with sufficient background can exempt out of required core courses and electives by completing the BIOST Course Exemption Form and obtaining approval of the student's advisor, the course instructor and department chair. Exempted courses do not carry any credits.

HDS Student Schedule

Fall 1st Year

BIOST 2036	Introduction to Health Data Science	2 credits
BIOST 2038	Foundations of Statistical Theory	3 credits
BIOST 2039	Biostatistical Methods	3 credits
BIOST 2081	Mathematical Methods for Statistics	3 credits
EPIDEM 2110	Principles of Epidemiology	3 credits
PUBHLT 2022	Public Health Grand Rounds	0 credits

Spring 1st Year

BIOST 2025	Biostatistics Seminar	1 credit
BIOST 2049	Applied Regression Analysis	3 credits
BIOST 2094	Advanced R Programming	2 credits
PUBHLT 2022	Public Health Grand Rounds	0 credits
HDS ELECTIVE(S)		

May of 1st Year MS Comprehensive Exam

Fall 2nd Year

BIOST 2079	Introductory Statistical Learning for Health Sciences	2 credits
BIOST 2087	Biostatistics Consulting Practicum	1 credit
INFSCI 2710	Database Management	3 credits
HDS ELECTIVE(S)		

Spring 2nd Year

BIOST 2099	Capstone	2 credits
PUBHLT 2011	Essentials of Public Health	3 credits
HDS ELECTIVE(S)		

MS Comprehensive Examination

MS students must pass a written comprehensive examination offered annually at the end of the first year of study in early May. The MS comprehensive examination will cover applied methods as well as theoretical concepts given in a 3-hour exam. The examination is a proctored closed book exam.

Eligible students who fail either part of the examination on the first attempt are permitted to take that part of the examination a second time during the summer. The summer examination is only for eligible first-year students who did not pass the examination on the first attempt in order not to delay graduation or decisions about continuation in the program. Eligible students who fail the examination on the first attempt may also choose to wait until the following May to retake the exam. Students who do not pass the examination on the second attempt will be dismissed from the MS Program in accordance with the Pitt Public Health Probation and Dismissal Guidelines.

Once a student passes the comprehensive examination, the student may take Capstone (BIOST 2099) to work on his/her thesis. Students cannot register for Capstone before they pass the comprehensive examination.

Eligibility

A student is eligible to take the comprehensive examination if the student:

1. is enrolled in the Department of Biostatistics MS Program with good standing (3.00 QPA or greater)
2. did not fail the comprehensive examination more than once
3. completed the required courses (listed below) with a B or better, or equivalent coursework which the student has obtained transfer credits or exemption for

Required Coursework

BIOST 2038	Foundations of Statistical Theory
BIOST 2039	Biostatistical Methods
BIOST 2049	Applied Regression Analysis
EPIDEM 2110	Principles of Epidemiology

BIOST 2099: Capstone – MS Thesis Requirement

MS students must register for Capstone (BIOST 2099) after successful completion of the MS Comprehensive Examination requirement. Capstone is a required two-credit course that meets the master's thesis requirement. Capstone credits cannot fulfill elective credit requirements. MS students are required to write and defend a master's thesis. The master's thesis must be in accord with specifications stipulated in the Pitt Public Health Detailed Essay, Thesis, and Dissertation Rules. Thesis work, including analysis, writing, defending and presenting is done within Capstone.

Capstone is a heavily directed, mentored, fast-paced and intense data analysis/writing course with the goal of producing an ETD-formatted thesis document containing rigorous analytic methods, appropriately summarized analysis results with logical, statistically and scientifically valid conclusions. Capstone projects are based on student work with a faculty member, access to a dataset with a research question from an outside source, or work done on a student internship. In addition, if none of these options apply to an individual student, open access datasets from previously funded research projects in the department or open access databases will also be available for students to use. All projects must have a public health focus.

