The Blue Book

A Course Guide for the Secondary Field in Global Health and Health Policy
2025-2026

Website

www.ghhp.fas.harvard.edu

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Contents

What Can You Expect from Global Health and Health Policy?

Interdisciplinary Approach

Explore interdisciplinary world health challenges from many perspectives; use different disciplinary approaches to learn about health care delivery, health systems, public health, and health policy. Courses in the GHHP Secondary Field sit within 27 FAS departments and programs. These courses represent an array of perspectives on global health topics and can inform your course of study both in and out of the classroom.

Local and Global Perspective

Learn how health is influenced by social, economic, political, cultural, and environmental factors, both locally and globally. Your GHHP Secondary Field could include any of the above topics or move into themes such as: global governance for health; the relevance and morality of socioeconomic inequality in health; consequences of politics and the role of health in foreign policy, national security, and economic development.

Explore the Connections

Learn about the rising global burden of chronic diseases in high-, low-, and middle-resource countries; the emergence of pandemic diseases and their economic and psychological impact; health consequences of travel, urbanization, and migration, wars, and ethnic conflict; changes in climate and other environmental factors, including water and food security.

Experiential Learning

Studying global health and health policy requires integrative experiential learning to connect the knowledge and skills learned in the classroom to real-world complexities. You can take advantage of more than 50 summer internships, both domestic and abroad, and continue your work as part of your research requirement. More information about summer opportunities and funding can be found at ghhp.fas.harvard.edu/ExperientialLearning.

Faculty Mentorship

Learn from faculty members teaching global health courses from across the university and receive one-on-one mentorship on independent research. Participate in Harvard Global Health Institute workshops and student roundtables. Work with faculty on research in their field or get valuable advice on projects of your own creation.

This Booklet

The courses listed in this booklet fulfill the requirements of the Secondary Field in Global Health and Health Policy (GHHP).

The booklet includes FAS courses that are listed in my.harvard.edu as of August 2025. Since the terms and times in which courses are offered can change from time to time, students should consult my.harvard.edu for the most accurate, up-to-date information.

Spreadsheet of Courses

A list of courses that fulfill the various requirements of the Secondary Field in Global Health and Health Policy is available as a sortable spreadsheet on the GHHP website: ghhp.fas.harvard.edu/courses. Note that the spreadsheet has two tabs at the bottom: the left tab lists courses that appear in the 2025-26 course catalog, while the right tab lists courses that were offered in the past and still count for GHHP credit.

Petitioning Courses for GHHP Credit

Students may petition to have courses not listed in the Blue Book count for GHHP Secondary Field credit. A course will not be approved unless it has substantial global health or health policy content. To petition a course, email your request to ryan_kim@harvard.edu, attach a syllabus, and explain which category within the GHHP Secondary Field you believe the course satisfies.

Note that the Blue Book lists FAS courses, but courses at other Harvard Schools, such as Harvard Kennedy School or Harvard Chan School of Public Health, may be petitioned for GHHP credit. Be aware that many courses offered at the Chan School are half-semester courses and provide only half the credit of a semester-long course in FAS.

Cross Registration

Students must cross-register in order to take classes in Harvard schools outside of FAS. Policies and deadlines for cross-registration generally vary from school to school. Note that passing grades received for cross-registered courses will not be used in computing a student's GPA except when the courses are counted toward concentration requirements. Students wishing to cross-register should consult the discussion of cross-registration in the FAS Handbook for Students at this webpage: handbook.fas.harvard.edu/book/cross-registration.

Prerequisites and Instructor Permission

The courses listed in this booklet are suggestions for undergraduates who are interested in learning more about global health and health policy or the application of other disciplines to global health/health policy issues. It is the responsibility of students to ensure that they have the correct prerequisites and the permission of the instructor, when required, before they enroll in a course.

Questions or Comments?

Do you have any comments about this booklet? Do you know of a course that is not listed here and should be? Would you like to receive a copy of this booklet in future years and/or an extra copy of this year's booklet? Please email ryan_kim@harvard.edu.

Harvard College Secondary Field in Global Health and Health Policy Requirements

In total, five courses (20 credits) are required.

One Foundational Course

- GENED 1063: World Health: Challenges and Opportunities (Not offered in 2025-2026)
- GENED 1079: Why is There No Cure for Health?
- GENED 1093: Who Lives, Who Dies: Reimagining Global Health

One Research Course

- One term of the senior thesis tutorial, when the thesis pertains to global health or health policy
- One term of the senior thesis tutorial, when students write an additional thesis chapter on the global health or health policy implications of their hard science, engineering, or computer science thesis
- Global Health and Health Policy 99: Research in Global Health and Health Policy – culminating in a policy paper that provides new insight into a contemporary health policy or global health issue
- Global Health and Health Policy 91: Supervised Reading and Research (or equivalent 91R in another department) – culminating in a research paper pertaining to global health or health policy

Additional guidelines regarding the research requirement are available at ghhp.fas.harvard.edu.

Three Additional Courses

One course in **three** of the following eight categories.

Humanities and Social Sciences:

- Economics of Health
- Ethics of Health
- Health and Demography
- Health, Culture, and Society
- History and Practice of Medicine
- Politics of Health

Sciences:

- Engineering Sciences and Statistics
- Science of Health and Disease

Course options for the eight categories are listed in this Blue Book. Note that the eight categories are divided into two areas, Humanities & Social Sciences, and Sciences. Students are strongly encouraged to take at least one course from both areas.

Other Information

- Only one of the five courses may be non-letter graded. (Exception: Two courses may be taken non-letter-graded if one is the senior thesis tutorial used to satisfy the research requirement.)
- Only one course may double-count for a secondary field and concentration (includes double/joint concentrations).
- A maximum of two non-FAS courses may count for the GHHP Secondary Field. This includes courses taken at other Harvard schools, including Harvard Summer School, and courses taken in study abroad programs.
- GHHP 91 and GHHP 99 may not be taken pass/fail.

Course Listings by GHHP Category

FOUNDATIONAL COURSES

General Education 1063 | World Health: Challenges and Opportunities

Sue Goldie
***Not offered** in 2025-26*

How do we analyze the health of global populations in a time of unprecedented crisis, and create new policies that address the social, political, economic, and environmental dimensions of health in an increasingly interdependent world?

Extraordinary changes in the world present both risks and opportunities to health—global interconnections, shifting demographics, and changing patterns of disease. This course will challenge your assumptions about the world's populations as you discover surprising similarities and unexpected differences between and within countries. By first positioning the concept of health as a prerequisite for strong societies, we explore its connection to human rights, sustainable development, and climate change. Drawing on examples from infectious diseases, maternal and child health, chronic diseases, and injuries, we pay equal attention to the influence of the social, political, and environmental "conditions for health." We consider solutions from within and outside the health sector and interventions at the local, national, and global levels. Throughout the course, you'll be asked to link classroom concepts to contemporary events, applying your analytical skills to design "problem-inspired" products that respond to and motivate action on global health challenges you care about.

General Education 1079 | Why Is There No Cure for Health?

David Cutler
Fall; TTh 12-1:15

Given all our technological advances, why are we still not able to prevent preventable diseases, provide affordable healthcare for millions of people, and deliver cures for curable diseases?

Around the world, billions of dollars are spent on health care treatments, public health initiatives, and pharmaceutical research and development. So why are we still not able to prevent preventable diseases, provide affordable healthcare for millions of people, and deliver cures for curable diseases? And what are the best ways to address these issues?

Because these questions are so large, we will focus our discussion around questions like: What steps should be taken to address epidemics? How should the United States reform its health care system? And how should prescription drugs be produced and sold?

We will explore how social scientists address empirical questions, the types of data that are available, how those data are analyzed, and the confidence with which causal statements are made. By the end of the course, you will be able to dissect a large question—such as how to reform American healthcare—into its technological, social, economic, and moral components, and weigh potential solutions according to these guiding vectors.

General Education 1093 | Who Lives, Who Dies: Reimagining Global Health

Salmaan Keshavjee, Lindsey Zeve, Jason Silverstein, Luke Messac
Fall; TTh 10:30-11:45

How can health care systems be restructured to provide high quality care even to the poorest and most vulnerable people on our planet?

Health care is never just about medicine. It is about people. It is about those pushed to the margins, whose lives are ground down by poverty, trapped by unjust systems, and devalued by forces that declare some lives worth less than others. This course challenges students to reimagine disease, illness, and injury as biosocial phenomena—shaped as much by poverty, racism, and political violence as by pathogens. From rural Malawi to American prisons, from tuberculosis programs to the overdose crisis, we will trace the roots of global health inequities and examine the ideologies that sustain them. But this course is not only about identifying failures. It is about how we stand alongside the sick and destitute to fight for a future where health is a human right.

RESEARCH COURSES

Global Health and Health Policy 91 | Supervised Reading and Research

David Cutler
Fall, Spring
Consent: Instructor

Supervised reading leading to a long-term paper on a topic or topics not covered by regular courses of instruction.

Course Notes: May not be taken pass/fail. To enroll in the course, a written proposal and signature of advisor and chair of GHHP Committee is required. Refer to GHHP website for enrollment requirements and instructions: ghhp.fas.harvard.edu/ghhp-91.

Global Health and Health Policy 99 | Research in Global Health and Health Policy

David Cutler
Spring; M 12:45-2:45; W 3-5
Consent: Instructor

Global health and health policy are interdisciplinary fields that apply the theories and methods of statistics, sociology, political science, economics, management, decision science, and philosophy to the study of population health and health care. Research from these fields influences policymaking in a variety of settings. For example, the Patient Protection and Affordable Care Act (ACA) drew upon health policy research to develop programs for improving access and quality of care in the United States. Similarly, global health research guides international institutions, such as the World Health Organization, in determining health guidelines for all countries. Global health and health policy research can also inform practices inside hospitals, initiate programs for diseases like HIV, and regulate the food and drug industries. This course introduces the fundamentals of research design and methods in global health and health policy and assists students in developing research projects and crafting policy recommendations that can impact health care systems and public health.

Course Notes: This course fulfills the research requirement of the Secondary Field in Global Health and Health Policy, and enrollment is ordinarily limited to seniors in the GHHP Secondary Field. Underclass GHHP students may petition to take the course if all other Secondary Field requirements have been met. GHHP 99 is primarily taught by graduate students in the PhD in Health Policy program. It may not be taken pass/fail.

ECONOMICS OF HEALTH

Economics 50 | Using Big Data to Solve Economic and Social Problems

Nadarajan Chetty, Gregory Bruich
Spring; MW 1:30-2:45

This course will show how "big data" can be used to understand and address some of the most important social and economic problems of our time. The course will give students an introduction to frontier research and policy applications in economics and social science in a non-technical manner that does not require prior coursework in Economics or Statistics, making it suitable both for students exploring Economics for the first time and more advanced students. Topics include equality of opportunity, education, innovation and entrepreneurship, health care, climate change, and crime. In the context of these topics, the course will also provide an introduction to basic methods in data science, including regression, causal inference, and machine learning. The course will include discussions with leading practitioners who use big data in real-world applications.

