Public Health Concentration Requirements

Public Health is an interdisciplinary concentration through which students examine a variety of health issues, including population health and disease, health policy, cross-cultural and international aspects of health, the organizational and social structures through which health services are delivered and received, and the public health system. Courses in the concentration allow students to explore the ways in which the social, political, behavioral and biological sciences contribute to the understanding of patterns of population distributions of health and disease. The concentration also provides students with courses in basic research methods and statistics necessary for problem solving and critical thinking in the emerging emphasis on evidence-based health care and public health.

Requirements for Class of 2023 and Beyond

1. Core Courses (non-substitutable; 5 required for all students)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHP 0310</td>
<td>Health Care in the United States</td>
</tr>
<tr>
<td>PHP 0320</td>
<td>Introduction to Public Health</td>
</tr>
<tr>
<td>PHP 0850</td>
<td>Fundamentals of Epidemiology</td>
</tr>
<tr>
<td>PHP 1501</td>
<td>Essentials of Data Analysis</td>
</tr>
<tr>
<td>PHP 1910</td>
<td>Public Health Senior Seminar</td>
</tr>
</tbody>
</table>

2. Environmental Health and Policy (select one of the following):

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHP 0720</td>
<td>Public Health and the Environment</td>
</tr>
<tr>
<td>PHP 1101</td>
<td>World of Food: Personal to Global Perspectives on Nutrition, Agriculture and Policy</td>
</tr>
<tr>
<td>PHP 1700</td>
<td>Current Topics in Environmental Health</td>
</tr>
</tbody>
</table>

3. Health, Health Care Systems, and Policy (select one of the following):

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHP 0330</td>
<td>Public Health Policy</td>
</tr>
<tr>
<td>PHP 0650</td>
<td>From Manufacturer to Patient: Why is the Cost of Prescription Drugs So Dam High?</td>
</tr>
<tr>
<td>PHP 1100</td>
<td>Comparative Health Care Systems</td>
</tr>
<tr>
<td>PHP 1480</td>
<td>Introduction To Public Health Economics</td>
</tr>
</tbody>
</table>

4. Social and Behavioral Science for Prevention (select one of the following):

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHP 0400</td>
<td>Intro. to Health Disparities &amp; Making Connection btw Structure, Social Determinants&amp;Health Equity</td>
</tr>
<tr>
<td>PHP 0700</td>
<td>Global Public Health Interventions</td>
</tr>
<tr>
<td>PHP 1101</td>
<td>World of Food: Personal to Global Perspectives on Nutrition, Agriculture and Policy</td>
</tr>
<tr>
<td>PHP 1540</td>
<td>Alcohol Use and Misuse</td>
</tr>
<tr>
<td>PHP 1600</td>
<td>Obesity in the 21st Century: Causes, Consequences and Countermeasures</td>
</tr>
<tr>
<td>PHP 1610</td>
<td>Tobacco, Disease and the Industry: cigs, e-cigs and more</td>
</tr>
<tr>
<td>PHP 1650</td>
<td>Race, Racism and Health</td>
</tr>
<tr>
<td>PHP 1680U</td>
<td>Intersectionality and Health Inequities</td>
</tr>
<tr>
<td>PHP 1690</td>
<td>Technology and Health Behavior Change</td>
</tr>
<tr>
<td>PHP 1920</td>
<td>Social Determinants of Health</td>
</tr>
</tbody>
</table>

5. Global Health Elective (select one of the following):

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHP 0700</td>
<td>Global Public Health Interventions</td>
</tr>
<tr>
<td>PHP 0720</td>
<td>Public Health and the Environment</td>
</tr>
<tr>
<td>PHP 1070</td>
<td>The Burden of Disease in Developing Countries</td>
</tr>
</tbody>
</table>

6. Health Disparities Elective (select one of the following):

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHP 0400</td>
<td>Intro. to Health Disparities &amp; Making Connection btw Structure, Social Determinants&amp;Health Equity</td>
</tr>
<tr>
<td>Course</td>
<td>Title</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>PHP 1650</td>
<td>Race, Racism and Health</td>
</tr>
<tr>
<td>PHP 1680I</td>
<td>Pathology to Power: Disability, Health and Community</td>
</tr>
<tr>
<td>PHP 1680U</td>
<td>Intersectionality and Health Inequities</td>
</tr>
<tr>
<td>PHP 1820</td>
<td>Designing Education for Better Prisoner and Community Health</td>
</tr>
<tr>
<td>PHP 1920</td>
<td>Social Determinants of Health</td>
</tr>
<tr>
<td>7. Biology (select one of the following):</td>
<td></td>
</tr>
<tr>
<td>BIOL 0030</td>
<td>Principles of Nutrition</td>
</tr>
<tr>
<td>BIOL 0200</td>
<td>The Foundation of Living Systems</td>
</tr>
<tr>
<td>BIOL 0470</td>
<td>Genetics</td>
</tr>
<tr>
<td>BIOL 0510</td>
<td>Introductory Microbiology</td>
</tr>
<tr>
<td>BIOL 0530</td>
<td>Principles of Immunology</td>
</tr>
<tr>
<td>BIOL 0800</td>
<td>Principles of Physiology</td>
</tr>
<tr>
<td>BIOL 0860</td>
<td>Diet and Chronic Disease</td>
</tr>
<tr>
<td>8. Humanities/Fine Arts/Humanistic Social Sciences for Public Health (select one of the following):</td>
<td></td>
</tr>
<tr>
<td>AFRI 0550</td>
<td>African American Health Activism from Emancipation to AIDS</td>
</tr>
<tr>
<td>AFRI 1060W</td>
<td>Policy, Culture and Discourse that Shape Health and Access to Healthcare</td>
</tr>
<tr>
<td>AFRI 1060Z</td>
<td>Race, Sexuality, and Mental Disability History (HMAN 1973A)</td>
</tr>
<tr>
<td>AMST 1600C</td>
<td>The Anti-Trafficking Savior Complex: Saints, Sinners, and Modern-Day Slavery</td>
</tr>
<tr>
<td>AMST 1601</td>
<td>Health and Healing in American History (STS 1110, GNSS 1960B)</td>
</tr>
<tr>
<td>CLPS 0710</td>
<td>The Psychology and Philosophy of Happiness (PHIL 0650)</td>
</tr>
<tr>
<td>COLT 0610Y</td>
<td>Women’s Writing in the Arab World</td>
</tr>
<tr>
<td>COLT 1810P</td>
<td>Literature and Medicine</td>
</tr>
<tr>
<td>COST 0032</td>
<td>Music and Meditation</td>
</tr>
<tr>
<td>COST 0100</td>
<td>Introduction to Contemplative Studies</td>
</tr>
<tr>
<td>ENGL 1030C</td>
<td>Writing Science</td>
</tr>
<tr>
<td>ENGL 1140D</td>
<td>Writing Diversity: A Workshop</td>
</tr>
<tr>
<td>ETHN 1750B</td>
<td>Treaty Rights and Food Fights: Eating Local in Indian Country</td>
</tr>
<tr>
<td>GNSS 0090C</td>
<td>Reproductive Health: Science and Politics</td>
</tr>
<tr>
<td>GNSS 0120</td>
<td>Introduction to Gender and Sexuality Studies</td>
</tr>
<tr>
<td>HISP 0490A</td>
<td>Spanish for Health Care Workers</td>
</tr>
<tr>
<td>HISP 0750Q</td>
<td>Health, Illness and Medicine in Spanish and Spanish American Literature and Film</td>
</tr>
<tr>
<td>HIST 0150H</td>
<td>Foods and Drugs in History</td>
</tr>
<tr>
<td>HIST 0270B</td>
<td>From the Columbian Exchange to Climate Change: Modern Global Environmental History</td>
</tr>
<tr>
<td>HIST 0286A</td>
<td>History of Medicine I: Medical Traditions in the Old World Before 1700</td>
</tr>
<tr>
<td>HIST 0286B</td>
<td>History of Medicine II: The Development of Scientific Medicine in Europe and the World</td>
</tr>
<tr>
<td>HIST 0537B</td>
<td>Tropical Delights: Imagining Brazil in History and Culture</td>
</tr>
<tr>
<td>HIST 1080</td>
<td>Humanitarianism and Conflict in Africa</td>
</tr>
<tr>
<td>HIST 1830M</td>
<td>From Medieval Bedlam to Prozac Nation: Intimate Histories of Psychiatry and Self</td>
</tr>
<tr>
<td>HIST 1960Q</td>
<td>Medicine and Public Health in Africa</td>
</tr>
<tr>
<td>HIST 1977I</td>
<td>Gender, Race, and Medicine in the Americas</td>
</tr>
</tbody>
</table>

**Total Credits: 12**

### Requirements for Classes of 2021 and 2022

1. **Core Courses:** (non-substitutable; 4 required for honors, 5 for non-honors)
   - **PHP 0310** Health Care in the United States
     - This course is best taken as a freshman or sophomore.
   - **PHP 0320** Introduction to Public Health
     - This course is a prerequisite to the Fundamentals of Epidemiology (PHP 0850) and is best taken as a freshman or sophomore.
   - **PHP 0850** Fundamentals of Epidemiology
     - This course is best taken by end of junior year before PHP 1910, Senior Seminar.
   - **PHP 1501** Essentials of Data Analysis
     - This course is best taken by end of junior year before PHP 1910, Senior Seminar.
   - **PHP 1910** Public Health Senior Seminar
     - This course is required for all non-honors seniors. PHP 0320 and PHP 0310 are required prerequisites.

2. **Environmental Health and Policy (Select one of the following):**
   - **PHP 1101** World of Food: Personal to Global Perspectives on Nutrition, Agriculture and Policy
   - **PHP 1700** Current Topics in Environmental Health
   - **PHP 1710** Climate Change and Human Health
   - **AMST 1700I** Community Engagement with Health and the Environment
   - **BIOL 1820** Environmental Health and Disease
   - **ENVS 0705** Equity and the Environment: Movements, Scholarship, Solutions
   - **ENVS 1580** Environmental Stewardship and Resilience in Urban Systems

3. **Health, Health Care Systems and Policy (Select one of the following):**
   - **PHP 0650** From Manufacturer to Patient: Why is the Cost of Prescription Drugs So High?
   - **PHP 1070** The Burden of Disease in Developing Countries
   - **PHP 1100** Comparative Health Care Systems
   - **PHP 1802S** Human Security and Humanitarian Response: Increasing Effectiveness and Accountability
   - **PHP 1820** Designing Education for Better Prisoner and Community Health
   - **ECON 1360** Health Economics
   - **IAPA 1804E** Health Policy Challenges

4. **Social and Behavioral Science for Prevention (Select one of the following):**
   - **PHP 1400** HIV/AIDS in Africa: A Multidisciplinary Approach to Support HIV/AIDS Care and Treatment Programs
   - **PHP 1540** Alcohol Use and Misuse
   - **PHP 1600** Obesity in the 21st Century: Causes, Consequences and Countermeasures
5. Biology (Select one of the following) 1

Note that AP Biology does not exempt students from this requirement. Most students will likely take BIOL 0200. Students who place out of BIOL 0200 with AP credit can choose one of the other four (4) courses.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 0200</td>
<td>The Foundation of Living Systems</td>
</tr>
<tr>
<td>BIOL 0470</td>
<td>Genetics</td>
</tr>
<tr>
<td>BIOL 0510</td>
<td>Introductory Microbiology</td>
</tr>
<tr>
<td>BIOL 0530</td>
<td>Principles of Immunology</td>
</tr>
<tr>
<td>BIOL 0800</td>
<td>Principles of Physiology</td>
</tr>
</tbody>
</table>

