Epidemiology, Ph.D.

COLLEGE OF PUBLIC HEALTH (http://cph.temple.edu)

About the Program

The dynamic and quantitatively oriented doctoral program in Epidemiology provides advanced training in epidemiologic and biologic methods. The program develops strong academic researchers in the field of Epidemiology with a clear understanding of the patterns, causes, and effects of diseases in the population who are well-prepared to design, implement, analyze, and interpret research studies investigating key epidemiologic questions with the ultimate goal of improving overall population health. Working closely with faculty in the department, students gain expertise in collecting data, designing instruments and research protocols, directing and conducting sophisticated and multilevel statistical analyses, interpreting data, and communicating research findings to both lay and professional audiences. All students in the Epidemiology Ph.D. program complete common core public health course requirements, which include foundational courses in Biostatistics, Epidemiology, grantsmanship, and research design. Beyond these core courses, students master specialized courses in advanced epidemiologic and biostatistical methods and engage in research and scholarly productivity with faculty members in the department and throughout the College.

In addition to in-depth, didactic training in epidemiologic and quantitative concepts and methods, the Ph.D. in Epidemiology program aims to foster in students the development of a public health professional identity and values. Professional development exercises are infused in didactic courses and available in other program-sponsored activities (e.g., conference attendance, departmental colloquia and brown-bag presentations, journal clubs, and professional development workshops). Doctoral trainees in Epidemiology are encouraged to take advantage of these professional development opportunities offered at various public health centers and laboratories throughout the College of Public Health and Temple University. Ph.D. in Epidemiology students work closely with faculty mentors throughout the program and particularly during the dissertation phase on formalizing grant-writing skills, teaching in higher education, and writing papers for publications to prepare students as the next generation of academic researchers.

Time Limit for Degree Completion: 7 years

Campus Location: Main

Full-Time/Part-Time Status: Full-time study is preferred.

Interdisciplinary Study: Students are encouraged to develop a program of research that is interdisciplinary in nature, involving coursework and research across departments, schools, and colleges that is quantitative and methodologic in focus. Research in affiliated units is encouraged.

Affiliation(s): A number of centers and laboratories exist within the Department of Epidemiology and Biostatistics, the College of Public Health, and Temple University that are designed to study, develop, and evaluate interventions aimed at resolving significant public health problems (e.g., ethnic and racial disparities in cancer, inadequate disaster preparedness, maternal and child health, obesity, tobacco exposure, and violence). These centers and labs offer opportunities for research placements for doctoral students to assist students in developing research and papers for publication and presentation at conferences; provide professional socialization; help students meet and work with faculty to define dissertation projects using existing funded research studies; and may provide some funding in the form of Research Assistantships.

Specific centers and labs include the Health Behavior Research Clinic, the Maternal and Child Health Wellness Laboratory, the Risk Communication Laboratory, and the Social and Behavioral Health Intervention Laboratory. Faculty and doctoral students also are involved in research with affiliates in the Department of Nursing, Fox Chase Cancer Center, the Fox School of Business and Management, the Institute on Aging, the Institute on Disabilities, the School of Media and Communication, the School of Medicine, and the School of Podiatric Medicine. Additional research opportunities at Temple University include the Institute for Survey Research, the Social Science Data Library, and the Office of Institutional Research and Assessment.

Job Prospects: Graduates of the Ph.D. in Epidemiology program are prepared to become empirical quantitative researchers in academic units, non-profit organizations, government agencies, or the private sector, including pharmaceutical companies or health systems. Graduates are well trained to identify the etiology of major public health issues; conduct and analyze survey, surveillance, longitudinal, case-control, and experimental data using comprehensive and complex statistical techniques; and develop their own methodologically rigorous research studies.

Non-Matriculated Student Policy: Non-matriculated students may take Ph.D. courses only with the permission of the instructor. Further, 8000-level courses are not open to non-matriculated students. Completion of coursework does not ensure admission to the program.

Financing Opportunities: Full-time Ph.D. students generally receive financial support through a combination of fellowships and assistantships. Research Assistants (RAs) perform supervised research activities. Teaching Assistants (TAs) may be assigned to assist in the teaching of courses, including grading examinations and papers or teaching laboratory sections. Some TAs independently teach undergraduate courses. TAs and RAs provide 20 hours of service per week. Both assistantships carry a stipend and typically tuition remission for up to 9 credits per term. Applications for assistantships are available from the Department of Public Health and must be submitted by January 10 for the following Fall term. The RA/TA application requires a statement of previous teaching and/or research experience, areas of interest, and future goals; unofficial copies of transcripts; and a curriculum vitae. The department makes offers of assistantships following admission to the program. Applications should be addressed to:

Levent Dumenci, Ph.D.
Chair, Department of Epidemiology and Biostatistics
Admission Requirements and Deadlines

Application Deadline:

Fall: January 2

All applicants to the Ph.D. in Epidemiology program must apply via the Centralized Application Service for Public Health (SOPHAS). The system can be accessed at https://sophas.liaisoncas.com/.

