Department of Public Health Sciences

Chair
• Diane S. Lauderdale

Professors
• Habib Ahsan
• James J. Dignam
• Robert D. Gibbons
• Donald Hedeker
• Yuan Ji
• R. Tamara Konetzka
• Benjamin B. Lahey
• Diane S. Lauderdale
• Harold Pollack, School of Social Service Administration

Associate Professors
• Lin Chen
• Brian Chiu
• Dezheng Huo
• Brandon Pierce
• John Schneider, Medicine

Assistant Professors
• Kavi Bhalla
• Prachi Sanghavi
• Loren Saulsberry
• Marcia Tan

Instructors
• Aresha Martinez-Cardoso

Public Health Sciences (PHS) is the home in the Biological Sciences Division to biostatistics, epidemiology and health services research. These core fields in public health research share a focus on the development and implementation of complex analytic methods to understand the determinants of health, the efficacy of experimental treatments, and the structure of health care at the population level. Bringing together these fields in one department underscores their commonality and enhances opportunities for interdisciplinary research. Faculty members lead local, national, and international studies, and also welcome opportunities to collaborate with faculty across the Biological Sciences Division and the university. Substantively, our research themes include social and environmental determinants of health, genetics and disease, the economics of health care, and the evaluation and implementation of new technologies in public health and clinical care. In terms of methodological expertise, areas in which our faculty has developed innovative approaches include: risk factor measurement; multilevel, clustered and longitudinal data; clinical trials; administrative health data; social networks; and statistical methods to assess the genetic and molecular basis of disease.

Program of Study

Currently, the Department of Public Health Sciences offers a graduate program, the Master of Science in Public Health Sciences for Clinical Professionals, and a Ph.D. program. Current information on graduate programs is available from the department's website at http://health.bsd.uchicago.edu/.

The Degree of Doctor of Philosophy

The Department of Public Health Sciences at the University of Chicago offers a program of study leading to the Ph.D. with emphasis in biostatistics, epidemiology or health services research. This program will prepare individuals for research careers in population-based research in human health and biomedical science. The program is organized around a common quantitative core curriculum designed to prepare students methodologically for more in-depth study in their chosen field and for dissertation research. Beyond the core curriculum, each student will choose a major disciplinary area of concentration, take a sequence of advanced courses in that area, and prepare a dissertation of independent, original, and rigorous research. Opportunities
for such concentrated study will be available in the three broad areas of biostatistics, epidemiology and health services research, areas of expertise represented by department faculty.

In addition to the concentration, each student will choose a minor program of study in another area either represented by department faculty or offered elsewhere in the Biological Sciences Division or on campus. Tailored to each individual student, the minor will vary in its degree of specificity from student to student. It may be in one of the broad areas represented by the department, or in a more specialized area. Examples of specialized minors include psychiatric or cancer epidemiology, health economics, economics of aging, clinical trials design, cancer biology, genetic or molecular epidemiology, bioinformatics, or medical decision theory.

PROGRAM REQUIREMENTS

Students should expect to complete the program in 5 years by fulfilling the following requirements:

- A core curriculum of up to six courses.
- A major concentration program approved by the faculty consisting of at least 7 additional courses in a disciplinary domain (such as biostatistics).
- A minor program approved by the faculty consisting of at least 3 additional courses in a second disciplinary area.

Successfully complete a course in scientific integrity and the ethical conduct of research, usually in the first year of study (divisional ethics requirement).

Pass a multi-part preliminary examination demonstrating mastery of the core curriculum and of foundational knowledge in the chosen area of concentration.

Teach two quarters for credit in pre-approved teaching assistant positions in the biological sciences (divisional teaching requirement).

Establish a doctoral dissertation committee, present proposed dissertation research to members of that committee and other interested faculty, and obtain written approval from the committee on the proposed dissertation research.

Prepare and defend a doctoral dissertation of independent, original, and rigorous research in the chosen area of concentration.

Participate in the departmental seminar, in weekly faculty/student workshops, and in research workshops that overlap with the chosen area of concentration.