Economics 980W | Economic Aspects of Health Policy

Ariel Pakes
Spring; T 12:45-2:45
Class Capacity: 18
Consent: Instructor

The seminar will focus on policy issues in health economics. We will read papers on an assortment of policy options and formulate frameworks for analyzing their likely impacts on outcomes of interest. Examples include the analysis of mergers in hospital and insurance markets, the choice of capitation vs fee for service contracts and its impact on cost and quality of care, policy options for health insurance, and the re-structuring of health service providers. Where possible we will use data and do the analysis quantitatively. Some knowledge of microeconomic and statistical tools, particularly those related to industrial organization, will be helpful (a few of the needed techniques will be taught during the course). This is a Junior Tutorial.

Recommended Prep: Ec 1010a and 1010b (or 1011a and 1011b), one of stats 100, 104 or 110, and Ec 1123 or 1126 (or concurrent enrollment in 1123 or 1126).

Economics 1333 | Economics of Mental Health and Homelessness

Matthew Basilico
Spring; M 3:45-5:45

How does society influence mental health? How does mental health influence the economy? How do economic theory and econometrics illuminate, and obfuscate, the challenges of mental illness? Mental health has quickly become one of the most important topics in global policymaking. Yet the links between influential fields of social science – especially economics – and behavioral medicine remain underdeveloped. This course will first explore the frontier of concepts in psychopathology, including perspectives from rational choice theory which are both limiting and illuminating in the ongoing quest to characterize mental health and mental illness. The course will then turn to the social and economic drivers of mental health. From deaths of despair and the U.S. opioid epidemic, conspicuous consumption and income-wellbeing relationship, social media and American teen distress, and our general state of misery despite unprecedented material affluence, this course will systematically investigate the influences of society on mental health. Unlike most courses on mental health in other departments or medical schools, the syllabus will uncover unique empirical insights produced by the field of economics, and review in detail the econometric techniques used in these studies. Third, we will turn to the influences of mental health on society. We will consider extreme outcomes in housing markets such as homelessness and its relationship to severe mental illness. We examine classical approaches in economics to the housing market and homelessness, including new insights from behavioral health and transnational perspectives. Finally, we will turn to the roll of interventions. From pharmacotherapy, new interventional techniques (ECT, rTMS, ketamine), therapy, nutrition, and health system organization, ACT teams, supportive housing, we will consider potential and limitations in current societal responses to mental illness, using cross-national comparisons to illuminate the important differences in outcomes. We end with a consideration of the goals of economic policy, and examine how a focus on enhancing human mental wellbeing may offer unique opportunities in climate change and growth policy.

Course Prerequisites: Introductory Micro (Ec 10a), Statistics (Stat 100/104/110 or equivalent) and Calculus (Math 19a, 21a or equivalent).

Economics 1343 | The Economics of Development and Global Health

Matthew Basilico
Fall; M 6:45-8:45

Why are some places poorer than others? Why do some places have better health than others? In this class, we will harness the core development and health economics literature to approach some of the most fundamental questions facing humanity today. We will review the historical determinants of our present-day puzzles, including critical relationships between economic development and health. We will consider challenges affecting health and development including political institutions, micro development, environmental change, and psychological wellbeing. Methodologically, the course will review canonical approaches in applied econometrics, and will cover theories in development, macro-growth, and health. It will also consider perspectives on our core questions from neighboring disciplines, including social theory, anthropology and psychology.

Course Notes: A research paper option is available for this class which can be used to fulfill the writing requirement for Economics concentrators.

Recommended Prep: Economics 10a and 10b, familiarity with introductory statistics (e.g. Stat 100, 104 or 110), and calculus are recommended but not required.

General Education 1079 | Why Is There No Cure for Health?

David Cutler
Fall; TTh 12-1:15

Given all our technological advances, why are we still not able to prevent preventable diseases, provide affordable healthcare for millions of people, and deliver cures for curable diseases?

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We will explore how social scientists address empirical questions, the types of data that are available, how those data are analyzed, and the confidence with which causal statements are made. By the end of the course, you will be able to dissect a large question—such as how to reform American healthcare—into its technological, social, economic, and moral components, and weigh potential solutions according to these guiding vectors.

Global Health and Health Policy 20 | Maternal & Reproductive Health and Health Policy

Jessica Cohen
Spring; MW 3-4:15
Class Capacity: 25
Consent: Instructor

This course will introduce students to the dominant issues in reproductive, maternal, and newborn health —including determinants of health care access, equity, quality, and outcomes—while exploring how evidence is generated and the complex translation of evidence into policy. We will consider a range of programmatic and policy approaches to improving maternal and reproductive health and unpack why some have worked and some have not. We will read and discuss research from a range of settings, including the United States and low- and middle-income countries. A primary goal of the course will be to sharpen students' ability to think critically about the measurement and evaluation of health care programs and to expose them to the tradeoffs inherent in different approaches to evidence generation and dissemination. Readings and coursework will introduce students to, or deepen their familiarity with, approaches to causal inference, including randomized controlled trials and "natural experiments." Throughout the course we will discuss the implications of health policy choices, health system designs, and clinical guidelines for maternal-reproductive health equity, both within and across countries. Some sessions will include guest speakers, who are experts in the field of maternal health, including clinicians, researchers, policy-makers, and advocates.

Recommended Prep: Some familiarity with statistics is beneficial but not required.

ENGINEERING SCIENCES AND STATISTICS

Applied Mathematics 10 | Computing with Python for Scientists and Engineers

Logan McCarty
Fall; TTh 10:30-11:45

This course is a systematic introduction to computing (with python and jupyter notebooks) for science and engineering applications. Applications are drawn from a broad range of disciplines, including physical, financial, and biological-epidemiological problems. The course consists of two parts: 1. Basics: essential elements of computing, including types of variables, lists, arrays, iteration and control flow (for, while loops, if statement), definition of functions, recursion, file handling and simple plots, plotting and visualization tools in higher dimensions. 2. Applications: development of computational skills for problem solving, including numerical and machine learning methods, and their use in deterministic and stochastic approaches; examples include numerical differentiation and integration, fitting of curves and error analysis, solution of simple differential equations, random numbers and stochastic sampling, and advanced methods like neural networks and simulated annealing for optimization in complex systems. Course work consists of attending lectures and labs, weekly homework assignments, a mid-term project and a final project; while work is developed collaboratively, coding assignments are submitted individually.

Course Notes: This course satisfies the QRD requirement. Lectures meet concurrently with Physics 20, although sections, homework and project assignments are different between the two courses.

Recommended Prep: Mathematics 1b is a prerequisite, although it can be taken concurrently (particularly for sophomores). Some limited concepts from Mathematics 21a are used, but they can be learned during the course. The course provides an introduction to programming with a mathematical focus, using Python, and starts from the level of a complete beginner.

Biomedical Engineering 121 | Cellular Engineering

Kit Parker
Fall; TTh 11:15-12:30
Consent: Instructor

This is a combined introductory graduate/upper-level undergraduate course that focuses on examining modern techniques for manipulating cellular behavior and the application of these techniques to problems in the biomedical and biotechnological arenas. Applications in drug discovery, regenerative medicine, and cellular agriculture will be discussed. Topics will include controlling behavior of cells through cell-matrix interactions, cytoskeletal architecture, and cell behavior in processes such as angiogenesis and wound healing. Lectures will review fundamental concepts in cell biology before delving into topical examples from current literature. Students will work weekly in the lab learning cell culture techniques, soft lithography, microscopy, and classical in vitro assays measuring cell behavior.

Course Notes: BE121 and ES222 are the same course. This course has a mandatory laboratory section that will require hands-on work outside of scheduled lecture times.

Course Requirements: LS1a (or LPS A); LS 1b; Math 21b (or equivalent); Physical Sciences 12a and 12b (or equivalents); and Engineering Sciences 53; AND Co-requisite: Biomedical Engineering 110

Engineering Sciences 53 | Quantitative Physiology as a Basis for Bioengineering

Linsey Moyer
Fall; MWF 11:15-12:30

This course is designed as an introduction to thinking as a bio/biomedical engineer and is recommended for first years and sophomores but open to all students. Simple mathematical models are used to represent key aspects of organ systems function. Core engineering concepts are explored through mechanical and electrical examples within the human body. The primary focus is on quantitative descriptions of organ systems function and control in terms of physical principles and physiologic mechanisms. It includes a foundation in human organ systems physiology, including cardiovascular, pulmonary, and renal systems. Emphasis will be given to understanding the ways in which dysfunction in these systems gives rise to common human disease processes.

Course Notes: Open to first-year students. Course includes a 3-hour lab section once per week.

Recommended Prep: Calculus at the high school level

Course Requirements: Co-req or pre-req: Applied Physics 50a OR Applied Physics 50b OR Physical Sciences 12a OR Physical Sciences 12b OR Physics 15a OR Physics 15b OR PHYSCI 2 OR PHYSCI 3

First-Year Seminar 53F | Big Data, Tall Tales

Andrea Foulkes
Fall; Th 9:45-11:45
Class Capacity: 12
Consent: Instructor

Students in this seminar will get their hands dirty playing with data as we explore how to be judicious consumers of it. The huge swaths of data now available allow us to tell stories, big and small, some true and some not so true. With an emphasis on news media representations, we will take a deep dive into thinking about how data are generated, what we can (and cannot) discern from data, and how we can wrangle it to create narratives. Students will learn how to visualize and summarize data using R, an open-source and freely available programming language. No prior experience working with data or programming is required. Emphasis will be on communicating with data. Seminars will emphasize discussions with a focus on public health applications. Students will reflect on seminar content through regular written assignments.

Government 50 | Data Science for the Social Sciences

TBAFall; TTh 10:30-11:45

Data is a fundamental part of studying the social, political, and economic world. How can we measure racial discrimination in job hiring? What is the best way to predict election outcomes? What factors drive the onset of civil wars? Is it possible to determine what members of Congress are more or less liberal given their voting record? These are just a few of the numerous questions that social scientists in academia and industry are tackling with quantitative data. In this course, you will learn the fundamentals of data science as applied to the social sciences: visualization, wangling, causal inference, prediction, and inference. All the while you will learn how to communicate your findings to a broad audience and how to use the professional tools of the trade such as R, tidyverse, and GitHub. Each student will complete a final project to showcase their acquired skills. No previous experience with statistics or statistical computing required.

Course Notes: This course requires students to choose timed sections during registration.

Government 1737 | Evaluating the Impacts of Public Policies: How to Design and Implement Randomized Controlled Trials

Michael Hiscox
Spring; TTh 1:30-2:45

In a randomized controlled trial, a policy intervention or program participation is allocated among study subjects by random assignment, then differences in subsequent outcomes (e.g., health, academic performance, income) are compared across the groups. Such trials have become a favored method for empirical research across the social sciences in recent years and the methodology has also altered the way governments approach development, health, welfare, and education policies. The aim of the course is to provide students with training in how to design and implement randomized controlled trials to evaluate policies and programs. We will discuss working with government and non-government partners, ethics, sampling, the use of online and digital platforms, and the analysis and interpretation of results.