All application materials must be received by the deadline in order to be reviewed by the Ph.D. Admissions Committee. Admission is competitive, and students are admitted only once a year. Applications are evaluated together after the deadline has passed. Applications that are completed after the deadline are held for review the following year. An important component of the admissions decision is the fit between the applicant's goals, experiences, and interests and the expertise of the faculty in the Ph.D. program.

Letters of Reference:

Number Required: 3

From Whom: Letters of recommendation should be obtained from evaluators who can provide insight into the applicant's academic abilities and talents, as well as comment on the applicant's aptitude for doctoral-level study and research. Recommendations from college/university faculty members are preferred.

Coursework Required for Admission Consideration: Applicants are expected to have completed coursework in Statistics, Research Methods, Epidemiology, and Data Analysis. Courses in Natural, Social, or Behavioral Sciences related to health are desirable.

Master's Degree in Discipline/Related Discipline: Nearly all students admitted to the Ph.D. in Epidemiology program have a master's degree. Although a master's degree specifically in epidemiology is not required, preference is given to applicants who have a background in epidemiology, statistics, and the health sciences, including behavioral medicine, environmental health, medicine, or a public health discipline.

Bachelor's Degree in Discipline/Related Discipline: A baccalaureate degree is required, although it need not be in public health. Preference is given to applicants who have a background in epidemiology, statistics, and the health sciences, including behavioral medicine, environmental health, medicine, or a public health discipline.

Statement of Goals: In no more than 750 words,

- describe important academic and research achievements and interests, and
- specify how your research interests relate to your ultimate career goals in the field of Epidemiology and to ongoing work by faculty members affiliated with the Ph.D. in Epidemiology program.

The match between faculty and student interests is important in the admissions decision. Be sure to articulate clearly the linkages among your training goals, the expertise of our faculty, and the training emphasis of the Ph.D. program. For a description of faculty interests, visit https://cph.temple.edu/epibio/about-us/faculty.

Standardized Test Scores:

GRE: Required. The median score of recently admitted applicants is 153 on the verbal section and 144 on the quantitative section.

TOEFL (international applicants only): 79 iBT or 550 PBT minimum.

Resume: Current resume required.

Writing Sample: Scholarly articles, technical reports, or academic professional papers are preferred in which the applicant is the first author. Unless it is a published work, the writing sample should be no more than 10 pages.

Advanced Standing: A student enrolled in the Ph.D. in Epidemiology program may apply for advanced standing credits for graduate coursework graded “B” or better from an accredited institution. Credits for courses taken as part of a master's degree are considered; credits for thesis work, fieldwork, clinical practice, or directed projects/readings cannot be used for advanced standing credit. To be approved for advanced standing, the courses must be deemed appropriate as part of the student's training in the Ph.D. program. For the maximum number of advanced standing credits awarded, consult the program's Senior Graduate Advisor.