Because of the fast pace and rigor necessary to complete Capstone within one term, it is critical that students prepare in advance of the course. In the semester prior to taking the course but only after passing the MS Comprehensive exam, students must meet with one of the course directors to discuss possible data sets, potential

research questions and Pitt faculty members who are not on the Biostatistics faculty core to serve as an external reviewer as required by Pitt Public Health.

In the first two weeks of Capstone, students finalize their data set, complete a project prospectus and write thesis research question(s). Also during this time, the Capstone director requests approval from the Department Chair and Assistant Dean for Student Affairs, for a master's thesis committee for each student enrolled in Capstone. This committee will be the instructors of Capstone, the thesis advisor, if applicable, as well as a Pitt faculty member who is not on the Biostatistics faculty core. Students may select a Biostatistics faculty member other than Capstone instructors as their thesis advisor. This is not required, but if a different thesis advisor is selected, the faculty member must sign a memo of understanding in which they agree to adhere to the pace of the course. It will be the students' responsibility to gain the faculty members signature.

The MS thesis committee will judge the adequacy of the MS thesis by the final oral presentation/examination covering the subject of the thesis, which will occur in the final week of Capstone. Successful completion of the MS thesis requires unanimous agreement by the MS thesis committee.

It is required that all students follow the Pitt Public Health Detailed Essay, Thesis, and Dissertation Rules and work in the ETD template when they start to write their thesis. The final copy of the thesis must be prepared and submitted according to University Guidelines for Electronic Theses and Dissertations (ETD).

Graduation

All MS students must register for at least one credit during the term in which they intend to graduate. Please visit the Pitt Public Health Graduation page for detailed information on applying for graduation and graduation requirements.

Statute of Limitations

The purpose of the statute of limitations is to ensure that a graduate degree from the University of Pittsburgh represents mastery of current knowledge in the field of study.

All requirements for MS degrees must be completed within a period of four consecutive calendar years from the student's initial registration for graduate study. Please note that the statute of limitations is the same for both full- and part-time students.

Under exceptional circumstances, a candidate for an advanced degree may apply for an extension of the statute of limitations. The request must be approved by the department and submitted to the dean for final approval and action. Requests for an extension of the statute of limitations must be accompanied by a departmental assessment of the work required of the student to complete the degree as well as documented evidence of the extenuating circumstances leading to the requested extension. Students who request an extension of the statute of limitations must demonstrate proper preparation for the completion of all current degree requirements.

Master of Science (MS) in Biostatistics with concentration in Statistical and Computational Genomics (SCG)

The MS in Biostatistics with area of concentration in Statistical and Computational Genomics (SCG) is an academic degree program for students with a background in mathematics/programming and a strong interest in biology, public health and genomics. The SCG concentration emphasizes biostatistical theory and statistical computational methods for analyzing, processing and interpreting 'omics data so that students are prepared to clean, store, manage, manipulate, visualize and process 'omics data as well as be effective statistical collaborators in interdisciplinary studies; and lead the design and execution of studies.

Admission

Application for admission must be made through the Graduate School of Public Health Office of Student Affairs. Prospective students should visit the Graduate School of Public Health admissions page for school-wide admission requirements and the Department of Biostatistics admissions page for department-specific admission requirements. Full-time students normally complete graduation requirements for the MS degree with concentration in SCG within four terms (2 years).

Program Competencies

In addition to the core MS in Biostatistics competencies, student in the SCG concentration will be able to:

- Apply specialize data curation, management, and cleaning tools for various types 'omics data
- Apply specialized statistical, bioinformatics, and computational methods for analysis of 'omics data
- Effectively use a programming language (such as R) to analyze 'omics data

Requirements

Coursework

A minimum 40 credits are required.

