

Medical University of South Carolina

Department of
Public Health Sciences

MS/PhD Handbook

Master of Sciences in Biomedical Sciences

Biostatistics
Epidemiology

PhD

Biostatistics
Epidemiology

Academic Year
2019-2020



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

The Test of English as a Foreign Language (TOEFL) is required for all applicants who have attended institutions where the primary language of instruction is not English. The applicant must have a TOEFL score of at least 250 (computer), 600 (paper), or 100 (internet). Letters of recommendation should address the applicant's skills in written and spoken English. In addition, international applicants must participate in a telephone or Skype interview with a member of the DPHS faculty. Important information for international applicants is available at: <https://education.musc.edu/admissions/future-applicants/international-applicants>

7. Applications Process

All applications to the College of Graduate Studies must be submitted online at <https://education.musc.edu/admissions/ready-to-apply/apply-now>. 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 January 1st for fall admission of the same year. The deadline for the MS program is June 1st.

All application materials should be submitted to the Office of Enrollment Services:
Graduate Studies Admissions
MUSC Enrollment Services
45 Courtney Drive
MSC 203
Charleston, SC 29425-2030

8. Review of Applications

Once the *PhD application* is complete, it is sent for evaluation to the College of Graduate Studies Admissions Committee. Selected applicants are invited to participate in a group recruitment and interview visit to the university. The recruitment visit is composed of interviews with members of the College of Graduate Studies Admissions Committee, campus tours, introduction to the graduate training programs, and discussions with faculty in the Department of Public Health Sciences. Following the recruitment visit, the College of Graduate Studies Admissions Committee decides whether or not to offer admission to the applicants.

Once an *MS application* is complete, it is sent to the Department of Public Health Sciences for review.

B. Transfer Credits/Credit by Examination

Students may be allowed to transfer credits that were not used to earn a prior degree. It is MUSC's policy that academic credit used to successfully earn one degree cannot be re-used for a subsequent degree. Students are 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.

C. 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.

Full-time PhD students on assistantships receive reduced tuition and fee charges. Reduced tuition for PhD students is approximately \$5090 per year.

2. Financial Aid

Effective fall 2019, the financial support for PhD students will be \$29,000 per year. **Research assistantships are available for students beyond stipend support and require up to 20 hours of work per week.**

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.

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: the Student Recruitment Committee, the Admissions Committee, the Examination Committees (basic written and advanced qualifying), the Progress Review Committee, Student Grievance Committee and the Student Advisory Committee. See Section VII for a description of the function of each committee.

Graduate Training Administrative Team, 2019 – 2020

- Mulugeta Gebregziabher, PhD
Vice Chair for Academic Programs
- Brian Neelon, PhD
Biostatistics PhD/MS Graduate Training Director
- Jeff Korte, PhD
Epidemiology PhD/MS Graduate Training Director
- Paula Talbot
Student Coordinator

E. Americans with Disabilities Act

The DPHS follows the official guidelines established by the University to accommodate qualified students with disabilities. Important information is available at: <http://education.musc.edu/leadership/diversity/ada-resources>

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 of 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.

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. 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.

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. MUSC Policies and Information

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

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 fall semester, a departmental orientation for new students is held during Orientation Week at which students are introduced to members of the faculty and staff. They are also 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 Program of Study 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 in the first two weeks of June. 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 2020 Basic Written Examination is scheduled for Friday May 29th, Monday June 1st and Tuesday June 2nd.** All students complete one component from Biostatistics Methods I and II (BMTRY 700 & 701), and a second component from Epidemiology I and II (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% in the 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. 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, a pass/no pass indication is reported. Following a no pass determination, the student will have one additional opportunity to retake the entire examination within the guidelines of division specifications.

