MS/PHD STUDENT HANDBOOK

2024-2025 ACADEMIC YEAR

MUSC
Medical University of South Carolina

DEPARTMENT OF PUBLIC HEALTH SCIENCES

I. PROGRAM OVERVIEW

A. Introduction

Applications of quantitative sciences to biomedical questions and public health issues have grown dramatically over the past decade. The Department of Public Health Sciences (**DPHS**) strives to meet this challenge by providing innovative interdisciplinary training in analytic and mathematical sciences germane to biomedical and public health research. Collaboration with researchers from various departments offers a wealth of opportunities for students to acquire experience and expertise in the application of analytic methodology and theory to biomedical and clinical problems and to develop new methodologic approaches.

This Student Handbook provides information about the program requirements and policies related to graduate training in the Department of Public Health Sciences' Master of Science (MS) and Doctor of Philosophy (PhD) degree programs in Biostatistics and Epidemiology.

Biostatistics deals with applications of statistical methods in biomedical and health- related fields. Course offerings include categorical data analysis, clinical trials, longitudinal data analysis, survival analysis, bioinformatics, multivariate methods, and spatial statistics. Applied areas of interest include cancer, dental medicine, neurology, psychiatry, and radiology.

Epidemiology deals with the systematic study of the distribution and determinants of health-related states or events in specified populations, and the application of knowledge for developing rational measures of prevention and control of deleterious outcomes. Specific areas of faculty expertise include cardiovascular disease, HIV, cancer, traumatic brain injury, environmental epidemiology, and molecular epidemiology.

II. GENERAL INFORMATION

A. College of Graduate Studies Admissions Requirements

For applicants seeking the PhD degree, the final decision on admission rests with the Admissions Committee of the College of Graduate Studies. For applicants seeking the MS degree, the final decision on admission is made by the DPHS Admissions Committee (see Sections IV and V for MS degree requirements). Degree programs commence each fall; however, MS students entering with advanced placement may begin in the spring or summer semesters, provided the DPHS Admissions Committee approves. General college-level admission requirements are described below. Specific additional departmental and concentration-specific requirements are described under each respective heading.

1. Undergraduate and Graduate Record

Applicants must possess a bachelor's or master's degree from an accredited institution and should have a superior academic record. Applicants may have diverse backgrounds in the basic sciences, with emphasis in analytical, biological, or physical sciences including computing, mathematics, and engineering. For biostatistics PhD or MS applicants, transcripts should reflect successful completion of both single and multivariable calculus. For epidemiology PhD or MS applicants, transcripts should reflect successful completion of at least single variable calculus.

2. Graduate Record Examination

Applicants are strongly encouraged to submit official scores on the quantitative and verbal portions of the GRE. Scores more than five years old are not acceptable.

3. Letters of Recommendation

Applicants are required to submit three letters of recommendation from instructors, supervisors, or research mentors who have had close contact with the applicant during their undergraduate, graduate, clinical, or research training. Letters of recommendation should address the applicant's aptitude and capabilities for a research-oriented career.

4. Personal Statement

The applicant is required to provide a personal statement describing their reasons for wanting to enroll in the program, a discussion of their area(s) of interest and future goals.

5. Personal Interview

A personal interview with each PhD applicant is considered a useful part of the admission process. This interview allows a prospective student to visit the department and interact with the people under whom he/she will be training. It also provides the faculty an opportunity to assess the student's ability, independence of thought, and attitude toward a scientific career.

6. Special Requirements for International Applicants

International applicants whose native language is not English must submit the official results of the Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS) exam. The TOEFL or IELTS score must not be more than two years old. If an international applicant has graduated or will graduate from an institution that uses English as the language of instruction, the TOEFL/IELTS may be waived upon request.

Also, letters of recommendation should address the applicant's skills in written and spoken English. International applicants must participate in a telephone or Skype interview with a member of the DPHS faculty. Additional important information for international applicants is available at:

7. Applications Process

All applications to the College of Graduate Studies must be submitted online at Applicants who are unable to apply online must petition the Office of the Dean for special accommodation explaining the circumstances precluding an online application. The application fee is waived for applicants to all PhD programs (except the Nursing PhD) who are US citizens or US Permanent Residents. All other applicants must pay the $95 online application fee.

Applicants are encouraged to complete and submit applications materials early. The deadline to ensure consideration for stipends for the PhD program is December 15th for fall admission of the next year. The deadline for the MS program is June 1st.

All application materials should be submitted to the Office of Enrollment Management:
Graduate Studies Admissions
MUSC Enrollment Management
45 Courtney Drive
MSC 203
Charleston, SC 29425

B. Transfer Credits

In general, it is MUSC's policy that academic credit used to successfully earn one degree cannot be re-used for a subsequent degree. Under rare and exceptional circumstances, students may be allowed to sit for an examination/assessment in order to exempt participating in a course. At least 33 percent of semester credit hours applied toward a Medical University degree must be earned through instruction by the university. Regardless of the number of credits awarded, students are expected to complete a core of courses at the Medical University of South Carolina.

Students Entering with Prior Master's Degree: Students entering the program with a prior master's degree in biostatistics or related field must satisfy all requirements for the PhD as specified for students entering without a prior master's degree (see above and Tables 4 and 5). These requirements may be fulfilled through a combination of transfer credit, exemption, and courses taken while at MUSC. As stated in the MUSC bulletin, "At least 33 percent of semester credit hours applied toward a Medical University degree must be earned through instruction by the University." Both transfer of credit hours and exemption of courses require approval by the Graduate Training Director. The student must submit to the Program of Study Advisor and the Graduate Training Director a list of courses for which transfer credit or exemption is requested along with a description of the corresponding equivalent courses taken as part of the prior master's coursework. Only courses that directly correspond to courses offered in the DPHS curriculum will be considered for transfer credit or exemption.

Students who complete MUSC's MPH program **may** be able to exempt certain credits required in one of the DPHS PhD programs of study. **Whether or not a student is able to transfer credits from our MPH program will be determined on a case-by-case basis.**

C. Transfer Students

Students who transfer to MUSC with a new faculty member should meet with the Graduate Training Director of their program and their mentor to determine which hours are accepted for credit. This should be determined upon the student's arrival to ensure they have enough credit hours when they graduate. At least 33 percent of semester credit hours applied toward a MUSC graduate degree must be earned through MUSC.

The Graduate Training Director should submit a list of courses for approval to the Dean of Graduate Studies. Once the Dean has approved the transfer courses, the Graduate Training Director will be notified and should then submit a Request for Transfer of Credit Form to the Office of Enrollment Management.

Only courses which are merit graded and have a grade of 3.0 or higher will be acceptable. It is the responsibility of the Graduate Training Director to determine the student's comprehension of material before such hours are shown on the Program of Study as credit toward the degree.

The MUSC transcript will show the total units credited in transfer with a mention of specific courses and institution of origin but not grades.

Financial Information

1. Tuition and Fees

The tuition and fee schedule for full- and part-time students is published annually and is available in June. The schedule is posted on the University website. It is also available from the Office of Enrollment Services. Part-time students (including unclassified students) and visiting students also pay any applicable university, health, or student activity fees.

2. Financial Aid

Effective Fall 2025, the financial support for PhD students will be $37,000 per year.

Full-time PhD students who continue to make good progress, as assessed biannually by the DPHS Student Progress Review Committee, may expect to receive financial support for up to five consecutive years through a variety of sources, such as the College of Graduate Studies Dean's stipend, research grants, and training grants. If it takes a full-time PhD student longer than five years to complete the requirements of the PhD degree, the additional tuition and fees become the responsibility of the student. A mentor or faculty member may agree to cover tuition and fees beyond the five years in extenuating circumstances. However, all students are encouraged to complete the PhD requirements within five years from matriculation.

Students receiving full or partial financial support through the College of Graduate Studies and/or DPHS may not obtain other employment without the written approval of the Graduate Training Director and either the Program of Study Advisor or the Chair of the Research Advisory Committee. Failure to comply may result in termination of financial support.

3. Funding Information

Most students are funded by the College of Graduate Studies Dean's Scholarship during their first year. However, beginning in their second year, students are required to secure their own funding through student research assistantships. Students should meet with their Program of Study advisor for guidance. Once funding begins you will be required to work 20 hours a week in regard to your funding project.

Please use the first year to meet with faculty in the department to learn more about their research and funding opportunities.

4. Other Funding Opportunities

Students may apply for other funding opportunities and should speak with their advisor for guidance. Below are a few opportunities that past students have received.

Hollings Cancer Center Fellowship Program

The MUSC Hollings Cancer Center Fellowship program is an exciting research program designed to train the next generation of exceptional cancer scientists. This prestigious program will fund up to five two-year graduate student fellowships.

Information sessions held in December
Applications due in January
Notification of Awards-March
Fellowship begins-July

Questions regarding the Fellowship program should be sent to hcc-fellowship@musc.edu

SCTR TLI (T32) Predoctoral Clinical & Translational Research Training Program

The SCTR TL1 is an NIH-funded mentored research training program for pre-doctoral students in PhD or dual-degree programs with a strong interest in pursuing a career in clinical and/or translational research.

Trainees in the TL1 program do not incur any extra time for completion of their graduation requirements and successfully complete their degree programs in the same amount of time as non-TL1 trainees.

Appointment for one year with potential for a second year pending satisfactory progress

Recruitment begins in spring semester
Application deadline-July
Terms-September 1-August 31

For more information: contact Kristen Briggman at burgstei@musc.edu or visit https://research.musc.edu/resources/sctr/funding-opportunities/training-program

Kirschstein National Research Award (NRSA) for Individual Predoctoral Fellows (F31)

The purpose of this Kirschstein-NRSA program is to enable promising predoctoral students with potential to develop into a productive, independent research scientist, to obtain mentored research training while conducting dissertation research.
For more information, visit; https://researchtraining.nih.gov/programs/fellowships/F31

D. Graduate Training Administration

The DPHS graduate training programs are administered by the Vice Chair for Academic Programs, with assistance from the Student Coordinator. A designated Graduate Training Director provides oversight for the current students in the specified program. Graduate program policy decisions emanate from the program- specific Curriculum & Program Committees, with ultimate responsibility resting with the DPHS faculty and the Department Chair. Additional specific department- wide committees related to the educational program include Student Recruitment Committee, Admissions Committee, Examination Committees (basic written and advanced qualifying), Progress Review Committee, Student Grievance Committee and Student Advisory Committee. See Section VII for a description of the function of each committee.

Graduate Training Administrative Team, 2024 – 2025

- Mulugeta Gebregziabher, PhD
  Vice Chair for Academic Programs
  gebregz@musc.edu
- JacKetta Cobbs, PhD, MPH
  Academic Program Director
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- Brian Neelon, PhD
  Biostatistics PhD/MS Graduate Training Director
  neelon@musc.edu
- Jeff Korte, PhD
  Epidemiology PhD/MS Graduate Training Director
  korte@musc.edu
- Kristen DelliColli
  MS/PhD Student Services Manager
  dellicol@musc.edu

E. Americans with Disabilities Act

The DPHS follows the official guidelines established by the University to accommodate qualified students with disabilities. Disability Support Services are available to otherwise qualified students with disabilities to ensure equal access to the University's programs and services. Services may include making academic and/or nonacademic accommodations for students. For more information, contact Stephanie Price at pricstep@musc.edu or visit:https://web.musc.edu/about/leadership/institutional-offices/diversity/ada-resources/ada-policies

F. College of Graduate Studies Leave Policy

The College of Graduate Studies has adopted the following policy regarding leave time for students on stipends:

The policy of the graduate school is that full-time students on stipends may be granted up to two weeks leave per year. The College follows the NIH vacation policy for all its trainees. Kirschstein NRSA fellows may receive the same vacations and holidays available to individuals in comparable training positions at the sponsoring institution. Fellows shall continue to receive stipends during vacations and holidays. At academic institutions, the time between semesters or academic quarters generally is considered an active part of the training period and is not considered to be a vacation or holiday. Trainees must receive approval for their vacation from their mentor several weeks prior to the start date. Granting leave is at the discretion of the program/mentor. Requests for leave time exceeding two weeks cumulative may be granted at the discretion of the program/mentor with written notification to the Office of the Dean. For students on stipends, leave exceeding two weeks could result in stipend support being suspended until the student's return to campus.

Students in their first two years, who are taking didactic courses requiring one month or more leave during a single semester, are advised to request a formal leave-of- absence for that semester. If the student is on stipend, support will be discontinued for that semester. Students on stipends should be aware that their funding cannot be guaranteed upon their return from a leave-of-absence of more than one semester. Students not supported by stipends should communicate with their mentor regarding time away, recognizing that more time off will increase the time to completing their degree.