Core Courses

BIOST 2025*	Biostatistics Seminar	1 credit	
BIOST 2038*	Foundations of Statistical Theory	3 credits	
BIOST 2039*	Biostatistical Methods	3 credits	
BIOST 2049*	Applied Regression Analysis	3 credits	
BIOST 2055	Introductory High-throughput Genomic Data Analysis 1: Data Mining and Applications	3 credits	
BIOST 2079	Introductory Statistical Learning for Health Sciences	2 credits	
BIOST 2081*	Mathematical Methods for Statistics	3 credits	
BIOST 2087*	Biostatistics Consulting Practicum	1 credit	
BIOST 2094	Advanced R Programming	2 credits	
BIOST 2099*	Capstone	2 credits	
EPIDEM 2110†	Principles of Epidemiology	3 credits	
PUBHLT 2011†	Essentials of Public Health	3 credits	
PUBHLT 2022†	Public Health Grand Rounds	0 credits	*(2 terms required)*

** BIOST MS Core Course*

† GSPH Core Course

SCG Electives

Students must complete SCG elective credits to bring the total number of course credits to 40. In situations where a student's special interests or needs indicate an alternative course is more appropriate it may be substituted with the permission of the student's academic advisor and department chair.

BIOSC 2140	Genomics	3 credits
BIOSC 2940	Molecular Biology	3 credits
BIOST 2080	Advanced Statistical Learning	2 credits
CMPBIO 2070	Computational Genomics	3 credits
HUGEN 2022	Population Genetics	2 credits
HUGEN 2029	Introduction to Gene Mapping	3 credits
HUGEN 2049	Public Health Genetics	3 credits
HUGEN 2071	Genomic Data Processing and Structures	3 credits
HUGEN 2072	Genomic Data Pipelines & Tools	3 credits
HUGEN 2073	Genomic Data Visualization and Annotation	3 credits
HUGEN 2080	Statistical Genetics	3 credits

Biostatistics Seminar – BIOST 2025

MS students are required to register for one term of Biostatistics Seminar (BIOST 2025). Biostatistics Seminar (BIOST 2025) credits cannot fulfill elective credit requirements.

Advanced Standing and Credit Transfer

MS students with previous graduate experience in Biostatistics or a related field may apply to transfer up to six credits for graduate-level coursework successfully completed with a grade of B or better. The course credits to be transferred must be reviewed by the student's academic advisor and approved by the Department Chair and Assistant Dean for Student Affairs. Students who receive transfer credits for GSPH Core Courses must complete the GSPH Core Course Exemption Form in addition to the credit transfer paperwork to exempt out of those classes. Students who receive transfer credits for BIOST 2087 must complete the BIOST Course Exemption Form in addition to the credit transfer paperwork to exempt out of the class. All transfer credit paperwork must be complete by the end of a student's first term.

In special circumstances, undergraduate credits may be applied to a Pitt Public Health degree with the permission of the advisor. The undergraduate courses must be upper-level courses (1000-1999), with a limit of six total credits. It must be clear that these credits are taken as a graduate student while enrolled at Pitt Public Health and cannot have been taken as an undergraduate or as a non-degree student.

Biostatistics Course Exemption

Students with sufficient background can exempt out of required core courses and electives by completing the BIOST Course Exemption Form and obtaining approval of the student's advisor, the course instructor and department chair. Exempted courses do not carry any credits.

SCG Student Schedule

Fall 1st Year

BIOST 2038	Foundations of Statistical Theory	3 credits
BIOST 2039	Biostatistical Methods	3 credits
BIOST 2081	Mathematical Methods for Statistics	3 credits
EPIDEM 2110	Principles of Epidemiology	3 credits
PUBHLT 2022	Public Health Grand Rounds	0 credits

Spring 1st Year

BIOST 2025	Biostatistics Seminar	1 credit
BIOST 2049	Applied Regression Analysis	3 credits
BIOST 2094	Advanced R Programming	2 credits
PUBHLT 2022	Public Health Grand Rounds	0 credits
SCG ELECTIVE(S)		

May of 1st Year MS Comprehensive Exam

Fall 2nd Year

BIOST 2055	Introductory High-throughput Genomic Data Analysis 1: Data Mining and Applications	3 credits
BIOST 2079	Introductory Statistical Learning for Health Sciences	2 credits
BIOST 2087	Biostatistics Consulting Practicum	1 credit
SCG ELECTIVE(S)		

Spring 2nd Year

BIOST 2099	Capstone	2 credits
PUBHLT 2011	Essentials of Public Health	3 credits
SCG ELECTIVE(S)		

MS Comprehensive Examination

MS students must pass a written comprehensive examination offered annually at the end of the first year of study in early May. The MS comprehensive examination will cover applied methods as well as theoretical concepts given in a 3-hour exam. The examination is a proctored closed book exam.

