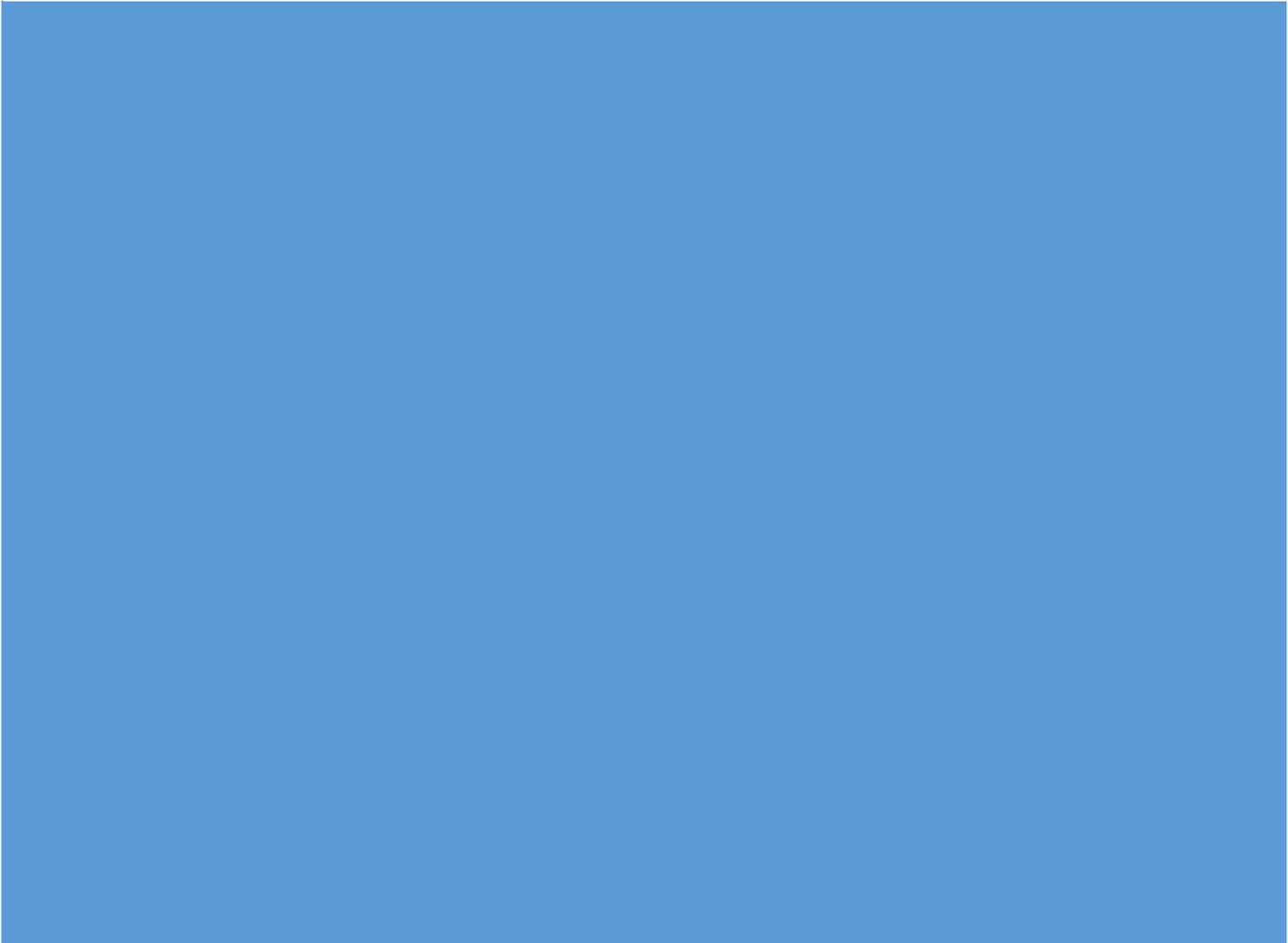




PHD IN EPIDEMIOLOGY
STUDENT HANDBOOK



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*“This School of Public Health is founded on a commitment – a commitment to public health as social justice. We see health not as a privilege, but as a right.”
Jonathan Mann, MD, MPH – April 20, 1998*

I. INTRODUCTION

A. Overview of the PhD in Epidemiology Program

The goal of the PhD Program in Epidemiology is to prepare graduates to use the science of epidemiology to ask and answer highly meaningful public health questions. Graduates will develop the skill and expertise necessary to initiate and direct the scientifically rigorous research necessary to generate the knowledge upon which to base public health and medical care policies and procedures designed to foster the maintenance and improvement of the health and well being of populations. The PhD program prepares students to approach problems with the critical analytic skills necessary for the generation of substantial and significant epidemiologic questions, and to utilize the most rigorous and parsimonious research strategies to answer such questions. Additionally, integral values of the Department and School will infuse students with the commitment to pursue important and innovative topics of inquiry even when faced with methodological challenges, and to undertake studies that generate knowledge applicable to diverse social, ethnic, and geographically defined populations.

Upon graduation PhD students will attain competencies in multiple areas. These competencies were based on guidelines developed by a joint working group of the American College of Epidemiology and the Association of Schools of Public Health in 2002, but have been influenced by the unique characteristics of Department and School faculty as well as University and area resources.

Competencies fall into four areas: general skills and knowledge; research; applied skills; and public health practice. The first two areas were designated by the ACE/ASPH workgroup as “core competencies” for Epidemiology PhD programs. Each of these is discussed further below.

General skills and knowledge

- Descriptive epidemiology – Ability to provide the descriptive epidemiology of major conditions and conditions of special interest to the student; know strengths and weaknesses of descriptive studies; and identify data from existing national and international sources
- Biology – Have a basic understanding of human physiology and pathophysiology, with special competence in areas needed for dissertation research
- Basic public health knowledge – understand the general history of epidemiology and public health, know principles of screening and disease surveillance, understand the global, cultural, and social context of health problems and how these influence research

Research

- Problem conceptualization – Search and critically evaluate literature; synthesize information; identify gaps, formulate statement of research problem and hypotheses
- Study design – Design studies based on principal study designs, know strengths and limitations, evaluate sample size issues, identify, assess, and minimize bias and confounding, and use basic sampling strategies
- Data collection/monitoring – Use methods of measurement, determine validity of measure, identify presence and magnitude of measurement error and adjust when possible, and monitor data collection and develop and implement quality and control measures
- Data management – Create files appropriate for data analyses, create new and recoded variables, clean data
- Data analysis – Use appropriate statistical approaches for descriptive statistics, analyses of categorical data, multivariable regression, survival and longitudinal analyses
- Interpretation – Interpret research results and make appropriate inferences recognizing limitations
- Communication – Communicate results orally and in writing to scientists and non—scientists, present data summaries appropriately in tables and figures; place findings in appropriate public health and health policy context
- Ethics – understand concepts of human subjects protection and apply to design and conduct of thesis research
- Substantive area – demonstrate mastery of a substantive area, including application of that knowledge in conducting original research

Applied Skills

- Learn principals of research management (including research budget development/management) and interdisciplinary team work.
- Have opportunities to participate in teaching and learn effective strategies for teaching introductory epidemiology
- Gain some experience in both primary data collection and secondary data analyses

Public Health Practice

- Utilize epidemiologic skills in the context of community health assessment and be able to conceptualize and synthesize data on public health problems
- Be familiar with principles of prevention, intervention and evaluation
- Have a working understanding of public health ethics and acquire cultural competence

II. DEGREE REQUIREMENTS

Completion of the PhD in Epidemiology will require: (1) a minimum of 69 quarter credit hours of course work beyond the master's degree as prescribed by the program's curriculum; (2) a

minimum cumulative grade point average of 3.3; (3) passing the doctoral comprehensive examination; (4) passing the candidacy oral examination; (5) completing a dissertation of publishable quality; and (6) passing the final defense. A student in the PhD degree program shall have five calendar years from the date of initial registration to complete and successfully defend a dissertation. Exceptions may be made for extenuating circumstances and students can petition for additional time if needed, though it is not guaranteed.