Psychology 1900 | Introduction to Statistics for the Behavioral Sciences

TBA
Fall; TTh 10:30-11:45
Spring; MW 9-10:15

Provides an introduction to statistics used in psychology and other behavioral sciences, with applications to industry-facing data science roles. Emphasizes conceptual understanding of key statistical principles and develops hands-on data analysis skills using the statistical programming language R. Topics include measures of central tendency and variability, probability and distributions, as well as hypothesis testing and data exploration (including chi-square tests, t-tests, correlation, analysis of variance, and regression). Includes a lab section focused on applying these methods to behavioral data.

Statistics 100 | Introduction to Statistics and Data Science

James Xenakis (Fall and Spring),
Fall; MW 10:30-11:45
Spring; MW TBA
Class Capacity: 150 (Spring)
Consent: Instructor (Spring)

Introduction to key ideas underlying statistical and quantitative reasoning, and the practice of data science. Course topics include methods for organizing, summarizing and visualizing data; basics of probability; elements of study design; data ethics; parameter estimation and hypothesis testing in one- and two-sample problems; regression with one or more predictors; and basic analysis of categorical data. Students will learn a reproducible workflow for analyzing data in the statistics package R. No prior statistics or computing knowledge is assumed.

Course Notes: Anti-Req: this course may not be taken for credit if STAT 111, STAT 139, STAT 149, or STAT 244 already complete. This course requires students to choose timed sections during registration.

Statistics 102 | Introduction to Statistics for Life Sciences

Kevin A. Rader
Spring; TBA

Introduces the basic concepts of probability, statistics and statistical computing used in medical and biological research. The emphasis is on data analysis and visualization instead of theory. Designed for students who intend to concentrate in a discipline from the life sciences.

Course Notes: Cannot be taken for credit if STAT 100, STAT 104, STAT 111, STAT 139, STAT 149, or STAT 244 already complete.

Statistics 109A | Data Science 1: Introduction to Data Science

Pavlos Protopapas, Kevin A. Rader
Fall; MW 10:30-11:45

Data Science 1 is the first half of a one-year introduction to data science. The course will focus on the analysis of messy, real life data to perform predictions using statistical and machine learning methods. Material covered will integrate the five key facets of an investigation using data: (1) data collection - data wrangling, cleaning, and sampling to get a suitable data set; (2) data management - accessing data quickly and reliably; (3) exploratory data analysis – generating hypotheses and building intuition; (4) prediction or statistical learning; and (5) communication – summarizing results through visualization, stories, and interpretable summaries. Part one of a two part series. The curriculum for this course builds throughout the academic year. Students are strongly encouraged to enroll in both the fall and spring course within the same academic year.

Course Notes: Only one of the following can be taken for credit: Stat 109a, Stat 121a, CS 109a, AC 209a.

Recommended Prep: Programming knowledge at the level of CS 50 or above, and statistics knowledge at the level of Stat 100 or above (Stat 110 recommended).

Course Requirements: Not to be taken in addition to Computer Science 1090A or Applied Computation 209A.

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ETHICS OF HEALTH

First-Year Seminar 23H | Medicine in Nazi Germany and the Holocaust—Anatomy as Example for Changes in Medical Science from Routine to Murder

Sabine Hildebrandt
Spring; M 3-5
Class Capacity: 12
Consent: Instructor

This seminar introduces students to the history of Nazi Germany and the Holocaust as an extreme example of antisemitism and racism, and of crimes against humanity and genocide. These included medical crimes, which, thus far, are the most thoroughly documented examples of ethical transgressions of health care professionals. They include forced sterilizations, the "euthanasia" systematic patient murder program, and forced brutal medical experiments on the living and the dead. However, under conditions of oppression by the same political system, some health care professionals chose to retain the healing powers of medicine.

Anatomy in Nazi Germany is an example of ethical transgressions in the medical sciences that reveals the complex relationships between scientists and the Nazi regime. Changes of the traditional anatomical body procurement manifested in the use of many bodies of Nazi victims in teaching and scientific investigations. Research gradually moved from routine studies to murder, from the anatomy lab to the Nazi prison system and then to the concentration camps. Ultimately, anatomists were complicit with the government through their role in the complete destruction of the perceived "enemies" of the Nazi regime.

This history of medicine can thus serve as a model for the recognition of patterns and common roots with other histories of discrimination, oppression, and atrocities. Also, there are continuities and legacies from this history that reach into the present and have relevance for today's education and practice in the health professions.

General Education 1115 | Human Trafficking, Slavery, and Abolition in the Modern World

Orlando Patterson
Spring; MW 1:30-2:45
Class Capacity: 210
Consent: Instructor

Why do slavery, human trafficking and other forms of servitude thrive today globally, including in the USA, and what can we do about it?

We often think of slavery as being a dark chapter in our past, but this is a tragic oversimplification. What defines slavery in the modern world, and what are the moral, political and social implications of its continued existence? As we explore its underpinnings, we discover that all of us may be in some way complicit in its survival. This course surveys the nature, types and extent of modern servitude such as transnational and domestic prostitution, forced marriage, labor trafficking and forced domestic labor, child soldiering and other forms of enslavement of children, organ trafficking and other health aspects of trafficking, debt-bondage, and the forced exploitation of other vulnerable groups such as refugees and stateless persons. Throughout the course, but especially in the final part, we examine anti-trafficking and anti-slavery measures and movements and ways in which you can increase awareness or become involved. You will, by the end of our exploration, be able to trace the moral and ethical arguments surrounding human slavery in its various forms, understand the ways in which this problem still affects so many people, and what can and should be done about it.

Global Health and Health Policy 70 | Humanitarian Response to Conflict and Disasters

Michael VanRooyen
Spring; W 3-5
Class Capacity: 30
Consent: Instructor

Global conflict, climate change, forced migration of refugees have increased in scale and complexity. How should the world respond when war and disasters force people from their homes? How can we better help the world's civilian populations in such extreme circumstances? This course examines the past, present, and future of the international humanitarian response system. We will explore through case studies of modern conflict and disaster, how Doctors Without Borders, the United Nations, the Red Cross, and other aid agencies came to be and how global response standards, international humanitarian law, and new technologies are shaping worldwide disaster relief.

Through interactive discussions, case studies, and assignments, students will:

- Learn how aid workers prioritize and coordinate lifesaving humanitarian efforts.
- Explore the interaction of humanitarian agencies with governments and civil society to provide refugee aid.
- Understand the challenges of the refugee journey.
- Analyze the humanitarian community's response to conflicts and crisis.

Course Notes: At the end of the course, students can opt to participate as a 'refugee' as part of a large, outdoor humanitarian response training exercise with students and professional aid workers from around the world. No prior

knowledge of the subject is required. No auditors or cross-registrants.

Stem Cell and Regenerative Biology 120 / Government 1090 | Biotech Ethics

Instructor TBA
Spring; MW 1:30-2:45
Sergio Imparato
Spring; TTh 10:30-11:45

This course examines the ethical challenges posed by technological advancements in healthcare and biotechnology, addressing their impact on personal ethical conduct and public policy-making. It begins with an introduction to key ethical theories and their application to biotech dilemmas. Students then analyze case studies, exploring real-world ethical issues faced by biomedical companies and research institutions, emphasizing the effects of emerging technologies on public health, individual rights, and social justice. The course concludes with students collaborating to create ethical frameworks for decision-making in biotech policy.

Course Notes: Previous experience in biology and economics is helpful but not necessary. May not be taken concurrently with Gov 1090. May not be taken for credit if Gov 1090 has already been taken. The course is open to both science and nonscience concentrators.

HEALTH AND DEMOGRAPHY

First-Year Seminar 22H | My Genes and Cancer

Giovanni Parmigiani
Spring; Th 3:45-5:45
Class Capacity: 12
Consent: Instructor

The effect of a person's genetic background on whether they will develop cancer, and when, is at the center of scientific and societal dilemmas which will be explored in this seminar. The seminar will include a brief didactic phase, followed by student-led learning activities and by final debates, moderated by students. Learning will cover genetic inheritance of cancer; cancer evolutionary theories; conceptual and technical notions of probability and risk; and their use in personalized medicine. Debates will emerge from the student's interest. Examples may include: should we test all children at birth? Should we research methods for editing genetic susceptibility to cancer out of embryos? Should race be part of the construction of personalized cancer risk? NASA is both an employer and a health care provider for astronauts: space missions increase astronauts' risk of cancer; should Nasa test astronauts for inherited susceptibility to cancer, and how should they use the information?

Recommended Prep: There are no strict prerequisites, though some familiarity with the basic concepts of probability and genetics will be very helpful.

Environmental Science and Engineering 169 | Field and Lab-Based Seminar on Local Pollution Issues

Elsie Sunderland
Fall; TTh 10:30-11:45
Class Capacity: 18
Consent: Instructor

This course provides a cross-disciplinary overview of environmental science and how research contributes to public policy and human health risk assessment through a case study of a local pollution issue. The course will focus on exposing students to a combination of field, lab and modeling techniques used in environmental sciences through an intensive study of factors affecting the bioaccumulation of contaminants on Cape Cod, MA. The class will include field visits, lab work, and interactive group research aimed at synthesizing research findings. Experience conducting multidisciplinary environmental research and data analysis will be provided. Course Activities: Lectures, discussions, presentations, field/lab research, data analysis.

Course Notes: ESE 169 is also offered as EPS 169. Students may not take both for credit. Total class capacity of 18 is for both ESE 169 and EPS 169.

Recommended Prep: Two semesters of undergraduate chemistry including Physical Sciences 1 or Physical Sciences 11; Mathematics 1a & 1b. Knowledge of basic statistics is also helpful.

Course Prerequisite: Physical Sciences 1 or 11; and Math 1b.

Environmental Science and Public Policy 173 | Water Resources in Developing Countries

Ken Thomas
Spring; MW 12-1:15

This course will examine major issues of water resources (i.e. water sources, supply, quality, treatment, use, distribution and storage, policy) in the developing world at various geographic locations and scales. Specific water resources issues will be highlighted through in-depth case studies from Africa, Asia, and Small Island Developing States. Analysis of the hydrological, technological, legal, and geopolitical factors that affect the availability of water for human consumption and agriculture will be explored in all cases. To understand fundamentals in the developing world context, the course will compare how water resources are managed in the developed and developing world. Fundamentals cut across water-related policies, water flows, water sources, water supply, water and wastewater treatment, water distribution, and water storage. The course will emphasize – both quantitatively and qualitatively – the real-world challenges and systemic issues of the developing world that make water resources planning and management complicated.