Program Requirements

General Program Requirements:
Number of Credits Required to Earn the Degree: 45

Required Courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td><strong>College Core Course</strong></td>
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<tr>
<td>HRPR 5001</td>
<td>Current and Emerging Issues in Public Health and Health Professions</td>
<td>0</td>
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<tr>
<td><strong>Epidemiology/Biostatistics Core Courses</strong></td>
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<tr>
<td>EPBI 5201</td>
<td>Epidemiological Research Methods I</td>
<td>3</td>
</tr>
<tr>
<td>EPBI 8012</td>
<td>Multivariable Biostatistics</td>
<td>3</td>
</tr>
<tr>
<td>EPBI 8202</td>
<td>Epidemiological Research Methods II</td>
<td>3</td>
</tr>
<tr>
<td>EPBI 8208</td>
<td>Data Management and Analysis</td>
<td>3</td>
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<tr>
<td><strong>Teaching in Higher Education course</strong></td>
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<tr>
<td><strong>Research Methods Courses</strong></td>
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<tr>
<td>EPBI 8011</td>
<td>Social Epidemiology</td>
<td>3</td>
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<tr>
<td>EPBI 8212</td>
<td>Grantsmanship in Health Research</td>
<td>3</td>
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<tr>
<td>EPBI 8302</td>
<td>Behavioral Measurement</td>
<td>3</td>
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<tr>
<td><strong>Pathophysiology of Human Disease course</strong></td>
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<td>3</td>
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<tr>
<td><strong>Epidemiology/Biostatistics Electives</strong></td>
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<td>15</td>
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<td>Choose five from the following:</td>
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<tr>
<td>ENVH 8016</td>
<td>Human Health Risk Analysis</td>
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<td>ENVH 8207</td>
<td>Environmental Epidemiology</td>
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<td>ENVH 8309</td>
<td>Exposure Assessment</td>
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<tr>
<td>EPBI 5003/GUS 5062</td>
<td>Spatial Analysis in Public Health</td>
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<td>EPBI 5204</td>
<td>Mental Health Epidemiology</td>
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<tr>
<td>EPBI 5500</td>
<td>Seminar in Current Issues in Public Health</td>
<td>2</td>
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<tr>
<td>EPBI 8201</td>
<td>Structural Equation Modeling</td>
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<td>EPBI 8203</td>
<td>Public Health Data Reporting</td>
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<tr>
<td>EPBI 8204</td>
<td>Multilev Mod in Int Res</td>
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<tr>
<td>EPBI 8205</td>
<td>Chronic Disease Epidemiology</td>
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<tr>
<td>EPBI 8206</td>
<td>Infectious Disease Epidemiology</td>
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<tr>
<td>EPBI 8209</td>
<td>Epidemiology of HIV/AIDS</td>
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<td>EPBI 9187</td>
<td>Biostat Cnslt Practicum</td>
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<tr>
<td>GUS 5065</td>
<td>Urban Geographical Information Systems</td>
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<td>GUS 5066</td>
<td>Environmental Applications of GIS</td>
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<td>GUS 5067</td>
<td>GIS and Location Analysis</td>
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<td>GUS 5068</td>
<td>Census Analysis with Geographical Information Systems</td>
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<tr>
<td>GUS 5069</td>
<td>GIS for Health Data Analysis</td>
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<tr>
<td>SBS 8018</td>
<td>Obesity: From Genes to Junk Food</td>
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<tr>
<td>STAT 8121</td>
<td>Statistical Computing</td>
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<tr>
<td>STAT 8122</td>
<td>Advanced SAS Programming</td>
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<tr>
<td>STAT 9103</td>
<td>Stat Lng &amp; Data Mining</td>
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<td><strong>Non-Didactic Courses</strong></td>
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<tr>
<td>EPBI 9994</td>
<td>Preliminary Examinations</td>
<td>1</td>
</tr>
<tr>
<td>EPBI 9998</td>
<td>Dissertation Proposal Research</td>
<td>2</td>
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<tr>
<td>EPBI 9999</td>
<td>Dissertation Research</td>
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<tr>
<td><strong>Total Credit Hours</strong></td>
<td></td>
<td><strong>45</strong></td>
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1. This common College Core course is required of all incoming graduate students in the College of Public Health. It is available completely online and designed such that students can complete the modules at their own pace over the course of their degree program.

2. Sample topics for EPBI 5500 include Data Analysis for Computer Packages and Molecular Epidemiology.

3. Students enrolled in EPBI 9998 must take 2 credits each term until the dissertation proposal is approved and filed with the Graduate School.
Students enrolled in EPBI 9999 must take a minimum of 3 credits after approval of the proposal and be enrolled for at least 1 credit each term until the dissertation is defended and filed with the Graduate School.

Culminating Events:

Area Paper:
Prior to sitting for the preliminary examinations, students must write a published or publishable paper in their chosen area. The purpose of the paper requirement is to demonstrate critical and interpretive knowledge in epidemiology, as well as a high proficiency in written communication and a capacity to contribute to generalizable knowledge in the field. The paper can be written in one of a variety of formats, including a systematic review, an empirical paper, or a theoretical piece relevant to the field. The student must be the lead or sole author.

The Director of Graduate Studies determines if the published paper meets the writing requirement. If a student is not submitting a first-authored, peer-reviewed, and published (or in press) article, two faculty reviewers review the paper to assess whether it is of publishable quality. The second reader may not be the student's advisor. The review is similar to a peer review of a journal article and evaluated as either passing or failing the writing requirement. Students who fail the paper requirement are allowed to submit a revision. The evaluators set a reasonable timeline for doing so, usually within one term.

A student cannot advance to the preliminary examinations without passing the paper requirement. Failure to satisfactorily complete the area paper requirement within the specified time frame can result in dismissal from the Ph.D. program. Students who are entering the Ph.D. program and have already published a peer-reviewed paper related to epidemiology can request to waive this requirement by completing a waiver application and submitting it along with the published document to the Director of Graduate Studies.

Preliminary Examinations (EPBI 9994):
In the term prior to taking the preliminary examinations, students should review their progress with their faculty advisor. To register for EPBI 9994, students must also meet with the Director of Graduate Studies, who can best explain the scope of and process involved in taking the preliminary examinations. The Director of Graduate Studies is charged with reviewing " Advising Form 1," which describes the student’s program plan, and, in consultation with the Senior Graduate Advisor, reviewing Banner records to determine the student’s eligibility. The Director of Graduate Studies then provides authorization to enroll eligible students for the preliminary examinations. When their eligibility has been confirmed, students must contact the Academic Coordinator and request to be registered for the exam course in the subsequent academic term with the Director of Graduate Studies or faculty advisor.

All students are required to take the preliminary examinations after completion of coursework but prior to registering for EPBI 9998 and defending the dissertation research proposal. Offered in the Fall or Spring term as needed, the preliminary examinations cover the core components of students’ training in epidemiology and biostatistics, as well as the specific area of concentration. The examinations consist of the following components:

- Two separate in-class examinations reflect knowledge of both advanced epidemiological methods and advanced biostatistical techniques.
- One take-home written research examination involves responding to a request for proposal (RFP) and generating an innovative, fully described study design. The RFP is within the student’s research expertise and preapproved by the faculty advisor.
- An oral examination on any and all areas covered in the three examinations and the student’s content concentration is taken before a panel of three faculty members.