Eligible students who fail either part of the examination on the first attempt are permitted to take that part of the examination a second time during the summer. The summer examination is only for eligible first-year students who did not pass the examination on the first attempt in order not to delay graduation or decisions about continuation in the program. Eligible students who fail the examination on the first attempt may also choose to wait until the following May to retake the exam. Students who do not pass the examination on the second attempt will be dismissed from the MS Program in accordance with the Pitt Public Health Probation and Dismissal Guidelines.

Once a student passes the comprehensive examination, the student may take Capstone (BIOST 2099) to work on his/her thesis. Students cannot register for Capstone before they pass the comprehensive examination.

Eligibility

A student is eligible to take the comprehensive examination if the student:

1. is enrolled in the Department of Biostatistics MS Program with good standing (3.00 QPA or greater)
2. did not fail the comprehensive examination more than once
3. completed the required courses (listed below) with a B or better, or equivalent coursework which the student has obtained transfer credits or exemption for

Required Coursework

BIOST 2038	Foundations of Statistical Theory
BIOST 2039	Biostatistical Methods
BIOST 2049	Applied Regression Analysis
EPIDEM 2110	Principles of Epidemiology

BIOST 2099: Capstone – MS Thesis Requirement

MS students must register for Capstone (BIOST 2099) after successful completion of the MS Comprehensive Examination requirement. Capstone is a required two-credit course that meets the master's thesis requirement. Capstone credits cannot fulfill elective credit requirements. MS students are required to write and defend a master's thesis. The master's thesis must be in accord with specifications stipulated in the Pitt Public Health Detailed Essay, Thesis, and Dissertation Rules. Thesis work, including analysis, writing, defending and presenting is done within Capstone.

Capstone is a heavily directed, mentored, fast-paced and intense data analysis/writing course with the goal of producing an ETD-formatted thesis document containing rigorous analytic methods, appropriately summarized analysis results with logical, statistically and scientifically valid conclusions. Capstone projects are based on student work with a faculty member, access to a dataset with a research question from an outside source, or work done on a student internship. In addition, if none of these options apply to an individual student, open access datasets from previously funded research projects in the department or open access databases will also be available for students to use. All projects must have a public health focus.

Because of the fast pace and rigor necessary to complete Capstone within one term, it is critical that students prepare in advance of the course. In the semester prior to taking the course but only after passing the MS Comprehensive exam, students must meet with one of the course directors to discuss possible data sets, potential

research questions and Pitt faculty members who are not on the Biostatistics faculty core to serve as an external reviewer as required by Pitt Public Health.

In the first two weeks of Capstone, students finalize their data set, complete a project prospectus and write thesis research question(s). Also during this time, the Capstone director requests approval from the Department Chair and Assistant Dean for Student Affairs, for a master's thesis committee for each student enrolled in Capstone. This committee will be the instructors of Capstone, the thesis advisor, if applicable, as well as a Pitt faculty member who is not on the Biostatistics faculty core. Students may select a Biostatistics faculty member other than Capstone instructors as their thesis advisor. This is not required, but if a different thesis advisor is selected, the faculty member must sign a memo of understanding in which they agree to adhere to the pace of the course. It will be the students' responsibility to gain the faculty members signature.

The MS thesis committee will judge the adequacy of the MS thesis by the final oral presentation/examination covering the subject of the thesis, which will occur in the final week of Capstone. Successful completion of the MS thesis requires unanimous agreement by the MS thesis committee.