6. Humanities/Fine Arts/Humanistic Social Sciences Course for Public Health (Select one of the following) 1

<table>
<thead>
<tr>
<th>Course</th>
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<td>AMST 1600C</td>
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<td>AMST 1601</td>
<td>Health and Healing in American History</td>
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<tr>
<td>COST 0100</td>
<td>Introduction to Contemplative Studies</td>
</tr>
<tr>
<td>ENTH 1750B</td>
<td>Treaty Rights and Food Fights: Eating Local in Indian Country</td>
</tr>
<tr>
<td>ETHN 1890J</td>
<td>Native American Environmental Health Movements</td>
</tr>
<tr>
<td>GNSS 0090C</td>
<td>Reproductive Health: Science and Politics</td>
</tr>
<tr>
<td>GNSS 0120</td>
<td>Introduction to Gender and Sexuality Studies</td>
</tr>
<tr>
<td>GNSS 1961H</td>
<td>Literary Imaginations of the Law: Human Rights and Literature</td>
</tr>
<tr>
<td>HISP 0490A</td>
<td>Spanish for Health Care Workers</td>
</tr>
<tr>
<td>HISP 0750Q</td>
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<td>From Medieval Bedlam to Prozac Nation: Intimate Histories of Psychiatry and Self</td>
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<tr>
<td>HIST 1977I</td>
<td>Gender, Race, and Medicine in the Americas</td>
</tr>
<tr>
<td>HIST 1960Q</td>
<td>Medicine and Public Health in Africa</td>
</tr>
<tr>
<td>HIST 1972H</td>
<td>U.S. Human Rights in a Global Age</td>
</tr>
<tr>
<td>HMAN 1970G</td>
<td>International Perspectives on NGOs, Public Health, and Health Care Inequalities</td>
</tr>
</tbody>
</table>

LACA 1503H | Sexuality, Human Rights and Health: Latin American Perspective and Brazilian Experiences |
PHIL 0060 | Modern Science and Human Values |
PHIL 0520 | Global Justice |
POBS 1501E | Histories of Global Health from Lusophone Africa: Biomedical Actions in Angola, Mozambique, Guinea |
TAPS 1281W | Arts and Health: Theory |

7. General Electives (Class of 2021: Select two) 2

General electives may be selected from: A. All PHP and BIOL course offerings; B. the approved content area electives (#2, #3, #4, and #5) listed above; or C. the approved general electives listed below. No more than one (1) BIOL course can count as a general elective.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHP 1400</td>
<td>HIV/AIDS in Africa: A Multidisciplinary Approach to Support HIV/AIDS Care and Treatment Programs</td>
</tr>
<tr>
<td>PHP 1680I</td>
<td>Pathology to Power: Disability, Health and Community</td>
</tr>
<tr>
<td>AFRI 1060W</td>
<td>Policy, Culture and Discourse that Shape Health and Access to Healthcare</td>
</tr>
<tr>
<td>AMST 1601</td>
<td>Health and Healing in American History</td>
</tr>
<tr>
<td>AMST 1906P</td>
<td>Food in American Society and Culture</td>
</tr>
<tr>
<td>ANTH 0110</td>
<td>Anthropology and Global Social Problems: Environment, Development, and Governance</td>
</tr>
<tr>
<td>ANTH 0300</td>
<td>Culture and Health</td>
</tr>
<tr>
<td>ANTH 1020</td>
<td>AIDS in Global Perspective</td>
</tr>
<tr>
<td>ANTH 1242</td>
<td>Bioethics and Culture</td>
</tr>
<tr>
<td>ANTH 1300</td>
<td>Anthropology of Addictions and Recovery</td>
</tr>
<tr>
<td>ANTH 1310</td>
<td>International Health: Anthropological Perspectives</td>
</tr>
<tr>
<td>BIOL 0030</td>
<td>Principles of Nutrition (Human Biology/Physiology course)</td>
</tr>
<tr>
<td>BIOL 0040</td>
<td>Nutrition for Fitness and Physical Activity</td>
</tr>
<tr>
<td>BIOL 0140K</td>
<td>Conservation Medicine</td>
</tr>
<tr>
<td>BIOL 0180</td>
<td>The Biology of AIDS</td>
</tr>
<tr>
<td>BIOL 0190E</td>
<td>Botanical Roots of Modern Medicine</td>
</tr>
<tr>
<td>BIOL 0200</td>
<td>The Foundation of Living Systems (Human Biology/Physiology course)</td>
</tr>
<tr>
<td>BIOL 0470</td>
<td>Genetics (Human Biology/Physiology course)</td>
</tr>
<tr>
<td>BIOL 0530</td>
<td>Principles of Immunology (Human Biology/Physiology course)</td>
</tr>
<tr>
<td>BIOL 0600</td>
<td>Principles of Physiology (Human Biology/Physiology course)</td>
</tr>
<tr>
<td>BIOL 0860</td>
<td>Diet and Chronic Disease</td>
</tr>
<tr>
<td>BIOL 0920A</td>
<td>Controversies in Medicine (Human Biology/Physiology course)</td>
</tr>
<tr>
<td>BIOL 1920C</td>
<td>Social Contexts of Disease</td>
</tr>
<tr>
<td>CLPS 0700</td>
<td>Social Psychology</td>
</tr>
<tr>
<td>CLPS 1700</td>
<td>Abnormal Psychology</td>
</tr>
<tr>
<td>CLPS 1783</td>
<td>Nudge: How to Use Social Psychology to Create Social Change</td>
</tr>
<tr>
<td>ECON 0510</td>
<td>Development and the International Economy</td>
</tr>
<tr>
<td>EDUC 0800</td>
<td>Introduction to Human Development and Education</td>
</tr>
</tbody>
</table>
The Undergraduate Concentration in Statistics is administered by the Department of Biostatistics and leads to a Sc.B. degree. To ensure deep rigorous understanding of the foundations and main methods of analysis in statistics, the program is composed of three parts. The first part entails foundations in mathematics and computing, combined with an introduction to statistical thinking and practice. The second part includes four core courses that provide a comprehensive account of the fundamentals of statistical theory and data analysis. The third part delves into more advanced material covering important areas of statistical methodology. The Concentration prepares students for careers in industry and government, for graduate study in statistics or biostatistics and other sciences, as well as for professional study in law, medicine, business, or public administration. The undergraduate concentration guide is available here (https://www.brown.edu/academics/public-health/biostatistics/undergraduate-statistics-concentration/).

The Bachelor of Science degree in Statistics is designed to provide foundations that include basic statistical concepts and methodologies, and to expose students to the role of statistical thinking and analysis in interdisciplinary research and in the public sphere. To ensure deep rigorous understanding of the foundations and main methods of analysis in statistics, the program is composed of three parts: a) foundations in mathematics and computing, combined with an introduction to statistical thinking and practice; b) four core courses on the fundamentals of statistical theory and data analysis; and c) more advanced material covering important areas of statistical methodology. A capstone project involving substantial data analysis or focused on methodology/theory is required. Students also have opportunities to acquire practical experience in study design, data management, and statistical analysis by working as undergraduate research assistants in projects in one of the participating academic departments or Research Centers at Brown.

The Concentration is based on several premises: that statistics is a scientific discipline in its own right, with specialized methodologies and body of knowledge; that it is essentially concerned with the art and science of data analysis; and that it is best taught in conjunction with specific, substantive applications. To this end, the Concentration is designed to provide foundations that include basic statistical concepts and methodologies, and to expose students to the role of statistical thinking and analysis in interdisciplinary research and in the public sphere. The Concentration prepares students for careers in industry and government, for graduate study in statistics or biostatistics and other sciences, as well as for professional study in law, medicine, business, or public administration. The undergraduate concentration guide is available here (https://www.brown.edu/academics/public-health/biostatistics/undergraduate-statistics-concentration/).

The program requires thirteen one-semester courses. The required courses are as follows:

### Level I: Foundations in Mathematics - Calculus

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 0100</td>
<td>Introductory Calculus, Part II</td>
</tr>
<tr>
<td>MATH 0180</td>
<td>Intermediate Calculus</td>
</tr>
</tbody>
</table>

### Level I: Foundations in Mathematics - Linear Algebra

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 0520</td>
<td>Linear Algebra</td>
</tr>
</tbody>
</table>

### Computing

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>APMA 0160</td>
<td>Introduction to Computing Sciences</td>
</tr>
<tr>
<td>or CSCI 0040</td>
<td>Introduction to Scientific Computing and Problem Solving</td>
</tr>
</tbody>
</table>

### Introduction to Statistical Thinking and Practice

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHP 1501</td>
<td>Essentials of Data Analysis</td>
</tr>
</tbody>
</table>

With the approval of the Director of the Statistics Concentration, one of the following courses may serve as replacement:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOC 1100</td>
<td>Introductory Statistics for Social Research</td>
</tr>
<tr>
<td>ECON 1620</td>
<td>Introduction to Econometrics</td>
</tr>
</tbody>
</table>
The MPH Program has a 14 course requirement (12 standard courses and 2 half courses). In addition to the core courses listed below (4 standard and 2 half courses), MPH students must complete 5 concentration courses and 3 general MPH electives.

The School of Public Health
The Brown MPH has a singular purpose: to train leaders in public health who are armed with the skills to conduct research, bring about policy change, and positively affect the health of populations. The program includes an internship, a thesis, and the option of customizing your MPH with one of several concentrations.

Prospective students will be able to obtain Advanced Placement credit for the requirements in mathematics. Students who have already completed an introductory course in statistics will be granted permission to proceed to Level II core courses if they meet the prerequisites in mathematics and computing.

**PHP 0100:** As part of the capstone course or thesis, students should complete an online course, PHP 0100, at their own pace. This course is a requirement and is meant to give a broad overview of public health and computing.

**Senior Thesis:** A senior honors thesis is not a requirement for graduation, but concentrators who choose to write one are required to write a manuscript that describes a major project of statistical data analysis that they performed or a simulation study to evaluate the performance of a statistical method. Students that decide to write an honor thesis will generally integrate their capstone project into their thesis. Generally, writing a senior thesis includes two semesters of independent study (PHP 1970/1980). Students who are in a double concentration in public health are exempt from this course.

**Study Abroad/Study Away:** Up to two courses taken elsewhere (study abroad or other transfer) may be applied to required courses. Meet with a concentration adviser to discuss; provide a syllabus for each course to be considered for transfer to your concentration plan.

The program is administered by the Department of Biostatistics, located at 121 South Main Street, 7th floor. For additional information please contact: Roee Gutman, Box G-S-121-7; Telephone: 401-863-2682; Fax: 401-863-9182; e-mail: roee.gutman@stat.brown.edu

**Master of Public Health Graduate Program**

The Brown MPH has a singular purpose: to train leaders in public health who are armed with the skills to conduct research, bring about policy change, and positively affect the health of populations. The program includes an internship, a thesis, and the option of customizing your MPH with one of several concentrations.

The MPH Program has a 14 course requirement (12 standard courses and 2 half courses). In addition to the core courses listed below (4 standard and 2 half courses), MPH students must complete 5 concentration courses and 3 general MPH electives. For further information on program curriculum, please visit: https://www.brown.edu/academics/public-health/mph/curriculum (https://www.brown.edu/academics/public-health/mph/curriculum/).