The complete process takes approximately seven weeks from the time that the student takes the first examination till s/he completes the oral exam. A typical timeline for the exam process follows:

- Week 1: Six-hour in-class exam I
- Week 2: Six-hour in-class exam II
- Weeks 3-4: Take-home exam with one week to complete. The exact dates for receiving the take-home exam and returning it must be determined by the student and clearly communicated to the Director of Graduate Studies in writing via email. The Director of Graduate Studies is responsible for sending out the exam on the established date, and the student is responsible for returning it via email to the Director. The student must return the exam by the predetermined date.
- Weeks 4-6: Faculty grade all written exams
- Week 7: Oral exam

On occasion, a student chooses to complete a course after or concurrent with taking the preliminary examinations. The student’s faculty advisor and the Director of Graduate Studies must approve such an exception in advance and in writing.

The Director of Graduate Studies coordinates the grading of the preliminary examinations and is responsible for coordinating the scheduling of the oral exam. A committee of departmental faculty members review and score the examinations and evaluate each student’s performance in the oral exam.

Dissertation Proposal (EPBI 9998):
After passing the preliminary examinations, students may enroll in EPBI 9998. Students must be enrolled for 2 credits of EPBI 9998 each term until they file their dissertation proposal with the Graduate School.

All students must form a Doctoral Advisory Committee (DAC) with the approval of the Director of Graduate Studies. The DAC is composed of at least three Graduate Faculty members: two members, including the Chair, must be from the Ph.D. program faculty of the Department of Epidemiology and
Biostatistics. The DAC Chair must be approved as Doctoral Graduate Faculty by the Dean of the College of Public Health and by the Graduate School. The chair is responsible for overseeing and guiding the student's progress; coordinating the responses of the committee members; and informing the student and the Director of Graduate Studies annually of the student's academic progress. A fourth, external reader is also required at the time of the final dissertation defense. This person must be a member of the Graduate Faculty at Temple or approved by the Dean of the College to take part in the final dissertation examination. This fourth member is not required to be present at the defense of the proposal.

To fulfill the requirements of EPBI 9998, students must submit a dissertation proposal, successfully defend it orally before their committee, apply for IRB approval for the proposed research, and submit the proposal to the Graduate School. Students have a maximum of one year from the time of completing their preliminary examinations to develop and defend their dissertation proposal. Thus, students may enroll in EPBI 9998 for only two terms without permission. Students needing more time may, with the support of their advisor, formally petition the Director of Graduate Studies for an extension, although an extension is not guaranteed. Failure to meet these requirements can result in dismissal from the program.

**Dissertation (EPBI 9999):**
The doctoral dissertation is an original theory-based research study that makes a significant contribution to the fields of public health and epidemiology. It should expand existing knowledge and demonstrate the student's mastery of research design methods and advanced statistical techniques, particularly within the field of epidemiology. The research should be rigorous, while upholding the ethics and standards of the field. It is expected that the study will result in publication and presentation to professional audiences.

To fulfill the dissertation requirement, students must prepare and orally defend the final dissertation in a public meeting. Students should present their plans for publishing their dissertation as part of their defense. Students must be enrolled continuously for at least 3 credits of dissertation research until their dissertation is successfully defended. The Graduate School requires a minimum of 6 credits for the dissertation experience. Students must be enrolled in the term that they graduate.

The Dissertation Examining Committee (DEC) consists of the DAC plus at least one additional external reviewer. The external reviewer must be doctorally prepared. If this person is not a member of the Temple University Graduate Faculty, s/he must be approved by the Director of Graduate Studies, the Dean of the College, and the Graduate School to take part in the final dissertation examination. The DEC evaluates the student's written dissertation and oral defense, including the student's ability to articulate orally the research question; methodological approach; primary findings; interpretation of the findings; and implications for theory, research, and practice. The DEC votes to pass or fail the dissertation and the defense at the conclusion of the public presentation.

If a student needs to change a member of a committee, the new member must be approved by the Director of Graduate Studies and registered with the Graduate School.

Students who are preparing to defend their dissertation should confirm a time and date with their DEC and work with the Department of Epidemiology and Biostatistics's administrative assistant to secure a room. This should be done at least one month in advance of the proposed date. The administrative assistant arranges the time, date, and room within two working days. After the time, date, and room are secured, the student must send to the Graduate School a completed "Announcement of Dissertation Defense" form, found in TUportal under the Tools tab within “University Forms.” This must be submitted at least 10 working days before the defense. The department posts flyers announcing the defense, and the Graduate School lists the defense on its website.