HEALTH, CULTURE, SOCIETY

African and African American Studies 86 / History 86 | Race and Public Health Crises: From TB to AIDS to COVID-19

George Aumoithe (Fall)
Fall; TTh 12-1:15

This course explores the complex interplay between race and public health crises, from tuberculosis to AIDS and COVID-19. Students will examine the visual culture of epidemics, critically analyze systems of racial classification, and study the work of influential sociologists, political scientists and historians of medicine and public health. The course challenges students to question the racial epistemology underlying epidemiological research and practice, fostering a deeper understanding of how race has shaped and has been shaped by public health responses from the 19th century to the present. By engaging with diverse materials and perspectives, students will develop critical tools to analyze racial health disparities and their societal implications, both in historical contexts and amid contemporary health challenges.

African and African American Studies 197 | Poverty, Race, and Health

David Williams
Fall; T 12:45-2:45

This course critically examines the health status of the poor, and of African Americans and other socially disadvantaged racial and ethnic groups in the US. Attention will be focused on the patterned ways in which the health of these groups is embedded in the social, cultural, political, and economic contexts, and arrangements of US society. Topics covered include the meaning and measurement of race, the ways in which racism affects health, the historic uses of minorities in medical research, how acculturation and migration affects health, and an examination of the specific health problems that disproportionately affect nondominant racial groups.

Anthropology 1829 | Health Science and the "Replication Crisis": Anthropological Perspectives

Lindsey Zeve
Fall; Th 3-5:45
Class Capacity: 25
Consent: Instructor

Over the last two decades, health scientists have grown increasingly concerned about a perceived methodological crisis centered on the reliable replication of research findings—a crisis exacerbated by growing public mistrust in science, which reached a fever pitch in the wake of the global COVID-19 pandemic. This seminar draws on anthropological perspectives to examine critically what has come to be known as the "replication crisis" in health science. Framing the crisis both as a moment of danger and of radical possibility, together we will explore how debates over replication illuminate deeper questions regarding the nature, stakes, and commitments of health science and its objects of study, as mediated through themes of representation, causality, error, epistemic virtue, risk, uncertainty, and objectivity. In doing so, we will consider how scientific authority is constructed and contested; how the replication crisis affects public trust, lay participation, and broader engagements with health and science; and unexpected opportunities the crisis may present to advance the cause of health equity. Through ethnographic readings, case studies, and interdisciplinary scholarship, students will analyze the drivers of the crisis and consider its implications for the future of scientific knowledge-making and health care delivery.

First-Year Seminar 23K | Insights from Narratives of Illness

Jerome Groopman
Spring; Th 12:45-2:45
Class Capacity: 12
Consent: Instructor

A physician occupies a unique perch, regularly witnessing life's great mysteries: the miracle of birth, the perplexing moment of death, and the struggle to find meaning in suffering. It is no wonder that narratives of illness have been of interest to both physician and non-physician writers. This seminar will examine and interrogate both literary and journalistic dimensions of medical writing. The investigation will be chronological, beginning with "classic" narratives by Tolstoy, Chekhov, and Kafka, and then moving on to more contemporary authors such as William Carlos Williams, Richard Selzer, Oliver Sacks, Susan Sontag, and Philip Roth. Controversial and contentious subjects are sought in these writings: the imbalance of power between physician and patient; how different religions frame the genesis and outcome of disease; the role of quackery, avarice, and ego in molding doctors' behavior; whether character changes for better or worse when people face their mortality; what is normal and what is abnormal behavior based on culture, neuroscience, and individual versus group norms. The presentation of illness in journalism will be studied in selected readings from the New York Times' and Boston Globe's Science sections, as well as periodicals like the New Yorker, The New York Review of Books, Harper's, and the Atlantic Monthly. The members of the seminar will analyze how the media accurately present the science of medicine or play to "pop culture." The seminar will study not only mainstream medical journalists, but so called alternative

medical writers such as Andrew Weil and celebrity health voices like Gwyneth Paltrow. Patients with different diseases will be invited to speak to the members of the seminar about their experiences. Students will try their hands at different forms of medical writing, such as an editorial on physician-assisted suicide that would appear in a newspaper and a short story that describes a personal or family experience with illness and the medical system.

First-Year Seminar 25N | Finding Connections: Perspectives on Psychological Development and Mental Illness

Nancy Rappaport
Fall; T 3-5
Class Capacity: 12
Consent: Instructor

The seminar's challenge will be to deepen our understanding of human development and how individuals cope with serious emotional or social difficulties (neglect, bipolar disorder, autism, depression, schizophrenia). We will use multiple perspectives: medical observations and texts that provide practical knowledge (e.g. The New England Journal of Medicine review articles), narrative readings to understand how patients experience the meaning of illness from the inside out (e.g. The Center Cannot Hold), visitors who will discuss their experience with mental illness, and how development-related mental illness is portrayed in the press (e.g. The New Yorker articles). We will start with the mental life of babies and how scientists interpret infants' nonverbal ways of finding safety and security. This begins the journey of our understanding fundamental needs for tenderness, holding, and making meaning. Understanding how conditions such as autism, depression, and schizophrenia are described in clinical research and literature will help us to appreciate the biological vulnerabilities and relational patterns that may disrupt the human connection. We will examine the resourcefulness required for both fragility and resiliency. Throughout the seminar, the instructor, as a practicing child and adolescent psychiatrist, will bridge the gap between research findings, clinical applications, and everyday insight.

First-Year Seminar 43F | When Bad Things Happen Early in Life: The Effects of Early Adversity on Brain and Behavioral

Charles Nelson
Fall; M 12-2:45
Class Capacity: 15
Consent: Instructor

Decades of research tell us that the foundations of healthy development are built early in life. Genes provide the basic blueprint for brain architecture, but experiences shape the activity of the genome and thus determine how the circuitry is wired. Significant adversity can derail developmental processes and distort brain maturation, leading to limited economic and social mobility. Exposure to significant adversity early in life, particularly during critical periods of brain development, may increase risk for a host of chronic physical health problems, including cardiovascular disease, hypertension, diabetes, and addictive behavior; it can also lead to a variety of mental health problems, including depression and anxiety and characterological problems. Science clearly indicates that the longer we wait to intervene on behalf of such children, the more difficult it becomes to achieve healthy outcomes. This constraint is particularly true for children who sustain the wear and tear of early exposure to so-called "toxic stress". In this seminar we will critically examine the range of adverse early experiences that impact children growing up in both low and high resource countries. Key themes include a) the nature of the adversity children are exposed to, b) the timing of the adversity c) the chronicity of the adversity, and d) individual differences (including genetic and environmental factors that may confer protection on children exposed to early adversity). We will pay particular attention to the short- and long-term outcomes on physical, neurological and psychological health.

First-Year Seminar 52N | Misinformation, Disinformation, and BS in Science Communication

Daniel Hartl
Spring; W 9:45-11:45
Class Capacity: 15
Consent: Instructor

It's a jungle out there. The world is awash in hucksters, tricksters, frauds, scammers, grifters, and thieves. And there's no shortage of easy marks, suckers, dupes, and fools. Classic cons like the pigeon drop and three-card monte aimed to heist a bundle from a few. The internet and cable TV have changed the game. Now the goal is to nick a bit from a crowd. You're one of the suckers, so are your friends, so am I, so is everybody. We don't notice we're being scammed because what is being stolen is not our money. What's being stolen is our attention and our time. We're all suckers for clickbait. What's wrong with clickbait is that it leads you down a rabbit hole of misinformation, disinformation, and conspiracy theories that have created and sustained widespread skepticism and mistrust of science and scientists resulting in covid-19 conspiracy theories, vaccine hesitancy, bogus drug treatments, climate change denial, anti-evolution, and so forth. Even the most educated and savvy consumer of information is easily misled in today's complex information ecosystem. This seminar is clickbait vaccine to boost your critical thinking. It is designed to help you identify and refute misinformation, disinformation, and BS rampant on the internet. It will help you recognize sensationalism when science is communicated in the press. It will familiarize you with the main logical fallacies that students and scientists themselves are prone to. As a framework for discussion, we use Bergstrom and West's book "Calling Bullshit" along with supplemental readings.

First-Year Seminar 66I | Is Being Good Actually Good for the Body?

Immaculata De Vivo
Spring; T 3-5
Class Capacity: 15
Consent: Instructor

Did you know that kindness is good for your health? Did you know that happiness is contagious? Did you know that music lowers your cortisol levels? The science is in! This seminar will examine how the biology of prosocial behaviors shows how kindness and optimism improve overall well-being in profound and demonstrable ways. We will delve into a revolutionary approach to health, longevity, and quality of life and explain the scientific evidence that supports this work. The class will investigate five fundamental values of prosocial behaviors — kindness, optimism, forgiveness, gratitude, and happiness — and collectively engage in six essential strategies for cultivating these values — relationships, nutrition, physical activity, meditation, music, and nature. Along the way we will read the scientific data that reveals the impact such behavior has on biology, particularly on telomeres, the parts of DNA that serve as biomarkers of aging. While DNA is mostly immutable, telomeres are influenced by our choices. This seminar will discuss evidence that what is commonly ascribed to "spiritual" well-being has a clear and direct impact on physical health, helping to buffer premature aging and decrease the incidence of chronic disease.

First-Year Seminar 71X | Fat Talk and Thin Ideals - Culture, Social Norms, and Weight

Anne Becker
Fall; Th 9:45-11:45
Class Capacity: 12
Consent: Instructor

In 1995, the Fiji Islands were one of the last places on the planet to receive broadcast television. Within just three years, body weight ideals had transformed from large to thin and purging had become as common in Fijian high school girls as in their Massachusetts counterparts. How can we understand what happened in Fiji? And, likewise, how did heaviness in the U.S. migrate from signifying prestige to stigmatizing? In this seminar, we will examine the bio-social dimensions of disordered eating and being overweight as well as the volatility of weight ideals and their enduring moral salience. We will draw from anthropological and clinical perspectives to explore the rapidly shifting landscape of body shape ideals in the U.S. over the last century, the arrival of eating disorders in the Global South, the medicalization of obesity, and the emergence of pervasive weight stigma—as manifest in 'fat shaming' and even in policy interventions that have had unintended consequences. We will ask what the social structural determinants of obesity are, as well as how social adversities relating to the built environment, toxic food environment, climate change, and food deserts are embodied. We will examine variation in how the body is cultivated for self-presentation across diverse cultural contexts alongside evidence that the media have accelerated the globalization of thin ideals. We will conclude by considering both emerging threats inherent to pervasive social media platforms and digital photo-shopping as well as potential opportunities to reset social norms through social movements and policy.

First-Year Seminar 73L | Unequal Origins: Pregnancy, Poverty, and Child Health

Margaret McConnell
Fall; Th 3-5
Class Capacity: 12
Consent: Instructor

The US has worse pregnancy and child outcomes than any other high-income country in the world. Is this because we spend less providing direct income support to families than other high-income countries? This course will discuss the intersection between maternal and child health outcomes and poverty in the United States through a medical, economic, political, and historical lens. Assignments will ask students to become familiar with and attempt to navigate available supports for pregnant people and their children in the United States. Students will visit the Harvard art museum to observe how pregnancy and early childhood health and social supports for families with low incomes were conceptualized at the turn of the 20th century. Students will discuss elements of design and implementation of ongoing projects being conducted by Harvard faculty and collaborators to rollout and test direct cash support to pregnant or postpartum people.