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

As soon as a student has selected an area of research interest, he or she will select a *Research Advisor*. This should be done **by the end of the third year in the PhD program**. 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**. Both 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 Program of Study 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. Plan of Research

Prior to beginning the thesis/dissertation work, the MS or PhD student must prepare a written *Plan of Research* in consultation with his/her Research Advisor and Research Advisory Committee. The topic chosen for the thesis or dissertation must be approved by the Department Chair with regard to the scope of research, availability and utilization of departmental resources. For PhD students, the *Plan of Research* must also be approved by the Dean of the College of Graduate Studies. This plan must follow the format of a journal article or research grant application in accordance with the National Institutes of Health Guidelines:

<http://grants.nih.gov/grants/funding/phs398/phs398.html>

The Plan of Research 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. The Plan of Research will often need refinement as the research progresses.

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.

G. 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. The format should be one publishable paper with an additional detailed background section that includes a comprehensive literature review.

H. 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 *A Guide to the Preparation of Theses and Dissertations*, which is available in the office of 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.

I. Admission to Candidacy

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.

J. Oral Defense of Doctoral Dissertation

Each PhD candidate is required to pass a final oral examination directed primarily to the defense of the 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 dissertation 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 of the dissertation is a rigorous examination intended to test the student's knowledge of the particular research covered in the 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 PhD degree.

K. Teaching Experience

Candidates for the PhD degree are 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.

L. Collaborative Work

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

M. 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.

N. 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.

O. 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.

P. 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.

Q. 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 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.

R. 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.

S. 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.

T. 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. 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 – 22sh (sh = semester hours)

Introduction to Clinical Biostatistics – Methods I (BMTRY 700) (4sh)
 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)

2. Basic Written Examination

Biostatistics MS students must take the Basic Written Examination in 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.

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.

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 – 22 sh (sh = semester hours)

Introduction to Clinical Biostatistics – Methods I (BMTRY 700) (4sh)
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)
Spatial Epidemiology (BMTRY 763) (3sh)
Longitudinal Data Analysis (BMTRY 761) (3sh)
Methods in Clinical Cancer Research (BMTRY 781) (3sh)
Statistical Methods for Bioinformatics (BMTRY 783) (2sh)

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.)

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 requires 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.

2. Basic Examination

Biostatistics PhD students must take the Basic Written Examination in 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). 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. 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 – 16 sh (sh = semester hours)
Introduction to Clinical Biostatistics-Methods I (BMTRY 700) (4sh) 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 – 5 sh
Introduction to Public Health (PHGEN 706) (3sh) 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 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)
Microbiome Informatics (BDSI 731) (2sh)
Statistical Methods for Bioinformatics (BMTRY 783) (2sh)
Biostatistics Methods III (BMTRY 784) (3sh)
Probability and Statistical Inference (BMTRY 785) (3sh)
Principles in Environmental Health Sciences (PHGEN 708) (3sh)
Introduction to Health Systems and Policy (PHGEN 710) (3sh)
Social and Behavioral Sciences (PHHBP 700) (3sh)

2. Basic Written Examination

Epidemiology MS students must take the Basic Written Examination in 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 Comprehensive/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.

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:

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

Table 8: Required courses for Epidemiology PhD degree.

DPHS Common Departmental Core – 19 sh (sh = semester hours)

Introduction to Clinical Biostatistics-Methods I (BMTRY 700) (4sh)
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 – 13 sh

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) (3sh)
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 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)
- Microbiome Informatics (BDSI 731) (2sh)
- Statistical Methods for Bioinformatics (BMTRY 783) (2sh)
- Principles in Environmental Health Sciences (PHGEN 708) (3sh)
- Introduction to Health Systems and Policy (PHGEN 710) (3sh)5
- 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).

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 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 Comprehensive/Qualifying (Advanced) 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 ten 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. **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.**



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 Problems

Various offices on campus are available to assist students with personal problems that may arise during their stay at MUSC. The Interschool Council publishes a Student Guide which can be helpful in areas of housing, financial assistance, personal counseling, and student activities. A copy is mailed to each entering student. More information is available from the Student Activities Office located in the MUSC Wellness Center.