REQUIRED COURSES

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PBHS 30910</td>
<td>Epidemiology and Population Health</td>
<td>100</td>
</tr>
<tr>
<td>PBHS 32400</td>
<td>Applied Regression Analysis</td>
<td>100</td>
</tr>
<tr>
<td>PBHS 31001</td>
<td>Epidemiologic Methods</td>
<td>100</td>
</tr>
<tr>
<td>PBHS 32700</td>
<td>Biostatistical Methods</td>
<td>100</td>
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<tr>
<td>PBHS 35100</td>
<td>Health Services Research Methods</td>
<td>100</td>
</tr>
<tr>
<td>PBHS 35411</td>
<td>The U.S. Health Care System</td>
<td>100</td>
</tr>
</tbody>
</table>

APPLICATION FOR ADMISSION

Applications should be received by December 1st for entrance into the program in Autumn Quarter and should consist of a BSD application (including three letters of recommendation), uploaded official transcript(s) from all degree institutions, GRE scores, TOEFL scores (if applicable), CV/detailed relevant work history, a personal statement, and a research statement indicating area of major concentration.

Interested students should visit the department website at https://pbhs.uchicago.edu/.

MASTER OF SCIENCE IN PUBLIC HEALTH SCIENCES FOR CLINICAL PROFESSIONALS

The Master of Science Program for Clinical Professionals is a course of study in the theory, methods, and concepts of biostatistics, epidemiology, and health services research needed to design and carry out clinical and epidemiologic research programs. It is designed for the professional enhancement of physicians and other clinical professionals. The program can be completed in one year of full time study, or it can be undertaken in conjunction with a clinical fellowship or training program, in which case the course work may be distributed over two or three years. Students in the program acquire skills with basic statistical methods, followed by additional training in the fundamental theory and methods of epidemiology, biostatistics, and health services research. Through choice from a broad range of elective courses, students can specialize in one of the three disciplinary areas.
## Entrance Requirements

Applicants should either have a doctoral level clinical degree (such as M.D., D.O., or nursing Ph.D.) from an accredited institution, or must have completed pre-clinical training at an accredited medical school. In the latter case, the candidate must provide a plan for completion of both the M.D. and S.M. degrees, and a letter of support from the candidate's medical school.

## Program Requirements

A candidate in this program for the degree of Master of Science in Public Health Sciences must complete the required and elective courses (nine courses in total), and complete a master’s paper.

### Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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<tbody>
<tr>
<td>PBHS 30700</td>
<td>Clinical Epidemiology</td>
<td>100</td>
</tr>
<tr>
<td>PBHS 30910</td>
<td>Epidemiology and Population Health</td>
<td>300</td>
</tr>
<tr>
<td>PBHS 31001</td>
<td>Epidemiologic Methods</td>
<td>100</td>
</tr>
<tr>
<td>PBHS 32100</td>
<td>Introduction to Biostatistics *</td>
<td></td>
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<tr>
<td>PBHS 32400</td>
<td>Applied Regression Analysis</td>
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<td>100</td>
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<tr>
<td>PBHS 33300</td>
<td>Applied Longitudinal Data Analysis</td>
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<tr>
<td>And three electives</td>
<td></td>
<td>300</td>
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<td>Total Units</td>
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<td>900</td>
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* STAT 22000 or equivalent can be substituted for this course.

### Application for Admission

Applications for admission should be completed by December 1st for entry into the program in the following summer quarter.

If the degree program will be pursued while the candidate will be participating in a clinical training program, a letter of support from the training program director is required. Candidates must also submit a statement describing how the proposed course of study will enhance their professional objectives. In addition, candidates must provide transcripts from all post secondary institutions, MCAT or GRE scores, and a completed Biological Sciences Division application.

Interested students should visit the department website at [http://health.bsd.uchicago.edu](http://health.bsd.uchicago.edu).

### Public Health Sciences Courses

**PBHS 30700. Clinical Epidemiology. 100 Units.**

Clinical epidemiology is the "application of epidemiologic principles and methods to problems encountered in clinical medicine." This course introduces the basic principles of epidemiologic study design, analysis and interpretation, with a particular focus on clinical applications. The course includes lectures and discussions based on critical appraisal of significant research articles. The course is primarily intended for, but not restricted to, students with prior clinical training. Public Health Sciences 30700 and 30900 may not both be taken for credit, either will fulfill the basic epidemiology requirement for the MSCP in Public Health Sciences and either will serve as the epidemiology prerequisite for Public Health Sciences 31001.