First-Year Seminar 74C | Making Sense of Health Information in the Digital Age

Rebecca Robbins
Spring; M 12:45-2:45
Class Capacity: 12
Consent: Instructor

BREAKING: Coffee causes cancer! THIS JUST IN: Microplastics in our brains! Making sense of – and coping with – the often conflicting and seemingly ever-changing information we receive from various sources on health and medical topics can be hard. This seminar will give you the skills to make sense of health and medical information and this seminar will give you the skills to communicate health and medical information effectively to others using new and novel media. Whether you are interested in a career as a social media content creator on TikTok, a medical journalist for the New York Times, a surgeon at the Massachusetts General Hospital, or you are simply interested in being a better consumer of medical information, this seminar is for you. You will learn about how health information is developed for traditional (e.g., newspapers, television) and non-traditional (e.g., TikTok, YouTube) media outlets. You will visit a newsroom, meet health journalists, and learn how

journalists craft health content for newspapers, television, and online publications. You will also meet the creator of the #1 podcast in the world and visit her studio in Boston. You will hear from YouTube-funded health content creators and learn their tricks for communicating health information that empowers their online communities. The seminar will also wrestle with the power structures that adjudicate which health topics are covered in the media and discuss the imperative of defending vulnerable populations and considering culture and literacy levels in health content creation.

General Education 1053 | The Global Heart Disease Epidemic: Stopping What We Started

Richard Lee
Fall; MW 9-10:15
Class Capacity: 90 (Some seats reserved)
Consent: Instructor

What are you willing to do for the health of others?

Heart diseases have killed occasional humans since ancient times, but only in the past century have heart diseases become epidemic throughout the world. In fact, the first description of a heart attack in a human was not until 1912. In the current century, heart diseases will be the leading global cause of death, and the majority of those heart disease deaths will actually occur in the developing world. The epidemic of heart disease has been driven by many social, economic and technological events. Some of these events have been dramatically detrimental to human health, such as the accidental invention of the American cigarette by a slave in North Carolina in the 19th Century—an invention that is projected to kill one billion people between 2000 and 2100. Other events, such as advances in public health and safety, have been beneficial by extending lifespan and preventing early death, but they have also allowed age-related heart diseases to explode. Technological advances have improved our economic productivity but also led to changes in our lifestyles that promote heart diseases. In this course, we will consider the complex relationship of health and society by examining the epidemic in common heart diseases. We will explore how major lifestyle factors such as tobacco, alcohol, exercise and diet affect health, and we will also consider how economics and politics powerfully influence health. We will also discuss the role of government and our obligations to each other, and to future generations.

Course Notes: You may not take GENED 1053 if you have previously taken SCRB 175.

General Education 1089 | The Border: Race, Politics, and Health in Modern Mexico

Gabriela Soto Laveaga
Fall; TTh 10:30-11:45
Class Capacity: 75 (Some seats reserved)
Consent: Instructor

If we want to understand our own history we need to look at the fringes, in this case the ongoing tensions and violence at the U.S.-Mexico border illustrates what we value and fear as a society.

Our southern border is continuously covered in newspapers, social media, and political debates. Why does the Mexico-U.S. border continue to be a space of discussion and controversy? In the twenty-first century, as nations across the world militarize or rebuild their borders, the U.S.-Mexico border serves as a vital case study to understand the ongoing trend of tightening national borders—it also allows us to better understand our own history, politics, and how we shape our view of the world. In addition to examining the creation of the U.S.-Mexico border in 1848 to the present, this course examines how ideas of public health have historically been used in border debates. For many, the border served (and serves) as a protective barrier from poverty, violence, and, especially, disease. By the early twentieth century many Mexican bodies were perceived as "alien," "illegal," and in need of patrolling. Yet these descriptions were also used by Mexican politicians to describe and isolate Indigenous groups and the Chinese within Mexico. By examining, for example, border ecological disasters, response to epidemics and a pandemic, and how ideas of race and health played out within Mexico and the U.S. we can better understand borders in general.

History of Science 1490 | The History and Culture of Stigma

Allan Brandt
Fall; Th 3-5
Class Capacity: 20
Consent: Instructor

This course will investigate the history of a number of stigmatized conditions and diseases including, for example, cancer, mental illness, addiction, obesity, AIDS, and disability. A central goal will be to understand the stigmatization of disease and its effects in diverse historical and cultural contexts. The course will evaluate both the impact of stigmatization on health disparities and outcomes, as well as attempts to de-stigmatize conditions that are subject to discrimination, prejudice, and isolation.

Humanities 2 | Introduction to the Medical and Health Humanities

Karen Thornber
Fall; TTh 10:30-11:45
Class Capacity: 30 (Some seats reserved)
Consent: Instructor

HUM 2 serves as an introduction to the burgeoning field of the medical and health humanities, a thriving discipline that explores the human side of medicine, health and healthcare through the lens of the humanities, social sciences, and the arts. We will bring together perspectives from literature, media, history, philosophy, ethics, anthropology, and the

visual and performing arts to deepen our understanding of illness, health, and healing.

This course is aimed at students with a broad range of career goals - from medicine and the other health professions to politics, law, journalism, nonprofits, and the creative and performing arts.

Mind, Brain, and Behavior 980P | The Role of Music in Health and Education

Lisa Wong
Fall; Th 3-5
Class Capacity: 15
Consent: Instructor

Music shapes the course of human history at both a micro and macro scale; The "universal language" has the power to connect people who share no other common ground. Its power to bind people together is intuitively understood, but only through recent neuroimaging advances over the past few decades have scientists been able to move past intuition to reveal its impact on the brain. In this course, we will examine the exciting progress of the fields of music, science, and social science, through a variety of lenses, and meet some of the experts in the field. Who are the key investigators and practitioners in today's emerging music/brain landscape? What are the latest discoveries about how music affects the brain? How does how we hear and listen impact our perception of music? Who are some of the key influencers in music and social change? This course invites students to deepen their relationship with music, exploring different aspects of the art form through the lens of neuroscience, education, medicine, music therapy, public health and social justice. By the end of this course, the learner will (1) understand the effect of music on the developing brain; (2) understand the mechanism of hearing music; (3) consider the pathophysiology of disordered movement and hearing and how music can be used therapeutically; and (4) understand how other disciplines can add to their knowledge of the therapeutic uses of music. Given the transdisciplinary nature of the work, students will be introduced to literature from different disciplines and use these resources to explore their own individual interests in music.

Psychology 980AD | Psychopathology and the Family

Jill Hooley, Katherine Powers
Fall; Th 12-2
Class Capacity: 16
Consent: Instructor

In this course, we will explore how the family impacts psychopathology, including relapse, recovery, and resilience, for a member with a mental disorder. We will examine the relationship between the family and mental health conditions like anxiety, autism, depression, personality disorders, and schizophrenia from a life course and a family systems perspective. We will also examine these relationships by discussing the biopsychosocial features of the family that impact child and adolescent psychopathology. The course will focus on contemporary approaches to family life (e.g., dual-earner families, gender equality, LGBTQ+ families, etc.), and the role these approaches play in family functioning.

Class Notes: The instructor of this course is John Knutsen, john_knutsen@g.harvard.edu.

Recommended Prep: The Psychology Department requires completion of Science of Living Systems 20 or Psychology 1 or the equivalent of introductory psychology (e.g. Psych AP=5 or IB =7 or Psyc S-1) and one of PSY 18 or PSY 1861 before enrolling in this course; or permission of instructor.

Psychology 1813 | Technology and Mental Health

Shifali Singh
Fall; Th 3-5

How does screen time relate to changes in emotional states? Can using social media cause depression and disordered eating? How do influencers' online posts affect self-esteem? In what ways can technology improve equity and access in mental health care? We will explore these questions and more in this course, which will delve into the nuanced ways technology has positively and negatively impacted mental health and wellbeing. For your final project, you will have the opportunity to develop your very own technology-based intervention. Be prepared to think critically about how you and your peers engage with technology!

Recommended Prep: The Psychology Department requires completion of Science of Living Systems 20 or Psychology 1 or the equivalent of introductory psychology (e.g. Psych AP=5 or IB =7 or Psyc S-1) and one of PSY 18 or PSY 1861 before enrolling in this course; or permission of instructor.

Psychology 1845 | Stigma, Discrimination, and Health

Mark Hatzenbuehler
Fall; MW 1:30-2:45

What is stigma? How do stigmatized identities and conditions differ from each other? Why do we stigmatize? What are the consequences of stigma for cognitions and emotions, for social relationships, and for health? Through what mechanisms—individual, interpersonal, and structural—does stigma operate to produce adverse health outcomes? How do stigmatized individuals cope with and resist stigma? How can we reduce stigma and its negative effects? In this course we will consider stigma as a fundamental cause of health inequalities across a broad range of phenomena, including (but not limited to) mental illness, sexual and gender diversity, weight, disability, aging, poverty, and immigration status. Students can expect to examine stigma as a predicament that affects nearly all individuals at some point in the life course, and to develop

expertise in an individual stigma that is relevant to their personal, academic, and professional interests through a series of focused course assignments.

Recommended Prep: The Psychology Department requires completion of Science of Living Systems 20 or Psychology 1 or the equivalent of introductory psychology (e.g. Psych AP=5 or IB =7 or Psyc S-1) before enrolling in this course; or permission of instructor.

Sociology 1146 | Sociology of Health and Medicine

David Showalter
Spring; MW 1:30-2:45

This course introduces a sociological perspective on the topics of health and medicine. First, we discuss social determinants of health and the effects of intersecting inequalities on health disparities. Second, we investigate how knowledge about health and illness is influenced by social categories and social relations. Third, we explore how healthcare workers do their jobs and how their work is shaped by social context. Finally, we consider healthcare policies and politics, including how social movements address health and illness. This course is recommended for students considering careers in medicine and healthcare.

Sociology 1218 | Food Choice, Health, and Inequality

Caitlin Daniel
Fall; T 3-5
Class Capacity:18
Consent: Instructor

Food and diet-related health have become a pressing topic in research, policy and public discourse. This concern stems in part from the fact that disadvantaged groups tend to have poorer diets than their more advantaged peers. In order to understand socioeconomic and racial disparities in diet quality, we will examine how people's food choice is related to their material resources, to their social circumstances, and to the meaning that they attach to—and derive from—food. Additionally, we will consider how the public imagines that disadvantaged people eat and how these ideas themselves relate to social inequalities. In addressing these issues, we will consider several core questions: 1) How do patterns of food consumption reflect existing inequalities?, 2) How do patterns of food consumption contribute to social inequalities?, 3) How do cultural constructions of what people eat compound these inequalities?, and 4) How might we reduce food-related inequalities? While these questions focus on food, they will help us to think about structure, culture, agency, identity, and stigma more generally.