2. Academic Problems

Students may consult their Program of Study Advisor, the chairman of the 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/policies-and-guidelines>

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://www.musc.edu/honorcode>

“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 foundation of the Honor Code depends entirely upon the willingness of every individual to adhere to the basic principles of honesty and agree never to lie, cheat, steal, or tolerate those who do. Students or faculty who believe that a breach of the Honor Code has occurred are obligated to report the suspected breach to their college's Honor Council. A breach of the Honor Code is a serious offense. Such a violation is an affront to each of us independently as well as collectively.”

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

“Violations of the Honor Code include, but are not limited to, the following acts that violate academic integrity:

- 1) **Lying**: Lying is the statement of an untruth with the intent to mislead fellow students, faculty, patients, hospital staff, or administrative officials. Lying includes “lies of omission” or failure to divulge voluntarily the whole and complete truth. Fabrication or falsification of information (verbal or written) in any academic or clinical exercise is in violation of the Honor Code. Lying also includes any false testimony presented during Preliminary or Formal Hearings.
- 2) **Cheating**: **All tests, quizzes, written work, laboratory work, research, and examinations at the Medical University of South Carolina are conducted under the Honor Code.** Cheating is defined as using or attempting to use unauthorized assistance, devices, material, or study aids in or prior to examinations or any other academic work; or cheating or attempting to prevent others from using authorized assistance, material or study aids.
 - a) **Plagiarism**: **Intentionally or unintentionally using the ideas, information, work, or writings of another person and accepting credit for the work as one's own without proper acknowledgement on any paper, test, essay, lab work, research, or similar course activity.**
 - b) **Altering records**: Misrepresenting or tampering with transcripts, academic records, research data, or computer programs; obtaining or using another's ID code, social security number, or electronic password.
 - c) **Knowingly using, buying, transporting, or soliciting, any, or all, or part of the contents of an examination or other assignment not authorized for release, including the use of previously administered exams without the permission of the instructor.**

- 3) Stealing: Possession of MUSC property or another individual's private property without permission or knowledge.
- 4) Any of the following also constitute a violation of the Honor Code, but this list should not be interpreted as all-inclusive.
 - a) Facilitating academic dishonesty: colluding with another in the violation of any provision of this code.
 - b) Breach of appropriate standards of behavior in the presence of patients.
 - c) Breach of confidentiality with respect to information about patients.
 - d) The use of pressure, threat, abuse, bribery, or other practices that result in harassment.
 - e) The failure to report any violation of this Honor Code or the withholding of evidence pertinent to any case under investigation.
- 5) Unauthorized entry or presence in any office, laboratory, clinic, or other location is a violation of the Honor Code. Likewise, the purposeful or malicious abuse or destruction of any instruments, equipment, supplies, property, or books constitutes an offense of the Honor Code.
- 6) Inappropriate use of technology on the MUSC network, as articulated in all MUSC policies that govern the use of information technology, including but not limited to the MUSC Computer Use Policy.
 - a) Inappropriate use of a program template (e.g., Word, Excel, PowerPoint, etc.) as a component of course exams or class assignments that was not original work generated by the student. This includes use of templates generated for previous classes/exams or templates generated by another classmate unless prior approval is obtained from the course instructor.
 - b) Unauthorized sharing or use of copyrighted works, which can include but may not be limited to: PowerPoint presentations, music, or other copyrighted material.”

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 hand written 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.

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. Specific sanctions are listed below, but students are encouraged to refer to the University Honor Code for specific details.