Instructor(s): B. Chiu, D. Lauderdale Terms Offered: Summer

Prerequisite(s): Introductory statistics recommended, may be taken concurrently.

Equivalent Course(s): CCTS 45100
PBHS 30910. Epidemiology and Population Health. 100 Units.
This course does not meet requirements for the biological sciences major. Epidemiology is the study of the
distribution and determinants of health and disease in human populations. This course introduces the basic
principles of epidemiologic study design, analysis, and interpretation through lectures, assignments, and critical
appraisal of both classic and contemporary research articles.
Instructor(s): D. Lauderdale Terms Offered: Autumn
Prerequisite(s): STAT 22000 or other introductory statistics highly desirable. For BIOS students-completion of the
first three quarters of a Biological Sciences Fundamentals sequence.
Equivalent Course(s): STAT 22810, ENST 27400, PPHA 36410, HLTH 20910

PBHS 31001. Epidemiologic Methods. 100 Units.
This course expands on the material presented in "Principles of Epidemiology," further exploring issues in the
conduct of epidemiologic studies. The student will learn the application of both stratified and multivariate
methods to the analysis of epidemiologic data. The final project will be to write the "specific aims" and "methods"
sections of a research proposal on a topic of the student's choice.
Instructor(s): B. Chiu Terms Offered: Winter
Prerequisite(s): PBHS 30700 or PBHS 30900 or PBHS 30910 AND PBHS 32400 or applied statistics courses
through multivariate regression.
Equivalent Course(s): STAT 35700

PBHS 31200. Cancer Epidemiology. 100 Units.
The purpose of this course is to review the basic concepts and issues relevant to cancer epidemiology. Specifically,
this course will focus on interpreting cancer statistics, and describing the current state of knowledge regarding
the etiology and risk factors for the major cancer sites. In addition, issues in research design and interpretation
within the context of cancer epidemiology, as well as the molecular and cellular basis of carcinogenesis as it
pertains to cancer occurrence in populations will be discussed. The course is appropriate for students who have
an introductory knowledge of epidemiology. Previous study of cancer biology is helpful but not required.
Instructor(s): B. Chiu Terms Offered: Winter. Not offered 2019-20
Prerequisite(s): PBHS 30700 or PBHS 30910

PBHS 31300. Infectious Disease Epidemiology; Networks and Modeling. 100 Units.
This intermediate-level epidemiology course directed by two infectious disease epidemiologist-physicians will
provide an up to date perspective on forgotten, contemporary and emerging infections. The course lectures and
readings will provide a rigorous examination of the interactions among pathogens, hosts and the environment
that produce disease in diverse populations. In addition to the demographic characteristics and the behaviors of
different individuals that are associated with a high risk of infection, we will examine complex aspects of the environment
as they pertain to disease transmission. These include poverty, globalization, social networks, public health, and
racial and ethnic disparities. Methodologic approaches to infectious disease epidemiology that will be covered
include traditional study designs, molecular epidemiology, social network analysis, modeling, and network
science. Local and global approaches will be applied to case studies from the United States, Asia, and Africa.
Instructor(s): TBN Terms Offered: TBD. Not offered in 2019-20.
Prerequisite(s): Biology majors: Three quarters of a Biological Sciences Fundamentals sequence. HSTD 30700 or
HSTD 30910 or introductory epidemiology or consent of instructor
Equivalent Course(s): CCTS 43200, MEDC 31300, BIOS 25419

PBHS 31450. Social Inequalities in Health: Race/Ethnicity & Class. 100 Units.
This course examines how social stratification and social inequality shape racial/ethnic and socioeconomic
inequalities in health. In particular, we will explore the production of race and class inequality in the US and
draw on the extensive and empirical literature to understand how these social factors influence health
behaviors and health outcomes. Finally, we will review both the classic and emerging methodological approaches
used by public health and social scientists to measure and test how these features of society get "under the skin"
to shape a variety of health outcomes.
Instructor(s): Aresha Martinez-Cardoso and Diane Lauderdale Terms Offered: Spring. New course Spring 2020
Equivalent Course(s): HLTH 27450, PBHS 27450