For maternity/paternity related accommodations, please go to the following link https://horseshoe.musc.edu/university/colleges/college-of-graduate-studies/students/forms-and-guidelines/miscellaneous-forms and click on Maternity Accommodations.

Per departmental policy, all students must complete a Leave Request Form. If your leave is related to work associated with MUSC, you are also required to complete the Administrative Absence Form. Submit all forms to the Student Coordinator.

G. Withdrawal and Leave of Absence Policy

Students who voluntarily withdraw from a graduate program or wish to take a leave of absence are required to submit in writing their intent to withdraw or take a leave by completing the university withdrawal/leave of absence form. A letter or email from the student's Major Advisor or Program Director must be attached to the form. The letter should state he/she is aware the student is withdrawing or requesting a leave of absence and it is approved. Students are required to turn in their MUSC ID Badges to the Dean's Office at the time of the leave or withdrawal. Action by the College or program is required before a student will be requested to withdraw for academic reasons. The university reserves the right to sever the connection of a student with the university at any time, if in its opinion the student is unsuited for a career in the health professions and sciences.

The Bulletin of the Medical University of South Carolina is the document of authority for all students. Access to the MUSC Bulletin is available at:

https://education.musc.edu/students/enrollment/bulletin

H. MUSC Policies and Information

A complete list of MUSC academic, student, and general policies is available at:
https://education.musc.edu/students/enrollment/bulletin/education-policies

III. GENERAL DEPARTMENTAL DEGREE REQUIREMENTS

A. Prerequisite Coursework

Applicants to the biostatistics PhD and MS degree programs should have had a minimum of single and multivariable college-level calculus. Applicants to the epidemiology PhD and MS degree programs should have had a minimum of single variable college-level calculus. Under special circumstances, an applicant may be admitted to the program under the provision that all prerequisites are satisfied before beginning the program. For applicants planning to pursue the concentration in Biostatistics, additional coursework in linear algebra and computer programming are strongly encouraged.

B. Orientation and Advising of Students

1. Orientation

In addition to the university and the College of Graduate Studies orientation at the beginning of the fall semester, a departmental orientation for new students is also held. New students are introduced to members of the faculty and staff, given current information about the department, degree requirements, and research projects.

2. Program of Study Advisor

Upon entrance to the program, each student is appointed a Program of Study Advisor. For students who have chosen an area of emphasis, the advisor will be from this area. The selections are made with consideration of such factors as interests of the students and faculty, any specialized fellowship support, and faculty commitments. Any request for change in the initial advisor assignment should be directed to the Graduate Training Director.

The primary responsibilities of the Program of Study Advisor are to provide guidance in the academic program, especially with respect to course work, and to carry out selected academic functions related to completion of academic program requirements. The student consults with his/her Program of Study Advisor until a thesis or dissertation Research Advisor is chosen.

Students must confer with their advisors when selecting courses and should meet with the advisors for approval of the course plans before online registration, as well as for signatures on forms for any subsequent dropping or adding of courses.

C. Program of Study

The Program of Study is a list of courses and other requirements that the student must complete. It lists courses that are being transferred as well as courses that are to be taken on campus. The Program of Study is approved in a joint meeting of the student, the Research Advisor and/or the Graduate Training Director. For PhD and MS students, the Research Advisory Committee also must approve the Program of Study. Approval of the Program of Study by the Research Advisory Committee must be made ***within three months after the advisory committee is organized.*** After approval by the Research Advisory Committee, the Program of Study is filed with the Graduate Training Director and with the Office of the Dean of the College of Graduate Studies.

Decisions to remove, substitute, or add courses to the Program of Study must be approved by the student's Program of Study Advisor with the concurrence of the Graduate Training Director. If a Research Committee has been formed, approval rests with this body. A record of any change in the Program of Study must be submitted by the student to the Graduate Training Director and to the Office of the Dean of the College of Graduate Studies with that office acknowledging receipt of the change. The Program of Study must meet the course requirements of DPHS. In most cases, the coursework will exceed this minimum requirement.

D. Examinations

1. Basic Written Exam

MS and PhD students are required to take the Basic Written Examination (BWE) after successful completion of the first-year departmental core curriculum. This examination is intended to test the student's retention and comprehension of the knowledge and understanding of basic materials taught in the core courses. The examination will be offered once each year, typically near the end of May. The BWE is administered in three parts and on three days in a proctored setting in a four-hour block of time for each part. **The 2025 Basic Written Examination is scheduled for Friday May 23th, Tuesday, May 27th, and Wednesday, May 28th.** All students complete one component from Biostatistics Methods I and II (BMTRY 700 & 701), and a second component from Epidemiology I and I (BMTRY 736 & 747). Biostatistics students complete a third component from Theory I and II (BMTRY 706 & 707). Specific information regarding the exam will be provided to students at least one month prior to the exam date.

Each part of the examination is graded by the BWE Committee with a disposition of pass/no pass. A student must pass all parts to successfully complete the examination. Each component of the BWE will show the points earned from each question, and a passing grade will depend on the student's degree program and concentration. For MS students, a passing grade is 70% in each component. For PhD students in Biostatistics, a passing grade is 70% inthe Epidemiology

component, and 80% in the other two components. For PhD students in Epidemiology, a passing grade is 80% in each component. Any student who fails the examination on his/her first attempt will be given one opportunity to retake the exam. The student will be required to retake only those component(s) that he/she failed on the first attempt. The retake is administered in August prior to the beginning of the fall semester. With the approval of the Program of Study Advisor, the student may petition the Graduate Training Director to delay retaking the exam until the following June; however, in such circumstances the student's funding (tuition, stipend, health insurance) may be suspended during this interim period.

A student who fails the BWE a second time will no longer be considered to be in good academic standing in their degree program, and he/she will be dismissed from the program. The student has the option to file a grievance.

No waivers of the Basic Written Examination will be granted, regardless of previous training and degrees in related areas.

2. PhD Advanced Qualifying Exam

After completing required coursework (typically about 3 years) and under the advice of the Program of Study/Research Advisor, the PhD student should prepare for the Advanced Qualifying Examination (AQE). The examination is offered once per year on a determined date and is prepared by the Department Examination Committee for all students taking the examination on that date. Guidelines for allowable materials (equation sheets, etc.) are described prior to the examination and provided to each student. After evaluation of the examination by the faculty one of the following indications is reported.

PASS - The student has met the expectations of the AQE Committee.

CONDITIONAL PASS - If a student has significant deficits on the exam the AQE committee will require that the student re-write responses to specific question(s) or take other remedial options so that the student works on the topics that the student failed to demonstrate understanding.

FAIL - In the event a student fails the AQE, they will be given an opportunity to reschedule the exam.

Possible outcomes of exam retake due to conditional pass or fail:

PASS - The student has met the expectations of the AQE Committee.

FAIL - The AQE Committee has decided that the student does not have the potential to complete the Ph.D. program

A student who does not pass the AQE a second time will no longer be considered to be in good academic standing in their degree program, and he/she will be dismissed from the program. The student has the option to file a grievance.

Please note: In compliance with the MUSC Student Honor Code, academic assignments and all examinations are encompassed by the rules and policies enshrined in the code. Examinee's responses need to strictly adhere to these rules. Please refer to Section VI for additional information.

E. Research Advisor/Research Advisory Committee

The student should choose a Research Advisor no later than three months after successful completion of the AQE. The Research Advisor must have his/her primary appointment in the Department of Public Health Sciences. Additionally, the Research Advisor must be a full member of the Graduate Faculty of the College of Graduate Studies. Once the Research Advisor is selected, the student should meet with the Advisor at least once a semester to discuss course selection and research topics. It is the responsibility of the Research Advisor, in consultation with the student, to select a *Research Advisory Committee*. This should be done **no later than 6 months after the successful completion of the advanced qualifying exam (AQE). B**oth the Research Advisor and the Research Advisory Committee must be approved by the Graduate Training Director and the Department Chair. The function of the Research Committee is to direct and monitor the student's research program and to assume responsibility for oversight of the student's progress toward the degree. Upon approval of the Research Advisor and Research Committee, the charge of the student's Program of Study Advisor is terminated.

The Research Committee is composed of at least five members, with the Research Advisor as Chair. The composition of the Committee is as follows:

1. At least three committee members must be from DPHS, including at least two from the student's program area (biostatistics or epidemiology)
2. Two committee members must be from outside DPHS
3. At least three members of the overall committee must be from the student's program area
4. All MUSC committee members must have current appointments to the Graduate Faculty of the College of Graduate Studies.

Prior to the first meeting of the Research Committee, the student must present the Committee with a Program of Study (approved by the Research Advisor) with grades received in all courses completed. The Research Committee, after review of the Program of Study, may suggest further coursework deemed beneficial for completion of the research project.
Throughout his/her research, the student should meet regularly with the Research Committee. There should be a formal meeting of the DPHS members of the committee at least once every semester and at least one meeting each year must include the full Research Committee.

F. Research Proposal

MS or PhD student must prepare a written *Research Proposal* in consultation with their Research Advisor and Research Advisory Committee.

The Research Proposal should identify either the methodologic problem (for biostatistics) or the hypotheses to be tested (for epidemiology) and describe the design and approach for addressing the proposed problem. This proposal should show evidence of creative integration of course material, superimposed on a sound understanding of the pertinent literature. It should also contain a work timeline toward the final proposal. The Research Proposal will often need refinement as the research progresses.

G. Proposal Defense

When the Research Advisor is satisfied with the student's preparation and the content of the Plan of Research, the student submits a written copy of the research proposal to each member of his/her Research Committee and schedules a date for the proposal defense. The student also notifies the Department Chair and the Graduate Training Director of the date and submits a copy of the research proposal to both for approval, allowing a minimum of two weeks prior to the proposal date for review. A copy of the approved plan of research is internally available to MUSC faculty and students at least a week in advance of the proposal date for those who would like to familiarize themselves with the particular research topic before the material is presented at the defense. The proposal defense should be scheduled to ensure full participation by the entire Research Advisory Committee as well as the Graduate Training Director and/or Department Chair.

On the date of the scheduled proposal defense, the student presents and defends the research proposal orally before faculty and students. The proposal defense begins with a formal 45–50-minute presentation that outlines the research questions, their significance, and methods proposed for their solution. The presentation is followed by questions and discussion from the audience. The student will then be questioned extensively by the Research Committee in a closed session on those methodologies and background areas needed to successfully complete the proposed research. The Research Committee then meets in closed session for a vote on approval of the Plan of Research and feedback to the student. All members of the DPHS faculty are encouraged to give the student and his/her Research Committee additional written feedback within a week of the proposal defense. It is the prerogative of the Research Advisor/Research Committee to evaluate the faculty comments and to suggest to the student their implementation.

H. Admission to Candidacy

For students pursuing the MS degree, upon satisfactory completion of the Program of Study and approval of the Plan of Research by the Research Committee along with successful defense of the proposal, the Research Committee recommends to the Dean of the College of Graduate Studies that the student be admitted to candidacy for the MS degree. Admission to Candidacy must occur at least 3 months prior to completing the degree.

For students pursuing the PhD degree, upon satisfactory completion of the Program of Study, the PhD advanced qualifying exam, and approval of the Plan of Research by the Research Committee along with successful defense of the proposal, the Research Committee recommends to the Dean of the College of Graduate Studies that the student be admitted to candidacy for the PhD degree. Such admission to candidacy must occur at least one year prior to completing requirements for the doctoral degree. All candidates must submit an Individual Development Plan (IDP) with the Admission to Candidacy form. The IDP must be completed annually.

All candidates must register for a minimum of one credit hour every semester to be considered active students in the program but may register for one credit hour for only one semester during their program.

I. Master's Thesis

Students pursuing an MS degree in the concentration areas of biostatistics or epidemiology must write a master's thesis. The master's thesis should document the student's ability to conceive, implement, analyze and report on a biostatistics or epidemiologic problem in a scholarly manner. The thesis content must consist of original methodologic or collaborative research; its acceptability is determined by the student's Research Advisor and Research Committee.

Preparation of the thesis must comply with the regulations contained in the *Thesis/Dissertation Guidelines,* which is available on the MUSC Horseshoe under the College of Graduate Studies or can be downloaded from the DPHS website. The format should be one publishable paper with an additional detailed background section that includes a comprehensive literature review.

Students may go onto the MUSC Library Website and access the MEDICA database to view scholarly works produced by MUSC to view format and layout of submitted theses. Please see website: The Waring Historical Library Digital Collections: MEDICA@MUSC Institutional Repository Collections

J. PhD Dissertation

A dissertation based on original investigation is required of all PhD students. The dissertation must give evidence of mature scholarship and critical judgment, demonstrate methodologic

rigor indicating knowledge of research methods and techniques and demonstrate the student's ability to carry out independent investigation.