Spanish 61PH | Spanish for Public Health

Adriana Gutierrez
Spring; TTh 12-1:15 (2 sections), 1:30-2:45
Class Capacity: 15
Consent: Instructor

An advanced language and culture class that examines literature, documentary, films, journalistic articles and other media portraying the cultural, political, sociological and financial impact of Public Health issues in Latin America. Students' linguistic competency is developed through discussion of the issues of public health. Grammar reviews, and weekly writing assignments. Students will also choose a specific project for a Public Health issue in Latin America and research its possible outcome and cultural, social, political, economic consequences.

Course Notes: Not open to auditors. May not be taken Pass/Fail but may be taken Sat/Unsat by GSAS students.

Recommended Prep: Prerequisite: A score between 751 and 780 on the SAT II test or Harvard Placement test, a Spanish 50-level course, or permission of course head. Students are allowed to take a maximum of two courses at the 60-level in Spanish, not including Spanish 60.

Women, Gender, and Sexuality 1311 | Race, Gender, and Medicine

TBA
Spring; Th 12-2:45
Class Capacity: 15
Consent: Instructor

Why is racism so prevalent in hospitals and other health care settings? What unique challenges do trans and gender-diverse youth face in seeking medical care as a result of recent transphobic laws and policies? How are community organizers advocating for the end of medical neglect, abuse, and torture in prisons and migrant detention facilities? In this largely discussion-based course we explore these questions and many others. Social approaches to medicine and public health challenge and expand contemporary debates in the medical humanities by centering issues of gender, race, and sexuality. This course provides an overview of the theoretical landscape and social movements that ground recent developments in the field. In particular, the course engages feminist theory, disability justice movements, critical race theory, queer theory, anti-colonial thought, and trans liberation movements. Special attention is paid to the structuring force of anti-Blackness in various clinical and research settings, the development and racialization of transgender medicine, and what it means to view state violence as an issue in public health and the medical humanities.

HISTORY AND PRACTICE OF MEDICINE

East Asian Studies 170 | Medicine and Self in China and in the West

Shigehisa Kuriyama
Fall; MW 1:30-2:45

Comparative historical exploration of the striking differences and unexpected similarities between traditional conceptions of the body in East Asian and European medicine; the evolution of beliefs within medical traditions; the relationship between traditional medicine and contemporary experience.

Course Notes: This course fulfills the East Asian Studies concentration "Historical Survey" requirement.

First-Year Seminar 24G | A Brief History of Surgery

Frederick Millham
Fall; Th 6-8
Class Capacity: 12
Consent: Instructor

Was Surgery practiced in the Stone Age? Twenty six hundred years ago at the dawn of recorded history, Egyptian surgeons operated on patients by the shores of the Nile. What diagnoses were they making? What treatments did they offer? How did they understand human anatomy and physiology? A millennium later, the Hippocratic physicians emerged on the Aegean Island of Cos. These physicians left us carefully stated surgical principles based, at least partly, on observation and measurement. Why did they record their wisdom in the form of aphorisms? At around the same time, Shushruta, in what is now India, appears to have offered surprisingly modern surgical care to his patients. Who was he? In the second century CE Galen of Pergamum bursts on to the scene, intending to restore Hippocratic orthodoxy. Why was surgical thinking for nearly two millennia dominated by this his, often erroneous, teaching? The Islamic Golden Age, an explosion of scientific and medical discovery, is a key to our understanding of all that follows in surgical history. Why is this period overlooked today? How did the exposure of Galen's anatomical imprecision by Vesalius in 1543 and his absurd physiology by Harvey in 1628 begin a Medical Enlightenment? Why did it take until the 19th century for surgeons solve the riddles of anesthesia and antisepsis? What were the roles of surgeons in the Eugenics movement and the Holocaust? Is the advice of the Hippocratic physicians that "To understand surgery one must go to war" true in the 21st Century?

Our study will examine these questions and many more. We will visit the site of the first use of ether anesthesia and explore the human body in the anatomy lab at Harvard Medical School. We will admire rare first additions of the great works of surgical history at the Countway Medical Library. From time to time we will be joined by doctors with expertise in specific areas such as anesthesiology, combat surgery, and anatomy.

Course Notes: The seminar will visit the site of the first use of ether anesthesia (the Ether Dome) and explore the human body in the anatomy lab at Harvard Medical School. We will admire rare first additions of the great works of surgical history at the Countway Medical Library. From time to time we will be joined by doctors with expertise in specific areas such as anesthesiology, combat surgery, and anatomy.

First-Year Seminar 26K | Transformative Ideas in Brain Science: War, Technology, and Disease Pioneered Discovery

Jeffrey Macklis
Fall; Th 3-5:45
Class Capacity: 12
Consent: Instructor

This seminar will offer an integrated historical-neurobiological-neurological introduction to foundational and transformative ideas in the ~3,700 year history of brain science, neuroscience, and "lay" neurology—all accessible to freshmen with interests from neuroscience and (molecular, developmental, organismic, evolutionary, or regenerative) biology to history and philosophy of science to neuroeconomics and medicine. No background will be assumed. Rather, a series of historical vignettes and sources will be tied to modern understanding of core elements of the nervous system, its organization, function, and modes of investigation and manipulation. Selected historical contexts, often involving war, disease, serendipity, and technology advancement, will be highlighted as advancing knowledge in surprising ways. An inter-disciplinary approach will benefit from each student bringing insights from their own reading of primary source and history of science texts, to be added to in-session discussion, with moderation and direction from me (JDM). We will visit a number of the Harvard Collections and museums, including the Museum of Comparative Zoology, Harvard Herbaria, Houghton Rare Books Library, History of Science Collections, the HMS Warren Anatomical Museum collection (Phineas Gage's skull and railroad tamping rod, among much more), the Harvard collection of historical scientific instruments (advances in microscopy, electrical measurement, e.g.), and the state-of-the-art Center for Brain Science human functional brain imaging facility, with each visit providing context for the week.

Recommended Prep: No background will be assumed.

Global Health and Health Policy 50 | The Quality of Health Care in America

Anupam Jena
Fall; TTh 3-4:15
Class Capacity: 50
Consent: Instructor

This course offers an introduction to the field of health care quality in the United States. Over the past two decades, quality of care has been recognized as one of the most important areas of medicine and health policy. In this course, students will be exposed to timely issues related to the current quality of health care and efforts to make improvements. Students will be grounded in the current state of the US health care system, with consideration given to where it excels (e.g., advances in diagnosis and treatment) and where it requires improvement (e.g., errors of commission and omission, threats to patient safety, flaws and waste in the delivery of services). Students will be introduced to methods for improving the quality of care. Problems in the quality of care experienced by selected populations will be explored. Throughout the course, students will hear from leaders in the field of health care who will present their own research and recommendations for improving the quality of health care in America.

History of Science 1350 | Modern Life Science: From Pasteur to CRISPR

Rijul Kochhar
Spring; MW 1:30-2:45
Class Capacity: 40
Consent: Instructor

What do we mean when we speak of the "the modern life sciences"? In this course, we examine this question following Darwin's revolutionary theories of evolution. We cover a range of topics spanning the late 19th to the early 21st centuries, including the emergence of the scientific laboratory; the development of disciplines such as bacteriology, virology, genetics, and molecular biology; and the promissory horizons of emergent bio(medico)technologies. In a time where scientific actions are both a source of rapid innovation and social suspicion, this course emphasizes how the life sciences and society profoundly shape one another.

History of Science 1445 | Medicine and Health in America

Eram Alam
Fall; TTh 10:30-11:45

This course surveys major historical developments in medicine and health in the United States during the modern period. We will analyze medicine and health within social, cultural, and political contexts to better understand the relationship between medicine and power. Topics will include: citizenship, nationalism, and imperialism; race, gender, and the body; capitalism and the medical marketplace; professionalization, expertise, and authority; crises and epidemics; technology and therapeutics; and questions of care.

History of Science 1462 | Therapeutic Histories: Global Encounters between Healing Systems

Rijul Kochhar
Fall; Th 3-5
Class Capacity: 18
Consent: Instructor

This seminar will examine the ways in which cultures and therapeutic techniques are entangled with each other. We will focus on a variety of healing traditions, from a range of historical and geographic locations. Readings will include Western biosciences, Chinese and Ayurvedic "traditional" therapies, Unani and Perso-Arabic curative practices, and medical life sciences from the former Soviet Union.

A key question we will ask throughout the seminar is: how is therapeutic knowledge historically produced? This question will help us think through illness experiences, the pursuit of cures, and quests for therapeutic pluralism amidst technological advancement. Readings will also grapple with culturally salient phenomena such as science and embodiment; collective memory; social deprivation; and therapeutics in times of multiple crises.

History of Science 1770 | Broken Brains: A Patient-Centered History

Anne Harrington
Spring; Th 3-5:45
Class Capacity: 36
Consent: Instructor

An exploration of the complex relationship between doctors and scientists who study and treat different kinds of "broken brains," the patients they study and treat, and larger public conversations about being human in today's neurological society. Topics include iconic cases of brain damage that catalyze new scientific understandings (like the case of H.M.), the study of brain damage in war, the emergence of writings (including memoirs and novels) that attempt to describe "what it is like" to suffer from disorders like autism and Alzheimer's, and controversies over recent efforts to see psychiatric disorders like depression as simple products of a chemically "broken brain."

History of Science 1840 | Science, Technology, and Medicine in South Asia

Eric Gurevitch
Spring; TBA
Class Capacity: 15
Consent: Instructor

Science is big in South Asia, and it has been for a long time. Today, the Constitution of India speaks of the duty of citizens to develop a "scientific temper" and of the responsibility of the government to finance "scientific or technical education." Medicine, mathematics, astronomy,

and other practical sciences have lengthy histories in the region, and these disciplines were used to theorize society and belonging in colonial and nationalist thought. This undergraduate seminar explores the changing and contested understandings of science, technology and medicine in South Asia from the precolonial to the present. No prerequisites or specialized knowledge required.

Psychology 1023 | The Mind-Body Connection: Exploring the Intersection between Psychology and Physical Health

Mark Blanchard
Spring; M 3:45-5:45
Class Capacity: 40
Consent: Instructor

What is the connection between physical and mental health? How does this relationship affect our potential for disease development and overall wellness? How does it affect our ability to learn, work, exercise, socialize, and experience personal growth? Drawing on research from historical, philosophical, psychological, and medical perspectives, this course explores the intricate relationship between the mind and body by investigating how psychological well-being and physical health impact one another. Students will engage in discussions on lifestyle and personality factors, stress management, mindfulness, chronic pain, somatic disorders, biofeedback, health disparities, and the influence of emotions on overall health. As we explore these concepts, be prepared to gain an enhanced understanding and appreciation of the mind-body network as well as practical tools to enhance your well-being and resilience in the face of life's challenges. This course is designed for students interested in psychology, health science, disease prevention and management, and holistic wellness.

Recommended Prep: The Psychology Department requires completion of Science of Living Systems 20 or Psychology 1 or the equivalent of introductory psychology (e.g. Psych AP=5 or IB =7 or Psyc S-1) and at least one foundational course from PSY 11, PSY 14, PSY 15, PSY 16, and PSY 18 before enrolling in this course; or permission of instructor.