PBHS 31510. Critical Readings in Epidemiology. 100 Units.
Course consists of reading and critiquing important and innovative recent papers in epidemiology. Each week,
there will be a different substantive or disease focus for the papers. Research areas covered will be primarily, but
not exclusively, in noninfectious diseases. Different faculty will lead the discussion each week and students will
prepare and present summary critiques of the articles.
Prerequisite(s): PBHS 30700 or PBHS 30910
PBHS 31831. Genetic & Molecular Epidemiology. 100 Units.
This course is designed for students with strong research interests related to identifying and characterizing the role of genetic and molecular features in human disease. Students will be introduced to the key concepts and methodological issues encountered in epidemiological studies that utilize genetic and molecular data. This course will train students on the theoretical and practical aspects of study design and data generation, and also provide the relevant hands-on training for quality control, management, and analysis of large-scale genomic/molecular data. Students are expected to have taken prior coursework in epidemiology, biostatistics, and genetics.
Instructor(s): B. Pierce Terms Offered: Spring
Prerequisite(s): PBHS 30700 or PBHS 30900, or PBHS 30910 (or introductory epidemiology) AND HGEN 47000 or consent of instructor.

PBHS 31900. Global Health Metrics. 100 Units.
This course provides an overview of the causes of illness and injury in populations across the world and the most important risk factors. We will discuss how population health is measured using summary indicators that combine mortality and non-fatal health outcomes. We will use these indicators to compare and contrast the health of populations across global regions and in time. Sound measurement of the global burden of disease is essential for prioritizing prevention strategies. Therefore, there will be a strong emphasis on understanding how data sources in information-poor settings are used to generate estimates of population health.
Instructor(s): Kavi Bhalla Terms Offered: Spring
Prerequisite(s): N/A
Equivalent Course(s): PBHS 27900, PBPL 27905

PBHS 32100. Introduction to Biostatistics. 100 Units.
This course will provide an introduction to the basic concepts of statistics as applied to the bio-medical and public health sciences. Emphasis is on the use and interpretation of statistical tools for data analysis. Topics include (i) descriptive statistics; (ii) probability and sampling; (iii) the methods of statistical inference; and (iv) an introduction to linear and logistics regression.
Instructor(s): J. Cursio Terms Offered: Summer
Prerequisite(s): 2 quarters of pre-calculus
Note(s): *In addition to the course, there is a statistical computing workshop.
Equivalent Course(s): CCTS 45000

PBHS 32400. Applied Regression Analysis. 100 Units.
This course introduces the methods and applications of fitting and interpreting multiple regression models. The primary emphasis is on the method of least squares and its many varieties. Topics include the examination of residuals, the transformation of data, strategies and criteria for the selection of a regression equation, the use of dummy variables, tests of fit, nonlinear models, biases due to excluded variables and measurement error, and the use and interpretation of computer package regression programs. The techniques discussed are illustrated by many real examples involving data from both the natural and social sciences. Matrix notation is introduced as needed. Prerequisite: PBHS 32100. Equivalent Course(s): PBHS 32400
Terms Offered: Autumn Spring
Prerequisite(s): STAT 22000 or 23400 with a grade of at least C, or STAT 22200 or 22600 or 24500 or 24510 or PBHS 32100, or AP Statistics credit for STAT 22000. Also two quarters of calculus (MATH 13200 or 15200 or 15300 or 16200 or 16210 or 15910 or 19520 or 19620 or 20250 or 20300 or 20310).
Equivalent Course(s): STAT 22400

PBHS 32600. Analysis of Categorical Data. 100 Units.
This course covers statistical methods for the analysis of qualitative and counted data. Topics include description and inference for binomial and multinomial data using proportions and odds ratios; multi-way contingency tables; generalized linear models for discrete data; logistic regression for binary responses; multi-category logit models for nominal and ordinal responses; loglinear models for counted data; and inference for matched-pairs and correlated data. Applications and interpretations of statistical models are emphasized.
Terms Offered: Winter
Prerequisite(s): STAT 22000 or 23400 with a grade of at least C+, or STAT 22200 or 22400 or 24500 or 24510 or PBHS 32100, or AP Statistics credit for STAT 22000. Also two quarters of calculus (MATH 13200 or 15200 or 15300 or 16200 or 16210 or 15910 or 19520 or 19620 or 20250 or 20300 or 20310).
Equivalent Course(s): STAT 22600