It is required that all students follow the Pitt Public Health Detailed Essay, Thesis, and Dissertation Rules and work in the ETD template when they start to write their thesis. The final copy of the thesis must be prepared and submitted according to University Guidelines for Electronic Theses and Dissertations (ETD).

Graduation

All MS students must register for at least one credit during the term in which they intend to graduate. Please visit the Pitt Public Health Graduation page for detailed information on applying for graduation and graduation requirements.

Statute of Limitations

The purpose of the statute of limitations is to ensure that a graduate degree from the University of Pittsburgh represents mastery of current knowledge in the field of study.

All requirements for MS degrees must be completed within a period of four consecutive calendar years from the student's initial registration for graduate study. Please note that the statute of limitations is the same for both full- and part-time students.

Under exceptional circumstances, a candidate for an advanced degree may apply for an extension of the statute of limitations. The request must be approved by the department and submitted to the dean for final approval and action. Requests for an extension of the statute of limitations must be accompanied by a departmental assessment of the work required of the student to complete the degree as well as documented evidence of the extenuating circumstances leading to the requested extension. Students who request an extension of the statute of limitations must demonstrate proper preparation for the completion of all current degree requirements.

COURSE DESCRIPTIONS

Please visit the Biostatistics Course Listing for detailed course descriptions, credits and pre/co-requisites.

COURSE OFFERING SCHEDULE 2019-2020

Please note that this schedule is subject to change. Please visit the Biostatistics Class Schedule for the most current course schedules filtered by term.

FALL 2019

BIOST 2016	Sampling Design and Analysis	2 credits
BIOST 2021	Special Studies	variable
BIOST 2025	Biostatistics Seminar	1 credit
BIOST 2036	Introduction to Health Data Science	2 credits
BIOST 2038	Foundations of Statistical Theory	3 credits
BIOST 2039	Biostatistical Methods	3 credits
BIOST 2043	Introduction to Statistical Theory I	3 credits
BIOST 2050	Longitudinal and Clustered Data Analysis	2 credits
BIOST 2051	Statistical Estimation Theory	3 credits
BIOST 2065	Analysis of Incomplete Data	3 credits
BIOST 2066	Applied Survival Analysis	2 credits
BIOST 2079	Introductory Statistical Learning for Health Sciences	2 credits
BIOST 2081	Mathematical Methods for Stat	3 credits
BIOST 2083	Linear Models	3 credits
BIOST 2087	Biostatistics Consulting Practicum	1 credit
BIOST 2099	Capstone	2 credits
BIOST 3010	Research and Dissertation PhD	variable
FTDR 3999	Full-Time Dissertation Research	0 credits

SPRING 2020

BIOST 2021	Special Studies	variable
BIOST 2025	Biostatistics Seminar	1 credit
BIOST 2044	Introduction to Statistical Theory II	3 credits
BIOST 2049	Applied Regression Analysis	3 credits
BIOST 2054	Survival Analysis	3 credits
BIOST 2061	Likelihood Theory & Applications	2 credits
BIOST 2062	Clinical Trials: Methods & Practice	3 credits
BIOST 2063	Bayesian Data Science	3 credits
BIOST 2080	Advanced Statistical Learning	2 credits
BIOST 2086	Applied Mixed Models Analysis	3 credits
BIOST 2087	Biostatistics Consulting Practicum	1 credit
BIOST 2093	SAS for Data Management & Analysis	2 credits
BIOST 2094	Advanced R Computing	2 credits
BIOST 2096	Numerical Methods in Biostatistics	3 credits
BIOST 2099	Capstone	2 credits
BIOST 3010	Research and Dissertation PhD	variable
FTDR 3999	Full-Time Dissertation Research	0 credits

SUMMER 2020

BIOST 2099	Capstone	2 credits

DEPARTMENT OF BIOSTATISTICS
PHD DEGREE REQUIREMENT WORKSHEET

Student Name: PeopleSoft #:

Entered Program:

Statute of Limitation:

Advisor:

Degree Awarded	Major	Year	Institution

Required Courses

A minimum of 72 credits are required

Completed	Course #	Course Name	Credits	Grade	Credit Transfer	Waiver	Alt. Course Taken
	BIOST 2025	Biostatistics Seminar	1				
			1				
			1				
	BIOST 2039	Biostatistical Methods	3				
	BIOST 2043	Introduction to Statistical Theory I	3				
	BIOST 2044	Introduction to Statistical Theory II	3				
	BIOST 2049	Applied Regression Analysis	3				
	BIOST 2050	Longitudinal and Clustered Data Analysis	2				
	BIOST 2051	Statistical Estimation Theory	3				
	BIOST 2054	Survival Analysis	3				
	BIOST 2061	Likelihood Theory & Applications	2				
	BIOST 2083	Linear Models	3				
	BIOST 2086	Applied Mixed Models Analysis	3				
	BIOST 2087	Biostatistics Consulting Practicum	1				
	BIOST 2093	SAS for Data Management & Analysis	2				
	EPIDEM 2110	Principles of Epidemiology	3				
	PUBHLT 2011	Essentials of Public Health	3				
	PUBHLT 2022	Public Health Grand Rounds	0				
			0				

BIOST Elective Courses

In situations where a student's special interests or needs indicate an alternative course is more appropriate it may be substituted with the permission of the primary academic advisor.

6 of the following courses:

Completed	Course #	Course Name	Credits	Grade	Credit Transfer	Waiver	Alt. Course Taken
	BIOST 2016	Sampling Design & Analysis	2				
	BIOST 2036	Introduction to Health Data Science	2				
	BIOST 2040	Elements of Stochastic Processes	3				
	BIOST 2052	Multivariate Analysis	3				
	BIOST 2055	Introductory High-Throughput Genomic Data Analysis 1: Data Mining & Applications	3				
	BIOST 2056	Introduction to Diagnostic Test Evaluation & ROC Analysis	3				
	BIOST 2058	Scientific Communication Skills	2				
	BIOST 2059	Constrained Statistical Inference with Applications	2				
	BIOST 2062	Clinical Trials: Methods & Practice	3				
	BIOST 2063	Bayesian Data Science	3				
	BIOST 2065	Analysis of Incomplete Data	3				
	BIOST 2078	Statistical Learning in High-Dimensional Data with Omics Applications	2				
	BIOST 2079	Introductory Statistical Learning for Health Sciences	2				
	BIOST 2080	Advanced Statistical Learning	2				
	BIOST 2094	Advanced R Computing	2				
	BIOST 2096	Numerical Methods in Biostatistics	3				

Outside Elective Course(s)

At least 3 credits taken outside BIOST

Completed	Course #	Course Name	Credits	Grade	Credit Transfer	Waiver	Alt. Course Taken

Alternate Courses

Completed	Course #	Course Name	Credits	Grade	Required Course #

Research/Dissertation Courses

3 credits of BIOST 3010 or 1 term of FTDR 3999

- ☐ BIOST 3010
- ☐ FTDR 3999

Milestones

1. **Doctoral Preliminary Evaluation (Qualifying Exam)**

	Theory	Applied	Public Health	Overall	Date
Attempt 1					
Attempt 2 *(if applicable)*					

2. **Doctoral Overview/Prospectus**_____

3. **Doctoral Comprehensive Exam** _____

4. **Admission Doctoral Candidacy**_____

5. **Manuscript Submitted**_____

   At least one of the manuscripts, based on the dissertation and first authored by the student, must be submitted before the PhD dissertation defense.