Preparation of the dissertation must comply with the regulations contained in the *Thesis/Dissertation Guidelines,* which is available on the MUSC Horseshoe under the College of Graduate Studies or can be downloaded from the DPHS website. Typically, the dissertation should consist of three publishable papers on a single theme with additional overarching Background and Discussion/Conclusions sections. The decision of "publishable" quality rests with the Research Advisory Committee. At least one paper must have been submitted to a journal approved by the Research Committee prior to completion of the degree with the remaining two papers in "submittable" form. Students are referred to individual track requirements and to the *College of Graduate Studies Bulletin* for additional dissertation requirements.

Each student should strive to present the results of his/her research at a national or international meeting of a professional society, and to publish results in a peer-reviewed professional journal, prior to graduation. A distinguished publication record is considered by the academic community as the primary indicator of professional qualification in the sciences. Publications resulting from a student's research will usually be co-authored with the student's Research Advisor.

Students may go onto the MUSC Library Website and access the MEDICA database to view scholarly works produced by MUSC to view format and layout of submitted dissertations. Please see website: The Waring Historical Library Digital Collections: MEDICA@MUSC Institutional Repository Collections

K. Oral Defense of Thesis/Dissertation

Each MS/PhD candidate is required to pass a final oral examination directed primarily to the defense of the thesis/dissertation. When scheduling the defense, the student should have his/her Research Committee present as well as the Graduate Training Director or Department Chair, who have approved the dissertation as ready to defend. **The penultimate version of the draft should be submitted to the Research Committee, the Graduate Training Director and the Department Chair at least three weeks in advance of soliciting signatures on the ready to defend form for the Dean's office**. **The final draft of the dissertation should be posted on the DPHS website at least 10 days before the defense date to allow other faculty and students to review it before the defense**. The defense begins with a formal 45 – 50-minute presentation describing the research methods and results. The presentation is followed by questions and discussion from the audience. The candidate's Research Committee then conducts an oral examination in a closed session to test the candidate's understanding of the area of research. The defense is a rigorous examination intended to test the student's knowledge of the particular research covered in the thesis/dissertation as well as general knowledge of his/her major field and related fields of study. Performance on this examination must receive approval of the student's Research Committee before the student will be recommended to the College of Graduate Studies for the MS or PhD degree.

In reference to the oral defense of a dissertation, approval of the Advisory Committee, with no more than one dissenting vote, is necessary for recommendation for awarding the degree. The decision of the Advisory Committee will be forwarded to the dean.

The graduate faculty has the authority, which it has delegated to the Dean, for final approval of the candidate for the awarding of the degree. Upon completion of the defense, each faculty will fill out a defense rubric form and give it to the Major Advisor. The Major Advisor will in turn collate the evaluations into one form, discuss it with the trainee and then submit it to the College's Registrar. In the event of disapproval, the candidate may be permitted to **retake the examination in not less than six months and not more than two years from the time this decision was made.**
Only one opportunity for re-examination is given. Any candidate who is granted this privilege shall retain the status and obligations of a graduate student until the time of such re-examination.

If all work is not completed within four years following the qualifying examination, a second qualifying examination will be required. All work for the Ph.D. degree must be completed within seven years. This time limit may be extended upon approval by the Dean.

Please visit https://education.musc.edu/students/enrollment/bulletin/colleges-and-degrees/graduate-studies/doctor-of-philosophy for more information.

L. College of Graduate Studies Form

All forms that are required can be found at the following website https://horseshoe.musc.edu/university/colleges/college-of-graduate-studies/students/forms-and-guidelines

M. Teaching Experience

Candidates for the PhD degree is required to successfully serve a minimum of two semesters as a Teaching Assistant. Failure to complete this requirement may delay the confirmation of the PhD degree. MS students do not have a teaching requirement.

N. Collaborative Work

All Biostatistics and Epidemiology students are strongly encouraged to participate in collaborative work.

O. Core Courses

All MS and PhD students in the Department must take the departmental core courses in addition to those core courses in their area of concentration. Students who are supported by a training grant may be required to fulfill a core curriculum or other required courses specific to that training grant.

P. Non-Departmental Courses

All MS and PhD students may take course work outside the department with the approval of their Program of Study Advisor or Research Advisory Committee. Non- Departmental courses must be at a graduate level that corresponds to the MUSC courses at or above the 600 level.

Q. Research/Special Topics Courses

Students enrolled in the research course BMTRY 970 will be assigned to a faculty member who will supervise the research.

Students who enroll in Special Topics (BMTRY 789) must have approval from their Program of Study Advisor or their Research Advisory Committee. A copy of the syllabus for each BMTRY 789 course must be submitted to the Graduate Training Director and the Student Coordinator.

R. Audit and Pass/Fail Courses

Required or essential elective DPHS courses may only be taken for a merit grade or for a pass/fail grade based on the grade designation in DPHS course offerings. Non- DPHS electives may be taken as pass/fail if they are not considered critical to the student's research topic and/or degree program and are offered as pass/fail.

Courses from institutions other than MUSC (either in person or online) may not be taken for degree credit or substituted for the same or similar courses offered by DPHS unless approved by the student's research mentor and the curriculum committee of the student's division. Exceptions will be considered individually and based on criteria established by each curriculum committee. Criteria may include whether the course is required for the student's degree program or research topic, comparability of course methods and approaches, etc.

For doctoral students only, courses offered at MUSC or at institutions other than MUSC that are not deemed essential to the student's research topic may be audited if the student has already passed the Advanced Qualifying Exam.

If a student decides to audit a course, complete the drop/add form and type AUDIT in the credit hour field.

S. Departmental Seminars

The Departmental and Brown Bag Seminar series are an essential component of graduate education in Biostatistics and Epidemiology. Students are required to attend and participate in a minimum of 80% of scheduled departmental seminars and 80% of scheduled Brown Bag seminars during both the fall and spring semesters. (PLEASE NOTE - First year students must attend all seminars as part of the required BMTRY 776 Public Health Seminar course in both the fall and spring semesters.) A student who does not meet minimum attendance as

determined by the Progress Committee following the spring semester of an academic year will be required to register for and participate in BMTRY 776 Public Health Seminar during the next academic year.

T. Progress Evaluation

DPHS students are evaluated on the basis of performance in course work and conduct of research. In addition, evidence of the development of professional responsibility, including initiative, timely response to emails and communication from faculty, attendance at scheduled meetings with faculty, professional commitment, peer relationships, and attendance at seminars and professional meetings, will also be evaluated. Each student must maintain a minimum overall GPA of 3.0 in order to graduate. In addition, satisfactory progress is considered as having at least a 3.0 GPA within the student's specific field of study. A student whose cumulative GPA is below these requirements at the end of any semester will be placed on academic probation and will be given one semester to raise the cumulative GPA to the required standards. Credit will not be given for any course in which the student receives a grade of less than 2.0.

The Student Progress Review Committee meets periodically to review the progress of each student and determine if the student is making satisfactory progress towards his or her degree. Upon two consecutive semesters of unsatisfactory academic performance, the Progress Review Committee or the student's Research Committee may recommend to the Vice Chair for Academic Programs and the Department Chair that the student be dismissed from the program.

U. PhD Students with Previous MS Degree

A student who enters the PhD program with a prior MS degree from any institution including MUSC may not apply any previously completed thesis work toward the dissertation.

V. Changing Degree Programs

Students may request a lateral (MS to MS or PhD to PhD) change in degree program within DPHS by formal written petition to the Graduate Training Director of the program to which the change is requested. Students must be in good academic standing at the time of the request. In addition to the student's written petition, the student must submit letters of support from both the Division Leader of the program to which the change is requested, as well as the Graduate Training Director of the program in which they currently reside. The Graduate Training Director, to whom the petition is requested, will forward all materials to the Student Progress Committee for review and final decision.

IV. BIOSTATISTICS PROGRAM

A. MS Degree Requirements: Biostatistics Concentration

Requirements for the MS degree includes successful completion of all course work with a minimum GPA of 3.0, satisfactory completion of the Basic Written Examination, and the writing and successful defense of a thesis. Completion of the program usually requires two years of full-time student participation.

1. Required Coursework

All students must register as a full-time student for 9 credit hours in every semester to maintain active student status. Some of these credits may be in non-thesis research hours (BMTRY 970). MS students are required to take a minimum of 45 credit hours which include 30 hours of didactic instruction to complete the program. This includes the required courses shown in Table 2 and electives shown in Table 3. Students are further required to gain proficiency in SAS and R Advisory Committee. Other department elective coursework requires prior approval by the Program of Study Advisor or Research Advisory Committee (if the latter has been formed).
At least one Category A elective is required.

Table 2: Required courses for Biostatistics MS degree.
DPHS Common Departmental Core – 21sh (sh = semester hours)
Introduction to Clinical Biostatistics – Methods I (BMTRY 700) (3sh) Biostatistics Methods II (BMTRY 701) (4sh) Theoretical Foundations of Statistics I (BMTRY 706) (3sh) Theoretical Foundations of Statistics II (BMTRY 707) (3sh) Foundations of Epidemiology I (BMTRY 736) (3sh) Foundations of Epidemiology II (BMTRY 747) (3sh) Public Health Seminar (BMTRY 776) (2sh total – 1sh each fall and spring)
Additional Courses Required for MS – 5sh
Biostatistics Methods III (BMTRY 784) (3sh) Principles, Practices, and Professionalism (CGS 770) (2sh)
Electives: Students enroll in elective courses to satisfy the balance of the minimum 30 didactic credit hours (see Table 3). At least one Category A elective is required.

Table 3: Elective courses for Biostatistics MS degree. Students are required to take at least one Category A elective.
Category A Electives
Biostatistics Methods IV (BMTRY 702) (4sh) Analysis of Categorical Data (BMTRY 711) (3sh) Linear Models in Biology & Medicine (BMTRY 714) (3sh) Bayesian Biostatistics (BMTRY 719) (3sh) Analysis of Survival Data (BMTRY 722) (3sh) Multivariate Methods in Biology & Medicine (BMTRY 726) (3sh) Longitudinal Data Analysis (BMTRY 761) (3sh) Advanced Inference (BMTRY 779) (4sh)
Category B Electives
Statistical Methods for Clinical Trials (BMTRY 717) (2sh) Design and Conduct of Clinical Trials (BMTRY 724) (3sh) Foundations of Epidemiology III (BMTRY 748) (3sh) Spatial Epidemiology (BMTRY 763) (3sh) Methods in Clinical Cancer Research (BMTRY 781) (2sh) Statistical Methods for Bioinformatics (BMTRY 783) (2sh) Machine Learning & Data Mining (BMTRY 790) (3sh)

2. Basic Written Examination

Biostatistics MS students must take the Basic Written Examination in May/June of their first year in the program. Examination content reflects material covered in the DPHS common departmental core curriculum. See Section III D for additional details.

3. MS Thesis

Students pursuing an MS degree in the area of Biostatistics must write a master's thesis. Each student will produce a research proposal and successfully defend a final thesis in the form of one publishable paper.

The Biostatistics MS degree requires completion of at least 45 credit hours, of which 30 credit hours are didactic coursework.

Core Courses	Course Title	Credits
BMTRY 700	Biostatistics Methods I	3
BMTRY 701	Biostatistics Methods II: Regression Methods in Biology and Medicine	4
BMTRY 706	Theoretical Foundations of Statistics I	3
BMTRY 707	Theoretical Foundations of Statistics II	3
BMTRY 736	Foundations of Epidemiology I	3
BMTRY 747	Foundations of Epidemiology II	3
BMTRY 776	Public Health Seminar-Fall	1
BMTRY 776	Public Health Seminar-Spring	1
BMTRY 784	Biostatistics Methods III-Analysis of Categorical & Correlated Data	3
CGS 770	Principles, Practices, and Professionalism	2
	Total Hours	**26**
Required Electives		
One Category A Elective		3/4
	Total Hours	**29/30(meets didactic requirement)**
Optional Electives		
Category A Electives		3/4
Category B Electives		2/3
	Total Program Hours	**45**
BMTRY 970	Research	1-15

B. PhD Degree Requirements: Biostatistics Concentration

The program of study leading to the Doctor of Philosophy (PhD) degree is designed to prepare students to perform independent scholarly research, participate in collaborative research and consultation in the biomedical sciences, and to teach at the college or university level.

Requirements for the PhD degree include course work, satisfactory completion of the Basic Written Examination and the Advanced Qualifying Examination, and the writing and successful defense of a dissertation with the three dissertation papers prepared in submittable form to a professional journal. The PhD program normally requires four to six years of full-time student participation for students entering without advanced standing. **PhD funding will only cover up to five years in the program.**

1. Required Coursework

A full-time student must register for at least 15 credit hours in any semester. Some of these credits may be in research hours (BMTRY 970). PhD students are required to take a minimum of 60 didactic credit hours to complete the program.