PBHS 32700. Biostatistical Methods. 100 Units.
This course is designed to provide students with tools for analyzing categorical, count, and time-to-event data frequently encountered in medicine, public health, and related biological and social sciences. This course emphasizes application of the methodology rather than statistical theory (e.g., recognition of the appropriate methods; interpretation and presentation of results). Methods covered include contingency table analysis, Kaplan-Meier survival analysis, Cox proportional-hazards survival analysis, logistic regression, and Poisson regression.
Instructor(s): J. Dignam Terms Offered: Winter
Prerequisite(s): PBHS 32400, STAT 22400 or STAT 24500 or equivalent or consent of instructor.
Equivalent Course(s): STAT 22700
PBHS 32901. Introduction to Clinical Trials. 100 Units.
This course will review major components of clinical trial conduct, including the formulation of clinical hypotheses and study endpoints, trial design, development of the research protocol, trial progress monitoring, analysis, and the summary and reporting of results. Other aspects of clinical trials to be discussed include ethical and regulatory issues in human subjects research, data quality control, meta-analytic overviews and consensus in treatment strategy resulting from clinical trials, and the broader impact of clinical trials on public health.
Instructor(s): Y. Ji Terms Offered: Winter
Prerequisite(s): PBHS 32100 or STAT 22000; Introductory Statistics or Consent of Instructor
Equivalent Course(s): STAT 35201

PBHS 33200. Statistical Analysis with Missing Data. 100 Units.
This course is intended to introduce basic concepts and provide a guide to conducting missing data analysis using the statistical software R. The course will cover topics including Expectation-Maximization algorithm, weighting methods, imputation and other likelihood-based approaches to the analysis of missing data. Some other relevant topics will also be introduced, such as non-ignorable missing data, machine learning methods and multivariate missing data analysis. Computation and application will be emphasized, rather than statistical theory. In the end of the course, the students are expected to complete a final project related to missing data analysis.
Instructor(s): L. Chen Terms Offered: TBD. Not offered in 2019-20.
Prerequisite(s): PBHS 32400/STAT 22400; or STAT 24500; or equivalent; and basic programming skill using R or equivalent

PBHS 33300. Applied Longitudinal Data Analysis. 100 Units.
Longitudinal data consist of multiple measures over time on a sample of individuals. This type of data occurs extensively in both observational and experimental biomedical and public health studies, as well as in studies in sociology and applied economics. This course will provide an introduction to the principles and methods for the analysis of longitudinal data. Whereas some supporting statistical theory will be given, emphasis will be on data analysis and interpretation of models for longitudinal data. Problems will be motivated by applications in epidemiology, clinical medicine, health services research, and disease natural history studies.
Instructor(s): D. Hedeker Terms Offered: Spring
Prerequisite(s): PBHS 32400/STAT 22400 or equivalent, and PBHS 32600/STAT 22600 or PBHS 32700/STAT 22700 or equivalent; or consent of instructor.
Equivalent Course(s): CHDV 32501, STAT 36900

PBHS 33400. Multilevel Modeling. 100 Units.
This course will focus on the analysis of multilevel data in which subjects are nested within clusters (e.g., health care providers, hospitals). The focus will be on clustered data, and several extensions to the basic two-level multilevel model will be considered including three-level, cross-classified, multiple membership, and multivariate models. In addition to models for continuous outcomes, methods for non-normal outcomes will be covered, including multilevel models for dichotomous, ordinal, nominal, time-to-event, and count outcomes. Some statistical theory will be given, but the focus will be on application and interpretation of the statistical analyses.
Instructor(s): D. Hedeker Terms Offered: Autumn
Prerequisite(s): PBHS 32400 and PBHS 32700 or consent of instructor.
Equivalent Course(s): CHDV 32401