**Contacts**

**Department Web Address:**
https://cph.temple.edu/epibio/programs-offered/graduate/phd-epidemiology

**Department Information:**
Dept. of Epidemiology and Biostatistics
Ritter Hall Annex, 9th Floor (004-09)
1301 Cecil B. Moore Avenue
Philadelphia, PA 19122-6005
publichealth@temple.edu
215-204-8726

**Submission Address for Application Materials:**
https://sophas.liaisoncas.com/

**Department Contacts:**

*Admissions:*
CPH Office of Admissions
cph@temple.edu
215-204-5200
Courses

EPBI 5002. Biostatistics. 3 Credit Hours.
This course introduces applied biostatistics as used in research in public health. Topics of study include statistical methods used for descriptive and analytic research, inferential statistics, surveillance systems, and statistical software used in public health.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: College of Public Health, Social Work.

Repeatability: This course may not be repeated for additional credits.

EPBI 5003. Spatial Analysis in Public Health. 3 Credit Hours.
This course will create a methodological framework for approaching public health issues within the context of spatial investigations of health and disease, both internally via perceptual mapping, and externally via geographic information systems (GIS). This integrative discipline provides the opportunity for students to draw upon the concepts and techniques of sound public health and add a spatial perspective to their analysis.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

EPBI 5101. Fundamentals of Epidemiology. 3 Credit Hours.
This course introduces descriptive and analytical epidemiology. Concepts and methods used in public health are covered, with emphasis on the calculation and interpretation of indices of community health; morbidity and mortality rates; age-adjustment; and risk ratios, sensitivity, specificity, and predictive value of screening tests. Surveyed are epidemiological research designs, surveillance systems, and evidence-based practice guidelines. Note: This is an introductory course for students in public health and related fields. Master's and doctoral students who have strong quantitative skills and plan to conduct epidemiological research should enroll in EPBI 5201.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

EPBI 5201. Epidemiological Research Methods I. 3 Credit Hours.
This course provides an introduction to the fundamentals of conducting epidemiologic research and protocol development. It covers definitions of epidemiology; measures of disease frequency and risk assessment; measures of effect and association; epidemiologic study designs, including randomized clinical trials, cohort, case-control studies, and cross-sectional surveys; assessment of screening programs; an overview of the role of bias and confounding in epidemiologic study results; and analytic techniques, including modeling using multiple variables, survival analysis, and issues related to quality assurance. Note: This course is the introductory epidemiology course for students in the M.S. in Epidemiology or related Public Health degree programs that require advanced quantitative methods. May be taken in place of EPBI/PBHL 5101 for students in the M.P.H., M.S. in Environmental Health and Ph.D. programs.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

EPBI 5204. Mental Health Epidemiology. 3 Credit Hours.
Epidemiology of psychiatric disturbances is explored, including alcohol and other drug dependencies, psychosocial aspects of health and illness. The emphasis is on epidemiologic methods and theories in psychosocial and mental health research.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: College of Public Health, Social Work.

Repeatability: This course may not be repeated for additional credits.
EPBI 5500. Seminar in Current Issues in Public Health. 3 Credit Hours.
Seminar topics rotate to address current issues in public health research, policy and practice.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: College of Public Health, Social Work.

Repeatability: This course may be repeated for additional credit.

EPBI 8001. Research Methods in Public Health. 3 Credit Hours.
This course examines how to develop and test models, formulate research problem statements and hypotheses, and implement and evaluate research designs and methods of data collection in public health research. It concentrates on fundamental concepts in research design and measurement that help prepare the student to plan and implement theoretically informed and methodologically sound scientific studies in public health and to critically evaluate and discuss public health research. The course emphasizes ethical and practical methods of studying and evaluating causal relations (efficacy and internal validity); determining generalizability of observations (effectiveness, external and ecological validity); and accurate and reliable measuring and conceptualizing of variables (construct validity). In addition, it covers systematic literature searches and randomized controlled trials, which are both increasingly important methods for conducting research in public health.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: College of Public Health, Social Work.

Repeatability: This course may not be repeated for additional credits.

EPBI 8002. Research Seminar in Public Health. 3 Credit Hours.
This is a research seminar on linkages between theory and research in social and behavioral health studies. It is required for Ph.D. students prior to taking the preliminary examinations.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Repeatability: This course may not be repeated for additional credits.

EPBI 8011. Social Epidemiology. 3 Credit Hours.
The purpose of this course is to provide an introduction for graduate students to the key social factors that are thought to influence health. These social factors include constructs such as gender, race, socioeconomic status, and social support. Understanding these social factors is important for public health research and practice. These factors can be considered "fundamental causes" of health outcomes insofar as they may cause or modify other factors that are known to influence health, such as individual behaviors or genetics. The course will focus on the conceptual and theoretical basis of these social factors, how these social factors are measured in epidemiologic research, and the mechanisms by which these social factors are thought to affect health. Students will have the opportunity to improve their skills in critically evaluating empirical data about the association between these social factors and health.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: College of Public Health, Social Work.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites:
EPBI 5101|Minimum Grade of B-|May not be taken concurrently
OR PBHL 5101|Minimum Grade of B-|May not be taken concurrently
OR EPBI 5201|Minimum Grade of B-|May not be taken concurrently
OR PBHL 5201|Minimum Grade of B-|May not be taken concurrently.