A. Course Work

Students in the Epidemiology PhD Program will be required to complete at least 69 quarter credits to satisfy degree requirements.

All entering students are expected to have already completed introductory level epidemiology and biostatistics courses (equivalents of PBHL 520, 530) as part of their Master's program or must enroll in these courses, or their equivalents, as *additional* requirements.

All students must complete the School's three doctoral core requirements, eight Departmental Required PhD Courses, two Epidemiology area selectives, two Biostatistics area selectives, and three electives. Students who have previously completed required courses (or their approved equivalents) as part of their Master's program may, with faculty mentor approval, substitute other courses for equivalent credits. Students who have completed equivalents of required courses in other programs may still elect to take required courses for credit as part of the doctoral program. This decision is made in consultation with the student's faculty mentor and is done in consideration of several factors including: time since course completion, grade in course, and current comfort level with material.

In addition, students without adequate biology or clinical training will be required to complete relevant coursework biology, pathobiology, or clinical sciences as additional requirements.

In keeping with University requirements, candidates must have at least one academic year (three consecutive full-time terms) of full time residency.

Additional credits come from elective coursework offered at the School or elsewhere in the University and Thesis Research credits. There are no specific requirements for distribution of these credits as Thesis Research or coursework. There is no limit to the number of special studies/ independent courses/ research credits a PhD student can take. If you have taken a required PhD course at the Masters level or waived out, you have the option to take on research credits once you are post-certified.

B. Plan of Study

Students are expected to be actively involved in planning, implementing and evaluating their program of study. It is strongly recommended that students meet regularly with their faculty mentor to determine their goals and objectives so that their course work, research and dissertation proceed at a reasonable pace. An initial plan of study worksheet is developed by the student with their faculty mentor during the first term of study. This is submitted to the Department. This worksheet can be used by the student to complete the University Plan of Study and Supervising Professor Appointment (form D1) which needs to be approved by the PhD Program Director and filed with the School's Office of Academic Affairs and Drexel University Office of Research and Graduate Studies by the end of the 3rd quarter of study. University Plan of Study forms should be revised when plans change substantively. The Department will monitor courses students register for against the Plan of Study Worksheet.

The Table below lists important forms and due dates throughout the PhD program.

Important Dates/Forms for PhD Program University Forms can be found here: http://www.drexel.edu/graduatecollege/forms-policies/forms		
Form	Title	Due Date
D-1	Plan of Study and Supervising Professor Appointment	End of 3 rd quarter of study.
	Doctoral Comprehensive Exam	End of the 1 st year of study.
D-2	Doctoral Candidacy Exam Form	Due within 48 hours of candidacy determination.
D-2A	Doctoral Candidacy Examination Member Report	Due within 48 hours of exam.
D-3	Dissertation Advisory Committee Appointment	Due within six months of successful completion of the Doctoral Candidacy Exam
D-3A	Dissertation Proposal	Submitted at the same time as the D3.
D-3B	Annual Review of Candidates	Prior to the end of the summer term, for all doctoral candidates.
D-4	Final Oral Defense Committee Appointment and Schedule	Four weeks prior to the final defense.
D-5	Report of PhD Final Oral Defense Committee	Within 48 hours of the oral defense.
	Completion Form	When dissertation is finalized for printing.
	Thesis Approval Form	When dissertation is finalized for printing.
	Survey of Earned Doctorates	Completed after the dissertation defense.
	Drexel Exit Survey	Completed after the dissertation defense.

C. Comprehensive Examination

The Comprehensive Examination will be taken, typically, following completion of the first year of course work. Students must take the following courses before sitting for the comprehensive exam: Intermediate Epidemiology, Advanced Epidemiology, Intermediate Biostatistics I, Intermediate Biostatistics II, Infectious Disease Epidemiology and Applied Survey Research.

The Exam will have three portions given on three successive mornings. The first is a short answer/essay portion focusing on core descriptive epidemiology and epidemiologic research concepts. This portion is closed-book, closed-note. The second portion is critical appraisal of article(s) from the epidemiologic literature. The article(s) is distributed the day prior. This portion

is open-book, open-note. The third component involves analysis of a data set and interpretation of findings. The data set and data dictionary is distributed the day prior. This portion is open-book, open, note. Responsibility for developing and grading the exam lies with a Departmental Comprehensive Examination Committee, comprised of Departmental faculty, which will be assembled under the supervision of the Program Director. Students who fail the comprehensive examination will be permitted to retake that portion (or portions) of the examination that was deficient after a minimum of one term. A second failure will result in termination from the program.

D. Dissertation Proposal

After passing the comprehensive examination, the student works to develop a dissertation proposal. The dissertation proposal will detail an epidemiologic research project of high scientific merit with substantive downstream public health impact. It is developed with the supervising professor but may also involve consultation with other interested faculty.

E. Candidacy Committee

After developing the proposal concept, the student selects a candidacy committee of five members in accordance with University guidelines. One member must be from a SPH Department other than Epidemiology and Biostatistics and one member must be from outside the School. The Candidacy Committee reviews the student's proposal, provides feedback, and determines whether the proposal is sufficiently developed for the student to move on to the Candidacy Examination.

F. Candidacy Exam

The Candidacy Exam is an oral examination conducted by the Candidacy Committee, chaired by the student's supervising professor, assessing the student's general knowledge and research capacity. The exam is therefore not limited to the proposal, but the proposal provides the context for this exam. The exam will begin with a closed presentation by the student about his/her planned research. Following the student's presentation, the committee members will ask questions. Immediately following the examination, the committee will meet privately to evaluate the success or failure of the student by a closed ballot. The closed ballot will be administered prior to the discussion of the candidate's performance. The options for evaluating a student include: (1) Unconditional Pass - all members vote "unconditional pass" on the first ballot; (2) Conditional Pass - further evidence of qualifications is necessary, the nature of the required condition(s) decided by consensus; and (3) Failure - a majority of the committee decides that the student has failed the examination. If the student fails the exam, the committee may recommend a reexamination. If the student is permitted a reexamination, he or she must be reexamined within 6 months. The student will be informed of the committee's decision immediately following the vote, although the form signifying successful completion of the proposal defense will not be submitted until the specified conditions have been met. The results of the examination are reported to the PhD program. After passing the exam, the student becomes a doctoral candidate and the appropriate forms must be submitted.

After the Candidacy Exam is passed, students are considered to have attained doctoral candidate status. The minimum number of credits per term that a student who has reached candidate status and who has already completed their required one-year in residency (i.e., has previously registered for three consecutive terms at least 9 credits/term) must register for is (1) credit for at least 3 terms each academic year until they complete their degree. Students can register for coursework or dissertation research credits. Doctoral candidates need to remain mindful of the total credits needed to complete the program.

G. Thesis Committee

University guidelines require that the committee must consist of at least five members, at least three of whom must be currently tenured, tenure-track, or non-tenure track Research faculty at Drexel. At least two of the committee members must be from outside the student's primary specialization area. In the Department of Epidemiology and Biostatistics we interpret this as allowing Epidemiology faculty whose principal research interest and expertise does not overlap with the student's to be counted as committee members outside the student's primary specialization area. Also, according to University guidelines, at least one of the committee members must be from outside the student's department, preferably from outside the University. Faculty with secondary, adjunct or auxiliary appointments in the Department cannot be counted as outside members. Tenured, tenure-track and non-tenure track Research faculty can all serve as Committee Chairs.