South Asian Studies 104 | The Body in Indian Medicine

Martha Selby
Fall; W 3-5:45
Class Capacity: 15
Consent: Instructor

What does it mean to inhabit a body in India? This is the primary question that we will attempt to answer during the course of the semester in this seminar. The readings and discussion over the course of the term will parallel the development of the human being from conception, infancy and childhood, adulthood and sexuality, and will end with aging and death. We will take an interdisciplinary approach, and will examine textual materials from an extensive range of sources and time periods. Sources will include selections in translation from medical literature from India's Āyurvedic traditions as well as readings from religious narratives that deal directly with issues of embodiment and provide powerful metaphors for it. We will also be drawing largely on sociological and anthropological studies of the different forms that embodiment takes, from metaphysical issues on what it means to be "alive" or "dead" and the human body's connection to land and landscape to careful explorations of the body's outer surfaces in terms of ritual, ascetic, and strictly sartorial concerns with adornment and fashion. We will also explore the fascinating interfaces between bodybuilding and nation building in India.

Course Notes: No auditors will be permitted. Enrolled students must take the course for a letter grade.

POLITICS OF HEALTH

First-Year Seminar 27I | Global Health: Comparative Analysis of Healthcare Delivery Systems

Sanjay Saini
Fall; M 12-2:45
Class Capacity: 15
Consent: Instructor

This interactive seminar will allow students to obtain greater understanding of challenges faced by US healthcare system through critical comparative analysis of healthcare systems of selected countries from the developed, emerging and developing world. Weekly sessions will comprise of student-led discussion that revolves around an important healthcare issue. Domain expert guest speakers will be included allowing students to network with thought leaders. Students will explore in-depth a topic of their choice and prepare a manuscript potentially for publication in a peer-reviewed journal.

Government 94GK | The Politics and Ethics of Healthcare

Gabriel Katsh
Fall; Th 12:45-2:45
Class Capacity: 16
Consent: Instructor

This course looks at contemporary debates about health care, with a focus on the ways in which political theory can inform our understanding of its moral and political dimensions. Using case studies as a launching point, we will explore ideas about autonomy, paternalism, beneficence, and distributive justice, and their application to issues such as informed consent, medical privacy, the right to refuse care, and the distribution of scarce medical resources. The course also introduces students to key concepts in health policy, especially as they apply to the United States. Readings include classics of moral and political philosophy, writings by contemporary medical ethicists, Supreme Court decisions, and some empirical and historical studies.

History of Science 1441 | Foreign Bodies: On Health and Migration

Eram Alam
Fall; W 12-2:45
Class Capacity: 20

Consent: Instructor

During the twentieth century, unprecedented human mobility has raised significant questions regarding migration and health. Whether coerced or voluntary, these migratory flows reverberate through individuals, communities, populations, environments, and the body politic in unexpected ways. This course will focus on the relationship between health and migration and ask the following questions: How are moving bodies named and managed? What are the political, economic, juridical, and medical implications of movement? How is risk defined and constructed in relation to migration? Readings will include case studies from around the world, supplemented with theoretical and literary texts.

Social Studies 98WD | The Politics of Health and Medicine in the United States

Matt Reichert
Fall; W 9:45-11:45
Class Capacity: 10
Consent: Instructor

How does politics shape our health? In this multidisciplinary class, students explore the historical origins of institutions like Medicare and Medicaid, the FDA, and the NIH. We seek to explain the politics of why American healthcare policy differs so dramatically from its peers, with narrowly targeted public programs and a dominant private insurance sector. Students learn how epidemiologists and clinicians today think about social determinants of health, especially racial disparities in care and outcomes. We conduct deep dives into topics like the sociology of mental illness, maternal mortality, the Affordable Care Act, Covid-19, and the medical ecosystem here in Boston. We consider normative questions, like how to balance cultural competency or patient autonomy with the medical mission to provide care and prevent harm. Finally, students also observe how public health researchers make use of social science methods, from the ethnographic case study to the clinical trial. This is a junior tutorial.

SCIENCE OF HEALTH AND DISEASE

Education Studies 125 | Children with Learning and Developmental Differences

Nadine Gaab
Spring; M 10-12
Class Capacity: 15
Consent: Instructor

The duration of education is a strong predictor of health and longevity, but approximately 1 in 5 children with learning or attention issues have long-lasting negative consequences related to their academic, social, mental health, vocational, economic outcomes. In the US, over 2 million students struggle with specific learning disabilities (SLD), which represents roughly 35% of all students who receive special education services under the Individuals with Disabilities Education Act. Children with a learning disability are less likely to complete high school or enroll in postsecondary educational programs and have a heightened risk for developing mental health problems such as depression or anxiety. Currently, SLDs are primarily identified and addressed within the education system; however, these students also receive care and support outside of school and are members of various community settings. A streamlined approach that informs the coordination of general education, special education, clinical psychology, policymaking, advocacy, caregivers, and health professionals (e.g., pediatricians, speech-and language pathologists) is often absent and hinders the design of preventive approaches, identification strategies, and service implementation. It further leads to a siloed approach for care and policymaking, lack of community supports.

The course will provide a broad overview of learning disabilities and differences, including dyslexia, dyscalculia, attention deficit/hyperactivity disorder, developmental language disorder, and autism spectrum disorder, as well as the relevant policies and educational documentation for these learners. It will then cover the professional stakeholders that should be involved in an evidence-based response to a learning difference, and identify their unique knowledge base, toolset, developmental timeline, and communication strategies, both in the educational/professional environment and the community. Finally, we will focus on barriers and challenges faced by children with learning differences in the academic, professional, and community settings. Throughout the course, students will be provided with both research/evidence-based content and case-based learning opportunities, practical examples, and guest speakers drawn from the community. Class activities will include both synchronous and asynchronous learning activities led by the Instructor (Prof. Nadine Gaab), along with breakout sessions overseen by the instructor and/or Teaching Fellows.

This course is divided into thirds and will cover: (1) a broad overview of learning disabilities, educational policies, and service documentation; (2) stakeholders in academic and professional settings, including their unique knowledge base, toolset, developmental timeline, and communication strategies, barriers faced by children with learning differences in these settings, existing solutions to these barriers; and (3) stakeholders in community settings, barriers faced by individuals with learners in these settings, existing solutions to these challenges.

Environmental Science and Public Policy 180 | Climate Change, Health, and Environmental Justice-Focusing on Solutions

Kari Nadeau
Spring; TBA
Class Capacity: 30
Consent: Instructor

Human health and the health of our planet are inextricably linked and they can be mutually beneficial. However, our planet's health and our health are at risk. Climate change represents one of the most pressing issues of our time, affecting every nation and person. In this class, we will focus on the ways in which climate change impacts human health and discuss approaches to quantify and mitigate these impacts at the local, state, national, and global levels. You will have the opportunity to monitor, measure, and analyze climate change associated data relevant to human health such as air pollution and temperature with devices we provide. You will also meet policy makers, community leaders, and community members who are addressing climate change impacts on human health. The overarching goal of the course is to critically discuss the health outcomes of energy production and climate change impacts on food, water, air, soil, food systems, and e-waste through the lens of social justice and health equity.

First-Year Seminar 51M | Skin, Our Largest, Hottest, and Coolest Organ: From Cancer to Cosmetics

David Fisher
Fall; Th 9:45-11:45
Class Capacity: 10
Consent: Instructor

Skin provides a protective barrier that is vital to survival of all multicellular organisms. Its physical properties have been exploited for centuries, from clothing to footballs, and yet skin is a vibrant and dynamic organ that responds to environmental signals in myriad ways. Skin protects humans from toxic exposures, but can also be an intrinsic source of dangerous diseases. While its defects only rarely kill humans, its imperfections can cause misery and discomfort, ranging from subtle annoyances to depression and loss of self-esteem. It is a source of immense pleasure or excruciating pain. This seminar will provide a series of

exposures at an introductory level, to distinct topics in skin biology. They will exemplify the diverse and vibrant nature of cutaneous networks and signals, through the lens of commonly recognized topics such as tanning, hair, sweat, cancer, cosmetics, cancer, and infections.

Recommended Prep: None. Prior AP-Biology may be helpful but not required.

First-Year Seminar 52Z | Attention Deficit Hyperactivity Disorder (ADHD): Myths, Media and Meaning

Anne Arnett
Fall; W 3-5
Class Capacity: 15
Consent: Instructor

This first-year seminar will dive into the science and fiction of attention deficit hyperactivity disorder (ADHD) through engagement with multiple sources, including research articles and reports, social media, news media, psychology guidelines, and clinical cases. We will use these multiple sources of information to explore the controversies about how and when ADHD is diagnosed, differences between males and females, biological and environmental causes of ADHD, rising rates of ADHD, and traditional and alternative treatments. We will approach these issues through a variety of student-led presentations, mock clinical interviews, written critiques, and class debates.

Early in the semester, the class will take a trip to Dr. Arnett's laboratory at Boston Children's Hospital to see a demonstration of how electroencephalography (EEG) is used to measure brain activity in children with ADHD. Altogether, the goal of the seminar is to use the topic of ADHD, broadly, to practice reading and understanding scientific articles, think critically about media, work collaboratively with student peers, and learn how to generate scientific hypotheses.

First-Year Seminar 57Z | Unlocking the Power of Immunology – From Fundamental Principles to Innovative Research Routes

Kazuki Nagashima
Spring; M 3-5
Consent: Instructor

Immunology stands at the forefront of cutting-edge science, offering game-changing solutions like mRNA vaccines for COVID-19. In today's world, where global challenges demand innovative responses, researchers are eager to delve into the fundamentals of immunology. Yet, navigating the complexities of the field requires more than passive learning; it demands a deep understanding of the immune system and the ability to identify critical questions worth exploring.

Welcome to our seminar, where we embark on a journey into the heart of immunology research. Through dynamic discussions and hands-on exercises, students will not only grasp the core principles of immunology but also learn the art of selecting impactful research questions. Our interactive approach fosters active engagement, empowering students to become thinkers and doers in the world of immunology. Join us as we unravel the mysteries of the immune system and ignite a passion for scientific inquiry that will shape the future of healthcare.

General Education 1027 | Human Evolution, Human Health, and Climate Change

Kevin Uno
Spring; TTh 10:30-11:45

How and why did climate change influence how humans evolved to be the way we are, and what are the implications of our evolutionary history for human health in a post-industrial world? In addition, how did human activities drive and continue to influence climate change with major impacts on human health?

To tackle these important issues, this course reviews the story of how humans evolved through a series of major transitions starting with our divergence from the apes continuing to the present day. At the same time, we explore how the earth's climate has changed over the course of human evolution, driving these transitions, which in turn have major effects on human health. Finally, we will explore the feedback loop between climate change, health, and the future of our species and planet.

General Education 1038 | Sleep

Charles Czeisler, Frank Scheer
Spring; T 3-5

How does sleep affect your health, your safety, and our society?