EPBI 8012. Multivariable Biostatistics. 3 Credit Hours.
The objective of the course is to provide basic theory and application of regression models, analysis of variance, nonparametric statistics, and survival analysis applied to the analysis of population-based data. The emphasis will be on generating and interpreting results and health related applications rather than on statistical theory. The course is designed for graduate students in public health who are already familiar with basic statistical concepts, including descriptive statistics, the components of statistical inference (p-values, hypothesis tests, confidence intervals, etc.), as well as concepts of confounding and effect modification.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Repeatability: This course may not be repeated for additional credits.

Pre-requisites:
EPBI 5002|Minimum Grade of B-|May not be taken concurrently
OR PBHL 5002|Minimum Grade of B-|May not be taken concurrently.
EPBI 8201. Structural Equation Modeling. 3 Credit Hours.
An extremely rapid pace of change in statistics and methodology in the field of developmental processes and family systems requires that graduate students (and newly minted PhDs in academic and applied settings) be well versed in current data analytic techniques and able to keep abreast of emergent techniques by being aware of contemporary methodological literature. This course will illustrate the uses of structural equation models for cross-sectional, longitudinal, and family data analysis. The course is organized to take participants through each of the cumulative steps in the analysis: deciding which type of model is appropriate, setting up the data file and coding variables, interpreting and displaying empirical findings, and presenting results in both verbal and written form. Class time will be devoted primarily to lectures, examples, group discussions, and hands-on application of course material.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

EPBI 8202. Epidemiological Research Methods II. 3 Credit Hours.
The content of this course illustrates statistical concepts, methods, and strategies used in epidemiologic studies, beyond the principles discussed in EPBI/PBHL 5201 (Epidemiological Research Methods 1). Topics include a review of basic study designs, analysis of prospective and retrospective data, assessment of bias, confounding, effect modification/interaction, statistical methods of stratification and adjustment, sample size/power calculations, importance of quality control and data monitoring in randomized clinical trials, critical determination of causality, and the comprehensive analyses, reporting and presentation of epidemiologic results.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites:
EPBI 5201|Minimum Grade of B-|May not be taken concurrently
OR PBHL 5201|Minimum Grade of B-|May not be taken concurrently.

EPBI 8203. Public Health Data Reporting. 3 Credit Hours.
Systematic reviews are essential tools for health care workers, researchers, consumers, and policymakers who need to keep abreast of the accumulation of knowledge within their field. Systematic reviews provide more objective evaluation of the evidence than has been possible with traditional narrative reviews, and so can help resolve uncertainty and point toward promising future directions in research and practice. When appropriate, meta-analyses can help increase the precision of estimates regarding treatment effects and way to improve treatments. For example, identification of subgroups of individuals most (or least) likely to benefit from treatment can generate new questions to be addressed.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites:
EPBI 5101|Minimum Grade of B-|May not be taken concurrently
OR PBHL 5101|Minimum Grade of B-|May not be taken concurrently
OR EPBI 5201|Minimum Grade of B-|May not be taken concurrently
OR PBHL 5201|Minimum Grade of B-|May not be taken concurrently.

EPBI 8204. Multilev Mod in Int Res. 3 Credit Hours.
Interdisciplinary research nearly always involves data with a nested, hierarchical, or multilevel structure. Such data violate the standard statistical assumption of independence of observations. As well, the most important interdisciplinary research questions often involve understanding effects of one level of this structure on characteristics of another level of structure. Within the intervention contexts, individuals often serve as their own context as events unfold over chronological time. This course provides a broad and comprehensive introduction to analysis of multilevel data with an emphasis on questions which bridge disciplines. Participants should be familiar with the general linear model (analysis of variance, regression) prior to enrolling in this course, but no previous familiarity with mixed models (other than repeated measures ANOVA) is assumed.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.
EPBI 8205. Chronic Disease Epidemiology. 3 Credit Hours.
This intermediate course will cover selected topics in chronic disease epidemiology through critical examination of the current literature. Students will have the opportunity to study methodological issues, strategies for prevention, and contemporary issues in research. Coronary heart disease, cancer, diabetes, musculoskeletal disorders, chronic lung diseases and others will be addressed.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites:
- SBS 5102|Minimum Grade of B-|May not be taken concurrently
- OR PBHL 5102|Minimum Grade of B-|May not be taken concurrently
- OR EPBI 5201|Minimum Grade of B-|May not be taken concurrently
- OR PBHL 5201|Minimum Grade of B-|May not be taken concurrently.