Students Entering Without a Prior Master's Degree: Courses required for the PhD in Biostatistics are shown in Table 4. Elective courses for the PhD in Biostatistics are shown in Table 5. Students are allowed a maximum of six elective credit hours from no more than two courses outside of DPHS.

Table 4: Required courses for Biostatistics PhD degree.
DPHS Common Departmental Core – 21 sh (sh = semester hours)
Introduction to Clinical Biostatistics – Methods I (BMTRY 700) (3sh) Biostatistics Methods II (BMTRY 701) (4sh) Theoretical Foundations of Statistics I (BMTRY 706) (3sh) Theoretical Foundations of Statistics II (BMTRY 707) (3sh) Foundations of Epidemiology I (BMTRY 736) (3sh) Foundations of Epidemiology II (BMTRY 747) (3sh) Public Health Seminar (BMTRY 776) (2sh total – 1sh each fall and spring)
Additional Courses Required for PhD – 21sh
Biostatistics Methods IV (BMTRY 702) (3sh) Analysis of Categorical Data (BMTRY 711) (3sh) Linear Models in Biology & Medicine (BMTRY 714) (3sh) Bayesian Biostatistics (BMTRY 719) (3sh) Analysis of Survival Data (BMTRY 722) (3sh) Advanced Inference (BMTRY 779) (4sh) Principles, Practices, and Professionalism (CGS 770) (2sh)

Table 5: Elective courses for Biostatistics PhD degree.
Preferred Biostatistics Electives
Statistical Methods for Clinical Trials (BMTRY 717) (2sh) Design and Conduct of Clinical Trials (BMTRY 724) (3sh) Multivariate Methods in Biology & Medicine (BMTRY 726) (3sh) Foundations of Epidemiology III (BMTRY 748) (3sh) Longitudinal Data Analysis (BMTRY 761) (3sh) Spatial Epidemiology (BMTRY 763) (3sh) Methods in Clinical Cancer Research (BMTRY 781) (3sh) Statistical Methods for Bioinformatics (BMTRY 783) (2sh) Machine Learning & Data Mining (BMTRY 790) (3sh)
Additional DPHS Courses: Other departmental courses may be taken for elective credit only with *prior approval* from the Program of Study Advisor or Research Advisory Committee (if the latter has been formed).
Non-DPHS Courses: Students are allowed a maximum of six elective credit hours from no more than two courses outside of DPHS. (Exceptions may be considered for transfer students or students with a prior master's degree.)

The Biostatistics PhD degree requires 60 didactic hours to complete program.

Core Courses	Course Title	Credits
BMTRY 700	Biostatistics Methods I	3
BMTRY 701	Biostatistics Methods II: Regression Methods in Biology and Medicine	4
BMTRY 702	Biostatistics Methods IV: Advanced ANOVA & Regression	4
BMTRY 706	Theoretical Foundations of Statistics I	3
BMTRY 707	Theoretical Foundations of Statistics II	3
BMTRY 711	Analysis of Categorical Data	3
BMTRY 714	Linear Models in Biology and Medicine	3
BMTRY 719	Bayesian Biostatistics	3
BMTRY 722	Analysis of Survival Data	3
BMTRY 736	Foundations of Epidemiology I	3
BMTRY 747	Foundations of Epidemiology II	3
BMTRY 776	Public Health Seminar-Fall	1
BMTRY 776	Public Health Seminar-Spring	1
BMTRY 779	Advanced Inference	4
CGS 770	Principles, Practices, and Professionalism	2
	Total Hours	**43**
Electives	*Total Required*	17
	Total Didactic Hours	**60**
BMTRY 970	Research	1-15

2. **Basic Examination**

Biostatistics PhD students must take the Basic Written Examination in May/June of their first year in the program. Examination content reflects material covered in the DPHS common departmental core curriculum. See Section III D for additional details.

3. **PhD Advanced Qualifying Examination**

The Advanced Qualifying Examination in Biostatistics will contain questions covering the following Biostatistics core courses: Biostatistical Methods IV (BMTRY 702), Analysis of Categorical Data (BMTRY 711), Analysis of Survival Data (BMTRY 722), Bayesian Biostatistics (BMTRY 719), Linear Models (BMTRY 714), and Advanced Inference (BMTRY 779). The Biostatistics AQE Committee reserves the right to adjust courses covered on the exam as needed. Additional information regarding the structure and timing of the AQE will be announced at least one semester prior to the scheduled exam date.

4. **Dissertation Research**

All candidates must register for a minimum of one credit hour every semester to be considered active students in the program but may register for one credit hour only once (i.e.in a single semester) during their tenure as a PhD student.

5. **Additional Requirements**

As described in Section III (General Departmental Degree Requirements), PhD Biostatistics students must satisfy the Departmental teaching requirement and are strongly encouraged to participate in collaborative work.

V. EPIDEMIOLOGY PROGRAM

A. MS Degree Requirements: Epidemiology Concentration

Requirements for the MS degree includes successful completion of all course work with a minimum GPA of 3.0, satisfactory completion of the Basic Written Examination, the writing and successful defense of a thesis, and submission to a professional journal of the thesis paper. Completion of the program usually may take up to two years of full-time enrollment.

1. Required Coursework

All students must register as a full-time student for 9 credit hours in every semester to maintain active student status. Some of these credits may be in non-thesis research hours (BMTRY 970). MS students are required to take a minimum of 45 credit hours which include 30 hours of didactic instruction to complete the program. Other department elective coursework requires prior approval by the Program of Study Advisor or Research Advisory Committee (if the latter has been formed). Courses required for the MS in Epidemiology are shown in Table 6. Elective courses for the MS in Epidemiology are shown in Table 7. At least four Category A electives are required.

Table 6: Required courses for Epidemiology MS degree.
DPHS Common Departmental Core – 15 sh (sh = semester hours)
Introduction to Clinical Biostatistics-Methods I (BMTRY 700) (3sh) Biostatistics Methods II (BMTRY 701) (4sh) Foundations of Epidemiology I (BMTRY 736) (3sh) Foundations of Epidemiology II (BMTRY 747) (3sh) Public Health Seminar (BMTRY 776) (2sh total – 1sh each fall and spring)
Additional Core Courses Required for MS – 4 sh
Introduction to Public Health (PHGEN 706) (2sh) Principles, Practices, and Professionalism (CGS 770) (2sh)
Electives: A minimum of 5 electives are required for the MS in Epidemiology. At least four Category A electives are required. See Table 7.

Table 7: Elective courses for Epidemiology MS degree. Students are required to take at least four Category A electives.

Epidemiology Category A Electives
Infectious Disease Epidemiology (BMTRY 713) (3sh)
Design & Conduct of Clinical Trials (BMTRY 724) (3sh)
Grant Development in Clinical Research (BMTRY 725) (2sh)
Cancer Epidemiology (BMTRY 734) (3sh)
Epidemiology of Cardiovascular Disease (BMTRY 737) (3sh)
Field Epidemiology (BMTRY 738) (3sh)
Environmental Epidemiology (BMTRY 745) (3sh)
Foundations of Epidemiology III (BMTRY 748) (3sh)
Molecular Epidemiology (BMTRY 757) (3sh)
Health Disparities (BMTRY 759) (3sh)
Chronic Disease Epidemiology (BMTRY 765) (3sh)
Epidemiology of SARS -Co-V-2 (PHGEN 712) (2sh)
Epidemiology Category B Electives
Theoretical Foundations of Statistics I (BMTRY 706) (3sh)
Theoretical Foundations of Statistics II (BMTRY 707) (3sh)
Analysis of Categorical Data (BMTRY 711) (3sh)
Statistical Methods for Clinical Trials (BMTRY 717) (2sh)
Analysis of Survival Data (BMTRY 722) (3sh)
Multivariate Methods in Biology & Medicine (BMTRY 726) (3sh)
Spatial Epidemiology (BMTRY 763) (3sh)
Methods in Clinical Cancer Research (BMTRY 781) (2sh)
Statistical Methods for Bioinformatics (BMTRY 783) (2sh)
Biostatistics Methods III (BMTRY 784) (3sh)
Probability and Statistical Inference (BMTRY 785) (3sh)
Microbiome Informatics (BDSI 731) (2sh)
Principles in Environmental Health Sciences (PHGEN 708) (3sh)
Introduction to Health Systems and Policy (PHGEN 710) (3sh)
Social and Behavioral Sciences (PHHBP 700) (3sh)

The Epidemiology MS degree requires completion of at least 45 credit hours, of which 30 credit hours are didactic coursework.

Core Courses	Course Title	Credits
BMTRY 700	Biostatistics Methods I	3
BMTRY 701	Biostatistics Methods II: Regression Methods in Biology and Medicine	4
BMTRY 736	Foundations of Epidemiology I	3
BMTRY 747	Foundations of Epidemiology II	3
BMTRY 776	Public Health Seminar-Fall	1
BMTRY 776	Public Health Seminar-Spring	1
CGS 770	Principles, Practices, and Professionalism	2
PHGEN 706	Introduction to Public Health	2
	Total Hours	**19**
Required Electives		
Category A Class		3
Category A Class		3
Category A Class		3
Category A Class		2/3
	Required Elective Total	*11/12*
	Total Hours	**30/31 (meets didactic requirement)**
Optional Electives		
Category A		
Category B		
	Optional Electives Total	*15/14*
	Total Program Hours	**45**
BMTRY 970	Research	1-15

2. Basic Written Examination

Epidemiology MS students must take the Basic Written Examination in May/June of their first year in the program. Examination content reflects material covered in the DPHS common departmental core curriculum. See Section III D for additional details.

3. MS Thesis

Students pursuing an MS degree in the area of Epidemiology must write a master's thesis. Each student will produce a research proposal and successfully defend a final thesis in the form of one publishable paper.

B. PhD Degree Requirements: Epidemiology Concentration

The program of study leading to the Doctor of Philosophy (PhD) degree is designed to prepare students to do independent scholarly research, participate in collaborative research and consultation in the biomedical sciences, and teach at the college or university level.

Requirements for the PhD degree include course work, satisfactory completion of the Basic Written Examination and the Advanced Qualifying Examination, the writing and successful defense of a dissertation, and submission to a professional journal of the three dissertation papers. The PhD program normally requires four to five years of full-time student participation for students entering without advanced standing. **PhD funding will only cover up to five years in the program.**

1. Required Coursework

A full-time student must register for at least 15 course credits in any semester. Some of these credits may be in research hours (BMTRY 970). PhD students are required to take a minimum of 52 didactic credit hours to complete the program.

Students Entering Without a Prior Master's Degree: Courses required for the PhD in Epidemiology are shown in Table 8. Elective courses for the PhD in Epidemiology are shown in Table 9. A minimum of 20 didactic credit hours of elective coursework from Table 9 are required according to the following criteria:

- A least four courses from Epidemiology Category A
- No more than one 2 credit hour course from Epidemiology Category B
- No more than 6 credit hours outside DPHS
- No more than 2 courses outside DPHS

Table 8: Required courses for Epidemiology PhD degree.
DPHS Common Departmental Core – 18 sh (sh = semester hours)
Introduction to Clinical Biostatistics-Methods I (BMTRY 700) (3sh) Biostatistics Methods II (BMTRY 701) (4sh) Foundations of Epidemiology I (BMTRY 736) (3sh) Foundations of Epidemiology II (BMTRY 747) (3sh) Public Health Seminar (BMTRY 776) (2sh total – 1sh each fall and spring) Probability and Statistical Inference (BMTRY 785) (3sh) *

Additional Courses Required for PhD – 12sh
Grant Development in Clinical Research (BMTRY 725) (2sh) Foundations of Epidemiology III (BMTRY 748) (3sh) Biostatistics Methods III (BMTRY 784) (3sh) Introduction to Public Health (PHGEN 706) (2sh) Principles, Practices, and Professionalism (CGS 770) (2sh)
*Students may take BMTRY 706-Theoretical Foundations of Statistics I in place of BMTRY 785-Probability and Statistical Inference.