### Core Courses in Theory and Data Analysis

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>APMA 1710</td>
<td>Recent Applications of Probability and Statistics</td>
</tr>
<tr>
<td>APMA 1860</td>
<td>Graphs and Networks</td>
</tr>
<tr>
<td>APMA 2610</td>
<td>Recent Applications of Probability and Statistics</td>
</tr>
<tr>
<td>ENGN 2520</td>
<td>Pattern Recognition and Machine Learning</td>
</tr>
<tr>
<td>CLPS 1292</td>
<td>Introduction to Programming for the Mind, Brain and Behavior</td>
</tr>
<tr>
<td>CLPS 1492</td>
<td>Computational Cognitive Neuroscience</td>
</tr>
<tr>
<td>ECON 1360</td>
<td>Health Economics</td>
</tr>
<tr>
<td>ECON 1630</td>
<td>Mathematical Econometrics I</td>
</tr>
<tr>
<td>ECON 1640</td>
<td>Mathematical Econometrics II</td>
</tr>
<tr>
<td>ECON 1660</td>
<td>Big Data</td>
</tr>
<tr>
<td>MATH 1810A</td>
<td>Applied Algebraic Topology</td>
</tr>
</tbody>
</table>

### Electives in Social Science and Biostatistics (Students must choose 2)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOC 1120</td>
<td>Market and Social Surveys</td>
</tr>
<tr>
<td>SOC 1340</td>
<td>Principles and Methods of Geographic Information Systems</td>
</tr>
<tr>
<td>SOC 2230</td>
<td>Techniques of Demographic Analysis</td>
</tr>
<tr>
<td>CSCI 1420</td>
<td>Machine Learning</td>
</tr>
<tr>
<td>CSCI 1810</td>
<td>Computational Molecular Biology</td>
</tr>
<tr>
<td>CSCI 1820</td>
<td>Algorithmic Foundations of Computational Biology</td>
</tr>
<tr>
<td>CSCI 1951A</td>
<td>Data Science</td>
</tr>
<tr>
<td>PHP 0850</td>
<td>Fundamentals of Epidemiology</td>
</tr>
<tr>
<td>PHP 2030</td>
<td>Clinical Trials Methodology</td>
</tr>
<tr>
<td>PHP 2120</td>
<td>Introduction to Methods in Epidemiologic Research</td>
</tr>
<tr>
<td>PHP 2200</td>
<td>Intermediate Methods in Epidemiologic Research</td>
</tr>
<tr>
<td>PHP 2515</td>
<td>Fundamentals of Probability and Statistical Inference</td>
</tr>
<tr>
<td>PHP 2520</td>
<td>Statistical Inference I</td>
</tr>
<tr>
<td>PHP 2530</td>
<td>Bayesian Statistical Methods</td>
</tr>
<tr>
<td>PHP 2550</td>
<td>Practical Data Analysis</td>
</tr>
<tr>
<td>PHP 2580</td>
<td>Statistical Inference II</td>
</tr>
<tr>
<td>PHP 2602</td>
<td>Analysis of Lifetime Data</td>
</tr>
<tr>
<td>PHP 2601</td>
<td>Linear Models</td>
</tr>
<tr>
<td>PHP 2610</td>
<td>Causal Inference and Missing Data</td>
</tr>
<tr>
<td>PHP 2620</td>
<td>Statistical Methods in Bioinformatics, I</td>
</tr>
<tr>
<td>APMA 1070</td>
<td>Quantitative Models of Biological Systems</td>
</tr>
<tr>
<td>APMA 1080</td>
<td>Inference in Genomics and Molecular Biology</td>
</tr>
<tr>
<td>APMA 1200</td>
<td>Operations Analysis: Probabilistic Models</td>
</tr>
<tr>
<td>APMA 1690</td>
<td>Computational Probability and Statistics</td>
</tr>
<tr>
<td>APMA 1710</td>
<td>Information Theory</td>
</tr>
</tbody>
</table>

### Concentration Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>APMA 1650</td>
<td>Statistical Inference I</td>
</tr>
<tr>
<td>or APMA 1655</td>
<td>Honors Statistical Inference I</td>
</tr>
<tr>
<td>APMA 1660</td>
<td>Statistical Inference II</td>
</tr>
<tr>
<td>OR</td>
<td>MATH 1610</td>
</tr>
<tr>
<td>MATH 1620</td>
<td>Mathematical Statistics</td>
</tr>
<tr>
<td>PHP 1510</td>
<td>Principles of Biostatistics and Data Analysis</td>
</tr>
<tr>
<td>OR</td>
<td>PHP 2510</td>
</tr>
<tr>
<td>PHP 1560</td>
<td>Statistical Programming in R</td>
</tr>
<tr>
<td>OR</td>
<td>PHP 2560</td>
</tr>
<tr>
<td>AND</td>
<td>PHP 1511</td>
</tr>
<tr>
<td>OR</td>
<td>PHP 2511</td>
</tr>
<tr>
<td>PHP 1970</td>
<td>Independent Study</td>
</tr>
</tbody>
</table>

## Total Credits

- **2** Core Courses in Theory and Data Analysis
- **2** Electives in Social Science and Biostatistics (Students must choose 2)
- **1** Capstone Project
- **13** Total Credits

For further information on program requirements, please visit: https://www.brown.edu/academics/public-health/mph/curriculum.
MPH Program Core Course Requirements

MPH Core Course Requirements

Students must complete one of the following 2 course sequences in Biostatistics and Applied Data Analysis:

Sequence 1:
- PHP 2507 Biostatistics and Applied Data Analysis I
- PHP 2508 Biostatistics and Applied Data Analysis II

Sequence 2:
- PHP 2510 Principles of Biostatistics and Data Analysis
- PHP 2511 Applied Regression Analysis

Students must complete one of the following Epidemiology courses:
- PHP 2120 Introduction to Methods in Epidemiologic Research
- PHP 2150 Foundations in Epidemiologic Research Methods

Students must complete the following course:
- PHP 2355 Designing and Evaluating Public Health Interventions

Students must complete the following two half credit courses:
- PHP 2071 Applied Public Health: Systems and Practice
- PHP 2072 Applied Public Health: Policy, leadership and communication

A five-year integrated Undergraduate/MPH (UG/MPH) program is also offered. This rigorous program in professional public health education is open to Brown undergraduates in any concentration. Students accepted into the program will complete the degree requirements for both their undergraduate degree and an MPH degree in a five-year period. Students must take 13 total course credits toward the MPH (5.5 during their first four years and 7.5 courses in the fifth year). For more information, please visit: https://www.brown.edu/academics/public-health/mpm/ugmph

Dual Degree Program: Master of Public Health (MPH) and Master of Public Affairs (MPA)

The School of Public Health and the Watson Institute for International and Public Affairs also offer a dual-degree Master of Public Health (MPH) and Master of Public Affairs (MPA) program. Emphasizing a learning by doing approach, this rigorous program will offer highly qualified applicants the opportunity to gain training in public health and public policy to prepare them to address the critical health policy issues in the United States and throughout the world. The dual degree program starts in summer and includes 20 courses (14 full courses and 6 half courses) as well as an internship and a master's thesis. Students will benefit from the rich academic resources at the Watson Institute and the School of Public Health, as well as their extensive applied learning programs in Rhode Island, as well as throughout the United States and the world.

Program and admissions information can be found here: https://www.brown.edu/academics/public-health/mph/mpm-mpa

Clinical and Translational Research Graduate Program

The Master of Science in Clinical and Translational Research (CTR) is designed primarily for physicians, doctorally-trained basic scientists, and students in doctoral programs or medical school. The goal of the Master's in Clinical and Translational Research Program is to train clinicians and basic scientists to extend basic scientific research into the clinical arena, ultimately leading to improvements in individual and population health. By translating basic research into improved clinical outcomes, researchers and clinicians are able to provide new treatments to patients more efficiently and quickly.

Full details on admission and program requirements, please visit https://www.brown.edu/academics/public-health/ctr/masters
For more information on admission, please visit: https://www.brown.edu/academics/public-health/admissions (https://www.brown.edu/academics/public-health/admissions/)

**Certificate in CTR Course Requirements**

**Master’s in CTR Requirements**

**Intro to Research Methods (Students must complete one of the following two courses)**
- PHP 2120 Introduction to Methods in Epidemiologic Research
- PHP 2150 Foundations in Epidemiologic Research Methods

**Biostatistics and Applied Data Analysis (Students must complete one of the following 2 courses sequences)**

Sequence 1:
- PHP 2507 Biostatistics and Applied Data Analysis I
- PHP 2508 BioStatistics and Data Analysis II

Or

Sequence 2:
- PHP 2510 Principles of Biostatistics and Data Analysis
- PHP 2511 Applied Regression Analysis

**Advanced Research Methods (Students must complete two of the following courses)**
- PHP 1560 Statistical Programming in R
- PHP 2030 Clinical Trials Methodology
- PHP 2040 Survey Research Methods
- PHP 2060 Qualitative Methods in Health Research
- PHP 2180 Interpretation and Application of Epidemiology
- PHP 2410E Medicare: A Data Based Policy Examination
- PHP 2415 Introduction to Evidence-based Medicine
- PHP 2465A Introduction to Health Decision Analysis
- PHP 2507 Biostatistics and Applied Data Analysis I
- PHP 2508 BioStatistics and Data Analysis II

**Scientific Writing (Students must complete the following course)**
- PHP 2090 Research Grant Writing for Public Health

**Topics in CTR (Students must enroll in this half credit course two times to fulfill the one credit requirement)**
- PHP 2470 Topics in Clinical, Translational and Health Services Research

Students must complete two CTR electives found at https://www.brown.edu/academics/public-health/education-training/masters/clinical-and-translational-research/scm-ctr-electives

The Certificate in Clinical and Translational Research is designed for trainees who need a more structured and intensive experience than can be obtained from taking one or two courses as a special/non-degree student, but who do not need or are not in a position to pursue the full Master’s Degree. Students in the Certificate Program in Clinical and Translational Research must complete four courses. Full details on the Certificate in CTR can be found at https://www.brown.edu/academics/public-health/ctr/certificate (https://www.brown.edu/academics/public-health/ctr/certificate/).

**Certificate in CTR Course Requirements**

**Research Methods (Students must complete one of the following courses)**
- PHP 2120 Introduction to Methods in Epidemiologic Research
- PHP 2150 Foundations in Epidemiologic Research Methods
- PHP 2300 Research Methods in Behavioral Science

Biostatistics and Applied Data Analysis (Students must complete both of the following courses)
- PHP 2507 Biostatistics and Applied Data Analysis I
- PHP 2508 BioStatistics and Data Analysis II

Students must complete one elective from the list found at https://www.brown.edu/academics/public-health/ctr/certificate

**Health Services Research Graduate Program**

The graduate program in Health Services Research offers comprehensive course work leading to the Doctor of Philosophy (Ph.D.) degree. The program seeks to develop scientists experienced in the use of state-of-the-art experimental and non-experimental research methods to investigate how people obtain access to health care, the components and impacts of health care costs, and what happens to patients as a result of care. Health services research aims to identify the most effective ways to organize, manage, finance, and deliver high quality care to benefit population health.

For more information on admission and program requirements, please visit: https://www.brown.edu/graduateprograms/health-services-research-phd (https://www.brown.edu/graduateprograms/health-services-research-phd/)

**Global Public Health Graduate Program**

As with all educational programs in the School of Public Health, our Global Public Health SoM students learn public health by doing public health. Course work comes alive during an international fieldwork experience that fosters deep engagement and understanding of a global public health location. Academic and hands-on experiences culminate with a thesis project. Most full-time students complete the degree in two years, fulfilling the fieldwork requirement during the summer between academic years 1 and 2. The degree may be completed on a part-time basis.

- 12 courses, including 9 required courses and 3 electives
- 8-week international fieldwork experience
- Thesis project

For further information on admission and program requirements, please visit: https://www.brown.edu/academics/gradschool/programs/global-public-health (https://www.brown.edu/academics/gradschool/programs/global-public-health/

The School is no longer accepting applications for the Sc.M. in Global Public Health. Students interested in studying Global Public Health at the master’s level are strongly encouraged to apply to our research-intensive MPH program (https://www.brown.edu/academics/public-health/mph/).