EPBI 8206. Infectious Disease Epidemiology. 3 Credit Hours.
This course provides the basis for understanding infectious diseases, disease transmission, risk factors, outbreak investigation and study designs, surveillance methods, and current infection-control strategies and mechanisms. The purpose of this course is to expose students to the principles and practices of infectious disease epidemiology and how communicable diseases and their control affect public health locally, nationally, and internationally.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites:
- SBS 5102|Minimum Grade of B-|May not be taken concurrently
- OR PBHL 5102|Minimum Grade of B-|May not be taken concurrently
- OR EPBI 5201|Minimum Grade of B-|May not be taken concurrently
- OR PBHL 5201|Minimum Grade of B-|May not be taken concurrently.

EPBI 8208. Data Management and Analysis. 3 Credit Hours.
The content of this course will illustrate practical concepts, methods, and strategies used in the development, management and analysis of large data sets through in-class and homework exercises, quizzes, and a final project. Each class session will be a mixture of a lecture, demonstration and hands-on SAS programming exercises.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites:
- EPBI 5002|Minimum Grade of B-|May not be taken concurrently
- OR EPBI 8012|Minimum Grade of B-|May not be taken concurrently.

EPBI 8209. Epidemiology of HIV/AIDS. 3 Credit Hours.
The epidemiology of HIV/AIDS is the subject of this course. Application of epidemiological principles and concepts in infectious disease epidemiology with emphasis on surveillance, research, prevention, and control are covered.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites:
- EPBI 5101|Minimum Grade of B-|May not be taken concurrently
- OR PBHL 5101|Minimum Grade of B-|May not be taken concurrently
- OR EPBI 5201|Minimum Grade of B-|May not be taken concurrently
- OR PBHL 5201|Minimum Grade of B-|May not be taken concurrently.
EPBI 8211. Epidemiology Grand Rounds. 1 Credit Hour.
The purpose of this course is to socialize, inform and engage graduate-level students in the broader profession of public health through promoting attendance of lectures and background readings of publications for invited speakers through the College of Public Health (CPH). This is a required course for the PhD Epidemiology program. The course will enable students to interact with researchers and practitioners from other settings and universities both nationally and internationally. The course will build students’ capacity to work in interdisciplinary teams and address challenging and complex public health problems. Four CPH invited speakers who are presenting their work on substantive programs in a wide range of public health topics will be identified. Enrollment in this course requires that students participate and attend the selected CPH sponsored lectures or symposiums during the term for which they are enrolled as well as participate in course specific meetings and deliverables. For example, prior to the lecture, students will conduct a guided literature search and develop a written review of the state-of-knowledge and gaps in literature related to the speaker's topic. Students will also participate in a directed discussion prior to the invited lecture. Following the discussion, students will attend the lecture, meet with the invited speaker to ask questions, and complete a summary paper outlining the invited speaker's contribution to the science.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites:
(EPBI 5101|Minimum Grade of B-|May be taken concurrently
OR EPBI 5201|Minimum Grade of B-|May be taken concurrently)
AND (EPBI 5002|Minimum Grade of B-|May be taken concurrently)

EPBI 8212. Grantsmanship in Health Research. 3 Credit Hours.
This course will provide students with applied advanced epidemiologic research methods to critically assess gaps in current knowledge and to develop a competitive grant proposal application. Students will apply the epidemiologic methods and knowledge from prior courses and gain expertise in assessing gaps in knowledge, innovative thinking, grant conception, development and writing, study implementation and approach, budget preparation, and grant critiques. In the first half of the course, students will be introduced to the concepts of significance and innovation, identifying gaps in knowledge, choosing an epidemiologic research topic, identifying a funding agency and developing a set of specific aims, significance and innovation statements. In the second half of the course, the grant proposal will be written in the format of an NIH pre-doctoral epidemiology research grant following NIH grant application guidelines including a developed research plan, identified research team, and NIH biosketch and human subject protection plans. Students will be introduced to the concepts of power, sample size and effect size and will calculate necessary power and sample size requirements in the finalized grant proposal. Students will also participate in a mock grant review session. Students will use this opportunity to develop and submit an application for an NIH or foundation pre-doctoral award to support their dissertation work.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

EPBI 8301. Clinical Research Methods in Public Health. 3 Credit Hours.
This course provides an introduction to the core topics in clinical research. Beginning with practical issues in starting and advancing in a career in clinical investigation, the course proceeds to cover diagnosis and treatment studies, research on prognostic and casual risk factors, special types of study design and analyses, principles of measurement in human subjects, studies using secondary databases, and outcomes research. This course will be an elective class for all students enrolled in the Master of Science in Epidemiology, Clinical Research and Translational Medicine, as well as the Doctor of Philosophy in Epidemiology programs. This graduate level course is principally aimed at health care professionals, not limited to the field of public health, usually with graduate courses relevant to their clinical discipline, who desire advanced knowledge and skills in evaluating, designing and implementing clinical research studies.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites:
EPBI 5002|Minimum Grade of B-|May not be taken concurrently.
EPBI 8302. Behavioral Measurement. 3 Credit Hours.
This course will cover the classical and modern test theories and their applications to solve measurement problems in practice. This course will educate students on measurement concepts including test standardization, validity, reliability, operational definitions, scaling and latent variables in social and behavioral sciences. Issues surrounding validity and reliability of measures will be discussed in detail. Students will be given an opportunity to critically evaluate existing measures and to propose how a new measure can be developed and evaluated.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites:
EPBI 5002|Minimum Grade of B-|May not be taken concurrently
OR EPBI 8012|Minimum Grade of B-|May not be taken concurrently.