Table 9: Elective courses for Epidemiology PhD degree. Students are required to take at least four Category A electives.
Epidemiology Category A Electives
Infectious Disease Epidemiology (BMTRY 713) (3sh) Design & Conduct of Clinical Trials (BMTRY 724) (3sh) Cancer Epidemiology (BMTRY 734) (3sh) Epidemiology of Cardiovascular Disease (BMTRY 737) (3sh) Field Epidemiology (BMTRY 738) (3sh) Environmental Epidemiology (BMTRY 745) (3sh) Molecular Epidemiology (BMTRY 757) (3sh) Health Disparities (BMTRY 759) (3sh) Chronic Disease Epidemiology (BMTRY 765) (3sh) Epidemiology of SARS -Co-V-2 (PHGEN 712) (2sh)
Epidemiology Category B Electives
Theoretical Foundations of Statistics I (BMTRY 706) (3sh) Theoretical Foundations of Statistics II (BMTRY 707) (3sh) Analysis of Categorical Data (BMTRY 711) (3sh) Statistical Methods for Clinical Trials (BMTRY 717) (2sh) Analysis of Survival Data (BMTRY 722) (3sh) Multivariate Methods in Biology & Medicine (BMTRY 726) (3sh) Spatial Epidemiology (BMTRY 763) (3sh) Methods in Clinical Cancer Research (BMTRY 781) (2sh) Statistical Methods for Bioinformatics (BMTRY 783) (2sh) Microbiome Informatics (BDSI 731) (2sh) Principles in Environmental Health Sciences (PHGEN 708) (3sh) Introduction to Health Systems and Policy (PHGEN 710) (3sh) Social and Behavioral Sciences (PHHBP 700) (3sh)
Category C Electives: Other departmental courses may be taken for elective credit only with *prior approval* from the Program of Study Advisor or Research Advisory Committee (if the latter has been formed).

The Epidemiology PhD degree requires completion of 52 didactic credit hours.

Core Courses	Course Title	Credits
BMTRY 700	Biostatistics Methods I	3
BMTRY 701	Biostatistics Methods II: Regression Methods in Biology and Medicine	4
BMTRY 725	Grant Development for Clinical Research	2
BMTRY 736	Foundations of Epidemiology I	3
BMTRY 747	Foundations of Epidemiology II	3
BMTRY 748	Foundations of Epidemiology III	3
BMTRY 776	Public Health Seminar-Fall	1
BMTRY 776	Public Health Seminar-Spring	1
BMTRY 784	Biostatistics Methods III: Analysis of Categorical & Correlated Data	3
BMTRY 785	Probability and Statistical Inference	3
CGS 770	Principles, Practices, and Professionalism	2
PHGEN 706	Introduction to Public Health	2
	Total Hours	**30**
Required Electives		
Category A Class		3
Category A Class		3
Category A Class		3
Category A Class		3
	Required Electives Total	*12*
	Total Hours	**42**
Optional Electives		
Category A		
Category B		
	Optional Electives Total	*10*
	Total Didactic Hours	**52**
BMTRY 970	Research	1-15

Students Entering with Prior Master's Degree: Students entering the program with a prior master's degree in epidemiology or related field must satisfy all requirements for the PhD as specified for students entering without a prior master's degree (see above and Tables 8 and 9). These requirements may be fulfilled through a combination of transfer credit, credit by examination, and courses taken while at MUSC. As stated in the MUSC bulletin, "At least 33 percent of semester credit hours applied toward a Medical University degree must be earned through instruction by the University." Both transfer of credit hours and credit by examination of courses require approval by the Graduate Training Director. The student must submit to the Program of Study Advisor and the Graduate Training Director a list of courses for which transfer credit or credit by examination is requested along with a description of the corresponding equivalent courses taken as part of the prior master's coursework. Only courses that directly correspond to courses offered in the DPHS curriculum will be considered for transfer credit or credit by examination.

2. **Basic Examination**

Epidemiology PhD students must take the Basic Written Examination in May/June of their first year in the program. Examination content reflects material covered in the DPHS common departmental core curriculum. See Section III D for additional details.

3. **PhD Advanced Qualifying Examination**

The advanced exam in Epidemiology will contain questions covering the following courses: Foundations of Epidemiology III (BMTRY 748), Biostatistics Methods III (BMTRY 784), and 4 of the Epidemiology electives. The AQE will include three to four separate sub-exams—one or two from the examinee's **content area**, one from **epidemiological methods**, and one from **biostatistical methods**. The examinee will be allowed twelve days to complete the AQE. The questions will include topics drawn from the examinee's coursework, including the credited independent studies, the research proposal developed, and the subject matter the examinee intends to pursue for dissertation. The methodological challenges of sifting through the underlying topics of interest (e.g., cancer) are crucial in these exams and it may be necessary to identify two or three common problems that are associated with the topics of interest to ensure topic area proficiency. Additional information will be available upon request.

4. **Dissertation Research**

All candidates must register for a minimum of one credit hour every semester to be considered active students in the program but may register for one credit hour only once (i.e., in a single semester) during their tenure as a PhD student.

5. Additional Requirements

As described in Section III (General Departmental Degree Requirements), PhD Epidemiology students must satisfy the Departmental teaching requirement and are strongly encouraged to participate in collaborative work.

After the AQE has been passed PhD Epidemiology students are required to apply to the *SCTR TL1 (T32) Predoctoral Clinical & Translational Research Training Program* by the end of their second year in the program as long as the TL1 program is accepting applications. In some cases, the Program of Studies Advisor may suggest that they apply for an alternative training award in place of this requirement by the end of their second year in the program.

VI. INFORMATION FOR NEW STUDENTS

A. Housing

The University does not provide on-campus dormitory housing. However, the University is located in downtown Charleston and private housing facilities are readily available, with cost varying according to individual needs. The Off-Campus Housing Office at MUSC assists students in finding suitable housing in the Charleston area.

Further information is available from the website:
https://education.musc.edu/students/spsd/housing

B. Problems and Solutions

1. Personal Concerns

Various offices on campus are available to assist students with personal concerns that may arise during their stay at MUSC. Information is available from the Student Programs and Student Diversity Office located in the MUSC Wellness Center. The CAPS (Counseling and Psychological Services/ Office is available to support current students. Their office number is 843-792-4930. For further information all services:
https://education.musc.edu/students

2. Academic Problems

Students may consult their Program of Study Advisor, the chairman of their Research Advisory Committee, the Graduate Training Director, or any member of the faculty for advice concerning academic problems. The Departmental Student Grievances Committee (see Section VII G) can be called into session by contacting the Graduate Training Director in writing, stating the nature, circumstances, and principals involved in the problem. All efforts will be made to resolve the grievance within the Department. The formal academic review process for graduate students in the Department comes under the purview of guidelines stated in the Bulletin of the Medical University of South Carolina at the following site:
https://education.musc.edu/students/enrollment/bulletin/education-policies

C. MUSC Student Honor Code

As a unit in the Medical University of South Carolina, the Department of Public Health Sciences (DPHS) adheres to MUSC's Honor Code: https://musc.policytech.com/docview/?docid=19140&public=true

"The central purpose of the Honor Code is to sustain and protect an environment of mutual respect and trust in which students can enjoy the freedom to develop their intellectual and personal potential. The Honor Code depends upon the willingness of every individual to adhere to the basic principles of academic integrity and agree never to behave unfairly or dishonestly in academic work or tolerate those who do. Only through a mutual commitment to maintaining this high standard can students at MUSC enjoy the benefits of a community that is marked by honesty and integrity. The Honor Code both promotes and requires an atmosphere of trust in which students tell the truth, live honestly, advance on individual merit, and demonstrate deep respect for others in the academic, clinical, and research communities. The Honor Code is administered by and for the members of the MUSC community, and it depends on cooperation and support from each community member.

Students are required to review this document in full and expected to abide by all standards of conduct described therein. ***We review below select excerpts*, but students are responsible for familiarity with all components of the MUSC Honor Code**.

MUSC Honor Code Violations

Conduct adversely affecting the integrity of any academic work at or for MUSC violates the Honor Code. While this Honor Code cannot spell out every possible offense, the following examples are intended to describe the primary categories of Honor Code violations and to assist in interpreting the standard of "adversely affecting the integrity of academic work."

1) ***Deceit*:** defined as making untrue or deceitful statements to obtain an advantage in academic work. Examples include misleading others in order to obtain unauthorized answers or materials for academic work, and untruth concerning attendance at classes or other course-related events. "Deceit" also includes any untrue statement in connection with an Honor Code investigation or proceeding.
2) ***Cheating***: defined as the giving or receiving of unauthorized aid in academic work, and any attempt to gain an unfair advantage in academic work. Examples include copying another student's work; unauthorized use of notes or devices; unauthorized possession, dissemination, or use of examination questions or similar materials such as prior examinations; soliciting, giving, or receiving unauthorized aid.
3) ***Plagiarism*:** defined as presenting the words, work, processes, or ideas of another as one's own in academic work, without proper acknowledgement of the source. Examples include doing the following without proper acknowledgement of the source: copying or closely paraphrasing text or distinctive nomenclature; using facts, figures, graphs, charts or other information or presentations of information; submission of academic

work prepared in whole or in part by someone else (including a commercial vendor).

a) ***Tampering with Academic Records or Materials:*** defined as making pertinent academic materials unavailable to others; altering or tampering with grades, academic or attendance records, or examinations; and/or altering, damaging, or interfering with notes or laboratory or similar experiments or projects.

DPHS Specific Expectations

Successful progress in any DPHS academic program requires students to participate in frequent written and oral assessment, including preparing problem sets; writing computer code to analyze data; providing written interpretation of data analyses; writing papers for class projects; developing publishable manuscripts for capstone projects, or thesis and dissertation research; and composing poster or oral presentations for class or professional meetings. DPHS students are reminded of specific expectations regarding preparation of these materials.

1) Plagiarizing classmates: At the discretion of the course instructor, DPHS students may be permitted or required to work in groups to complete various course assignments. Nonetheless, **unless the course instructor explicitly states otherwise, students are expected to independently develop all class assignments including, but not limited to, the materials listed above**. Specifically, it is not acceptable for students to turn in multiple copies of the same document, either in whole or in part. Furthermore, both the student taking credit for someone else's work and the student making their work available to others are fully culpable. Students are cautioned not to share electronic or handwritten assignments with other students.

2) Plagiarizing published literature: Conducting a literature review for the purposes of a class report or paper, a manuscript developed for publication, a capstone project, or any thesis or dissertation document, requires the student to succinctly summarize the published literature or other documents (e.g., websites). Students are reminded to adhere to the following rules when summarizing another's work. Any failure to do so is considered an honor code violation.
   a) If you copy text *verbatim* from another source, you must put the text in quotes and reference the source.
   b) If you summarize the work of another author in your own words, then you need only reference the source.
3) Other forms of plagiarism:

a) Including any figure or table from a source in a presentation without referencing the source.
b) Use of another's presentation without referencing the source.
c) Claiming as one's own work the solution to all or part of an assigned problem obtained from unauthorized use of online solutions manuals and/or web searches, or problems assigned in previous years.
d) Plagiarism and Artificial Intelligence Guidelines and linked to: https://musc.policytech.com/docview/?docid=19557&public=true
e) "Use of Public Generative AI-Based Tools" per Aaron Heath and the MUSC Health AI Governance Council. This applies to all students, staff, and faculty: https://horseshoe.musc.edu/everyone/information-solutions/information-security/public-ai-based-tools
f) Learning Analytics Data Policy located here: https://musc.policytech.com/docview/?docid=17189&public=true

Honor Code Violation Consequences

Suspected Honor Code violations may be reported to the University Honor Council. Following the procedures outlined in the Honor Code document, students who are found to be in violation of the Honor Code will be sanctioned. Appropriate sanctions are included, but not limited to the following:

- Formal reprimand
- Resubmission or repetition of the affected work
- Sessions at the Center for Academic Excellence
- A zero (0) or F on the affected assignments or examination
- Probation-to be noted on student's transcript during the term of probation, and may affect severity of sanction for any future violation
- Failure of the affected course with a grade of "XF"
- Ineligibility for a period of time to hold elected or appointed positions at MUSC
- Suspension for one or more upcoming semesters
- Expulsion

Students are encouraged to refer to the University Honor Code for specific details. https://www.musc.edu/honorcode

D. Professionalism and Standards of Conduct

Students are required to review this document in full and expected to abide by all standards of conduct described therein. *We review below select excerpts*, but students are responsible for familiarity with all components of the College of Graduate Studies Professionalism and Standards of Conduct.

https://horseshoe.musc.edu/university/colleges/college-of-graduate-studies

The College of Graduate Studies has adopted a code of professional conduct which all students are expected to follow. Each student's professional conduct is continually observed by faculty. Under the code of professional conduct, a student enrolled in the College of Graduate Studies is expected to adhere to the following standards:

Compassion
Collaboration
Respect
Integrity
Innovation

The following examples illustrate, but are limited to, the types of unprofessional behavior that will be documented and reported:
Disrespectful or inappropriate verbal or written communication
Disrespectful behavior toward students, faculty, staff, or patients
Defensive in the face of constructive criticism or resists making changes in their professional behavior
Engages in disruptive behavior in the learning environment.
Inappropriate use of cell phone and/or social media

Insensitive to the needs, feelings, and wishes of others.
Absent without approval, misses deadlines, or is late for mandatory activities or submitting assignments.

E. Annual Training

All students are required to complete mandatory annual training. Your mandatory training also includes four (4) hours in Diversity and Inclusion. This training is completed in your OurDay account. The training is due by June 30 of each year.