- PHP 2710 Interdisciplinary Perspectives on Disability and Death in the Global South 1
- PHP 2730 Including the Excluded: Global Health Ethics 1
- PHP 2507 Biostatistics and Applied Data Analysis I 1
- PHP 2120 Introduction to Methods in Epidemiologic Research 1
- PHP 2720 Implementing Public Health Programs and Interventions in the Global South 1
- PHP 2740 Learning Global Health by Doing Global Health: Global Health Thesis Seminar 1
- PHP 2508 BioStatistics and Data Analysis II 1
- PHP 2750 Communicating and Disseminating Global Public Health Research 1
- PHP 2760 Critical Perspectives in Global Health 1
- Plus 3 electives 3
- Total Credits 12
Health Care Leadership Graduate Program

Requirements for the Master of Science in Healthcare Leadership

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCL 2010</td>
<td>Healthcare Policy: Yesterday, Today, and Tomorrow</td>
<td>1</td>
</tr>
<tr>
<td>HCL 2000</td>
<td>Strategic Planning and Value Creation in Integrated Healthcare</td>
<td>1</td>
</tr>
<tr>
<td>HCL 2020</td>
<td>Leadership and Marketing Skills for Healthcare Transformation</td>
<td>1</td>
</tr>
<tr>
<td>HCL 2060</td>
<td>Quality Improvement and the Healthcare Learning Organization</td>
<td>1</td>
</tr>
<tr>
<td>HCL 2070</td>
<td>Financial Decisions in the Changing Healthcare Landscape</td>
<td>1</td>
</tr>
<tr>
<td>HCL 2080</td>
<td>The Critical Challenge: Capstone Project</td>
<td>1</td>
</tr>
<tr>
<td>HCL 2090</td>
<td>Leadership and Professional Development</td>
<td>.5</td>
</tr>
<tr>
<td>Health Economics</td>
<td></td>
<td>.5</td>
</tr>
<tr>
<td>Health Law</td>
<td></td>
<td>.5</td>
</tr>
<tr>
<td>Statistics and Epidemiology</td>
<td></td>
<td>.5</td>
</tr>
<tr>
<td>Data Analytics</td>
<td></td>
<td>.5</td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>9.5</td>
</tr>
</tbody>
</table>

Courses

BioMed-Community Health

PHP 0310. Health Care in the United States.
Introduction to the health care delivery system. An overview of the U.S. health care financing, delivery and regulatory system. Considers the interaction between paying for and providing and assuring the quality of health services; changes in one component of the system inevitably affect the others. Addresses the balance between employer funded health insurance, publicly funded health insurance and the consequences of not being insured. Six discussion sections will be arranged. Open to undergraduates only. This is a core class for the concentration in public health.

PHP 0320. Introduction to Public Health.
An introductory overview of the U.S. Public Health System with an emphasis on the core functions of public health, challenges and strategies for working with communities, and specific health issues that impact the health of the population. Presents a comprehensive overview of the environmental and behavior factors associated with health promotion and disease prevention.

PHP 0330. Public Health Policy.
PHP 0330 provides a comprehensive overview of the function, aims, methods, implementation, and evaluation of public health policy in the U.S. and globally. The course grounds public health policy within the broader framework of public policy, examining key legal, ethical, economic, and political issues, as well as issues grounded specifically in public health, paying particular attention to the tensions between policy and personal freedoms. PHP 0330 assumes that the pursuit of public health has two essential, conjoined goals: to reduce the burden of human disease and disability, and to eliminate health disparities, taking the position that health equity is a non-negotiable right and must be in the forefront of policy assessment, development, implementation, and evaluation. Although the course will focus on mature public health policy in the United States, it will do so within two broad perspectives, historical and global.
Course provides an introduction to the examination of health disparities in the U.S. Through assigned readings, lectures, guest speakers, and class discussions—this course will provide a broad overview of health disparities in the United States and examine them through intersecting structural and social determinants (e.g., race and ethnicity; gender; immigration status; socioeconomic position; age; sexual orientation; policy). This course also examines how stigma, residential segregation, implicit bias and the debates around genetics also contribute to health disparities. Lastly, we will also critically delve into the ethical dimensions, the role of social networks as well as behavioral health and public policy interventions. Community leaders will be invited to discuss their respective organizations, discuss ongoing community-university partnerships, advocacy, and networking.

PHP 0650. From Manufacturer to Patient: Why is the Cost of Prescription Drugs So Darn High?
In 2015, estimates of drug spend in the United States was about $457 billion and could be as high as $610 billion by 2021. The reasons for the continued escalating costs of prescription drugs are unclear. In this course we will examine the complex chain of discounts, rebates and markups that impact the price of a prescription drug from the manufacturer’s list price to the time it is dispensed to the patient. We will examine the role of major stakeholders in the drug supply chain including the manufacturer, wholesalers and distributors, pharmacy benefit managers and health plans. PHP 0310, Healthcare in the United States, is a prerequisite. Students who feel they have adequate background and understanding of health insurance, Medicare and Medicaid and model of care delivery and financing but have not taken PHP 0310 should contact instructor for override. Students must have basic knowledge of terms associated with managed care and healthcare issues routinely written about or featured in the news.

PHP 0850. Fundamentals of Epidemiology.
As the cornerstone of public health, a strong foundation in epidemiology provides students with the ability to investigate, clarify and criticize claims of disease causation. This course provides students with a foundation in basic epidemiologic concepts and methods. Key measures of disease occurrence and effects used in epidemiology will be discussed; strengths and weaknesses of alternative epidemiologic study designs will be examined. Interpreting epidemiologic evidence to inform public health policy and practice will be emphasized throughout the course.
Open to Public Health concentrators and others by permission; Class limit 80.

Fall PHP0850  S01  17105  TTh  2:30-3:50(12)  (S. Buka)

PHP 1070. The Burden of Disease in Developing Countries.
Defines and critically examines environmental, epidemiologic, demographic, biomedical, and anthropological perspectives on health and disease in developing countries. Emphasis on changes in the underlying causes of morbidity and mortality during economic development. Focuses on the biosocial ecology of diseases. Required major term paper worth 50% of final grade is scholarly centerpiece of course. Weekly discussion sections and small group research projects supplement the two exams and term paper. Guest lecturers cover different diseases and public health perspectives. Enrollment limited to 65.

Fall PHP1070  S01  17106  TTh  9:00-10:20(05)  (A. Harrison)

PHP 1100. Comparative Health Care Systems.
Focuses on principles of national health system organization and cross-national comparative analysis. Emphasizes application of comparative models to the analysis of health and health-related systems among nations at varying levels of economic development and health care reform. Addresses research questions related to population health and systems’ performance. Questionnaire completion required for Freshman and Sophomore students. Enrollment limited to 30.

Fall PHP1100  S01  17107  MW  8:30-9:50(09)  ‘To Be Arranged’

PHP 1101. World of Food: Personal to Global Perspectives on Nutrition, Agriculture and Policy
This course explores food and nutrition in the US and around the world through the lens of public health, economics, and agriculture. The online setting intentionally requires students to engage in and learn about their own community from perspectives likely not previously noticed. Students will read from many sources; will review documentary films; and will write for several audiences.

At the completion of this course, students will:
• Describe how nutrients are consumed through foods
• Explore food consumption in the US and abroad
• Describe US agricultural production techniques
• Propose policy changes to the current food system

Provides an introduction to the classification, epidemiology, etiology, treatment and potential prevention of psychiatric disorders from a population perspective. Reviews the magnitude and social burden associated with mental disorders worldwide and opportunities to enhance prevention and treatment. Covers concepts and methods used to study mental illness at the population level, including definitions of “normality” and “pathology”, current classification systems and measurement approaches to assess psychopathology and severity and cross-cultural issues. Covers the prevalence, risk factors, and etiology of major disorders of children, adolescents and adults, including autism spectrum disorders, attention deficit disorders, mood and anxiety disorders, schizophrenia and substance use disorders. PHP 0850 OR prior coursework in psychology, epidemiology, sociology or related fields.

The course is intended to challenge students from different disciplines to develop strategies to address the challenges of establishing and sustaining HIV/AIDS care and treatment programs in Africa. The course will begin with a general introduction to HIV/AIDS to provide a foundation wherein students will obtain a basic scientific and sociological understanding of the disease. Discussion topics on: the impact of AIDS, introducing antiretroviral therapy in Africa, monitoring and evaluating ARV therapy scale up and developing a country wide plan for a national laboratory system to support HIV/AIDS care and treatment will be facilitated through the use of case studies. Enrollment limited to 25 juniors and seniors. Graduate students with permission of instructor.

PHP 1480. Introduction To Public Health Economics.
This course builds an understanding of the healthcare delivery and financing systems from a health economics perspective. It will draw examples that illustrate the production of and demand for health, healthcare, and health insurance. The goals of the course are twofold. First, it will provide the basic intuition of the fundamental economic models such as health production, demand for healthcare and demand for insurance. Second, it will introduce key empirical findings in the public health economics literature. Emphasis will be placed on key theoretical insights as well as practical and public health policy implications.

PHP 1501. Essentials of Data Analysis.
This course covers the basic concepts of statistics and the statistical methods commonly used in the social sciences and public health with an emphasis on applications to real data. The first half of the course introduces descriptive statistics and the inferential statistical methods of confidence intervals and significance tests. The second half introduces bivariate and multivariate methods, emphasizing contingency table analysis, regression, and analysis of variance. This is designed to be a first course in Statistics. The course is intended for Public Health or Statistics concentrators. Others can register with instructor’s permission. There are no prerequisites.

Fall PHP1501  S01  17109  TTh  1:00-2:20(08)  (R. Gutman)
Fall PHP1501  L01  17110  M  2:00-2:50  (R. Gutman)
Fall PHP1501  L02  17111  W  1:00-1:50  (R. Gutman)
Fall PHP1501  L03  17112  F  9:00-9:50  (R. Gutman)
Fall PHP1501  L04  17113  F  10:00-10:50  (R. Gutman)
PHP 1510. Principles of Biostatistics and Data Analysis.
This course is intended to provide a basic foundation in the methods and applications of biostatistics, and is geared towards the students whose fields of study include a substantial statistical or quantitative component. Ideally, this course is the first in a two-part sequence (the sequel being PHP 1511: Applied Regression), designed to provide students in the public health, biological and life sciences with broad-based exposure to modern methods of biostatistical inference, in addition to an understanding of underlying mathematical principles and motivations. Priority given to students concentrating in Public Health and Statistics. All others with instructor permission.

Fall PHP1510 S01 17114 TTh 9:00-10:20(05) (S. Dunsiger)

This course provides a survey of regression techniques for outcomes common in public health data including continuous, binary, count and survival data. Emphasis is on developing a conceptual understanding of the application of these techniques to solving problems, rather than to the numerical details. Extensive use of the computer will be made for analysis of datasets.

PHP 1540. Alcohol Use and Misuse.
Reviews the epidemiology of alcohol use, abuse, and dependence and examines its neurobiological and behavioral underpinnings. Covers etiology including physiological, genetic, psychological and social cultural influences, and prevention, brief intervention and treatment considerations. Course background in psychology, sociology, or public health is recommended. Recommended prerequisites: PHP 0320 and CLPS 0010. Enrollment limited to 20 juniors, seniors, and graduate students.

Fall PHP1540 S01 17116 TTh 9:00-10:20(05) (J. Merrill)

PHP 1560. Statistical Programming in R.
Statistical computing is an essential part of analysis. Statisticians need not only be able to run existing computer software but understand how that software functions. Students will learn fundamental concepts - Data Management, Data types, Data cleaning and manipulation, databases, graphics, functions, loops, simulation and Markov Chain Monte Carlo through working with various statistical analysis. Students will learn to write code in an organized fashion with comments. This course will be taught in a "flipped" format. Students will watch a series of videos and work through some simple coding examples before coming to class.

Fall PHP1560 S01 17118 TTh 9:00-10:20(05) (A. Paul)

PHP 1600. Obesity in the 21st Century: Causes, Consequences and Countermeasures.
The scope of obesity knowledge is too large to cover during one single course, therefore we will focus primarily on obesity-related health outcomes, assessment of obesity, obesity epidemiology, social and behavioral correlates of obesity, obesity and stigma, policy and interventions across population groups. The readings for this course are multi-disciplinary in nature and integrate epidemiological, biological, sociological, political and philosophical perspectives. This course is specific to the United States and thusly all readings will reflect this contextual focus. Enrollment limited to 30.

PHP 1610. Tobacco, Disease and the Industry: cigs, e-cigs and more.
This class will help students gain knowledge about tobacco use and cigarette smoking, nicotine addiction, novel new products, and the tobacco industry. We will cover the link between smoking, disease, and death; smoking prevalence and nicotine dependence; novel products such as e-cigarettes and Modified Risk Tobacco Products; the role of the tobacco industry; behavioral and pharmacological smoking cessation treatments; community, organizational, and media campaigns; tobacco policy; and, global tobacco control. The course is designed as a seminar course emphasizing class discussion and debate, as well as in-depth discussion of the assigned readings. Suggested prerequisites PHP 0850, PHP 2120, or PHP 2150

PHP 1650. Race, Racism and Health.
The primary aim of this course is to expose students to state-of-the-science conceptual and methodological approaches to critically analyze and identify strategies to address racial and ethnic health disparities. A multidisciplinary approach using readings from disciplines such as sociology, medicine, and biology will be used to provide a foundation for examining scientific literature and conducting intervention research on racial and ethnic health disparities.