PBHS 33500. Statistical Applications. 100 Units.
This course provides a transition between statistical theory and practice. The course will cover statistical applications in medicine, mental health, environmental science, analytical chemistry, and public policy. Lectures are oriented around specific examples from a variety of content areas. Opportunities for the class to work on interesting applied problems presented by U of C faculty will be provided. Although an overview of relevant statistical theory will be presented, emphasis is on the development of statistical solutions to interesting applied problems.
Instructor(s): R. Gibbons Terms Offered: Autumn
Prerequisite(s): PBHS 32700/STAT 34700 or consent of instructor.
Equivalent Course(s): CHDV 32702, STAT 35800

PBHS 35100. Health Services Research Methods. 100 Units.
The purpose of this course is to better acquaint students with the methodological issues of research design and data analysis widely used in empirical health services research. To deal with these methods, the course will use a combination of readings, lectures, problem sets (using STATA), and discussion of applications. The course assumes that students have had a prior course in statistics, including the use of linear regression methods.
Instructor(s): P. Sanghavi Terms Offered: Spring
Prerequisite(s): At least one course in linear regression and basic familiarity with STATA; or consent of instructor.
Equivalent Course(s): SSAD 46300, PPHA 38010, HLTH 29100
PBHS 35500. Introduction to U.S. Health Policy and Politics. 100 Units.
The purpose of this course is to introduce students to the concepts needed to critically evaluate U.S. health policy issues. The course will 1) provide an overview of the U.S. health system including its institutions, stakeholders, and financing mechanisms, 2) describe the politics of health and illuminate how the structure of our political system shapes health policy outcomes, and 3) offer a framework for assessing the critical features central to health policy debates. Building upon this knowledge, the course will conclude with a discussion of strategies for influencing the health policy process and how they might be employed in future leadership roles within the health sector.
Instructor(s): Loren Saulsberry Terms Offered: Spring
Prerequisite(s): None
Equivalent Course(s): PPHA 37720, SSAD 45011, PBHS 28500, HLTH 25500

PBHS 38010. Introduction to Health Economics. 100 Units.
This course covers the foundations of the economics of health care. Content includes demand for health, medical care, and insurance; supply of medical care and behavior of health care practitioners; and economic perspectives on measurement in health care research. Using a combination of lectures, readings, and problem sets, the goal is for students to acquire a basic understanding of economic knowledge and thinking that can be applied to current challenges in health care policy and practice. The course is open to undergraduate and graduate students with at least one prior course in microeconomics.
Instructor(s): T. Konetzka Terms Offered: Winter 2019-20
Prerequisite(s): Microeconomics course
Equivalent Course(s): PPHA 38290, HLTH 28010, PBHS 28010

PBHS 38400. Advanced Topics in Health Economics. 100 Units.
The purpose of this course is to provide substantial exposure to the state of the evidence and the major theoretical and empirical approaches used to study salient issues in health economics. Selected topics may vary from year to year; examples include health capital, health insurance, health behaviors, health care market structure and competition, not-for-profit ownership, payment incentives, and the effects of information on provider behavior (e.g. public reporting and value-based purchasing) and consumer behavior (e.g., advertising and medical decision making)
Instructor(s): T. Konetzka Terms Offered: Winter. Not offered in 2019-20
Prerequisite(s): Graduate courses in microeconomics and econometrics or statistics, including the use of linear and nonlinear regression methods.

PBHS 39000. Master's Readings: Public Health Sciences. 300.00 Units.
Arrange course content and meeting times with instructor.

PBHS 39100. Master's Research: Public Health Sciences. 300.00 Units.
Arrange course content and meeting times with instructor.

PBHS 40000. Public Health Sciences PhD Research & Training. 300.00 Units.
Arrange course content and meeting times with instructor.

PBHS 40100. Advanced Topics in Ethics for Public Health Sciences. 50 Units.
Arrange course content and meeting times with instructor.