H. Conducting Research and Writing Dissertation.

Students should meet with their supervising professors and thesis committee regularly while conducting their research. Upon completing analyses, the student should use the Drexel University dissertation manual in conjunction with the Department of Epidemiology & Biostatistics Thesis Manual. The Department of Epidemiology & Biostatistics Thesis Manual can be found in Appendix B of this program guide. The Drexel University Thesis Manual can be found here: <https://www.library.drexel.edu/sites/default/files/thesismanual.pdf> The doctoral student and supervising professor are responsible for conforming to the university format requirements to prepare a draft of the dissertation.

I. Reviewing Dissertation.

After the supervising professor has reviewed the dissertation draft, the student will give the draft to the other thesis committee members, discuss the dissertation with them, and incorporate suggestions made. After the final draft of the dissertation is approved by the thesis committee chair, the dissertation will be submitted to thesis committee members. Within 3 weeks, committee members will decide whether the dissertation is ready for a final defense. All thesis committee members must agree that the dissertation meets the scholarly expectation as a noteworthy contribution to knowledge before the final defense can be held.

J. Final Defense.

Oral defense of the dissertation is the final step for the doctoral degree. The student's thesis committee serves as the dissertation defense committee. The thesis committee chair will be the chair of the final defense examination. The final defense will begin with a brief presentation by the student about the research. Following the student's presentation, the thesis committee members will ask questions to assess the student's judgment and scholarship. Immediately following the examination, the committee will meet privately to evaluate the success or failure of the student by a closed ballot. The closed ballot will be administered prior to the discussion of the candidate's performance. The range of decisions following the defense is the same as those for the preliminary oral examination: (1) Unconditional Pass - all members vote "unconditional pass" on the first ballot; (2) Conditional Pass - the required condition(s) decided by consensus; and (3) Failure - a majority of the committee decides that the student has failed the examination. If the student fails the final defense, the committee may recommend a reexamination. If the student is permitted a reexamination, he or she must be reexamined within 6 months. The student will be informed of the committee's decision immediately following the vote. Results of the Committees decision should be forwarded to the Office of Research and Graduate Studies (form D5).

K. Final Draft of Dissertation

The final draft of the dissertation should not be prepared until the student has passed the final defense. It is not unusual for some modifications to the dissertation to be required by the committee as a result of the defense. The chair will be responsible for ensuring that any changes recommended by the committee are carried out. Other committee members may make final approval of the dissertation contingent upon their review and approval of the revisions. The Dissertation Approval Form finalizes the approval of the final dissertation. It requires signatures from the committee, Graduate Advisor, and Department Chair. Other information about final dissertation preparations is available in the Drexel University Thesis Manual found at <https://www.library.drexel.edu/sites/default/files/thesismanual.pdf>

III. CURRICULUM

Courses included in the Epidemiology PhD program curriculum should systematically build the competencies outlined above in section I A. Students must meet program course requirements as outlined in section II B. The table below lays out an example sequence of courses falling over a three-year period. The curriculum includes core courses, as well as 2 epidemiology selectives, 2 biostatistics selectives, and 3 electives. Selectives must be chosen from the list of selective courses, while electives may be any course in the University that is applicable to your doctoral research. *This table should be viewed only as a guideline.* Each student must meet regularly with his/her faculty mentor to implement a plan of study best suiting their needs.

Epidemiology PhD Program – EXAMPLE three-year / 69 credit sequence

Proposed Plan of Study

YEAR	FALL	WINTER	SPRING
1	Intermediate Epidemiology (3 cr) PBHL 630	Advanced Epidemiology (4 cr) PBHL 830	Methodologic Challenges: Adv Epidemiology II (3 cr) PBHL 834
	Intermediate Biostatistics I (3 cr) PBHL 620	Intermediate Biostatistics II (3 cr) PBHL 621	Selective or Elective (3 cr)
	Biostatistical Computing (3 cr) PBHL 623	Applied Survey Research in Epidemiology (3 cr) PBHL 632	Selective or Elective (3 cr)
	Public Health Spotlight Speaker Series Department Seminar and Journal Club Working Groups		

YEAR	FALL	WINTER	SPRING
2	Causal Inference in Epidemiology (3 cr) PBHL 826	Epidemiology Ph.D. Seminar II (3 cr) PBHL 833	Public Health Ethics (3 cr) PBHL 824 or Health and Human Rights (3 cr) 802

	Proposal Writing Seminar (3 cr) PBHL 835	Pathophysiology (3 cr) PBHL 691	Selective or Elective (3 cr)
	Selective or Elective (3 cr)	Selective or Elective (3 cr)	Selective or Elective (3 cr)
	Public Health Spotlight Speaker Series Department Seminar and Journal Club Working Groups		

YEAR	FALL	WINTER	SPRING
3	Thesis Research (1 cr)	Thesis Research (4 cr)	Thesis Research (3 cr)
	Selective or Elective (3 cr)		

School doctoral core courses and Departmental required courses are described briefly below. Summary tables of all Department courses and courses of potential interest as electives are also provided in Appendix A.

A. School doctoral core courses

PBHL 620: INTERMEDIATE BIOSTATISTICS (3 credits)

This course focuses on an overview of the linear modeling methods most commonly used in epidemiological and public health studies. Models include simple/multivariate linear regression, analysis of variance, logistic/conditional logistic regression, Poisson regression and models for survival data. Focus is on implementing models and interpreting results.

PBHL 630: INTERMEDIATE EPIDEMIOLOGY (3 credits)

This course expands on basic methods used in epidemiologic thinking and research – with a focus on observational studies of disease risk factors. Topics covered include: basic principals of causal inference; observational study designs; bias; confounding; effect modification; stratified analysis; and the epidemiologic approach to multivariable modeling. An emphasis is also placed on critically reading the epidemiologic literature.

PBHL 824: PUBLIC HEALTH ETHICS (3 credits)

Course explores emergence, philosophical, historical, political development, relationship to human

rights, and future of Public Health. Emphasis will be placed on developing a mastery of the current literature on the subject and on formulating novel approaches in public health ethics.

OR

PBHL 802: HEALTH AND HUMAN RIGHTS (3 credits)

Health and wellbeing are intricately associated with fundamental human rights. This course will cover direct and indirect links between public health policies, political circumstances, and social and economic conditions and their effects on health of individuals and populations using the human rights framework.

B. Departmental required courses

PBHL 623: BIOSTATISTICS COMPUTING (3 credits)

Provides the students with sufficient data management and computing skills enabling them to manage small to intermediate size public health research projects. Students will learn basic data management and analytic programming in the SAS statistical software.

PBHL 621: INTERMEDIATE BIOSTATISTICS II (3 credits)

The course reinforces and builds upon the concepts in PBHL 620. It adds theoretical background on various linear model assumptions and multivariable model-building strategies. Approaches to model diagnostics (e.g., goodness of fit, residual analysis) are also covered.

PBHL 632: APPLIED SURVEY RESEARCH IN EPIDEMIOLOGY (3 credits)

This course addresses theoretical/practical aspects pertinent to the conduct of survey research in human populations. Topics include sampling, recruitment, and enrollment strategies; selection, definition, and measurement of study variables; instrument development/design; data collection techniques/requirements; data file development/management activities; and issues related to the influence of survey study design/execution on epidemiological effect measures.

PBHL 691: PATHOPHYSIOLOGY BASIS OF EPIDEMIOLOGIC RESEARCH (3 credits)

This course will examine the causes of many human diseases at a molecular level, paying particular attention to the role of inflammation in disease processes and examining the role of cell cycle dysregulation in the etiology of many human cancers. In order to understand the pathologic basis for disease, the course will also cover the normal structure and function of many body systems, that when compromised lead to diseases of public health importance.