F. College of Graduate Studies Travel Allowance

Full time Doctoral students in the College of Graduate Studies are authorized a $700 (one-time) travel allowance to present research at a scientific meeting. You can use this for transportation or registration (not lodging expenses) The travel must be approved by the Dean. Once approved by the Dean, the CGS Business Manager will work with you on the logistics. This only applies to students matriculated at MUSC. This does not apply to visiting students or students with cross registration from another SC college of university.

Airline tickets and registration fees are the only costs that are allowable to be paid for in advance. Students need to identify the specific airline and flights that they are interested in prior to coming to the Dean's Office to meet with the Business Manager. Registration fees and airline tickets may be purchased via the internet or paid directly to a vendor. If purchased directly by the student, these costs are only reimbursable after the travel has been completed.

Reimbursement requests for travel-related expenses must be submitted to the Business Manager. Reimbursements will be direct deposited to your account or mailed to your home address within approximately one month after receipt of claim.

The following information is required on all travel claims: your name, social security number and home mailing address. You must submit original receipts for all reimbursable expenses except for meals. If you purchased your airline ticket via the web, a computer printed receipt is acceptable. You must submit any leftover pieces of your airline ticket along with your airline receipt. You need to submit a copy of your abstract, any name tag received at the meeting, and a copy of the cover and the page of a meeting booklet that lists your presentation.

Other allowable expenses include items such as airport parking, meals, mileage if driving, taxi fees to and from the airport/place of lodging. Mileage is reimbursed at the rate provided by the IRS Standard Mileage table. You must attach a web print (such as MapQuest) showing the mileage from your home to the airport, and to your destination, if driving instead of flying. If you are driving out of state, you need to provide a copy of a web airline price quote to show that it costs less to drive than it did to travel by air.

Meal reimbursements are made via a per diem rate set by MUSC Accounts Payable. You do not need to keep any receipts for meals. If you spend more than the per diem rate, you still will not be able to be reimbursed for anything above the per diem rate.

G. Public Health/Epidemiology/Biostatistics Organizations

South Carolina Public Health Association
www.scpha.com

American Public Health Association
www.apha.org

American College of Epidemiology
www.acepidemiology.org

Society for Epidemiologic Research
www.epiresearch.org

American Statistical Association
www.amstat.org

International Biometric Society
www.biometricsociety.org

Eastern North American Region International Biometric Society
Home | Eastern North American Region (enar.org)

H. College of Graduate Studies Grading Scale

CGS grading scale		
A	95-100	4.0
A-	90-94	3.7
B+	85-89	3.3
B	80-84	3.0
B-	75-79	2.7
C+	70-74	2.3
C	65-69	2.0
C-	60-64	1.7
F	<60	0

2024-2025 Academic Calendar

Fall 2024-Calendar B

Fall Semester Begins	August 27, 2024
Labor Day (campus closed)	September 2, 2024
Last Day for Drop/Add	September 6, 2024
Research Day (no classes or tests scheduled)	November 1, 2024
Election Day	November 5, 2024
Thanksgiving Day (campus closed)	November 28-29, 2024
Fall Semester Ends	December 20, 2024
Christmas (campus closed)	December 24-26, 2024

Spring 2025

Spring Semester Begins	January 2, 2025
Interprofessional Day	January 10, 2025
Dr. Martin Luther King Day (campus closed)	January 20, 2025
Last Day for Drop/Add	January 16, 2025
DPHS Spring Break	March 3-7, 2025
Spring Semester Ends	April 30, 2025
Commencement	May 17, 2025

Summer 2025-Calendar A

Summer Semester Begins	May 1, 2025
Memorial Day (campus closed)	May 26, 2025
Last Day for Drop/Add	June 12, 2025
Independence Day (campus closed) Summer Semester Ends	July 4, 2025 August 14, 2025

VII. Department Committees Related to Graduate Training

A. Student Recruitment Committee

The Student Recruitment Committee is charged with planning and monitoring DPHS student recruitment activities including the development of written and online recruitment materials.

B. Admissions Committee (Department of Public Health Sciences)

The Department Admissions Committee is charged with the evaluation of all applicants for the PhD and MS programs in the Department. Each member carefully reviews all application materials to determine the acceptability of each applicant. These reviews are reported to the Graduate Training Director, with final disposition reported to the College of Graduate Studies.

C. Student Progress Review Committee

The primary responsibilities of the Student Progress Committee are to: (1) oversee the progress of all MS and PhD students in DPHS; (2) after each fall and spring semester, evaluate the progress of each DPHS MS and PhD student and notify him/her of the results of the evaluation (3) make recommendation, if appropriate, to the Department Chair and the full graduate faculty to discontinue stipend or grant support for a student.

Recommendations of the Progress Committee after the spring semester progress meeting for a student not making good progress can be among the following:

- Continue in the program of study (PhD or MS) and be evaluated again in 6 months.
- Advise the student of probationary status and the timeline to make improvements.
- Discontinue the PhD or MS program.

D. Examination Committees

The Basic Written Examination (BWE) Committee convenes annually (and semi-annually when needed) to prepare and evaluate the basic examination. The exam is administered in three parts and on three days. The exam includes assessments from the departmental core curriculum.

The Advanced Qualifying Exam (AQE) Committee members are appointed ad hoc, specifically by curriculum area.

E. Research Advisory Committees (Specific to each MS or PhD candidate)

The primary responsibilities of the student's Research Advisory Committee (Research Committee) are to: (1) oversee the student's progress toward the degree; (2) direct and monitor the student with his/her master's thesis or doctoral dissertation research. (3) approve student's Program of Study and Plan of Research; (4) make recommendations for remedial work; (5) approve student's final thesis/dissertation.

F. Student Grievances Committee

The Graduate Training Director will convene this committee as needed to consider and resolve student grievances. The make-up of the committee will be selected from the entire faculty based on the specific grievance.

G. Student Advisory Committee

The Student Advisory Committee membership is composed of student representatives from each DPHS degree program (PhD/MS Biostatistics, PhD/MS Epidemiology, MPH Biostatistics, MPH Epidemiology, and MPH Health Behavior and Health Promotion). Student representatives meet regularly with the Vice Chair for Academic Programs (and other administrative personnel on an as-needed basis) to discuss issues and concerns raised by the students.

VIII. DEPARTMENTAL RESOURCES

A. Laptop Standards

The Department of Public Health Sciences (DPHS) requires that all incoming students purchase a portable or laptop computer. Our buildings are all wireless-enabled, and you will be able to access your campus email, student-related information, course materials, and other important web-based resources at any time using your laptop. To ensure compatibility with the existing campus technology infrastructure, DPHS has identified hardware and software standards for student laptops (see below). Students must bring to campus a laptop that meets or exceeds these standards. Students with laptops that do not meet the minimum standards will receive limited software support by DPHS. IT will not be able to offer hardware support or repair for any student-owned laptops.

Please note that the Department of Public Health Sciences laptop hardware and software standards are different from university standards.

It is imperative that you adhere to the Department of Public Health Sciences standards, as you will be required to complete complex statistical modeling.

Laptop: Any PC-based laptop (No Macs are allowed) which meets the following hardware standards:

- Processor: Minimum of an Intel Core i7
- Memory: Minimum of 16GB RAM
- Hard Drive: Minimum of 256 GB (a solid-state drive is recommended for faster read and write speeds)
- Operating System: Windows 11 Professional (No Home Editions). This provides BitLocker Drive Encryption which meets the MUSC policy and State of South Carolina requirements.

Antivirus Software: The Department of Public Health Sciences will provide antivirus software protection.

Warranty: Due to the critical nature of system availability, the department recommends purchasing an extended hardware warranty. The Department of Public Health Sciences does not maintain an inventory of hardware.

As Apple Mac Laptops are not supported, I.T. will not be able to install software or printer drivers on the devices.

They are also updated on the student resources page Laptop Standards | College of Medicine | MUSC

B. Biostatistics and Epidemiology Collaborative Unit

1. Goals and Objectives

The Biostatistics and Epidemiology Collaborative Unit is an MUSC University Research Resource Facility (URRF). As a URRF, the unit is committed to assisting MUSC investigators in meeting biostatistical, epidemiological, and bioinformatics needs related to research and grant development.

2. Student Participation

The Biostatistics and Epidemiology Collaborative Unit provides graduate students with experience in a variety of research problems and the many facets of the research process. These experiences may include collaboration with investigators, grant proposal preparation and review, sample size estimation, questionnaire or data collection form development, manuscript preparation, and other general study activities.

C. Data Coordination Unit

1. Goals and Objectives

The Data Coordination Unit (DCU) provides data collection and management consultation and coordination to researchers within and outside of MUSC in all areas of study. Its role is to collaborate with investigators in the development of an efficient and quality data management system for their research studies, with a particular focus in multicenter clinical studies. Like the Collaborative Unit, DCU is committed to assisting MUSC investigators with grant development.

2. Student Participation

The Data Coordination Unit provides hands-on training opportunities for graduate students interested in all aspects of multi- center clinical research studies, including study design, development of case report forms and data collection tools, database development, implementation of randomization schemes, and statistical programming.

D. Copying Facilities

Students will have access to a printer in the department for reasonable use, as determined by the Department IT staff. A four-digit copy code is assigned upon matriculation for copying and scanning purposes.

Timeline of Completion of Requirements

All forms are available at the following website:
https://horseshoe.musc.edu/university/colleges/college-of-graduate-studies/students/forms-and-guidelines/phd-forms-and-information

	MS	PhD
POS Advisor	Appointed by the Graduate Training Director.	Appointed by the Graduate Training Director.
Basic Written Exam	After successful completion of the first-year divisional core curriculum. Offered at the end of May or in the beginning of June.	After successful completion of the first-year divisional core curriculum. Offered at the end of May or in the beginning of June.
Advanced Qualifying Exam	N/A	Exam will be scheduled during the third year. Must have passed Basic Written Exam and must have completed required courses for respective area of emphasis.
Research Advisor	**No later than 12 months** after enrolling. **FORM REQUIRED:** Appointment of Major Advisor	**No later than 3 months** after successful completion of Advance Qualifying Exam. **FORM REQUIRED**: Appointment of Major Advisor
Program of Study	Concurrent with research advisor selection. **FORM REQUIRED:** CGS Program of Study form and DPHS Program of study Review form	Concurrent with research advisor selection. **FORM REQUIRED:** CGS Program of Study form and DPHS Program of Study Review form
Research Advisory Committee	**No later than 3 months** after successful completion of the Basic Written Exam. **FORM REQUIRED**: Recommendation for Appt of Advisory Committee	**No later than 6 months** after successful completion of the Advanced Qualifying Exam. **FORM REQUIRED**: Recommendation for Appt of Advisory Committee
	Student must meet at least once a year with entire Advisory Committee. **Student must meet with DPHS members of committee at least once every semester.** **FORM REQUIRED:** Annual Evaluation of Student Progress by the Thesis Advisory Committee	**Student must meet at least once a year with entire Advisory Committee.** **Student must meet with DPHS members of committee at least once every semester.** **FORM REQUIRED:** Annual Evaluation of Student Progress by the Dissertation Advisory Committee

Research Proposal	Prior to beginning thesis work. Student submits written copy to each member of Advisory Committee as well as the Division Graduate Training Director and the Dept Chair. Copy of proposal kept in the Dept for faculty and students to review.	Prior to beginning dissertation work. **Due no later than the end of the fourth year** after passing Advanced Qualifying Exam. Student submits written copy to each member of Advisory Committee as well as the Division Graduate Training Director and the office of the Dept Chair. Copy kept in the Dept for faculty and students to review.
Proposal Defense	Once Advisory Committee is satisfied with Plan of Research. Presentation should last approx. 45 minutes.	Once Advisory Committee is satisfied with Plan of Research. Presentation should last approx. 45 minutes.
Admission to Candidacy	Upon completion of Basic Written Exam and successful proposal defense. Must occur at least **3 months prior** to completing the degree requirements. **FORM REQUIRED:** Admission to Candidacy	Upon completion of Program of Study, Advanced Qualifying Exam, and successful proposal defense. Must occur at least **one year prior** to completing requirements for degree. **FORMS REQUIRED:** Admission to Candidacy and Individual Development Plan
Individual Development Plan (IDP)	N/A	Due when Admission to Candidacy Form is submitted and annually thereafter **FORMS REQUIRED:** CGS Graduate Student IDP Worksheet
Thesis/Dissertation	Draft and form **due to the Advisory Committee 6 weeks prior** to final defense. See "A Guide to the Preparation of Theses & Dissertations." **FORM REQUIRED:** Thesis/Dissertation Defense Notification must be turned in to the Dean's office with all signatures **3 weeks prior** to the defense date.	Draft and form **due to the Advisory Committee 6 weeks prior** to final defense. See "A Guide to the Preparation of Theses & Dissertations." **FORM REQUIRED:** Thesis/Dissertation Defense Notification must be turned in to the Dean's office with all signatures **3 weeks prior** to the defense date.
Defense	Formal presentation 45 minutes long followed by oral examination. **FORMS REQUIRED:** Certification of Successful Defense and Defense Rubric	Formal presentation 45 minutes long followed by oral examination. **FORMS REQUIRED:** Certification of Successful Defense, Title/signature Page and Defense Rubric

Time Limit	Within 5 years.	In the event that all work is not completed within 4 years following the qualifying exam, a second qualifying exam will be offered. All work for the PhD must be completed within 7 years. This time limit may be extended upon approval by the Dean.