PBHS 40500. Advanced Epidemiologic Methods. 100 Units.
This course examines some features of study design, but is primarily focused on analytic issues encountered in epidemiologic research. The objective of this course is to enable students to conduct thoughtful analysis of epidemiologic and other population research data. Concepts and methods that will be covered include: matching, sampling, conditional logistic regression, survival analysis, ordinal and polytomous logistic regressions, multiple imputation, and screening and diagnostic test evaluation. The course follows in sequence the material presented in "Epidemiologic Methods."
Instructor(s): D. Huo Terms Offered: Spring
Prerequisite(s): PBHS 31001

PBHS 43010. Applied Bayesian Modeling and Inference. 100 Units.
Course begins with basic probability and distribution theory, and covers a wide range of topics related to Bayesian modeling, computation, and inference. Significant amount of effort will be directed to teaching students on how to build and apply hierarchical models and perform posterior inference. The first half of the course will be focused on basic theory, modeling, and computation using Markov chain Monte Carlo methods, and the second half of the course will be about advanced models and applications. Computation and application will be emphasized so that students will be able to solve real-world problems with Bayesian techniques.
Instructor(s): Y. Ji Terms Offered: TBD
Prerequisite(s): STAT 24400 and STAT 24500 or master level training in statistics.
Equivalent Course(s): STAT 35920
PBHS 43201. Introduction to Causal Inference. 100 Units.
This course is designed for graduate students and advanced undergraduate students from the social sciences, education, public health science, public policy, social service administration, and statistics who are involved in quantitative research and are interested in studying causality. The goal of this course is to equip students with basic knowledge of and analytic skills in causal inference. Topics for the course will include the potential outcomes framework for causal inference; experimental and observational studies; identification assumptions for causal parameters; potential pitfalls of using ANCOVA to estimate a causal effect; propensity score based methods including matching, stratification, inverse-probability-of-treatment-weighting (IPTW), marginal mean weighting through stratification (MMWS), and doubly robust estimation; the instrumental variable (IV) method; regression discontinuity design (RDD) including sharp RDD and fuzzy RDD; difference in difference (DID) and generalized DID methods for cross-section and panel data, and fixed effects model. Intermediate Statistics or equivalent such as STAT 224/PBHS 324, PP 31301, BUS 41100, or SOC 30005 is a prerequisite. This course is a prerequisite for "Advanced Topics in Causal Inference" and "Mediation, moderation, and spillover effects."
Instructor(s): G. Hong, K. Yamaguchi Terms Offered: Winter
Prerequisite(s): Intermediate Statistics or equivalent such as STAT 224/PBHS 324, PP 31301, BUS 41100, or SOC 30005
Note(s): CHDV Distribution: M; M
Equivalent Course(s): CHDV 30102, PLSC 30102, STAT 31900, SOCI 30315, MACS 51000

PBHS 45610. Policy Analysis: Meths/Apps. 100 Units.
This master's-level course provides students with the basic tools of policy analysis. Students will learn and apply tools of decision analysis in written group assignments and in an accompanying computer lab. Students will also learn and apply concepts of cost-effectiveness, cost-benefit, and cost-utility analysis with social service, medical, public health applications. Doctoral students and master's students who intend to take the course Advanced Applications of Cost-Effectiveness Analysis in Health will complete two additional laboratory assignments. Topics to be covered include: Decision trees for structured policy analysis, the economic value of information, analysis of screening programs for HIV and child maltreatment, sensitivity analysis, cost-effectiveness analysis of life-saving interventions and programs to reduce behavioral risk, valuing quality of life outcomes, ethical issues in cost-benefit analysis, analysis of irrational risk behaviors. Substantive areas covered include: HIV/substance use prevention, school-based prevention of sexual risk, smoking cessation, and housing policy. In the associated learning lab, students will use computer decision software to build and analyze decision trees in policy-relevant examples. They will conduct one-way and two-way sensitivity analysis to explore the impact of key parameters on cost-effectiveness of alternative policies. Students will receive an introduction to dynamic modeling in the context of HIV prevention, cancer screening, and transportation programs.
Equivalent Course(s): PPHA 40101, SSAD 45600

PBHS 49000. Ph. D. Rdgs: Public Health Sciences. 300.00 Units.
Arrange course content and meeting times with instructor.

PBHS 49100. Ph. D. Rsch: Public Health Sciences. 300.00 Units.
Arrange course content and meeting times with instructor.

PBHS 70000. Advanced Study: Public Health Sciences. 300.00 Units.
Advanced Study: Public Health Sciences