6. **Dissertation Defense**

   Advertised University Times_____

   Passed_____

7. **Exit Survey**_____

Term	Term GPA	Term Credits	CUM. GPA	CUM. Credits	IDP

Notes

DEPARTMENT OF BIOSTATISTICE
MS DEGREE REQUIREMENT WORKSHEET

Student: PeopleSoft #:

Start Date:

Statute of Limitations:

Academic Advisor:

Provisional Requirements

For students accepted provisionally

Completed	Provision	Credits	Grade	Term

Course Requirements

A minimum of 40 credits are required

Core Courses

Completed	Course	Credits	Grade	Credit Transfer	Waiver
	BIOST 2025: Biostatistics Seminar	1			
	BIOST 2038: Foundations of Statistical Theory	3			
	BIOST 2039: Biostatistical Methods	3			
	BIOST 2049: Applied Regression Analysis	3			
	BIOST 2050: Longitudinal and Clustered Data Analysis	2			
	BIOST 2066: Applied Survival Analysis	2			
	BIOST 2081: Mathematical Methods for Statistics	3			
	BIOST 2087: Biostatistics Consulting Practicum	1			
	BIOST 2093: SAS for Data Management and Analysis	2			
	BIOST 2099: Capstone	2			
	EPIDEM 2110: Principles of Epidemiology	3			
	PUBHLT 2011: Essentials of Public Health	3			
	PUBHLT 2022: Public Health Grand Rounds – 1st term – 2nd term	 0 0			

BIOST Electives

Students must complete BIOST elective credits to bring the total number of course credits to 40. BIOST 2025 cannot fulfill elective credits. In situations where a student's special interests or needs indicate an alternative non-BIOST course is more appropriate it may be substituted with the permission of the student's academic advisor and department chair.

Completed	Course	Credits	Grade	Credit Transfer

MS Comprehensive Examination

Attempt	Date	Theory	Applied	Overall Result
First Sitting				
Second Sitting				

BIOST 2099: Capstone – MS Thesis Requirement

MS students must register for BIOST 2099: Capstone after successful completion of the MS Comprehensive Examination requirement. Capstone is a required two-credit course that meets the master's thesis requirement. Capstone credits cannot fulfill elective credit requirements. MS students are required to write and defend a master's thesis. Thesis work including analysis, writing, defending and presenting is done within the Capstone course.

	Date	Result
Defense Presentation		

Term	Term GPA	Term Credits	CUM. GPA	CUM. Credits

Notes

DEPARTMENT OF BIOSTATISTICS
MS HDS DEGREE REQUIREMENT WORKSHEET

Student: PeopleSoft #:

Start Date:

Statute of Limitations:

Academic Advisor:

Provisional Requirements

For students accepted provisionally

Completed	Provision	Credits	Grade	Term

Course Requirements

A minimum of 40 credits are required

Core Courses

Completed	Course	Credits	Grade	Credit Transfer	Waiver
	BIOST 2025: Biostatistics Seminar	1			
	BIOST 2036: Introduction to Health Data Science	2			
	BIOST 2038: Foundations of Statistical Theory	3			
	BIOST 2039: Biostatistical Methods	3			
	BIOST 2049: Applied Regression Analysis	3			
	BIOST 2079: Introductory Statistical Learning for Health Sciences	2			
	BIOST 2081: Mathematical Methods for Statistics	3			
	BIOST 2087: Biostatistics Consulting Practicum	1			
	BIOST 2094: Advanced R Programming	2			
	BIOST 2099: Capstone	2			
	EPIDEM 2110: Principles of Epidemiology	3			
	INFSCI 2710: Database Management	3			
	PUBHLT 2011: Essentials of Public Health	3			
	PUBHLT 2022: Public Health Grand Rounds – 1st term – 2nd term	 0 0			

HDS Electives

Students must complete HDS elective credits to bring the total number of course credits to 40. In situations where a student's special interests or needs indicate an alternative course is more appropriate it may be substituted with the permission of the student's academic advisor and department chair. BIOST 2025 cannot fulfill elective credits.