PBHL 826: CAUSAL INFERENCE IN EPIDEMIOLOGY (3 credits)

Provides an in-depth theoretical foundation on epistemology and models of disease causation in epidemiology. Students will be expected to answer the question how can we know that A causes B from diverse perspectives ranging from theoretical models, statistical conventions around identifying causation, and mitigating bias.

PBHL 830: ADVANCED EPIDEMIOLOGY (4 credits)

This course covers more advanced methodologic issues in analytic epidemiology including: in-

depth discussions of cohort, case-control, and case-cohort studies, missing data and methods of single/multiple imputation, theoretical basis of and analytic methods for using intermediate endpoints/surrogate markers, repeated measures analysis, the use of DAGS, and propensity scores to mitigate confounding.

PBHL 833: EPIDEMIOLOGY SEMINAR (3 credits)

Covers issues related to epidemiology teaching and curriculum development, grant writing and grantsmanship, epidemiology and the courts, and the management of epidemiologic research projects, also will include discussions of major emerging issues of significance to the discipline of epidemiology. This course is offered in fall, winter, and spring terms. Epidemiology doctoral students are required to take the course in all three terms for one year (usually the second program year). Doctoral students can register for the seminar in additional terms with advisor and instructor permission.

PBHL 834: ADVANCED EPIDEMIOLOGY II: METHODOLOGIC CHALLENGES (3)

This course is designed to provide a theoretical foundation and the practical tools necessary for addressing challenges to causal inference in epidemiological research. Upon successful completion of this course, students will be able to 1) Understand causal inference problems through the framework of potential outcomes and assignment mechanisms; 2) Identify challenges to causal inference, including missing data, measurement error, confounding, and selection bias; 3) Address identified challenges using analytical methods, such as multiple imputation, regression calibration, propensity score adjustment, and marginal structural models; 4) Assess sensitivity of inferences to complex methodological problems, such as those listed above.

PBHL 835: PROPOSAL WRITING SEMINAR

This course is designed to provide students with an understanding of the methodologic and logistic problems involved in designing and conducting epidemiologic studies. The course also offers students opportunities to critically evaluate the adequacy and scientific merit of research protocols. The seminars consist of student presentations of plans for collection and analysis of epidemiological data, with discussion by students and faculty. Students will prepare a research protocol for study in a human population using the SF424 (R&R) form developed by The National Institutes of Health. The emphasis is on conceptual issues necessary for the development of a feasible and informative epidemiological study.

C. Departmental Selective and other potential electives

Epidemiology Area Selectives (Choose 2)

PBHL 636: INFECTIOUS DISEASE EPIDEMIOLOGY (3 credits)

This course introduces epidemiologic methods specific to infectious disease epidemiology within the context of the study of several major classes of infectious diseases with global impact on public health. Students will learn about techniques in outbreak investigations as well as surveillance and disease reporting. They will learn how biological characteristics of infectious diseases such as transmission and immunity alter the more familiar approaches to descriptive and analytic epidemiology developed in the chronic disease setting.

PBHL 635: SOCIAL AND PSYCHIATRIC EPIDEMIOLOGY (3 credits)

The course addresses the content and methods of social epidemiology and the clinical, methodological, and epidemiologic aspects of psychiatric illness. Students are required to explore theoretical and empirical aspects of disease etiology and disease course that extends beyond a biomedical model.

PBHL 638: PERINATAL EPIDEMIOLOGY (3 credits)

Introduces topical issues and methodological approaches to studying maternal and child health outcomes during the perinatal period. The focus is on study designs and data sources most relevant to perinatal epidemiology and examples of epidemiologic research on common perinatal health issues. Current research areas in perinatal epidemiology and future directions for research are also presented.

PBHL 639: CARDIOVASCULAR DISEASE EPIDEMIOLOGY (3 credits)

This course provides a forum for in-depth discussions of one of the main public health issues. Topics include the pathophysiology of atherosclerosis and cardiovascular disease (CVD), trends in coronary heart disease, stroke, hypertension and heart failure mortality/morbidity, well-established and emerging CVD risk factors, and major strategies for CVD prevention/control.

PBHL 656: PHARMACOEPIDEMIOLOGY (3 credits)

The aim of the course is to equip students with a basic understanding of the concepts and practice of pharmacoepidemiology. By the end of the course, students should be able to: Demonstrate an understanding of the important pharmacoepidemiological concepts and methods, and how these methods can be applied to specific drug utilization in real-life settings in specific populations. Define disease burden in terms of prevalence, incidence and potential complications associated with the use of specific medications. Examine patients' characteristics and drug utilization, and address health disparities in medications associated health outcomes. Examine patients with multiple-comorbidity, multiple drug uses and drug-disease effects on health outcomes.

PBHL 645 EXPOSURE ASSESSMENT (3 credit hours)

Often described as the 'Achilles heel' of public health research, exposure assessment is a topic that is often taken for granted; many researchers take exposure information at face value and assume it to be true. This is rarely the case. This course will provide an overview of exposure assessment methods, loosely following a chronological ordering of methods used over time. We will discuss where each technique is most appropriate and the their limitations.

Epidemiology Area Electives

PBHL 633: CANCER EPIDEMIOLOGY (3 credits)

This course will provide students with training in the methods and topics specific to the epidemiology of cancer. Students will learn about cancer surveillance, etiologic studies, therapy trials, and prevention/screening studies of cancer.

PBHL 634: EPIDEMIOLOGY FOR PUBLIC HEALTH PRACTICE (3 credits)

This course is designed to enable the student to understand epidemiology as a health discipline and how epidemiology provides information for infectious/non-infectious disease prevention and

control. Topics cover public health surveillance, outcomes research, health services research, principles of cancer registration, and a variety of practice-related exercises.

PBHL 532: AUTISM AS A PUBLIC HEALTH CHALLENGE

The primary objectives of this course are for students to: learn how to apply public health concepts to an important societal challenge that is quite distinct from issues more commonly thought of as public health problems (for example= infectious diseases, chronic diseases, and injuries). Students will be introduced to autism spectrum disorders from the perspectives of a variety of academic disciplines and community perspectives and will gain skill and experience distill and communicating information relevant to explaining public health challenges and solutions.

Biostatistics Area Selectives (Choose 2)

PBHL 686: ADVANCED STATISTICAL COMPUTING

This course expands on computational methods used in biostatistics. It covers numerical techniques, programming, and simulations and will connect these two fundamental concepts in probability and statistics. The course will use the statistical software, R, to apply these concepts and enable the practical application of biostatistical models to real-world problems.

PBHL 698: LINEAR STATISTICAL MODELS

The objective of this course is to introduce students to linear regression models (computation, theoretical properties, model interpretation and application). Topics include: 1) Review of basic concepts of matrix algebra that are particularly useful in linear regression, and basic R programing features; 2) (weighted) least square estimation, inference and testing; 3) regression diagnostics, outlier influence; 4) variable selection and robust regression.

PBHL 697: GENERALIZED LINEAR MODELS

The objective of this course is to introduce students to generalized linear regression models (theoretical properties, model interpretation and application). Topics include: 1) Review of categorical data and related sampling distributions; 2) Two/Three-way contingency tables; 3) logistic regression and poisson regression ;4) loglinear models for contingency tables ; 5) generalized linear mixed models for categorical responses.

PBHL 625: LONGITUDINAL DATA ANALYSIS (3 credits)

Covers statistical methods and software commonly used to analyze longitudinal or repeated measurements data that are often encountered in public health and biomedical studies.

PBHL 628: SURVIVAL ANALYSIS (3 credits)

This course covers the basic techniques of survival analysis. These approaches are useful in analyzing cohort data, which are common in health studies, when the main interest outcome is the onset of event and time to event is known.