EPBI 8307. Systematic Reviews. 3 Credit Hours.
Systematic reviews are essential tools for health care workers, researchers, consumers, and policymakers who need to keep abreast of the accumulation of knowledge within their field. Systematic reviews provide more objective evaluation of the evidence than has been possible with traditional narrative reviews, and so can help resolve uncertainty and point toward promising future directions in research and practice. When appropriate, meta-analyses can help increase the precision of estimates regarding treatment effects and way to improve treatments. For example, identification of subgroups of individuals most (or least) likely to benefit from treatment can generate new questions to be addressed.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

EPBI 9083. Readings and Conference in Public Health. 1 to 3 Credit Hour.
This is an advanced tutorial in public health with an appropriate faculty member. Note: Registration requires a written contract with the supervising faculty member and approval of the student's advisor and of the Director of Graduate Programs.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

EPBI 9187. Biostat Cnslt Practicum. 3 Credit Hours.
The objective of this course is to prepare students to collaborate effectively as biostatistics support consultants in the health professions. The emphasis will be to refresh statistical techniques and develop communication and problem solving skills. This course is designed for graduate students in public health who can use well-validated commercial statistical software, such as SAS, for the analyses of data from observational and/or interventional research studies.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

EPBI 9189. MPH Capstone Seminar. 3 Credit Hours.
This seminar is required of M.P.H. students during final year of study. The seminar includes integration of coursework and practice skills to develop a fieldwork project or internship in a public health agency.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

EPBI 9289. MPH Fieldwork I. 3 Credit Hours.
This course entails a fieldwork project or internship in a public health agency. It includes seminars, oral and written reports of progress, and joint supervision by a preceptor and faculty member.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

EPBI 9389. MPH Fieldwork II. 3 Credit Hours.
This course is an evaluation of the fieldwork project or internship using a full range of research methodologies. Data are collected, analyzed, and reported in a comprehensive final report. Oral and/or poster presentations are presented to public health organizations. The course includes a final oral defense of the project or internship.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.
EPBI 9991. Independent Project in Environmental Health. 1 to 3 Credit Hour.
Under the direction of an appropriate graduate faculty member, students tie together their coursework in a project that poses a problem, gathers data to help analyze the problem, and provides a solution. Note: Enrollment must be approved by the student's advisor and the Director of Graduate Programs.

**Level Registration Restrictions:** Must be enrolled in one of the following Levels: Graduate.

**Repeatability:** This course may be repeated for additional credit.

EPBI 9994. Preliminary Examinations. 1 Credit Hour.
This course supports preparation for taking the preliminary examinations in the Health Policy and Social and Behavioral Sciences Ph.D. programs. To enroll, students must have completed all required coursework for the Ph.D. and obtain the approval of the Ph.D. Program Director. Students must be enrolled to take the required preliminary examinations.

**Department Restrictions:** Must be enrolled in one of the following Departments: CPH:Epidemiology/Biostatistics.

**Level Registration Restrictions:** Must be enrolled in one of the following Levels: Graduate.

**Degree Restrictions:** Must be enrolled in one of the following Degrees: Doctor of Philosophy.

**Repeatability:** This course may be repeated for additional credit.

EPBI 9996. Masters Res in Pub Hlth. 3 Credit Hours.
This course is limited to students who have chosen to fulfill the master's degree by writing a thesis.

**Level Registration Restrictions:** Must be enrolled in one of the following Levels: Graduate.

**Repeatability:** This course may be repeated for additional credit.

EPBI 9998. Dissertation Proposal Research. 1 to 2 Credit Hour.
This course supports preparation of the dissertation proposal. The course is required for students who have passed the preliminary examinations for their PhD program and who have not yet defended the dissertation proposal.

**Department Restrictions:** Must be enrolled in one of the following Departments: CPH:Epidemiology/Biostatistics.

**Level Registration Restrictions:** Must be enrolled in one of the following Levels: Graduate.

**Degree Restrictions:** Must be enrolled in one of the following Degrees: Doctor of Philosophy.

**Repeatability:** This course may be repeated for additional credit.

**Pre-requisites:**
EPBI 9994|Minimum Grade of P|May not be taken concurrently.

EPBI 9999. Dissertation Research. 1 to 6 Credit Hour.
This course is limited to Ph.D. candidates who have completed and defended a dissertation proposal that is filed with the Graduate School by the last day to add a course in the semester. Continuous registration in 9999 fall and spring is required until the dissertation is successfully defended.

**Level Registration Restrictions:** Must be enrolled in one of the following Levels: Graduate.

**Student Attribute Restrictions:** Must be enrolled in one of the following Student Attributes: Dissertation Writing Student.

**Repeatability:** This course may be repeated for additional credit.