Completed	Course	Credits	Grade	Credit Transfer
	BIOST 2063: Bayesian Data Science	3		
	BIOST 2080: Advanced Statistical Learning	2		
	BIOST 2093: SAS for Data Management & Analysis	2		
	INFSCI 2160: Data Mining	3		
	INFSCI 2410: Introduction to Neural Networks	3		
	INFSCI 2415: Information Visualization	3		
	INFSCI 2711: Advanced Database Management	3		
	INFSCI 2809: Spatial Data Analytics	3		
	PHARM 5834: Python for Data Management & Analytics	3		

MS Comprehensive Examination

Attempt	Date	Theory	Applied	Overall Result
First Sitting				
Second Sitting				

BIOST 2099: Capstone – MS Thesis Requirement

MS students must register for BIOST 2099: Capstone after successful completion of the MS Comprehensive Examination requirement. Capstone is a required two-credit course that meets the master's thesis requirement. Capstone credits cannot fulfill elective credit requirements. MS students are required to write and defend a master's thesis. Thesis work including analysis, writing, defending and presenting is done within the Capstone course.

	Date	Result
Defense Presentation		

Term	Term GPA	Term Credits	CUM. GPA	CUM. Credits

Notes

DEPARTMENT OF BIOSTATISTICS
MS SCG DEGREE REQUIREMENT WORKSHEET

Student: PeopleSoft #:

Start Date:

Statute of Limitations:

Academic Advisor:

Provisional Requirements

For students accepted provisionally

Completed	Provision	Credits	Grade	Term

Course Requirements

A minimum of 40 credits are required

Core Courses

Completed	Course	Credits	Grade	Credit Transfer	Waiver
	BIOST 2025: Biostatistics Seminar	1			
	BIOST 2038: Foundations of Statistical Theory	3			
	BIOST 2039: Biostatistical Methods	3			
	BIOST 2049: Applied Regression Analysis	3			
	BIOST 2055: Introductory High-throughput Genomic Data Analysis 1: Data Mining and Applications	3			
	BIOST 2079: Introductory Statistical Learning for Health Sciences	2			
	BIOST 2081: Mathematical Methods for Statistics	3			
	BIOST 2087: Biostatistics Consulting Practicum	1			
	BIOST 2094: Advanced R Programming	2			
	BIOST 2099: Capstone	2			
	EPIDEM 2110: Principles of Epidemiology	3			
	PUBHLT 2011: Essentials of Public Health	3			
	PUBHLT 2022: Public Health Grand Rounds – 1st term – 2nd term	 0 0			

SCG Electives

Students must complete SCG elective credits to bring the total number of course credits to 40. In situations where a student's special interests or needs indicate an alternative non-BIOST course is more appropriate it may be substituted with the permission of the student's academic advisor and department chair. BIOST 2025 cannot fulfill elective credits.

Completed	Course	Credits	Grade	Credit Transfer
	BIOSC 2140: Genomics	3		
	BIOSC 2940: Molecular Biology	3		
	BIOST 2080: Advanced Statistical Learning	2		
	CMPBIO 2070: Computational Genomics	3		
	HUGEN 2022: Population Genetics	2		
	HUGEN 2029: Introduction to Gene Mapping	3		
	HUGEN 2049: Public Health Genetics	3		
	HUGEN 2071: Genomic Data Processing & Structures	3		
	HUGEN 2072: Genomic Data Pipelines & Tools	3		
	HUGEN 2073: Genomic Data Visualization & Annotation	3		
	HUGEN 2080: Statistical Genetics	3		

MS Comprehensive Examination

Attempt	Date	Theory	Applied	Overall Result
First Sitting				
Second Sitting				

BIOST 2099: Capstone – MS Thesis Requirement

MS students must register for BIOST 2099: Capstone after successful completion of the MS Comprehensive Examination requirement. Capstone is a required two-credit course that meets the master's thesis requirement. Capstone credits cannot fulfill elective credit requirements. MS students are required to write and defend a master's thesis. Thesis work including analysis, writing, defending and presenting is done within the Capstone course.

	Date	Result
Defense Presentation		

Term	Term GPA	Term Credits	CUM. GPA	CUM. Credits

Notes