PHP 1680I. Pathology to Power: Disability, Health and Community.
This course offers a comprehensive view of health and community concerns experienced by people with disabilities. Guest speakers, and hands on field research involving interactions with people with disabilities will facilitate the students gaining a multi-layered understanding of the issues faced by people with disabilities and their families.

Fall PHP1680I S01 17122 W 3:00-5:30(10) (S. Skeels)

PHP 1680U. Intersectionality and Health Inequities.
This course examines health inequities in the U.S from an intersectionality perspective. Intersectionality is both a theory and methodology focused on the power dynamics between oppression and privilege and how various axes of social categories and systems interrelate on various and simultaneous levels. This framework critically examines how systemic injustice and social inequality transpires on a multidimensional basis. This course provides a broad overview of health disparities in the U.S., specifically, examining them through intersecting structural and social factors (e.g., race and ethnicity; gender; immigration status; socioeconomic position; age; sexual orientation; and the promise and limitations of public policy).

PHP 1690. Technology and Health Behavior Change.
Lifestyle behaviors like poor diet, low physical activity, drug/alcohol use, and poor medication use contribute to some of the top causes of morbidity and mortality globally, including heart disease, diabetes and many cancers. Changing these behaviors is difficult and requires substantial, long-term effort and commitment on the part of both patients and providers. This course is a survey of computing systems and technologies that are designed to help users make healthier choices. We will explore how and why these systems work, the theories behind them, and how to find/evaluate the evidence supporting them, using both popular industry products and more experimental programs as examples. Students interested in gaining hands-on experience with these technologies and learning more about the processes behind their features should take this course.

Fall PHP1690 S01 17676 Th 4:00-6:30(04) (T. Wray)

PHP 1700. Current Topics in Environmental Health.
This course is designed to introduce students to the field of environmental health, and demonstrate how environmental health is integrated into various aspects of our lives, both directly and indirectly. Topics to be covered include: toxic metals, vector-borne disease, food safety, water quality, radiation, pesticides, air quality, hazardous waste, risk assessment, and the role of the community in environmental health. Several topics will be presented by guest speakers so that students can learn from the expertise of professionals in the field. Enrollment limited to 65.

Fall PHP1700 S01 17127 TTh 10:30-11:50(13) (K. Kelsey)

PHP 1710. Climate Change and Human Health.
Global climate change is occurring and these changes have the potential to profoundly influence human health. This course provides students with a broad overview of the diverse impacts of projected climate change on human health, including effects of changing temperatures, extreme weather events, infectious and non-infectious waterborne threats, vector-borne disease, air pollution, the physical and built environment and policies to promote mitigation and adaptation. Students will explore multiple sides of controversial issues through lively and informed class discussions, writing exercises, and participation in a series of end-of-term debates. Enrollment is limited to 20 students.
Disasters, natural and anthropogenic, pose significant threats to human security. Effective humanitarian action is important for both short and long-term responses to complex emergencies. The array of factors contributing to the economic and human losses experienced in both natural disasters and complex humanitarian emergencies are vast and complicated, and the strategies employed to mitigate and heal the damage caused by these disturbances must be equal to the task. This course covers diverse topics including the role of NGOs, UN agencies, local governments, peacekeepers and military in humanitarian response; economic impact of humanitarian aid; the evidence base for humanitarian interventions.

PH 1820. Designing Education for Better Prisoner and Community Health.
This course will provide the needed background and context for understanding the multiple issues and challenges facing prisoners and the national justice and health systems that impact their lives. In addition to contextual background, students in this course will attain the knowledge and skills needed to develop a final practical, real world health communication/ intervention project that addresses one or more health literacy challenges facing people who are incarcerated and other low income, medically disenfranchised individuals. Students interested in taking the course must contact the professor directly for an application to obtain an override.

PH 1854. The Epidemiology and Control of Infectious Diseases.
Course objectives are to introduce students to methods and concepts in the study and control of infectious diseases. By the end of this course, students will have a solid foundation in the distribution, transmission, and pathogenesis of major infectious diseases that affect human populations. We will investigate methods to design and evaluate public health strategies to prevent or eliminate infectious diseases, including: outbreak investigation, disease surveillance, infection control, screening, and vaccination. The course is open to undergraduate students who have completed PHP 0320 or PHP 0850, and to graduate students who have completed or are concurrently enrolled in either PHP 2120 or PHP 2150.

PH 1880. Meditation, Mindfulness and Health.
This course provides an overview on the relation of meditation and mindfulness (the ability to attend in a nonjudgmental way to one’s own physical and mental processes during ordinary, everyday tasks) with various health outcomes and disease risk factors such as depression, anxiety, diet, substance use, and cardiovascular disease. Mechanisms by which mindfulness may influence health will be addressed. The course will assess studies in the field for methodological rigor, and students will be taught strengths and weaknesses of current research. Students will be taught various mindfulness practices including direct experience with mindfulness meditation.

PH 1885. Measuring Mindfulness.
Recently, the cover of Time magazine declared a "mindful revolution" due to its popularity and growing body of research suggesting that mindfulness may help to treat a number of health-related problems from general stress to anxiety to addiction. However, little is known about the underlying mechanisms of how it works. This course will investigate the many ways that mindfulness is measured (e.g. self-report, behavior, EEG, fMRI etc.), and use these as a doorway for our own experiential exploration of what mindfulness is for ourselves.

PH 1890. The Craving Mind.
We are creatures of habit. Driven by biological processes set up to help us survive, our minds are constantly craving experiences and substances— from smartphones to romance to alcohol—and this craving leads to habit formation. This course will explore the behavioral and mental processes that foster craving and consequent habit formation, the impact these have on individual and societal health, and how we can "hack" our own neurobiological reward circuitry using practices such as mindfulness, to foster greater health and wellbeing. Priority given to Public Health concentrators; all others with instructor permission.

PH 1900. Epidemiology of Disorders and Diseases of Childhood and Young Adulthood.
Students will learn about diseases and disorders of childhood and young adulthood, including allergies, autism, eating disorders, obesity, endometriosis, and migraines. Students will learn how these disorders are defined, how many youth are impacted, and the age-appropriate epidemiologic methods to study disorders and diseases during childhood, adolescence, and young adulthood, respectively. For the final project, students will pick a disease or disorder of interest that occurs during childhood, adolescence, or young adulthood, synthesize the results from multiple epidemiological studies, and concisely present this information in both a written report and an oral presentation.

The School of Public Health
Provides a theoretical and practical basis for measurement in health care. Introduces measurement theory, scale development, and criteria to be considered when choosing measures in clinical practice and research. Practical exercises include questionnaire development and a written research protocol for the development and validation of a new measure. Prerequisites: PHP 2120, 2130.

This is a graduate level course focused on maternal and child health in the United States. While some reference will be made to the experience in other countries, the focus of the course will be on the United States. A broad range of health conditions will be covered, with an emphasis on leading causes of mortality and morbidity. In addition, we will examine the range of programs designed to prevent or address important health threats.

Fall PHP2023 S01 17135 TTh 2:30-3:50(12) (P. Vivier)
Fall PHP2023 C01 17136 Th 4:00-5:30 (P. Vivier)

This overall goal of this course is to help students develop the knowledge, skills and perspectives necessary to make contributions in the field of maternal and child health, with a particular focus on community-based or community serving interventions, research and evaluation. This includes the short-term goal of helping students prepare for internship, thesis or capstone work and the long-term goal of providing training for students’ future career in the field of maternal and child health. In the course students will: expand their knowledge of current research in maternal and child health and explore the community context of the research; develop or refine a skill set that has applications in community-based interventions, research or evaluation; complete a community-based or community serving project as part of the Hassenfeld Child Health Innovation Institute’s Community of Learners.

PHP 2030. Clinical Trials Methodology.
We will examine the modern clinical trial as a methodology for evaluating interventions related to treatment, rehabilitation, prevention and diagnosis. Topics include the history and rationale for clinical trials, ethical issues, study design, protocol development, sample size considerations, quality assurance, statistical analysis, systematic reviews and meta-analysis, and reporting of results. Extensively illustrated with examples from various fields of health care research. Recommended prerequisites: introductory epidemiology and statistics. Pre-requisites: (PHP 2120 or PHP 2150) and either PHP 2508, 2510, or 2520. Open to graduate students only.

Fall PHP2030 S01 17137 M 1:00-3:30 (I. Gareen)

PHP 2040. Survey Research Methods.
Emphasizes the theory of sampling and survey methods and their application to public health research. Topics include: survey design and planning; principles of sampling and survey terminology; questionnaire construction; protection of human subjects; data collection (including interviewing and data coding procedures); and application, presentation, and evaluation of results. Suggested prerequisites: PHP 2120, and PHP 2508 or 2510. Open to graduate students only.

Fall PHP2040 S01 17140 W 3:00-5:30(10) (E. Belanger)

PHP 2060. Qualitative Methods in Health Research.
Introduces qualitative approaches to data collection and analysis in health research. Methods covered include: participant observation, key-informant interviews, focus groups, innovative data collection strategies, and non-obtrusive measures. Students will use applied projects to develop skills in: qualitative data collection and management, interviewing, transcript analysis using computerized software, triangulation between qualitative and quantitative data, and report preparation for qualitative studies. Enrollment limited to 20 graduate students.

Fall PHP2060 S01 17148 W 3:00-5:30(10) (E. Belanger)

Applied Public Health is a two-semester sequence of courses designed to give students the skills and experiences they need to master understanding public health and health care systems, policy in public health, leadership, communication, interprofessional practice, and systems thinking. This will be achieved through a combination of lectures, in class exercises, homework assignments, and practical experience in a public health setting. The first course in the sequence (PHP 2071) is taken in the Fall of your first year.

Fall PHP2071 S01 17139 T 1:00-2:20(08) (A. Gjelvik)

PHP 2090. Research Grant Writing for Public Health.
This course focuses on providing knowledge and experience in creating high quality public health research grant applications. Course objectives include developing significant and innovative scientific hypotheses, learning principles of effective written communication, and developing a research grant application suitable to submit for funding. Designed for Public Health School PhD students, post-doctoral fellows, and Masters students with advanced degrees (e.g. MD, PhD). Prerequisite: PHP 2120 or PHP 2150 or instructor permission.

Fall PHP2090 S01 17140 W 9:30-12:00 (J. Braun)

Epidemiology quantifies patterns and determinants of human population health, with a goal of reducing the burden of disease, injury, and disability. An intensive first course in epidemiological methods, students learn core principles of study design and data analysis through critiques of published epidemiological studies as well as hands on practice through weekly exercises and assignments. This is a graduate-level course aimed at masters and PhD students. The course is not open to first year students or sophomores but may be available for advanced undergraduates with the instructor’s permission.

Fall PHP2120 S01 17141 TTh 10:30-11:50(13) (M. Lurie)

This course provides basic principles of human biology and its applications to public health. Examples of biology topics include the cardiovascular system, endocrine system, immune system, nervous system, genetics, cancer, cardiovascular disease, HIV/AIDS, and depression. Examples of applied topics include strengths and weaknesses of using biomarkers, accuracy and precision of biological measures, quality assurance and quality control methods for using biomarkers for public health research. Mixed teaching methods are used, including small group discussions, problem-based learning and guest lectures. Prerequisite: PHP 2120 (may be taken concurrently) or instructor permission. Enrollment limited to 20 graduate students.

The overall objective of this course is to provide students with a strong foundation in epidemiologic research methods. This is the first of a two- or four-course sequence in epidemiologic methods aimed at students who expect to eventually conduct their own epidemiologic research. There will be a strong quantitative focus in this course. By the end of the foundations course, students should be sufficiently familiar with epidemiologic research methods to begin to apply these methods to their own work. Prerequisite: PHP 2507 or 2510 (either may be taken concurrently); the typical student will also have some introductory knowledge of epidemiology.