Biostatistics Area Electives

PBHL 622: STATISTICAL INFERENCE I (3 credits)

This course introduces probability and biostatistics theory. Topics include the basic concepts of

probability including Bayes theorem; probability distributions of both discrete and continuous types of variables along with their properties; and the underlying theoretical foundation of the statistical inference including parameter estimation, hypothesis testing, hierarchical models and Bayesian inference.

PBHL 684: STATISTICAL INFERENCE II (4 credits)

This course is a continuation of Biostatistics Theory I focusing on concepts and methods of statistical inference. Topics include point/interval estimation, methods of moments, maximum likelihood estimation, Bayes estimates, hypothesis testing, Neyman-Pearson lemma, likelihood ratio tests and large sample approximation, and Bayesian analysis.

PBHL 629: DESIGN AND ANALYSIS OF CLINICAL TRIALS (3 credits)

The purpose of this course is to cover the design and conduct of clinical trials. The course will also cover how to evaluate the scientific rigor of studies of clinical trials published in the scientific literature. Topics which will include power and sample size, study design, randomization methods, recruitment, missing data, ethical issues and statistical analysis methods.

PBHL 631: APPLIED MULTIVARIATE ANALYSIS

This course introduces students to statistical methods for describing and analyzing multivariate data. Topics include basic matrix algebra; multivariate normal distribution; linear models with multivariate response; multivariate analysis of variance; profile analysis; dimension reduction techniques, including principal component analysis, factor analysis, canonical correlation, multidimensional scaling; discriminate/cluster analysis; and classification/regression trees.

PBHL 683: ADVANCED CLINICAL TRIALS & EXPER. DESIGN

Course prepares students to design & conduct clinical trials and other health related experiments. It will cover the development of a study protocol for a clinical trial, selection of the study population, sample size, and treatment assignment methods. Advanced experimental designs will also be covered.

DORNSIFE SCHOOL OF PUBLIC HEALTH ELECTIVES

PBHL 540 BEHAVIORAL ASSESSMENT (4 credit hours)

Introduces principles of health behavior in context of human life-cycle and covers their application to prevention and health promotion programs in a community context.

PBHL 550 COMMUNITY ASSESSMENT (4 credit hours)

Examines concepts and theories regarding planned change, including models of community organization for health promotion. Presents critical appraisal of community-wide health communication campaigns. Offers a four-week practicum enabling students to develop community-health assessment skills in a community setting.

PBHL 611 RACE, ETHNICITY AND HEALTH (3 credit hours)

This course explores racial and ethnic disparities in health status and access to healthcare, and examines intervention approaches to eliminate them.

PBHL 640 ENVIRONMENTAL HEALTH (4 credit hours)

Introduces concepts, theories, and programmatic application within the field of environmental

health.

PBHL 641 ENVIRONMENTAL HAZARD ASSESSMENT (3 credit hours)

This course provides students with a general understanding of the recognition and evaluation of chemical, physical and biological hazards. Particular emphasis is placed on airborne hazard evaluation theory and methods. Students become familiar with commonly used industrial hygiene equipment through participation in laboratory and field exercise.

PBHL 643 OCCUPATIONAL TOXICOLOGY (3 credit hours)

This course provides students with a basic understanding of the recognition and evaluation of chemical, physical and biological hazards in the environment and workplace. The course addresses fundamentals of toxicology, legal implications of exposure and prevention strategies.

PBHL 649 OCCUPATIONAL AND ENVIRONMENTAL CANCERS (3 credit hours)

This course covers topics in causes of cancer, the prevention of cancer, and public policy regarding cancer.

PBHL 650 POLICY AND ADVOCACY (4 credit hours)

Introduces the fundamentals of public-health law and the concepts and theories of health-policy development, adoption, and evaluation. Introduces the advocacy process and its importance to development of sound public health policy. Emphasizes systemic integration and the integration of the assessment, assurance, and policy development roles of public health.

PBHL 660 OCCUPATIONAL HEALTH (4 credit hours)

Introduces concepts, theories, and programmatic applications within the field of occupational health.

PBHL 661 OCCUPATIONAL AND ENVIRONMENTAL DISEASES (3 credit hours)

It covers topics related to lung diseases caused by occupational and or environmental exposures.

PBHL 804 RESEARCH METHODS FOR COMMUNITY HEALTH AND PREVENTION (3 credits)

Public health leaders must understand and use diverse research methods to make significant contributions to community health and prevention. This course integrates foundations of research methodology with use of appropriate statistical procedures to prepare students to apply rigorous scientific methods to understand and solve major public health problems.

PBHL 805 QUALITATIVE RESEARCH IN COMMUNITY HEALTH (3 credit hours)

Students will study and use a variety of qualitative methods suited for public health practice and research. Methods include case study analysis, individual interviews, focus groups, ethnography, and observation.

PBHL 825 MEASURING HEALTH (3 credit hours)

Course for students using health measurement scales, and constructing measures of health for evaluation, research, population monitoring, or policy purposes. Methods will be explored for measuring health in individuals and populations. Reviews fundamental theories of measurement including classical test theory, item response theory, and qualitative and quantitative approaches.

UNIVERSITY ELECTIVES

BIO 526 IMMUNOLOGY (3 credit hours)

Covers the fundamental concepts of innate and adaptive immunity, including the molecular and

cellular mechanisms that generate responses to a broad spectrum of infectious threats, self/non-self recognition, immune regulation.

BIO 631 BIOINFORMATICS I (3 credit hours)

Covers concepts, theories and applications of bioinformatics. Designed to familiarized students with the computational tools used to analyze the large datasets generated by high throughput/content biotechnology. Includes algorithms to analyze nucleic acid and protein sequences, molecular structures, phylogenetic trees, and systems biology data.

BIO 644 HUMAN GENETICS (3 credit hours)

Covers the fundamentals and principles of genetics with an emphasis on their relevance to human genetics and disease. Topics include human genetic disorders, pedigree analysis and genetic testing, cytogenetics, epigenetics of cancer, gene therapy, stem cell research and human genomics and biotechnology.

BIO 650 VIROLOGY (3 credit hours)

Discusses major viral groups, including biochemistry and molecular genetics of viral replication, structure, gene expression, latency, and role in disease.

BIO 675 ADVANCED IMMUNOLOGY (3 credit hours)

Covers current concepts of humoral and cell-mediated immunity, with emphasis on interrelationships of components of the immune system and molecular mechanisms.

BMES 604 PHARMACOLOGY (3 credit hours)

Covers the interaction between chemical agents and biological systems at all levels of integration. Discusses general classes of drugs, with particular emphasis on general concepts and problems of medical importance.

ENVE 480 ENVIRONMENTAL GIS (3 credit hours)

Special topics offered in environmental science. Topics include recent multidisciplinary areas of environmental concern.

ENVS 516 SANITARY MICROBIOLOGY (3 credit hours)

Covers microscopic life forms of sanitary significance, with emphasis on bacteria, viruses, algae, fungi, and protozoa. Includes a thorough coverage of water and wastewater microbiology, especially transmission of waterborne diseases, bacterial indicators of pollution, and the microbiology of wastewater treatment.

ENVS 636 TOXICOLOGY I (3 credit hours)

This course reviews general human physiology and the acute and chronic effects of toxicants on physiological mechanisms. Basic principles of dose-response relationships, target organ toxicity, and exposure characterization are incorporated. Students are expected to have had an introductory course in human physiology.

ENVS 637 PRINCIPLES OF TOXICOLOGY II (3 credit hours)

This course expands upon knowledge gained in Principles of Toxicology I by focusing on the absorption, distribution, biotransformation and excretion of toxic substances. Current advances in the study of carcinogenesis and mutagenesis are also discussed, as well as toxicological research methods, animal and plant toxins, food toxicology, and pesticides.