- Verbal or written reprimand
- Resubmission of class assignment or retaking an examination
- Counseling services recommendation
- Academic probation
- Course failure
- Suspension
- Expulsion

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 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 spring semester, evaluate the progress of each MS and PhD DPHS student and notify him/her of the results of the evaluation, and reevaluate after the fall semester as needed; (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:

1. Continue in the program of study (PhD or MS) and be evaluated again in 6 months.
2. Advise the student of probationary status and the timeline to make improvements.
3. 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 (3 hours for each) and on three days. The exam includes assessments from the departmental core curriculum. A pass requires the successful evaluation of all three parts. A non-pass on any part requires a retake of the part not passed. The BWE is typically scheduled the first two weeks of June. If the exam is failed, a student is allowed one retake before the fall semester begins in that same year (late July or early August). A non-pass on the retake warrants dismissal from the

Program. After the examination has been scored and reported to the Graduate Training Director, final disposition is determined and reported to the students and advisors.

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 in the MPH program.

STUDENT LAPTOP MINIMUM HARDWARE AND SOFTWARE REQUIREMENTS

Students who need to purchase software may be able to do so through Compusult (<http://www.compusult.com/> or 1-800-992-6058). Compusult is a local software retail company located two blocks from the college that offers students discounted prices.

DELL Recommended: MUSC has a Premier Partnership with Dell, Inc. The Department of Public Health Sciences is a DELL SHOP.

Processor: Minimum of **iCore 7**

Memory: Minimum of **8 GB RAM**

Hard Drive: Minimum of **250 GB (a solid-state drive is recommended for faster read/write speeds)**

Operating System: **Windows 10 Professional** (NO Home Editions)

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

Warranty: Due to the critical nature of system availability, the Department recommends the **Dell 3-year GOLD W**

B. Biostatistics and Epidemiology Collaborative Unit

1. Goals and Objectives

The 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 Biostatistics and Epidemiology Data Coordination Unit 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 Biostatistics and Epidemiology 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.

IX. COURSE DESCRIPTIONS

BIOSTATISTICS

BMTRY 700 Biostatistics 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:* at least one college level course in mathematics (college algebra or higher) or statistics (Required Core - MS, PhD).

BMTRY 701 Biostatistics 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, 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 701, 706, 714 or 714 concurrently, or instructor consent (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 701, 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, 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, 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 701 and either 706 or 785 (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 Biostatistics, Bioinformatics, and Epidemiology; 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 707 or 784.

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 asymptotics, 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, 707.

BMTRY 784 Biostatistics Methods III: Analysis of Categorical & Correlated Data (3sh)

This course is intended mainly for Biostatistics MPH and MS students, and Epidemiology PhD students 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 701, 706 or 785 (Required Core – MS Biostats, PhD Epi).

BMTRY 785 Probability and Statistical Inference (3sh)

This one-semester course is intended for Biostatistics MPH and Epidemiology PhD students. The course provides an introduction to 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 provides an introduction to 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, 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 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 provides an introduction to 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 or permission of instructor.

BMTRY 745 Environmental Epidemiology (3sh)

The field of Environmental Epidemiology encompasses the investigation of environmental factors and how they affect human health. Environmental epidemiologists study health effects in populations resulting from exposure to physical, chemical, and biological agents. This includes the contribution of social, economic, and cultural factors that are related to these exposures. Occupational Epidemiology provides an introduction to clinical and epidemiologic aspects of occupational health and recognition and prevention of occupational diseases and injury. Case study approaches are used to learn about epidemiologic applications to occupational health. This course helps to address some of the 15 learning competencies of the doctoral program in Epidemiology and is intended for advanced epidemiology students to become familiar with applications of

epidemiology to environmental and occupational problems. *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 EGRET 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 in-depth quantitative view of advanced statistical analysis of epidemiological studies. The use of epidemiological analysis software (Epicure) will be taught. Builds on techniques developed in Epi II. *Prerequisites:* BMTRY 700, 701, 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 practice. Students 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 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 (3ch)

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 747 or permission of instructor.

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

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:* Permission of instructor (Required Core – PhD Epi).

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-Research (variable credit: 1–15sh)

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 (variable credit: 2 – 3sh)

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 it affects 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 more fully understand and address environmental health issues: environmental epidemiology; toxicology; and, environmental policy and regulation. 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.

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.