IX. COURSE DESCRIPTIONS

BIOSTATISTICS

BMTRY 700 Biostatistical Methods I: Introduction to Clinical Biostatistics (4sh) This course introduces basic applied descriptive and inferential statistics. Topics include elementary probability concepts, an introduction to statistical distributions, point and interval estimation, hypothesis testing, and simple linear regression and correlation. Basic data management and analysis techniques will be introduced using appropriate statistical software packages (includes 1 sh laboratory session). *Prerequisites:* College Algebra and one course in Calculus. (Required Core - MS, PhD).

BMTRY 701 Biostatistical Methods II: Regression Methods in Biology and Medicine (4sh)
The objective of this course is to provide basic and intermediate skills necessary to apply regression methods to clinical and basic science research data. Topics include regression issues such as least squares estimation, model-based hypothesis testing, diagnostics, model building and variable selection, and indicator variables. Simple and multiple linear regression, logistic regression, Poisson regression, and modeling of time-to-event (survival) data will be covered. The course uses a problem-based approach and applications to clinical and basic science problems are provided. *Prerequisites:* BMTRY 700 (Required Core - MS, PhD).

BMTRY 702 Biostatistics Methods IV: Advanced ANOVA & Regression (4sh)
The course emphasizes advanced experimental designs employed in biomedical research. It covers a variety of advanced ANOVA and regression topics such as block designs, repeated measures design, mixed effects models, analysis of missing data and model diagnostics and shows how these are applied to a variety of experimental designs. Mixed effect models will include Gaussian linear mixed models (LMM), generalized linear mixed models (GLMM), and finite normal mixture models. Students should be familiar with the basic notions of random variables, statistical inference, multiple regression modeling and matrix algebra. The focus is on underlying statistical theory and applications. Familiarity with statistical software such as SAS, R, or STATA is expected. *Prerequisites:* BMTRY 701, 706, 707 (Required Core – Biostat PhD).

BMTRY 706 Theoretical Foundations of Statistics I (3sh)
This course covers basic probability theory, random variables, transformation of random variables, expectation, moments and moment generating functions, discrete and continuous probability distribution functions; joint, marginal, and conditional distribution functions, bivariate normal distribution, and inequalities. *Prerequisite:* concurrent 700 (Required Core – Biostat MS, Biostat PhD).

BMTRY 707 Theoretical Foundations of Statistics II (3sh)
This course is the continuation of Theoretical Foundations of Statistics I. Topics covered are order statistics, stochastic convergence, point and interval estimation, hypothesis testing, evaluation of estimates and tests, and asymptotic theory. *Prerequisites:* BMTRY 700, 706 (Required Core – Biostat MS, Biostat PhD).

BMTRY 711 Analysis of Categorical Data (3sh)
This course offers a short review of standard measures of association and chi-square methods for binomial and multinomial distributions, followed by several special-purpose two-dimensional techniques. Other areas covered include the development of maximum likelihood-based inference (unconditional and conditional) for categorical data using generalized linear models. Models for binomial, multinomial and count data will be examined. In addition, topics including log-linear models, analysis of three-dimensional and higher tables, model selection strategies, regression model diagnostics, analysis of correlated or matched data, and generalized estimating equations, will be covered. *Prerequisites:* BMTRY 700, 701, 706. (Required Core -PhD Biostats).

BMTRY 714 Linear Models in Biology and Medicine (3sh)
The matrix representation of the general linear statistical model is studied through the implication, distribution, and partitioning of quadratic forms and their probability distributions. Estimation of parameters in the linear model by methods of maximum likelihood and least squares will be presented along with the accuracy and precision of these estimators. Estimability in both the full rank and less than full rank models is introduced. The test statistic for the general linear hypothesis is derived, and its distribution is determined under an assumption of normally distributed errors for both the null and a general alternative hypothesis. Sufficient examples are given to show its application to tests on means as well as in ANOVA and ANOCOVA. Students prepared in basic statistical methods and theory, and matrix algebra are eligible to take this course. *Prerequisites:* BMTRY 700, 701, 706, 707 (Required Core – PhD Biostats).

BMTRY 717 Statistical Methods for Clinical Trials (2sh)
This course is intended mainly for MS and PhD students in DPHS interested in the statistical methods and issues arising in a variety of clinical trials. The course will include topics in adaptive/flexible study design, adaptive randomization, sample size estimation, missing data handling, interim analysis methods, and issues in data analysis. The course will also cover topics related to the statistician's role in clinical trials, including the presentation of statistical information and statistical monitoring of safety data. At the completion of this course, students will have the tools to collaborate with clinicians in the design and implementation of clinical trials as well as analysis of study data and will have developed their skills in being a more critical reader of the medical literature. *Prerequisites:* BMTRY 700, 701, 702, 724.

BMTRY 719 Bayesian Biostatistics (3sh)
It is a graduate course on effective and sophisticated approaches to Bayesian modeling and computation in biostatistics and related fields. The course begins with a gentle introduction of Bayesian inference starting from first principle, but it intends to cover the philosophical backgrounds, logical developments and computational tools associated with Bayesian. *Prerequisites:* 701, 706, 707 (Required Core -PhD Biostats).

BMTRY 722 Analysis of Survival Data (3sh)
This is an introductory course in theory and application of analytic methods for time-to- event data. The methods covered include nonparametric, parametric, and semi-parametric (Cox model) approaches. The topics covered will also include types of censoring, sample size and power estimation. R or SAS will be used interactively throughout the semester for implementation of statistical methods. Datasets from medical research will be used in class and in homework assignments. *Prerequisites*: BMTRY 700, 706, working knowledge of SAS. (Required Core -PhD Biostats).

BMTRY 724 Design and Conduct of Clinical Trials (3sh)
This is a comprehensive course providing an overview in the design and conduct of clinical trials. The course covers the types of clinical trials; study design (including sample size estimation); randomization methods and implementation; project and data management; ethics; and issues in data analysis (e.g., intent-to-treat; handling of missing data; interim analyses). The course is designed primarily for the students in the Department of Public Health Sciences; however, both clinical and basic science investigators can benefit from this course provided they have the required background in basic statistics. *Prerequisites:* BMTRY 700.

BMTRY 726 Multivariate Methods in Biology and Medicine (3sh)
This course will consist of multivariate techniques in biology and medicine including multivariate tests of mean vectors and covariance matrices, multivariate analysis of variance and regression, repeated measures analysis, random and mixed effects models, generalized estimating equations, generalized linear mixed models, canonical correlation, factor analysis, principal components analysis, discriminant analysis. Directed to biostatistics students, useful for epidemiology students. *Prerequisites:* BMTRY 700, 701, 706, 707 and knowledge of Matrix Algebra & SAS.

BMTRY 761 Longitudinal Data Analysis (3sh)
This course will introduce students to methods used to analyze longitudinal data. Topics will include multivariate linear regression models for repeated measures, correlation structures for repeated measures, linear and generalized linear mixed models, generalized estimating equations, missing data, and Bayesian methods. While the course will emphasize application, the theoretical foundations underlying the methods will also be discussed. Students should be well acquainted with matrix algebra, linear and logistic regression, as well as the fundamentals of statistical inference, including maximum likelihood estimation and large-sample hypothesis testing. *Prerequisites:* BMTRY 701, 707.

BMTRY 763 Spatial Epidemiology – Statistical Methods and Applications (3sh)
This course focuses on the basic epidemiological and statistical issues to be found in the study of the spatial/geographical distribution of disease. The topics of disease mapping, disease clustering and ecological analysis will be examined. *Prerequisites:* BMTRY 701.

BMTRY 779 Advanced Inference (4sh)
This course is intended for Ph.D. students in Biostatistics. The course will begin with a review of basic mathematical concepts: probability and measure, integration, modes of convergence. A decision theoretical approach to statistical inference will be introduced. In statistical estimation theory, topics such as families of distributions, point estimation, unbiasedness, algorithmic issues (EM), etc. will be included. In hypothesis testing the Neyman-Pearson theory, unbiased tests, permutation tests, and likelihood-based tests will be discussed in depth. In asymptotic, limit theorems, relative efficiency, Wald's statistic, Rao's score statistic, etc., will be discussed. Computer intensive methods such as bootstrap estimation and permutation tests will be introduced. An overview of robust statistical procedures will be provided. *Prerequisite:* BMTRY 707 (Required Core – PhD Biostats).

BMTRY 781 Methods in Clinical Cancer Research (2sh)
Didactic lectures will cover: (1) clinical and statistical design of phase I, II and III trials: (2) incorporation of correlative endpoints and biomarkers in clinical trials, (3) considerations in chemotherapy, surgery, radiation and multimodality trials, (4) quality of life and other patient reported outcomes in cancer research, (5) the protocol review and IRB process, (6) informed consent, (7) data collection, trial monitoring and investigator responsibilities, (8) the grants process and mentoring. In addition to the didactic portions of the training, each trainee will have a clinical research proposal which will be developed into a "letter of intent" (LOI) for a clinical trial. Other contact hours will take the form of a journal club where clinical research papers from journals such as Clinical Cancer Research or Journal of Clinical Oncology are discussed, and protocols that are being undertaken at HCC are reviewed and discussed. Students will be required to attend and take part in the HCC Protocol Review Committee's monthly meetings. *Prerequisite:* Eligible students must satisfy at least one of the following criteria: 1) The student is enrolled in the MSCR program, 2) The student is a Paul Calabresi K-12 training grant scholar, 3) The student is enrolled in a masters or PhD program in the Dept. of Public Health Sciences, 4) The student has received consent of the instructor.

BMTRY 783 Statistical Methods for Bioinformatics (2sh)
This course will provide a survey of bioinformatics research areas and statistical methods needed to analyze data in these areas. This course will introduce students to biological concepts and statistical problems in various bioinformatics research areas, including functional genomics, population genetics, and cancer genomics. Statistical methods, such as multiple testing, Hidden Markov Model (HMM), clustering, classification, and high dimensional data analysis, will be discussed to address statistical problems in these research areas. Freeware and online resources related to these topics will be explored. *Prerequisites:* BMTRY 701, 706.

BMTRY 784 Biostatistical Methods III: Analysis of Categorical & Correlated Data (3sh)
This course is intended mainly MS and MPH students in DPHS interested in the applied statistical methods for analysis of categorical data and correlated data. The categorical data analysis sessions include methods for stratified 2x2 and r x c contingency table data, ordinal data, matched pair dichotomous data, and count data. The correlated data analysis section covers random and mixed effects models and generalized linear models. The didactic classes are augmented by SAS and R sessions led by the teaching assistants. At the completion of this course, students will have the tools to analyze these data using SAS and R and make appropriate inferences from the analyses. *Prerequisites:* BMTRY 700, 701, 706 or 785 or permission of the instructor. (Required Core – MS Biostats, PhD Epi).

BMTRY 785 Probability and Statistical Inference (3sh)
This course introduces fundamental principles of probability and inference including laws of probability, discrete and continuous random variables and their probability distributions, select multivariate probability distributions, sampling distributions and the central limit theorem, point and interval estimation including maximum likelihood, an overview of the hypothesis testing framework, and common hypothesis tests including the likelihood ratio, Wald, and score tests. *Prerequisite:* At least one semester of Calculus (Required Core – PhD Epi).

BMTRY-790 Machine Learning & Data Mining (3sh)
Machine learning is the interdisciplinary field at the intersection of statistics and computer science which develops such statistical models and interweaves them with computer algorithms. This course introduces the theory with a basis in real-world application, focusing on statistical and computational aspects of data analysis. It is designed to serve as an introduction to the fundamental concepts, techniques and algorithms of machine learning. The course will cover following topics: data representation, feature extraction, dimension reduction, supervised and unsupervised classification, support vector machines, latent variable models and clustering, and model selection. During the course of discussion, a main thread of probabilistic models will be used to integrate different statistical learning and inference techniques, including MLE, Bayesian parameter estimation, information-theory-based learning, EM algorithm, and variational methods. *Prerequisites:* BMTRY 701, 706, and knowledge of R.