FDSC 550 FOOD MICROBIOLOGY (3 credit hours)

Discusses factors affecting microbial growth in foods. Also covers methods of enumeration of food-borne organisms, microbial spoilage of foods, foods and ingredients from fermentation, food-borne pathogens and their control, and sanitation and HACCP in food processing.

MIIM 508S IMMUNOLOGY I (4.5 credit hours)

This is a graduate level introductory course that will cover basic principles of immunology. The format is a lecture series with student participation.

MIIM 512S MOLECULAR PATHOGENESIS I (4.5 credit hours)

This course is designed to convey to graduate students basic concepts concerning the molecular mechanisms of disease caused by pathogenic microorganisms. The course will utilize information derived from in vitro tissue culture and in vivo animal model systems as well as studies performed in humans to enhance students understanding of diseases caused by bacteria, fungi, parasites and viruses. The immune response and other host defense mechanisms will also be examined as an integral part of this course. The course is designed to compliment the first year graduate core curriculum and will strive to develop analytical thought processes. The student will learn to identify gaps in knowledge, formulate important and experimentally approachable questions, and develop sound hypotheses to direct the generation of new scientific discoveries. The development of sound specific aims and experimental design will also be emphasized.

MIIM 607 Immunology II (4.5 credit hours)

This is an advanced course in immunology covering various aspects of contemporary cellular and molecular biology. It consists of some didactic sessions followed by reading and discussion of current literature. The prerequisites for this course are a graduate level course in immunology and permission of the instructor.

NEUR 534 NEUROSCIENCE (3 credit hours)

This course describes: structure and functions of the human central nervous system; neurons; basic topography of the spinal cord and brain; major sensory and motor pathways; higher cortical functions. Neurological deficits resulting from stroke, brain trauma and other neuropathological processes; as well as implications for rehabilitation and psychotherapy are presented.

STAT 602 DECISION SCIENCE I (3 credit hours)

Concentrates on the application of quantitative decision-making models to significant problem situations in business and government. Emphasizes statistical inference techniques, including hypothesis testing, simple and multiple linear regression and correlation, analysis of variance models, non-parametric methods, and computer applications.

STAT 628 Regression & Correlation Analysis (3 credit hours)

Covers techniques of simple and multiple linear regression models, including residual analysis, assumption violations, variable selection techniques, correlated independent variables, qualitative input and output variables, ridge regression, polynomial and non-linear regression, regression with time-series data, forecasting, and normal correlation models.

IV. ACADEMIC POLICIES

A. Academic Advising and Course Registration

In order to ensure timely and correct completion of the curriculum, students should consult regularly with their academic faculty mentor. Graduate advisors serve to provide career advice, are well-connected with public health resources locally, nationally, and internationally, and are

excellent sounding boards for advice on educational and professional matters. Entering students will be assigned a faculty mentor and will be notified of their mentor prior to the start of classes. The faculty mentor will usually remain with the student and serve as the student's supervising professor for their dissertation work. However, students are permitted to change mentors. Request for a mentor change should be made to the PhD Program Director. If a change approved by the PhD Program Director is made after a supervising professor form has been filed with the University, a new form must be submitted.

In their first term, students in the PhD in Epidemiology program will be registered by the Department. All students will be encouraged to communicate with their faculty mentor prior to the start of classes. If an alternate course plan for the first term is devised and approved by the faculty mentor, Mary Genevieve Carty (mgc24@drexel.edu) should be notified at least two weeks prior to the start of classes.

Once a Plan of Study Worksheet is filed with the Department students can register for courses themselves through the DrexelOne portal <https://one.drexel.edu/cp/home/displaylogin>. Course offerings can be found at <http://www.drexel.edu/src/resources/current/default.html>. If you have any questions on how to self-register, contact Mary Genevieve Carty for assistance.

B. Letter Grade Definitions, Point Equivalency, and Credit

General Grading Policies and Expectations

There is an expectation of a steady increase in each student's level of performance throughout the program, with a concomitant expectation of steadily increasing ability to integrate and apply the critical elements from all preceding classes. Students are graded on their performance in all aspects of the curriculum.

- a. Students are expected to comply with the School's Attendance Policy.
- b. It is expected that all assignments are submitted on time. Failure to do so may result in a lower grade.
- c. If a student receives a grade below C in any class, they must retake that course. The course remains on their transcript and is averaged in with all other courses.

A: The student has exceeded the required standards and expectations of academic performance. A letter grade of "A" carries four (4.0) grade points. Performance at the "A" letter grade level is indicative of exemplary achievement of course objectives. A designation of **A+** can be given at the instructor's discretion to acknowledge students of highest distinction – however the A+ grade still carries four (4.0) grade points.

A-: The student has met the required standards and expectations of academic performance slightly below the exceptional level. A letter grade of "A-" carries 3.7 grade points. Feedback to students – both written and verbal – should define the specific areas where improvement is needed.

B+: The student has met the required standards and expectations of academic performance slightly above the satisfactory level. A letter grade of "B+" carries 3.3 grade points. Feedback to students – both written and verbal – should define the specific areas where improvement is needed.

B: The student has met the required standards and expectations of academic performance at a

satisfactory level. Performance at this level is indicative of good academic work with command of factual knowledge. The student's critical analysis and synthesis skills are appropriate but not exceptional. A letter grade of B carries three (3.0) grade points.

B-: The student has met the required standards and expectations of academic performance slightly below the satisfactory level. A letter grade of "B-" carries 2.7 grade points. Feedback to students – both written and verbal – should define the specific areas where improvement is needed.

C+: The student has met the required standards and expectations of academic performance slightly above the marginally acceptable level. A letter grade of "C+" carries 2.3 grade points. Feedback to students – both written and verbal – should define the specific areas where improvement is needed.

C: The student has met the required standards and expectations of academic performance at the marginally acceptable level. The academic work performed at this level is lacking in substance and/or form, and is of marginal quality. If a student receives a grade below C in any class, they must retake that course. The course remains on their transcript and is averaged in with all other courses.

F: The student has failed to meet the required performance standards and expectations of academic performance. A letter grade of "F" carries zero (0) grade points. Feedback to students – both written and verbal – should define the specific areas where improvement is needed.

C. Course Evaluations

Course evaluations are sent to students toward the end of every semester/quarter through AEFIS and can be accessed through the "AEFIS" hyperlink in Drexel One. It is important that students complete these evaluations so that faculty and administrators in the Dornsife School of Public Health can have a better understanding of students' educational experiences. These evaluations take about 10-15 minutes to complete and the process is completely anonymous. The course evaluations are a critical component to Dornsife's program evaluation process and the overall quality improvement of the courses. Student feedback is essential, if we wish to understand the strengths and address the limitations of the content and instruction of our Public Health courses.

D. Adding/Dropping/Withdrawing

Adding a course:

During the pre-enrollment period through the end of the second week of classes for the term, all students, with the exception of 1st term freshmen, may add courses that are free from restrictions/permissions, by using BANNER Web for Students. Instructor or academic unit approval is conditional on class size limitations. Regardless of when a student adds a course, the student is responsible for meeting all course requirements as mandated by the specific course syllabus.

Dropping a course:

For both graduate and undergraduate students, courses may only be dropped during the "drop period" lasting from the beginning of the enrollment period through the end of the second week of the quarter. Dropping a course results in the course being removed from the student's academic record without a "W" appearing on the transcript—specifically, neither the course nor the grade of "W" appears on the student's transcript.

Withdrawing from a course:

Graduate students may withdraw from a course during the “withdrawal period” lasting from the beginning of the third week through the end of the seventh week of the quarter. Withdrawing from a course causes both the name of the course and the grade of “W” to appear on the student’s transcript.