Fall PHP2150 S01 17142 TTh 10:30-11:50(13) (B. Marshall)
Provides an introduction to the classification, epidemiology, etiology, treatment and potential prevention of psychiatric disorders from a population perspective. Reviews the magnitude and social burden associated with mental disorders worldwide and opportunities to enhance prevention and treatment.
Covers concepts and methods used to study mental illness at the population level, including definitions of “normality” and “pathology”, current classification systems and measurement approaches to assess psychopathology and severity and cross-cultural issues.
Covers the prevalence, risk factors, and etiology of major disorders of children, adolescents and adults, including autism spectrum disorders, attention deficit disorders, mood and anxiety disorders, schizophrenia and substance use disorders.

PHP 2180. Interpretation and Application of Epidemiology.
This course builds upon the foundation of introductory epidemiology and a basic understanding of quantitative and conceptual methods, with a focus on the interpretation of the strength and meaning of epidemiologic findings. The goal is to help students develop critical thinking skills in order to become more sophisticated interpreters of epidemiologic evidence for guiding policy, clinical practice, and individual decisions, combining subject matter knowledge and epidemiologic methods to wisely evaluate the available research findings. We will focus on judging causality and identifying gaps that future research would need to fill to strengthen our understanding. Prerequisite required or permission of instructor.

This second course in epidemiologic methods reinforces the concepts and methods taught in PHP 2150, with in-depth instruction in issues of study design, assessing threats to study validity including confounding and selection bias, and analyzing data with standard regression models.
The course emphasizes hands-on learning and includes a combination of didactic lectures, discussions of methodologic papers, and a required laboratory component where students will learn to apply the concepts learned in class to real-world problems. Prerequisites: PHP 2150 and either PHP 2510 or PHP 2507, and PHP 2511 or PHP 2508 (which either can be taken concurrently) or permission of the instructor.

PHP 2202B. Nutritional Epidemiology.
This course provides a comprehensive and systematic review of contemporary issues in human nutrition that require the application of epidemiologic principles and quantitative methods. Substantive topics range from the assessment of molecular etiologies for health and disease outcomes to evidence-based development of clinical guidelines and public health policies for foods and dietary supplements. This course is designed for graduate trainees in public health or the division of biology and medicine, visiting fellows, and advanced undergraduates who want to understand or conduct research in human nutrition and dietary assessment related to health and diseases.

PHP 2220H. The Epidemiology, Treatment and Prevention of HIV.
The purpose of this seminar is to use HIV as an example to introduce students to a variety of methodological issues in the epidemiologic study of infectious diseases. While we will study the treatment and prevention of HIV in detail, emphasizing the current state of knowledge and critiquing the most recent literature, this course aims to use HIV as an example to better understand the variety of methodological issues in global and domestic infectious disease epidemiology today. Enrollment limited to 25 students. Prerequisites: PHP 0850 or PHP 1854 (undergraduates); PHP 2120 or 2150 and PHP 2508 or 2511 (graduate students).

PHP 2250. Advanced Quantitative Methods in Epidemiologic Research.
This course provides students with conceptual and quantitative tools based on counterfactual theory and causal diagrams (e.g., DAGs) to make causal inference using data obtained from observational studies. Causal diagrams will be used to provide alternative definitions of, provide clarifications regarding, or inform minimizing common biases. Non-, semi-, and fully parametric methods for minimizing bias will be discussed. These methods include standard regression, instrumental variables, propensity scores, inverse probability weighting, and marginal structural models.
Settings when such methods may not be appropriate will be emphasized. Prerequisite: PHP 2200 and 2511; or PHP 2200 and 2508; or instructor permission.

PHP 2260. Applied Epidemiologic Data Analysis.
This course will lead students through the process of writing a journal-style manuscript based on performing applied epidemiologic data analysis using statistical software (i.e., SAS). This course is best suited for students who already have a research idea in mind and data in hand prior to the start of the course or are able to develop a research question based on de-identified publicly available population-based datasets that will be recommended in the course. Course enrollment is restricted to graduate students.

This course provides students with fundamental principles of behavioral and social research methodology for understanding the determinants of public health problems, and for executing and testing public health interventions. We will focus on experimental methods, observational studies, and qualitative approaches. We will develop skills in understanding and interpreting data--both quantitative and qualitative. Throughout the course we will emphasize ethical, cultural, and professional issues for designing public health interventions. Prior coursework in research methodology and quantitative methods is recommended but not required. Open to graduate students and advanced undergraduates. Enrollment limited to 15.

PHP 2325. Place Matters: Exploring Community-Level Contexts on Health Behaviors, Outcomes and Disparities.
As with many health-related outcomes, the prevalence of ill health is unequally distributed across populations, with certain community features playing significant roles in shaping health. In this course, we will explore the features of place and the associations with health behaviors and health outcomes. The readings for this course are multi-disciplinary in nature and integrate epidemiological, biological, sociological, political and philosophical perspectives. This course is specific to the United States. The course activities will culminate with neighborhood audits, presentations, and policy briefs. Due to the course structure and activities, it is limited to 12 graduate students.
PHP 2330. Behavioral and Social Approaches to HIV Prevention. 
This course examines concepts, approaches, and empirical findings from behavioral and social research to prevent HIV transmission. Students will become familiar with behavioral theories, social epidemiological principles, intervention design, and debates within the field of HIV prevention. A particular focus of this course is on the linkages between science and HIV prevention practice/policy. Students will conduct weekly readings, engage actively in seminar discussions, and participate in small-group presentations and research activities. Prior coursework in public health research methodology is recommended. Prerequisites: Graduate student or senior public health concentrator. Enrollment limited to 15 advanced undergraduate, graduate and medical students.

PHP 2340. Behavioral and Social Science Theory for Health Promotion.
This course will help students become familiar with behavioral and social science theories commonly used for planning disease prevention/health promotion interventions. In addition to review of specific theories, topics to be discussed include: how theories are developed and tested; challenges and potential pitfalls in using theory for intervention planning; and creation of causal diagrams based on concepts from theories. Undergraduates need permission of instructor; priority will be for Public Health concentrations. Enrollment limited to 25.

Fall PHP2340  S01  17157  W  9:30-12:00(14)  (D. Williams)

PHP 2345. Affect, Emotion, and Health Behavior.
The purpose of this class is to learn about and discuss theory and research on affective determinants of health-related behaviors across multiple behavioral domains. The common thread through the entire course is that health-related behavior is the dependent variable and affect or emotion is the putative determinant. That is, this is a course about how affect and emotion influences health-related behavior. Although we will, in some instances, discuss the effects of affective behavior on affect and emotion, emotion and mood are NOT considered to be the outcome of interest.

PHP 2355. Designing and Evaluating Public Health Interventions.
Previously listed as PHP 1740. Examines health behavior decision-making and elements for design of health promotion interventions. Covers theories of health behavior (focusing on primary and secondary prevention), principles of intervention design, and reading of research literature. Emphasizes psychological, social, and proximate environmental influences on individuals' health-related behaviors. Restricted to undergraduates in the AB/MPH program, and graduate students. Prerequisite: PHP 0320 or equivalent. Enrollment limited to 35.

Fall PHP2355  S01  17158  MW  1:00-2:20  (P. Risica)

PHP 2360. Developing + Testing Theory-Driven, Evidence Based Psychosocial and Behavioral Health Interventions.
This is a graduate-level course designed to provide students with the knowledge and research skills necessary to develop and ultimately test a theory-driven, evidence-based psychosocial or health behavior change intervention. Drawing on research, theory, and practice, students learn how to conduct formative research to inform the content, structure, and format of an intervention, set goals/objectives, develop intervention materials/messages, and evaluate outcomes – all while taking into account factors such as gender, sexuality, race/ethnicity, poverty, culture, social-support/social-capital, etc. Research methods that are relevant for evaluating efficacy, including study-design, power/sample size calculations, fidelity monitoring, randomization, control conditions, measures selection/assessment, data collection, etc. are covered. Prerequisite: PHP2340 or instructor permission

PHP 2361. Proseminar in Health Behavior Intervention Research.
This course is required for doctoral students in Behavioral and Social Health Sciences. Students will consider advanced topics related to designing, implementing, and evaluating behavioral and social interventions to promote health. The course is designed as a proseminar, emphasizing discussion of primary readings and presentations by experienced intervention researchers.

This seminar is designed for graduate students interested in health disparities and determinants of health in LGBT populations (also referred to as sexual and gender minority populations). Students will become familiar with key epidemiological reports, behavioral and social science theories/frameworks, intervention studies, and scientific debates related to the determinants of and disparities affecting the health of LGBT and sexual and gender minority populations. The course will focus primarily on US populations, but will also include global LGBT and sexual and gender minority populations. Readings and discussion will be considered in light of social, policy, and cultural contexts that frame the lives of LGBT populations.

PHP 2370. Etiology of Substance Use Disorders.
This course will help students become familiar with behavioral, genetic, neurobiological, and cultural factors related to the onset and course of substance use disorders. In addition to review of specific theories, empirical evidence supporting models will be covered as will the integration of evidence across models. Priority will be given to postdoctoral fellows. BSHS students should take the class for a grade (ABC/NC), special students/postdocs should choose S/NC grade option.

Fall PHP2370  S01  17160  F  1:15-3:45(01)  (V. Mor)

PHP 2371. Psychosocial and Pharmacologic Treatment of Substance Use Disorders.
Intended to provide an overview of the history of the treatment of substance use disorders; assessment methods designed to determine progress in substance use treatment; and the current most common types of psychosocial and pharmacologic treatments for substance use. Enrollment limited to 20 graduate and medical students. Instructor permission required. BSHS students should take the class for a grade (ABC/NC), special students/postdocs should choose S/NC grade option.

This class will explore Health Communication, with a focus on behavioral and social science interventions delivered through health communication programs. The course is structured so that basic building blocks (i.e., definitions of health communication, public health context for health communications interventions, theories of health communication and health behavior change) are presented sequentially early in the semester. Students will synthesize knowledge and demonstrate their understanding of the role of health communication through a final research project. Seniors with concentration in Public Health may enroll with instructor's permission. Enrollment limited to 20 graduate and medical students.

Reviews the development of the health care delivery, financing and regulatory control systems in the U.S. and reviews the literature on the relationship between health system structure and the services used and health outcomes that populations experience. A case-study approach is used to understand the inter-relationship between financing, delivery and regulatory components of the health system and their implication for public health by drawing on epidemiological, economic, political and sociological principals. Prerequisites: Graduate standing or PHP 0310 and instructor permission.

PHP 2410E. Medicare: A Data Based Policy Examination.
This course will explore the role of Medicare as America's health insurer for the elderly and disabled through the use of real Medicare insurance claims data, examining how Medicare policy changes in financing and regulation have affected the delivery and receipt of medical services. At the end of the course students will: 1) know the history of important Medicare policy changes; 2) be able to construct aggregated patient case mix acuity adjusted measures of provider quality using insurance claims data; 3) be able to conduct policy analyses using Medicare claims data that are sensitive to standardized coding schemes. Enrollment limited to 15 graduate students. Prerequisite: PHP 2120, 2508, or 2510. Instructor permission required.

Fall PHP2410E  S01  17161  Th  12:00-2:30  (V. Mor)
PHP 2415. Introduction to Evidence-based Medicine
Unbiased assessments of the scientific literature by means of research
ontology and prioritizing future research. We focus on
the methods and uses of systematic reviews and meta-analyses and their
applications in medicine and health policy. After course completion, and
with some direction, students will be able to undertake a basic systematic
review or meta-analysis. Enrollment limited to 15. Prerequisites: PHP
2120, 2150, or 2460; and PHP 2507/08 or 2510/11 (2508 and 2511
may be taken concurrently); and clinical background or training in basic
concepts in medicine (must discuss with instructor).