EPIDEMIOLOGY

BMTRY 713 Infectious Disease Epidemiology (3sh)
This course provides an overview of the salient methods of infectious disease epidemiology with an emphasis on the application of epidemiologic techniques to various diseases caused by a microbial agent. Specifically, the course emphasizes the contributions of individual, environmental, and sociodemographic factors in the occurrence of infectious disease in a population. Lectures will describe the role of biological, environmental, social, and behavioral factors in determining the transmission of infectious diseases and their prevention. The course employs common statistical tests and epidemiological techniques to assess the transmission index of infectious agents. *Prerequisites:* None.

BMTRY 725 Grant Development for Clinical Research (2sh)
The objective of the course is to prepare the student to develop a draft grant application by teaching them about grantsmanship, helping them to develop the sections of a grant (aims, background, preliminary studies, methods), teaching them about IRB regulations and procedures, about ethics, and about developing a research budget. Students will be given examples of successful grants and grants that have not been funded to discuss and critique. *Prerequisites:* BMTRY 700, 736, or permission of instructor. (Required Core – PhD Epi).

BMTRY 734 Cancer Epidemiology (3sh)
This survey course will introduce students to the major cancer risk factors. For the major cancers the most important epidemiological studies will be reviewed. The issue of genetic susceptibility and the use of biomarkers in cancer epidemiology will be studied as well as cancer screening. *Prerequisites:* BMTRY 736 or permission of the instructor.

BMTRY 736 Foundations of Epidemiology (Epidemiology I) (3sh)
This course introduces basic epidemiologic principles including measurements of disease occurrence, study designs (cohort, case-control, randomized clinical trials) and calculation of risk. Lecture material is supplemented with exercises and discussion of examples from the epidemiologic literature and presentations of epidemiologic studies by guest speakers. *Prerequisites:* None (Required Core - MS and PhD).

BMTRY 737 Epidemiology of Cardiovascular Diseases (3sh)
This is an advanced course designed to acquaint students with the use of epidemiology in the study and investigation of cardiovascular diseases. *Prerequisites:* BMTRY 736 or permission of instructor.

BMTRY 738 Field Epidemiology (3sh)
An emphasis will be placed on procedures used in the implementation of epidemiological research studies. *Prerequisites:* BMTRY 736.

BMTRY 745 Environmental Epidemiology (3sh)
This course is designed to provide students with an understanding of the research methods and the basic physiological, toxicological, and physical components that are involved in the study of environmental epidemiology. Such an analytical approach provides students the means to address the varied and complex problems that arise in assessing the human impact of environmental stressors. Students will critically evaluate epidemiological and scientific literature to apply the concepts emphasized. The course is intended for graduate students interested in epidemiology, environmental risk assessment, or environmental health. *Prerequisites:* BMTRY 736 or permission of instructor.

BMTRY 747 Foundations of Epidemiology II (3sh)
This course will provide a comprehensive and quantitative view of the design, conduct, analysis, and interpretation of epidemiological studies and use of SAS software. There is a more in-depth coverage of topics than in Epi I. *Prerequisites:* BMTRY 700, 701 concurrently, 736 (Required Core – MS, PhD).

BMTRY 748 Foundations of Epidemiology III (3sh)
This course will provide an introduction of advanced statistical techniques in epidemiological studies. This course will use SAS and other analysis software as needed. Builds on the techniques developed in Epi II. *Prerequisites:* BMTRY 700, 701, 736, 747 (Required Core – PhD Epi).

BMTRY 757 Molecular Epidemiology (3sh)
This course introduces students to the principles and practices of molecular epidemiology and provides an overview of the application of biologic markers of exposure, disease or susceptibility to epidemiologic investigations of exposure-disease relationships. Students will be guided through general principles that draw on issues of validity and reliability, technical variability and control, biologic specimen banks with a strong emphasis on study design and how to incorporate biomarker studies into epidemiology practiceStudents will gain an appreciation of statistical considerations and interpretation and communication of molecular epidemiologic information and potential impacts. Key concepts will be illustrated from different disease categories. *Prerequisites:* BMTRY 736, 747 or permission of instructor.

BMTRY 759 Health Disparities (3sh)
The need for a public health workforce trained in equity-based approaches to social determinants of health has increased and is driven by a significant body of literature. In this course, students will learn principles and concepts of health equity and social determinants of health and relevant models and methodological issues in social epidemiologic research. *Prerequisite:* None.

BMTRY 765 Chronic Disease Epidemiology (3sh)
Examination of chronic disease from an epidemiologic perspective, with an emphasis on methodological and practical issues of study designs, exposure and

outcome assessment, factors determining the distribution of selected chronic diseases and critical review of relevant epidemiologic literature. Students are introduced to disease registries, their purpose, benefits and limitations. *Prerequisites:* BMTRY 736.

BMTRY 766 Methods & Outcomes in Cancer Population Sciences (3sh)
The objective of this course is to increase the knowledge and skills of early-stage clinicians and basic science researchers in conducting patient oriented and translational cancer research. *Prerequisite:* None.

OTHER DEPARTMENTAL COURSES

BDSI 701 Introduction to Biomedical Informatics (3sh)

This is an introductory course to provide students with an overview of the biomedical informatics field. Students will learn fundamental theories and concepts of bioinformatics, clinical research informatics, health informatics, consumer health informatics, and public health informatics. Students will learn how informatics tools, techniques, and approaches are used to support research and health care. The course consists of lectures and presentations taught by a variety of informatics experts. The course is intended as the first step in an informatics PhD as well as other students who want to broaden their understanding of biomedical informatics. No previous informatics or computer science experience is required. (Offered by the BDSI Program)

BDSI 721 Applied Machine Learning (3sh)

This course will introduce methods in statistical learning that are commonly used to extract important patterns and information for biomedical data. Topics include linear methods for regression and classification, regularization, kernel smoothing methods, statistical model assessment and selection, and support vector generalized principal component analysis will also be discussed. Time permitting overview of emerging topics in machine learning will be provided. The topics and their applications will be illustrated using the statistical programing language R. (Offered by the BDSI Program)

BDSI 731 – Microbiome Informatics (2sh)

This course is concerned with analysis of microbiome data enabled by high-throughput sequencing technologies. We will briefly cover foundational concepts in microbial ecology, molecular biology, bioinformatics, and DNA sequencing. The focus of the course will be on developing an understanding of multivariate analysis of microbiome data. Practical skills to be developed in this course include managing high- dimensional and structured data in metagenomics, visualization and representation of high-dimensional data, normalization, filtering, and mixture-model noise modeling of count data, as well as clustering and predictive model building. The topics in this course are developed only so as to enable the users to understand the merits of these analyses. The main goal is to give the students an intuition about when certain analyses are applicable and practical ways to implement these analyses. A deeper understanding of these methods can be achieved by taking additional classes in statistics such as 'Statistical Methods for Bioinformatics' and 'Multivariate Analysis', which cover a much broader range of topics in more rigorous detail. Familiarity with R will be readily acquired during the course. (Offered by the BDSI Program)

BMTRY 776 Public Health Seminar (1sh)
This course is a required course for Biostatistics and Epidemiology PhD and MS students in the department, to be completed in the fall and spring semesters of the student's first year in the program. Students attend the DPHS-sponsored seminars every other Monday throughout the semester to gain exposure to contemporary research topics in biostatistics and epidemiology. Seminar speakers are invited guests to the department and represent a diversity of research topics that are complimentary to the research interest of DPHS faculty. On alternating Mondays, the department sponsors its own Brown Bag seminar series featuring research presentations by DPHS faculty and advanced students actively engaged in mentored projects. This valuable exposure helps first-year students identify potential mentors and projects for summer research hours, as well as possible dissertation advisers and research topics. *Prerequisites:* None (Required Core– MS and PhD).

BMTRY 970-Reseach (variable credit: 1–15sh)
This course is an independent study for a student to participate in research with their advisor/instructor. It gives the student an opportunity to get hand-on experience working within grant funded research. *Prerequisites:* None.

CGS 770 - Principles, Practices and Professionalism(2sh) - This semester-long course introduces graduate students to essential concepts in the practice of biomedical science, such as critical thinking, responsible conduct of research, reproducibility of data, transparency in communication, rigor in experimental design and analysis, and professional development. The course utilizes didactic lectures, group activities based on hypothesis development, student discussion of case studies, and a range of skills focused on optimal development of career options *Prerequisites:* None (Required Core– MS and PhD).

PHGEN 706 Introduction to Public Health (2sh)
The overall purpose of this elective course is to introduce students to the principles and core functions of public health. Materials presented in the course will enable students to understand the role of public health and its core functions to better understand patterns of diseases, global threats to health, and factors contributing to disparate health outcomes in population groups. *Prerequisites:* None (Required Core – MS Epi, PhD Epi).

PHGEN 708 Principles in Environmental Health Sciences (3sh)
This course is designed for public health students interested in studying the relationships between people and their environment and how they affect their wellbeing. This course offers a general introduction to environmental health, addressing fundamental topics and current debates. The first part of the course covers core topics intended to prepare students to understand and address environmental health issues: environmental epidemiology; toxicology; and environmental policy and regulation more fully. The second part of the course presents agents of environmental disease and applications of environmental health. Emphasis will be placed on air quality and environmental exposure assessment. *Prerequisites:* None.

PHGEN 710 Introduction to Health Systems and Policy (3sh)
This course aims to identify the main components and issues of the organization, financing and delivery of health services within the various domains of public health in the US, describe the legal and ethical bases for public health and health services, identify the main components and issues of the organization, financing and delivery of health services and public health systems in the US, discuss the policy processes for improving the health of populations as well as how to evaluate and describe the performance of the U.S. health systems in terms of cost, quality, effectiveness, and access. The course includes evaluation of several case studies of public health policy decisions and their implications. *Prerequisites:* None.

PHGEN 712 Epidemiology of SARS-CoV-2(COVID 19) (2sh)
This class presents an overview of the epidemiology of the SARS-CoV-2 virus, and its resulting COVID-19 disease. Topics covered include basics of outbreak investigation, the biology of the virus, therapeutics, vaccine development, principles of contact tracing, and public policy. *Prerequisites:* None.

PHHBP 700 Social and Behavioral Health Sciences (3sh)
This course introduces MPH students to the principles and practices of the social and behavioral sciences in public health. The overall goal of the course is to provide a broad overview of social and behavioral science principles that can be used to guide the process of identifying, characterizing and resolving public health problems to improve the health of individuals and populations. Students will examine the role of behavioral and social factors as determinants of health outcomes and introduce key individual, organizational and community factors to consider when planning social and behavioral science interventions. This course provides a broad introduction to the basic theories, concepts and models from the social and behavioral sciences that are used in public health research and practice. *Prerequisites:* None.

PHHBP 704 Application of Health Behavior Theory (3sh)
Successful completion of this course will enable the student to describe the role of social and community factors in both the onset and solution of public health problems; identify the causes of social and behavioral factors that affect health of individuals and populations; identify basic theories, concepts and models; apply ethical principles to public health program planning, implementation and evaluation; specify multiple targets and levels of intervention; identify individual, organizational and community concerns, assets, resources and deficits; apply evidence-based approaches in the development and evaluation of interventions; describe the merits of social and behavioral science interventions and policies; describe steps and procedures for the planning, implementation and evaluation of public health programs; and identify critical stakeholders for the planning, implementation and evaluation of public health programs, policies and interventions. *Prerequisites:* PHHBP 700.

PHHBP 712 Health Promotion Intervention Planning (3sh)
In this course, students will critically examine models and processes for the systematic planning of public health interventions in a variety of settings (e.g., medical, community). Students will gain skills in needs assessment, the identification of behavioral and environmental determinants of public health problems and using theory to guide the selection of public health intervention strategies. Students will apply evidence-based approaches in the development of social and behavioral science interventions and become familiar with practical and ethical principles underlying public health program planning, implementation and evaluation. *Prerequisites:* PHHBP 700, PHHBP 704, PHHBP 714.

PHHBP 714 Health Promotion Research Methods (3sh)
This course introduces students to research methods in health promotion and allows them to understand and evaluate common research methods used in health promotion research. Students learn techniques related to data collection by observation, interview and questionnaire, and adapt research techniques to vulnerable and medically underserved populations. *Prerequisites:* PHHBP 700.

PHHBP 718 Health Psychology (3sh)
This course introduces MPH students to the principles and practices of Health Psychology. The first half of the class is focused on learning theories of behavior change, discussing the case formulation process in single unrelated cases, and an introduction to the fundamental aspects of health psychology treatments. The second half of the class will center on related and increasingly complicated cases and students will be urged to see connections between symptom classes and complementary treatment models and techniques. By the end of this class students will be able to have a health psychology patient case presented and be able to describe the case in terms of a theory of health behavior or psychological intervention model and to describe how to intervene with an appropriate psychological treatment. *Prerequisites:* None.