Before withdrawing from a course, students should consult with the instructor. All students must obtain their faculty mentor’s written authorization before withdrawing from courses. Written authorization is obtained once the instructor has signed the “Add/Drop/Withdrawal” form available here: <http://drexel.edu/drexelcentral/courses/adjustments/course-withdraw/>

E. Incompletes

At the sole discretion of the instructor a grade of Incomplete (INC) may be assigned to a course where, 1) the instructor judges the student to have a legitimate reason to request the Incomplete grade, 2) the student has successfully completed more than 70% of course work at the time of request, and 3) the student has the ability to pass the course upon successful completion of the course requirements. The student and instructor must complete a formal agreement stipulating all work to be completed and the deadline for such completion. A term grade of “F” will be assigned if contractually assigned work is not completed by the agreed upon deadline. A student with two or more incomplete grades will not be allowed to register for additional courses without permission from the Associate Dean for Academic and Faculty Affairs.

F. Academic Calendar

Students can find current and upcoming University academic calendars at:
<http://drexel.edu/provost/calendars/academic-calendars>

G. Academic Integrity

As detailed in the Drexel University Student Handbook, plagiarism, cheating, forgery or other forms of academic misconduct are not tolerated at this institution and if allegations of misconduct related to academic integrity are upheld, a student may be expelled from the school. It is the responsibility of each student to ensure that his/her study and participation in the academic process is so conducted that there can be no question concerning his/her integrity. All assignments, unless clearly designated group projects, are expected to be the work of the individual student. Any use of ideas, data or wording of another person must include explicit acknowledgement of the source. Failure to give such credit is plagiarism. Any alteration/fabrication of data or inaccurate reporting of actual participation in an assignment are examples of academic misconduct. Any violations of the above will be dealt with utilizing the procedures outlined in the University Student Handbook which is available online at http://drexel.edu/studentlife/community_standards/studentHandbook

Turnitin: Some courses may use Turnitin to submit written assignments. Faculty can also use Turnitin at their discretion to evaluate any student writing submitted, including dissertation proposals and dissertations.

H. Leave of Absence

Doctoral students who find it necessary to take a leave of absence from the University should seek advice from their departmental graduate advisors or supervising professor. On recommendation of the student's advisor, the PhD program director, and the Associate Dean for Academic and Faculty Affairs, a student may take a leave of absence for up to a maximum of two years consecutively or separately for reasons of military service, family care, serious illness or another reason deemed adequate for interrupting graduate studies. The doctoral student must submit a request in writing with the approval of their departmental Graduate Advisor and Supervising Professor to the Graduate College. The Dean of the Graduate College will give the final approval. Leaves of absence do not stop the time-to-degree requirement unless they are taken for service in the military, maternity, enrollment in an approved professional degree or other special circumstances.

I. Maintenance of Matriculation

All matriculated Dornsife School of Public Health students are required to be registered each quarter in order to continue to be degree candidates, unless they have requested and have received permission for a formal leave of absence. Informal leave of absence arrangements are not acceptable and will not be honored retroactively.

Matriculated students who fail to obtain a leave of absence or register for a semester will be subject to termination of their matriculated status and may be administratively withdrawn and dropped from the rolls of the Dornsife School of Public Health. Reinstatement to matriculated status for students who are administratively withdrawn will require petition to, and action by, the Admissions Committee. Such students will be treated as new applicants requesting admission with advanced standing. They will be required to file a new application and pay the application fee again.

J. Grievance Policies and Procedures

The Dornsife School of Public Health encourages open student-faculty communication and discussion to affect a satisfactory solution to problems relating to academic matters. Academic issues should be discussed with the faculty member, Program Director and/or Department Chair. If the issue is not solved at these levels, the student may seek help or advice informally by contacting the Associate Dean for Academic and Faculty Affairs of the Dornsife School of Public Health. The student may speak to the Associate Dean for Academic and Faculty Affairs confidentially and informally, without filing a complaint. If no complaint is filed, no record will be kept. Further consideration may be pursued through the Drexel University Academic Appeals Process as outlined in the Drexel University Handbook.

To submit a formal complaint, the student must address a letter to the Associate Dean for Academic and Faculty Affairs and the Dean, stating the specific complaint. The Dean will review the complaint, gather supporting material and render a decision within 10 days from receipt of the letter.

K. Voluntary withdrawal from the program

Students who wish to withdraw from the program should do so in consultation with their faculty mentor, Graduate Advisor, the Program Director and the Associate Dean for Academic and Faculty Affairs. Students must then submit a letter of intent to withdraw to the Associate Dean for Academic and Faculty Affairs and complete an exit interview with the same.

L. Probation/Dismissal

A student may be placed on probation if their term GPA is below 3.3 or if the comprehensive exam, candidacy exam, or dissertation is not satisfactorily completed. Remediation is based on criteria developed by the faculty mentor, graduate advisor and PhD Program Director.

A student may be dismissed from the PhD program if they do not pass their comprehensive examination as discussed in Section II C. Students not completing all requirements within seven years, as discussed below in Section IV M, may also be dismissed. Students may also be dismissed due to academic misconduct.

Students placed on probation may be dismissed if conditions for remediation are not met to the satisfaction of the faculty mentor, graduate advisor and PhD Program Director.

Students whose cumulative GPA is below 3.3 cannot graduate from the program.

M. Time Limits

A student has a total of seven years from initial enrollment to completion of dissertation to satisfy requirements for the PhD degree. Exceptions may be made in the case of an approved, extended leave of absence.

V. GRADUATION

Graduation Requirements

The following conditions must be met in order for a student to receive a degree:

- An Application for Degree must be filed no later than deadlines specified.
- A Completion Form
(Which can be found here: <http://www.drexel.edu/graduatecollege/forms-policies/forms>) must be filed with the Graduate College before the first day of final exam week for the term a student plans to graduate.
- Specific course requirements must be completed for the program or major in which the student is enrolled.
- A grade point average of 3.3 or higher must be achieved for all coursework undertaken in the PhD program at Drexel University.
- A student must be matriculated in his or her school or college (*registered for at least 1 credit*) during the term in which he or she completes the requirements.
- All grades for required courses must be submitted. No student will be approved for a degree while an unreported grade for a required course remains on his or her record.
- A doctoral student must receive final approval for graduation from the Graduate College.
- Students must satisfy all financial obligations to the University.
- If for any reason a student does not meet all requirements for graduation two days before commencement, he or she cannot graduate until the term in which all requirements are met.

- If a student completes all requirements for graduation in any term other than the spring term, the degree will be awarded in the term in which the requirements are met. All financial obligations to the University must be met before the student receives his or her diploma.

VI. FELLOWSHIPS, SCHOLARSHIPS, AND FINANCIAL ASSISTANCE

A. Department Scholarships

At the discretion of the Department, full or partial tuition scholarships and stipends can be made available to highly qualified applicants.

B. Research Fellowship Scholarships

The Department may also have Research Fellowship Scholarships available that are associated with extramurally funded research projects. These cover all tuition and fees as well as provide a stipend. Students offered these opportunities commit to working on a specific research project and typically will work to develop their dissertation on a topic closely related to the funded research project. The number of Research Assistantship Scholarships available each year depends on department research funding.

Full time Research Fellows are eligible for health insurance through the university.

C. University Teaching Fellowships

University TF positions may also be available for 2nd year (or higher) students and, occasionally, highly-qualified first-year students. These positions provide a stipend and cover full tuition and fees. As a University TF, students will be asked to assist faculty members with grading homework assignments and exams, holding office hours for students, or teaching/facilitating courses. University TFs will work as TFs in at least one course per term.