PHP 2440. Introduction to Pharmacoeconomics
The course will focus on substantive topics in pharmacoeconomics,
including relevant principles of pharmacology, inference from
spontaneous case reports, study design considerations, premarketing
pharmacoeconomics, and common data sources for pharmacoeconomic
studies, drug utilization review, adherence, and the development,
implementation, and assessment of therapeutic risk management policies.
The course will also focus on issues in pharmacovigilance, including
the legal and historical basis of pharmacovigilance, evaluation of individual
adverse drug events, signal detection, active safety surveillance, and
medication errors. A clinical background is not required. Prerequisites are
PHP 2507, PHP 2508, PHP 2510, or PHP 2511, AND PHP 2120 or PHP
2150, or permission.

PHP 2445. Minding the Gap: The U.S. Healthcare Safety Net
The right to access affordable, quality health care in the US is not
guaranteed. During our nation’s history, a patchwork quilt of programs,
referred to collectively as the safety net, has been crafted to address
healthcare needs for a wide range of people who fall through the cracks.
This course examines its structure, function, and effects. We introduce
key features of the safety net: access, cost, quality, and outcomes. We
pay particular attention to the nation’s largest program, Medicaid. We
highlight the unique challenges facing vulnerable groups: legal and illegal
immigrants, homeless populations, veterans, and people with disabilities.
Fall 2015 PHP2445 S01 17162 T 9:30-12:00(13) (T. Shireman)

PHP 2450. Measuring and Improving the Quality of Health Care
The quality of health care in the United States is in urgent need of
improvement. This course will focus on the science of measuring and
improving the quality of health care. Topics will include quality assessment,
patient safety, medical errors, public reporting, financial incentives,
organizational change, and health care disparities. Students will engage in
a team-based quality improvement project. Open to graduate and medical
students only.
Fall 2015 PHP2450 S01 17163 M 3:00-5:30(03) (A. Trivedi)

PHP 2451. Exchange Scholar Program
Fall 2015 PHP2451 S01 15746 Arranged "To Be Arranged"

PHP 2455A. Health Services Research Methods I
Health services researchers use theories, models, and data to understand
the health care system, assess the effectiveness of interventions (at
multiple levels of the healthcare system), and inform health policy
decisions. This course reviews the application of statistical and
epidemiological principles to the design and analysis of health services
research studies. The goal is to familiarize students with common study
designs and methods in health services research, so that they can
critically review the published literature and use these approaches in their
own research.

PHP 2455B. Health Services Research Methods II
This course covers commonly used statistical (regression) models
for health services research, including survival analysis; examines
the problem of missing data and strategies for addressing it; and
provides a basic introduction to causal inference methods for
time-varying exposures (including non-adherence). The goal is to familiarize
students with important methods in applied work, so they can critically
review the published literature and use the methods in their own
research. The topics covered should be of interest to students in Health
Services, Policy + Practice, Epidemiology, Economics, and beyond. Pre
Requisites: Successful completion of PHP 2455A or instructor permission.
Interested students who have not taken PHP 2455A should contact
issah_dahabreh@brown.edu to make arrangements. Those with adequate
background in basic health services research or epidemiologic methods
and regression analysis will be able to gain from this course, even if they
have not taken PHP 2455A.

PHP 2465A. Introduction to Health Decision Analysis
Many decisions in health are value-laden, involve competing objectives, or
must be made under uncertainty. Health decision analysis is a structured
approach to thinking through such decisional problems. This course
introduces decision analysis and cost-effectiveness analysis for public
health and clinical problems. It covers basic theory for decisionmaking;
principles and techniques for mathematical modeling; and implementation,
by analyzing archetypal decisional problems in health. Pre Requisites:
Some facility with mathematical notation and basic concepts in probability
(advanced undergraduate students can enroll after instructor approval).
Recommended course: DATA 1010, MATH 1610, or APMA 1690.
Fall 2015 PHP2465A S01 17165 W 1:00-3:30(01) (T. Trikalinos)

PHP 2470. Topics in Clinical, Translational and Health Services Research
Through a combination of mini-courses and seminars, students will
explore concepts, gain knowledge and develop skills in a variety of public
health areas. To receive a half credit for this course, students will be
required to successfully complete 70 units. Units must be pre-determined
by the course instructor and the unit instructor. Units are generally based
on the number of in-person contact hours and the number of outside of
class/homework hours required for a mini-course or seminar. Students
must receive special permission from the instructor or be accepted to the
Clinical and Translational Research Summer Institute to enroll.

PHP 2480. Selected Topics in Global Health Economics
This course will survey selected topics in global health economics. It is
designed to introduce students to specific issues, theory and practice of
health economics at the global level. The first part of the course will survey
research papers on econometric methods in global health including:
field experiments, instrumental variables, propensity score matching and
regression discontinuity. The second part will discuss current topics such as:
conditional economic incentives for providers and consumers, social
health insurance, public goods, and externalities. Prerequisites: PHP 2511
and ECON 1110, or equivalent. Enrollment limited to 8 graduate students.
Instructor permission required.

PHP 2507. Biostatistics and Applied Data Analysis I
The objective of the year-long, two-course sequence is for students to
develop knowledge, skills and perspectives necessary to analyze data
to answer public health questions. The year-long sequence focuses on
statistical principles as well as the applied skills necessary to answer
public health questions using data, including: data acquisition, data
analysis, data interpretation and the presentation of results. Using
lectures, labs and small group discussions, we focus on evaluating data
sources, refining research questions, univariate and bivariate analyses,
and presentation of initial results. Prerequisite: understanding of basic
math concepts and terms. Enrollment limited to 50 students. Instructor
permission required.
PHP 2508. BioStatistics and Data Analysis II.
Biostatistics and Applied Data Analysis II is the second course in a year-long, two-course sequence designed to develop the skills and knowledge to use data to address public health questions. The sequence is completed in one academic year, not split across two years. The courses focus on statistical principles as well as the applied skills necessary to answer public health questions using data, including: acquisition, analysis, interpretation and presentation of results. This spring semester course focuses on regression, interpretation of results, and communication of results. Prerequisite: PHP 2507. Enrollment limited to 50. Instructor permission required.

PHP 2510. Principles of Biostatistics and Data Analysis.
Intensive first course in biostatistical methodology, focusing on problems arising in public health, life sciences, and biomedical disciplines. Summarizing and representing data; basic probability; fundamentals of inference; hypothesis testing; likelihood methods. Inference for means and proportions; linear regression and analysis of variance; basics of experimental design; nonparametrics; logistic regression. Priority given to students in School of Public Health graduate programs. All others with instructor permission. Undergraduates are encouraged to enroll in PHP 1510.

Applied multivariate statistics, presenting a unified treatment of modern regression models for discrete and continuous data. Topics include multiple linear and nonlinear regression for continuous response data, analysis of variance and covariance, logistic regression, Poisson regression, and Cox regression. Prerequisite: APMA 1650 or PHP 2510. Open to advanced undergraduates with permission from the instructor.

PHP 2514. Applied Generalized Linear Models.
This course provides a survey of generalized linear models (GLMs) for outcomes including continuous, binary, count, survival and correlated data. This course will work through the basic theories of GLMs. Emphasis will be on understanding the implications of this theory and the applications to solving real data problems. Extensive use of computer programming will be required to analyze the data in this class. This course is designed for graduate and advanced undergraduate students who will be analyzing data and want to develop practical hands-on toolkit for regression analysis. Students in this class will need an understanding of probability, some simple statistical models (normal, binomial, exponential and Poisson), sample and population moments, nite and approximate sampling distributions, point and interval estimation, and hypothesis testing. Examples of their use in modeling will also be discussed. Open to undergraduates with permission from the instructor.

This course will provide an introduction to probability theory, mathematical statistics and their application to biostatistics. The emphasis of the course will be on understanding the implications of this theory and the applications to solving real data problems. Extensive use of computer programming will be required to analyze the data in this class. This course is designed for graduate and advanced undergraduate students who will be analyzing data and want to develop a practical toolkit for regression analysis. Students in this class will need an understanding of how to work with R. Prereq: PHP 2511 or PHP 2514; PHP 2508 with Permission from Instructor.

PHP 2517. Applied Multilevel Data Analysis.
This course provides a survey of multilevel data analysis. Topics will range from structure of multilevel data, basic and advanced linear models, multilevel GLM, Model testing and evaluation and missing data imputation. Data and examples will be drawn from medical, public health and social sciences. Students will be using real data throughout this course.

This course is designed for graduate and advanced undergraduate students who will be analyzing data and want to develop a practical toolkit for multilevel analysis. Students in this class will need an understanding of how to work with R. Prereq: PHP 2511 OR PHP 2514; PHP 2508 with Permission from Instructor.

PHP 2520. Statistical Inference I.
First of two courses that provide a comprehensive introduction to the theory of modern statistical inference. PHP 2520 presents a survey of fundamental ideas and methods, including sufficiency, likelihood based inference, hypothesis testing, asymptotic theory, and Bayesian inference. Measure theory not required. Open to advanced undergraduates with permission from the instructor.

PHP 2530. Bayesian Statistical Methods.
Surveys the state of the art in Bayesian methods and their applications. Discussion of the fundamentals followed by more advanced topics including hierarchical models, Markov Chain Monte Carlo, and other methods for sampling from the posterior distribution, robustness, and sensitivity analysis, and approaches to model selection and diagnostics. Features non-trivial applications of Bayesian methods from diverse scientific fields, with emphasis on biomedical research. Prerequisites: APMA 1650, PHP 2510, PHP 2511, or equivalent. Open to advanced undergraduates with permission from the instructor.

PHP 2550. Practical Data Analysis.
Covers practical skills required for successful analysis of scientific data including statistical programming, data management, exploratory data analysis, simulation and model building and checking. Tools will be developed through a series of case studies based on different types of data requiring a variety of statistical methods. Modern regression techniques such as cross-validation, bootstrapping, splines and bias-variance tradeoff will be emphasized. Students should be familiar with statistical inference as well as regression analysis. The course will use the R programming language.

PHP 2560. Statistical Programming with R.
Statistical computing is an essential part of analysis. Statisticians need not only be able to run existing computer software but understand how that software functions. Students will learn fundamental concepts – Data Management, Data types, Data cleaning and manipulation, databases, graphics, functions, loops, simulation and Markov Chain Monte Carlo through working with various statistical analysis. Students will learn to write code in an organized fashion with comments. This course will be taught using both R and Julia languages in a flipped format.

PHP 2561. Methods in Informatics and Data Science for Health.
The goal of this course is for students to develop a solution that uses data science and informatics approaches to address a biomedical or health challenge. This course will teach informatics and data science skills needed for public health and biomedicine research. Emphasis will be given to algorithms used within the context of biomedical research and health care, including those used in biomedical sequence analysis, electronic health records, clinical decision support, and public health surveillance. This course has been developed as a Course-based Undergraduate Research Experience (CURE), where students will gain experience with the scientific method, its application, and presentation.

PHP 2580. Statistical Inference II.
This course is designed for graduate and advanced undergraduate students who will be analyzing data and want to develop a practical toolkit for regression analysis. Students in this class will need an understanding of how to work with R. This course covers such topics as non-parametric statistics, quasi-likelihood, resampling techniques, statistical learning, and methods for high-dimensional Bioinformatics data. Prerequisite: PHP 2520. Open to advanced undergraduates with permission from the instructor.
PHP 2601. Linear Models.
This course will focus on the theory and applications of linear models for continuous responses. Linear models deal with continuously distributed outcomes and assume that the outcomes are linear combinations of observed predictor variables and unknown parameters, to which independently distributed errors are added. Topics include matrix algebra, multivariate normal theory, estimation and inference for linear models, and model diagnostics. Prerequisites: APMA 1650 or 1660, or taking PHP 2520 concurrently.

Note: The course will cover fundamental and advanced topics in linear models, and concepts related to the generalized linear models will not be covered during the course.

Fall PHP2601 S01 17178 T 1:00-3:30 (R. DeVito)

PHP 2602. Analysis of Lifetime Data.
Comprehensive overview of methods for inference from censored event time data, with emphasis on nonparametric and semiparametric approaches. Topics include nonparametric hazard estimation, semiparametric proportional hazards models, frailty models, multiple event processes, with application to biomedical and public health data. Computational approaches using statistical software are emphasized. Prerequisites: PHP 2510 and 2511, or equivalent. Open to advanced undergraduates with permission from the instructor.