Full time Teaching Fellowships are eligible for health insurance through the university.

D. Other TA Opportunities

Students who are not University TFs may also be given opportunities to work as Teaching Assistants on a course-by-course basis (for hourly compensation).

E. Other Financial Assistance

The Financial Aid office can also assist students in finding the resources necessary to attend Drexel University. The Financial Aid office assists students in seeking and applying for grants, scholarships and loans to help meet their educational costs.

Drexel University awards financial aid funds to students through numerous loan, scholarship, and grant programs, including Federal Work-Study. Funds are awarded to students based on financial need with the neediest students funded first. Some scholarship funds are available for students based on financial need and academic merit.

All students must complete the Free Application for Federal Student Aid (FAFSA) in order to be considered for financial aid. The electronic version of this form, as well as additional Drexel University financial aid information can be found here: <http://drexel.edu/drexelcentral> Students wishing to be considered for financial assistance may also be required to complete an institutional financial aid application, and provide copies of the students', and in some cases, parents' prior year's federal income tax return.

F. Other Awards/Opportunities

Department Travel Subsidy Awards

The Department of Epidemiology and Biostatistics will offer a limited number of travel subsidies annually (the amount available per year may vary) to full-time Departmental students (2nd year MPH Epidemiology & Biostatistics concentrators; MS students; PhD students) to encourage student participation in academic meetings and conferences. Subsidies will be awarded to masters or doctoral students presenting at a gathering of a professional society. No single students can receive more than one grant per fiscal year (July to June).

To apply, students should complete the travel subsidy application and submit the application to Mary Carty (mgc24@drexel.edu), along with all supporting materials: detailed budget, student statement, faculty mentor statement, and proof of presentation acceptance. The application must be submitted at least a full month before the date of the meeting. The application can be found here:

<http://drexel.edu/dornsife/academics/departments/epidemiology-biostatistics/scientific-travel-meeting-subsidy>

The student will be reimbursed only upon submission of appropriate receipts, which must conform to University policy on allowable travel reimbursements.

Applications will be reviewed within two weeks. The decision to award support and the amount of support awarded will be based on:

- Whether or not students are presenting work
- Extent to which presentation is tied to student's thesis, final data analysis project or CBMP
- Extent to which the meeting is directly related to the student's principal interest area and the meetings value for professional networking
- Type of participation and visibility in the conference, for example
 - o Quality/likely impact of the presentation
 - o Size/quality of the meeting (local vs. national, for example)
- Strength of support in faculty mentor statement
- Departmental funds available
- Lack of availability of alternate sources of travel support.

International Travel Award (ITA) for Graduate Students:

The ITA provides assistance to graduate students up to \$750 per academic year toward participation in an international conference outside the United States within the participant's professional field. Additional information can be found at the Office of International Programs website: <http://drexel.edu/oip/research-funding/international-travel-awards>

Travel Subsidy Program:

The Graduate College offers a limited number of travel awards up to \$200 plus registration

annually to full-time masters or doctoral students presenting at a meeting or conference. Additional information can be found at: <http://www.drexel.edu/graduatecollege/research-funding/travelsubsidy>

The Dornsife School of Public Health and the University may, at any time, change any provisions, curricular requirements, bylaws, rules, regulations and policies and procedures as may be necessary in the interest of the University, the Dornsife School of Public Health and its students.

Appendix A
Tables of Department Courses
and
Potential Non-Departmental Electives

The table below lists all Departmental courses by term offered and provides scheduling and instructor contact information.

DEPARTMENT REQUIRED COURSES & ELECTIVES

Fall Quarter AY 2016-17		
Course	Title	Instructor
PBHL 620	Intermediate Biostatistics I	Robinson
PBHL 622	Statistical Inference 1	Zakeri
PBHL 623	Intro to Statistical Computing	Patel
PBHL 628	Survival Data Analysis	Phillip-Tabb
PBHL 630	Intermediate Epi	Welles
PBHL 631	Applied Multivariate Analysis	Zakeri
PBHL 633	Epi of Cancer	Evans
PBHL 698	Linear Statistical Models	Trivedi
PBHL 835	Proposal Writing Seminar	Lee, B
Winter Quarter AY 2016-17		
Course	Title	Instructor
PBHL 621	Intermediate Biostatistics II	Robinson
PBHL 625	Longitudinal Data Analysis	Berhane
PBHL 632	Applied Survey Research	Michael
PBHL 638	Perinatal Epidemiology	Lee, N
PBHL 639	Cardiovascular Disease Epidemiology	Liu
PBHL 655	Making Sense of Data	Welles
PBHL 656	Pharmacoepidemiology	Liu
PBHL 695	Statistical Consulting	Trivedi
PBHL 696	Nonparametric and Semiparametric Models	Zakeri
PBHL 826	Causal Inference	Le Sherban
PBHL 830	Advanced Epidemiology	Welles & Evans
PBHL	Epi PhD Seminar	Auchincloss

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PBHL 684	Statistical Inference 2	Zakeri
PBHL 691	Pathophysiology Basis of Epidemiologic Research	Sweet
Spring Quarter AY 2016-17		
Course	Title	Instructor
PBHL 623	Intro to Statistical Computing	Patel
PBHL 634	Epi for Public Health Practice	Liu
PBHL 635	Social Epi/ Psych Epi	Mossey
PBHL 636	Infectious Disease Epi	Evans
PBHL 686	Adv Stat Computing	Tabb
PBHL 834	Methodological Challenges	Lee, B
PBHL 629	Design & Analysis of Clinical Trials	McClure
PBHL 697	Generalized Linear Models	Trivedi

Appendix B

**Thesis Format Guide for the
Department of Epidemiology & Biostatistics**

ORGANIZING THE PHD THESIS

The Epidemiology Doctoral Program recommends theses follow a multiple paper format.

Under this format, theses are expected to have the following substantive content components:

1. A comprehensive literature review chapter of publishable quality.
2. **At least** two chapters, of publishable quality, reporting original research (subject matter science or methodological), each organized as a freestanding manuscript. Manuscript formats in the field of epidemiology vary widely. One of the goals of this dissertation format is to build student's research dissemination skills and to promote the timely publication of thesis research. Students, in consultation with their faculty mentor, can consider manuscript lengths and formats most appropriate for their work. However, for the thesis, manuscript chapters should target a 3,000 – 4,000 word length (the target range for original research in the field's leading general-subject journals) and manuscript chapters should follow similar formats (in terms of subheadings etc) even if the ultimate target journals for publication have varying formats. Tables and Figures should be incorporated into the chapters or placed in a subsection at the end of the manuscript. Each manuscript chapter should begin with an abstract no longer than 250 words. It is anticipated that the Background sections of manuscript chapters will replicate some information from the comprehensive literature review chapter and that the discussion of background information in these chapters will not be in as great detail.
3. A final chapter that integrates findings across the manuscript chapters and discusses conclusions and recommendations.
4. Appendices that provide more detailed explanation of methods, copies of data collection instruments, presentation of additional results (including additional tables and figures), and discussion of issues in more depth that can be included in a manuscript-length chapter. These appendices should be referred to parenthetically in the manuscript chapters at points where readers would be interested in obtaining more detail.
5. Note also, if this format is used separate reference lists and sections for Tables and Figures are generated at the back of each chapter. A particular reference may thus be listed in more than one reference section.

A sample table of contents for theses prepared under this format is shown in Appendix X.

Students and faculty mentors wishing to organize their thesis in a traditional chapter format may do so as well.

All other matters of formatting should be done in compliance with the Drexel University Thesis Manual (LINK). The Manual suggests that references should be listed in the order they appear. Reference numbering in the thesis text should be done with superscripts.

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EPIDEMIOLOGY DOCTORAL THESIS**

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