This course will focus on the theory and application of generalized linear models (GLM), a unified statistical framework for regression analyses. Specifically, we will focus on using GLMs to model the categorical outcomes. The GLM for categorical outcomes include logistic regression, proportional odds model, and Poisson regression. Maximum likelihood estimation and inference will be introduced in the GLM context. The students are expected to have knowledge of probability and inference (at the level of APMA1650, APMA1660, or PHP2520), knowledge of matrix algebra (at the level of MATH0520), knowledge of regression analysis (at the level of PHP2511) and knowledge of R.

PHP 2610. Causal Inference and Missing Data.
Systematic overview of modern statistical methods for handling incomplete data and for drawing causal inferences from "broken experiments" and observational studies. Topics include modeling approaches, propensity score adjustment, instrumental variables, inverse weighting methods and sensitivity analysis. Case studies used throughout to illustrate ideas and concepts. Prerequisite: MATH 1610 or PHP 2511 or PHP 2580.

PHP 2620. Statistical Methods in Bioinformatics, I.
Introduction to statistical concepts and methods used in selected areas of bioinformatics. Organized in three modules, covering statistical methodology for: (a) analysis of microarray data, with emphasis on application in gene expression experiments, (b) proteomics studies, (c) analysis of biological sequences. Brief review and succinct discussion of biological subject matter will be provided for each area. Available software will be introduced. Intro level statistics (PHP 2507/2508 or PHP 2510/2511) recommended. Other students should contact instructor. Intro to software R and Bioconductor tools provided in lab. Open to advanced undergraduates with permission from the instructor.

PHP 2650. Statistical Learning and Big Data.
This course introduces modern statistical tools to analyze big data, including three interconnected components: computing tools, statistical machine learning, and scalable algorithms. It introduces the principal techniques: extract and organize data from complex sources, explore patterns, frame statistical problems, build computational algorithms, and disseminate reproducible research. Topics include web data extraction, database management, exploratory data analysis, dimension reduction, convex optimization algorithms, high-dimensional linear/nonlinear models, tree/ensemble methods, and predictive modeling. These techniques are illustrated using big data examples from many scientific disciplines. This course is open to graduate students and advanced undergraduate students pursuing degrees in science, technology, engineering, or mathematics. Students should have taken: either one course from: PHP 2510, PHP 2511, PHP 2550, APMA 2610; OR one course from: APMA 1690, APMA 1720, APMA 1930B, CSCI 0150, CSCI 0170; AND one course from: MATH 0520, MATH 0540. Students may ask permissions from the instructor for waiving this requirement. Students are also required to have some experience with any scripting language.

PHP 2690A. Advanced Topics in Biostatistics.
Introduction to applications of statistics and the way statisticians collaborate in interdisciplinary research. Guest lecturers from industry, government and academia will describe how statisticians fit into their environment. Techniques for effective collaboration and oral and written presentation of work including interviewing, writing proposals, giving talks, working with a team and consulting as an individual will be taught. Designed for graduate students (Masters or PhD) who would like to learn how to collaborate on projects with non-statisticians. Permission of the instructor is required to enroll for the course.

PHP 2710. Interdisciplinary Perspectives on Disability and Death in the Global South.
The course fosters interdisciplinary critical and integrative thinking and writing about the leading causes of disease, disability and death in low and middle income countries, and potential solutions to prevent and ameliorate these burdens of disease. The first part focuses on measures of population health, health disparities, multi-causal and multi-level thinking, social epidemiology, community interventions and implementation research. These topics provide the fundamental intellectual frameworks for global public health. The second part presents scholars from key disciplinary areas contributing to global health research and practice from many academic units at Brown University. To conclude students present their potential research ideas.

PHP 2720. Implementing Public Health Programs and Interventions in the Global South.
This course will focus on the theory and methods related to increasing the impact of evidence-based public health interventions and the effectiveness of healthcare delivery in diverse resource-limited settings across the globe. This course will focus on the influence of social, structural, political, and organizational processes on the development, adaptation, implementation, and evaluation of public health interventions in the Global South. We will review the emerging field of implementation science and critically analyze approaches for the evaluation of ongoing global public health programs. Fall PHP2720 S01 17183 F 9:00-11:30(05) "To Be Arranged"

PHP 2730. Including the Excluded: Global Health Ethics.
This course explores the ethics of global public health engagement. Global health implementation is fraught with ethical conundrums. These ethical conundrums include the process of generating rigorous evidence, championing health as a human right, engaging global partners in meaningful collaborations, and implementing complex programs in low-resource settings. These ethical challenges are driven by North-South inequities and by differences in socioeconomic backgrounds, culture, language, and other intersectional identities. This course introduces scholars to global health ethics as a framework for tackling health disparities, grappling in a scholarly and practical way with the complex fabric of global health research, policy, and practice.
This course prepares students for constructive engagement in cross-cultural research. The course aims to familiarize students with global funding priorities and research approaches, and to ask questions about meaningful cross-cultural engagement. Part I (Weeks 1-5) covers global health research priorities and writing a small grant proposal. Part II (Weeks 6-12) focuses on acquiring skills and knowledge to plan and implement a global health project, including strategies for community and stakeholder engagement, the challenges and opportunities of cross-cultural research, and tools for project implementation. This course is a research fieldwork preparation seminar intended to prepare students for global field-based research.

PHP 2760. Critical Perspectives in Global Health.
An overview of social theory and analytical approaches relevant to the study of global health topics and their social context. Students learn writing skills and analytical tools and methods for in-depth analyses of global health topics, including social science critiques of global health policy and practice. The goal is for students to learn the skills to conduct critical social analysis of global health issues using qualitative or quantitative data, or mixed methods approaches, on topics ranging from patterns of disease prevalence, to health systems functioning, to community-level project implementation and evaluation. Suitable for students writing theses or papers for publication.

PHP 2950. Doctoral Seminar in Public Health.
The purpose of this seminar is to facilitate discussions of current scientific literature in epidemiology, biostatistics, health services, behavioral and health sciences, and public health in general. The main goal is to expose students to current methodological issues and controversies, in an effort to integrate knowledge across disciplines. This seminar is only open to doctoral students in Epidemiology, Behavioral and Social Health Sciences, Biostatistics and Health Services Research.

PHP 2980. Graduate Independent Study and Thesis Research.
Section numbers vary by instructor. Please check Banner for the correct section number and CRN to use when registering for this course.

PHP 2981. Graduate Independent Study and Thesis Research (half-credit).
Half-credit independent study research course consisting of 90 credit hours of supervised independent work. Intended for master’s students. Section numbers vary by instructor. Please check Banner for the correct section number and CRN to use when registering for this course.

PHP 2985. MPH Independent Study for Thesis Preparation and Research.
This optional half credit course may be taken up to two times during preparation for the MPH degree. It provides MPH students with self-directed thesis research and preparation time under the guidance of a thesis advisor. Prior to taking this course the student and advisor must reach agreement as to what constitutes satisfactory completion of the course (e.g., completion of a satisfactory literature review, attainment of specific thesis benchmarks, or completion of the thesis). Please check Banner for the correct section number and CRN to use when registering for this course.

PHP 2988. SPH Doctoral Teaching Experience (TE).
The Teaching Experience (TE) independent study is designed to enable graduate students to expand practical teaching skills as course coordinators/instructors under the mentorship of an experienced instructor. While the TE is primarily a learning opportunity for doctoral students, secondarily, the activities associated with the TE should add value to the class by enhancing the experience of students enrolled in the course and assisting the faculty instructor with administration and delivery of the course. TEs are generally arranged according to student interests and goals and then approved by the student’s Graduate Program Director. Once approved, a student will register for the independent study section with the instructor teaching the TE-associated course. Students should consult their Graduate Program Handbook for more information.

PHP 2990. Thesis Preparation.
For graduate students who have met the residency requirement and are continuing research on a full time basis.

PHP XLIST. Courses of Interest to Concentrators in Community Health.

Healthcare Leadership

In this course, participants explore the meaning of value creation in healthcare organizations—how it relates to high performance, how it varies and is measured in different healthcare segments, and how it is embodied in the structure and performance of their own organizations. A holistic High Performance Model of enterprise value creation is presented, including strategic planning, process improvement, and resource and organizational alignment. The model is discussed from the perspectives of a variety of healthcare organizations—with the goal of applying the model to create value for the participants’ own organizations.

In this course, students appraise past and current political, legal, technological, and economic U.S. healthcare policy developments. Students critically examine the implementation of alternative methods of health services delivery and financing within multiple global healthcare systems. Participants question assumptions, think creatively, and consider integrated patient care solutions to prepare for change and new paradigms within the global healthcare sector.

In this course, students develop the management, marketing, and leadership skills needed to guide organizational change and refine their personal leadership style to lead in today’s rapidly-changing health care landscape. Particular focus is placed on negotiation, conflict management, collaboration, and team building skills. Participants create a robust plan for their continuous development as a leader. Students also learn how to harness the power of social media to develop their brand and their organization’s influence in the marketplace.

This course will provide an overview of the methods and applications of therapy economics, biostatistics and epidemiology in healthcare sector decision-making. Specific topics include: the application of therapy economics and economic evaluation to treatments, pharmacoconomics and technology assessment; the assessment and interpretation of published epidemiological studies; institutional oversight of epidemiological research programs; the four key steps of statistical analysis (identification of scientific programs or problems of interest, collection of the required data, analysis and summary of data, and generation of a conclusion).
HCL 2040. Navigating the Regulatory Maze.
This course explores the culture of decision making as well as the structure and role of key US and international regulatory bodies. Students explore how health care is regulated with an eye towards understanding how existing regulations improve quality, enhance access, and control cost. The topics of risk management, public health, and product/drug regulation are emphasized.

This course will provide an overview of the major aspects of information technology (IT) as they relate to both the causes of and the solutions to current problems in healthcare. Issues of standardization, integration, communication and patient engagement will be stressed, and the types of strategic planning for and governance of information systems will be explored. During the course students will be presented with real problems in the field of HiT and explore possible solutions.

In this course, students explore the quality improvement drivers, principles, systems, and tools that help create a healthcare learning organization. Students discover how quality improvement creates value, how to demonstrate the value of quality improvement to their colleagues, and how to ultimately develop a culture of learning within their organization. Students compare the learning needs of healthcare organizations to those in other industries. Students design and implement a quality improvement project within their own organization, and develop a "learning organization roadmap" for their organization.

This course focuses on the area of financial management as applied to international health organizations. The course emphasizes the application of principles and concepts of international health financial management to global health providers that represent innovative new structures and organizations, such as Accountable Care Organizations (ACOs) that offer integrated patient care. Students will gain competencies in the application of financial analysis tools and techniques internationally and in the interpretation of data for sound decision-making through case assignments and a class project to analyze the financial results of high performing healthcare organizations serving global markets.

HCL 2080. The Critical Challenge: Capstone Project.
In this project, supervised by Executive Master of Healthcare Leadership (HCL) faculty, students identify a critical challenge within healthcare and then work collaboratively to integrate knowledge from various perspectives and healthcare sectors and to apply relevant skills to develop possible solutions to their challenge. Students draw upon knowledge and skills from coursework with particular emphasis on collaborating across healthcare sectors, considering ethical implications, communicating effectively and developing creative and viable solutions. Upon completion of this project, students will be able to successfully integrate knowledge of healthcare policy, strategic planning, regulation, management, marketing, healthcare research, quality improvement, finance and information technology to address a critical challenge within healthcare. Project outcomes should prove applicable to professional practice. This course spans two semesters.

HCL 2090. Leadership and Professional Development.
The new leadership and professional development course supports 12 of our HCL leadership competencies. As a result of participating in this class, students will expand their knowledge of leadership theories, in particular adaptive leadership theory, strengthen the interpersonal skills associated with the effective use of authority and leadership and increase their awareness of their impact on others. They will be consistently challenged to apply this knowledge and skills to their work environment.