What is sleep? Why do we sleep? Why don't we sleep? How much sleep do you need? What are circadian rhythms? How do technology and culture impact sleep? This course will explore the role of sleep and circadian timing in maintaining health, improving performance and enhancing safety. We will evaluate the causes and consequences of the epidemic of sleep disorders and deficiency in our society, with particular attention to impacts on brain (learning and memory, mood and cognition) and body (appetite and metabolism, hormones and heart) functions. Personal and public policy approaches to issues such as drowsy students, drowsy drivers and drowsy doctors will be addressed.

Human Evolutionary Biology 58 | Evolutionary Medicine

Christopher Kuzawa
Fall; MW 1:30-2:45
Class Capacity: 20
Consent: Instructor

Many common diseases, including ailments like obesity, diabetes, and depression, have only emerged as health issues in recent human history. In addition, different human groups or ethnicities vary markedly in the burden of these

conditions. In this course we will explore two related ideas to gain insight into these issues. The first is that many modern ailments reflect an imbalance between modern life ways and those which shaped our ancestors' biology during much of human evolution. The second is that factors like inequality and discrimination, which trace to political, economic, and historical forces, help explain why some groups experience unequal conditions that ultimately drive health inequality. We will begin by reviewing foundational concepts in evolutionary biology, molecular biology, anthropology and human evolution, revealing why our bodies by necessity come equipped with biology that is responsive to the environments that we inhabit. We will then use these principles to explore domestic and global case studies that illustrate the power of evolutionary principles to shed light on why we get sick, including the role of social, economic and political factors as drivers of major disparities in disease burden.

Human Evolutionary Biology 114 | Gut Microbiome and Human Health

Cary Allen-Blevins
Fall; W 3-5
Class Capacity: 20
Consent: Instructor

Microorganisms residing in the human gastrointestinal tract are as numerous as our own cells and together encode at least 150 times as many unique genes. In this research seminar, we explore gut microbial contributions to human physiology in states of health and disease. We consider how the human gut is colonized, the factors shaping the structure and function of the gut microbiome, and the pivotal roles of the gut microbiome in digestion, energy regulation, immunity, development, drug metabolism, and behavior. We evaluate fast-growing evidence for the gut microbial modulation of metabolic syndrome, cardiovascular disease, cancer, and neurodevelopmental and neurodegenerative disorders, and discuss prospective microbiome-targeted approaches for the prevention and treatment of human disease. The weekly three-hour lab will introduce students to experimental, bench and computational techniques used to investigate the gut microbiome, enabling students to collaborate on a novel research project that dovetails with topics discussed in seminar.

Course Notes: This course fulfills the research seminar requirement for Human Evolutionary Biology. Preference will be given to students fulfilling a research seminar or thesis requirement.

Recommended Prep: Life Sciences 2 or permission of instructor.

Human Evolutionary Biology 135 | Clinical Comparative Medicine: Evolutionary Perspectives on Mental and Physical Health

Barbara Natterson-Horowitz
Fall; W 3-5

Why are human beings so vulnerable to mental and physical illness? Insights into the causes of human diseases and disorders can be found by studying similar health challenges in other species. In HEB 1328 students will explore physical illnesses and behavioral disorders in non-human animals—from wild animals to beloved family pets. While heart disease, cancer and other significant medical challenges will be explored, this year special emphasis will be placed on mental health. Comparative psychopathology—studying mental illness and abnormal behavior in fish, reptiles, birds, and non-human mammals—will be introduced as a framework strengthening our understanding of human depression, eating disorders, social anxiety, OCD, self-injury, addiction and other emotional and biobehavioral challenges. Taught by a physician and evolutionary biologist, this course uses a 'mini-medical school' approach to explore the evolutionary origins of disease. Each lecture takes on a specific common and challenging human health issue beginning with a brief overview of what modern medicine currently does and does not understand. Lectures then quickly move into the wild (literally–through the use of curated wildlife video) and into our evolutionary past that has shaped modern vulnerabilities. Students will explore Harvard Museum of Natural History collection and learn to build phylogenetic models to develop an expanded understanding of the nature and origin of mental and physical illness.

No prior medical or advanced scientific knowledge is assumed. Both physical and mental illnesses will be covered. As noted above, this year mental health will receive special focus. This year course lectures and other content will be presented in an interactive seminar style. Students will be expected to deeply engage with weekly readings and assignments and to contribute to a collective research project.

Life Sciences 2 | Evolutionary Human Physiology and Anatomy

Stephanie Pierce, Joanne Clark-Matott, Andrew Yegian, Rachel Carmody
Fall; MWF 12-1:15

Why is the human body the way that it is? This course explores human anatomy and physiology from an integrated framework, combining functional, comparative, and evolutionary perspectives on how organisms work. Major topics, which follow a life-course framework, include embryogenesis, metabolism and energetics, growth and development, movement and locomotion, food and digestion, stress and disease, and reproduction. Also considered is the relevance of human biology to contemporary issues in human health and biology.

Course Notes: This course includes a weekly 3-hour lab. This course may not be taken Pass/Fail.

Recommended Prep: LIFESCI 1A or permission of instructor.

Mind, Brain, and Behavior 980DD | Computational Psychiatry

Poornima Kumar
Fall; T 3:45-5:45
Class Capacity: 15
Consent: Instructor

Computational Psychiatry is an emerging interdisciplinary field that combines principles from neuroscience, psychology, and computer science to understand the neural basis of mental disorders and develop computational models for diagnosis, treatment, and prevention. The objectives of this seminar are to 1) introduce students to computational methods and modeling approaches used in psychiatric research, 2) explore the application of computational psychiatry in understanding the etiology, diagnosis, and treatment of mental disorders, 3) to develop students' critical thinking through assignments and final project, 4) to prepare the next generation of computational neuroscientists. Overall, the seminar aims to provide students with a comprehensive understanding of computational modeling in psychiatry, its applications in mental illness research, and the potential for advancing precision psychiatry through these approaches.

Mind, Brain, and Behavior 980EE | Neuroscience of Music: Clinical Applications across the Lifespan

Anne Arnett
Spring; T 3:45-5:45
Class Capacity: 15
Consent: Instructor

With the advent of modern neuroimaging technology, there has been a rapid expansion of neuroscientific research on music and its biomedical applications. The burgeoning field of music neuroscience investigates how the brain perceives, processes, and responds to musical stimuli, and how musical training and music-based interventions influence brain and behavior across the lifespan. This course will delve into the state-of-the-art research in both basic and clinical auditory neuroscience. Students will learn about brain plasticity associated with musical training and the therapeutic potential of music in clinical contexts, ranging from neurodevelopmental to neurodegenerative conditions. The course will be interdisciplinary, blending research from psychology, cognitive neuroscience, and medicine. The class will also take a trip to Dr. Arnett's laboratory at Boston Children's Hospital to see a demonstration of how electroencephalography (EEG) is used to measure brain activity during auditory-perceptual paradigms in children. By the end of the course, students will have developed critical thinking skills and the ability to evaluate scientific findings related to the therapeutic applications of music. They will gain a deeper understanding of experimental methods and the contentious theoretical issues and debates in music neuroscience and therapy. These topics will be explored through a mix of student- and faculty-led presentations, written critiques, and class discussions.

Mind, Brain, and Behavior 980H | What Disease Teaches about Cognition

William Millberg
Spring; T 3:45-5:45
Class Capacity: 14
Consent: Instructor

This course seeks to reconcile the complicated and messy problems of patients with brain disease with the concise analysis of precisely defined cognitive functions in normal subjects. Students will learn to overlap cognitive functions on to the brain in disease - at the gross dissection and imaging levels - and to understand some of the complex interactions of individual cognitive operations in disease using the examples of famous landmark cases in the literature (e.g.Broca's Monsieur Leborgne, Phineas Gage, HM and others). The course will include a dissection of a human brain, an examination of how the actual brain maps onto two dimensional neuroimages, and discussions of how the classic lesion based maps of cortical function are related to contemporary maps based on functional neuroimaging.

Mind, Brain, and Behavior 980M | Functional Neuroimaging of Psychiatric Disorders: Insights into the Human Brain-Mind

David Silbersweig
Spring; Th 3-5
Class Capacity: 15
Consent: Instructor

Consent: Instructor Functional brain imaging has revolutionized the study of systems-level behavioral neuroscience and psychiatric disorders, through the ability to localize and characterize distributed brain activity directly associated with perception, cognition, emotion and behavior in disorders where there are not gross brain lesions. This seminar will introduce students to translational neuroimaging methods at the interface of neuroscience, psychology and medicine. It will cover recent and ongoing advances in our understanding of fronto-limbic-subcortical brain circuitry across the range of psychiatric disorders (e.g. mood disorders, anxiety disorders, psychotic disorders, personality disorders, addictions). It will discuss new, emerging biological (as opposed to descriptive) taxonomies and conceptualizations of mental illness and its treatment. It will explore the implications of such knowledge for issues such as consciousness, meaning, free will, emotion, resilience, and religiosity. It will incorporate clinical observations, scientific data and readings, and examine future directions in brain-mind medicine.

Mind, Brain, and Behavior 980T | Sleep and Mental Health

Edward Pace-Schott
Spring; M 3:45-5:45
Class Capacity: 15
Consent: Instructor

The scientific study of sleep is an area of research that is both highly diverse and among the most interdisciplinary and unifying of topics in psychology and neuroscience. In the past several decades, exciting new discoveries on the neurobiology of sleep have been facilitated by technologies such as functional neuroimaging and molecular genetics. Nonetheless, sleep remains mysterious and controversial and, remarkably, there still is no generally agreed upon function for this behavioral state that occupies one third of our lives! Sleep science exemplifies the translational approach in biomedical science whereby human and animal research together continually advance the field of sleep medicine. In this seminar, lectures during the first half of each class will provide overviews of the physiology and behavioral neuroscience of sleep.The second half of each class will be devoted to student-led discussions of assigned study questions as well as free discussions. In a short term paper, students will research in depth a topic of their choice that they find particularly interesting related to sleep neuroscience or mental health. Students will also briefly present what they have learned about their topic during the final class meetings. Some topics students might choose are described in the following paragraph. In addition, students will keep a nightly sleep and/or dream diary for 2-3weeks at some point during the semester in order to learn more about sleep from their own experiences. They will then describe what they have observed in a short essay. In the past, students have found this exercise to be especially interesting. Lastly, there will be a short open-book, unlimited-time final exam on material from the lectures. Topics for term papers might include the characteristic abnormalities of sleep in mood, anxiety, psychotic, addictive or neurodevelopmental disorders. Scientific findings increasingly point to the importance of sleep for mental health and optimum performance, as well as to sleep disruption as both a result and a contributing cause of mental illnesses. Thus, one might focus on the contribution of primary sleep disorders to psychiatric and neurological illness, such as the circadian rhythm disorders in bipolar illness or insomnia as a risk factor for mood and anxiety disorders. Still other topics might focus on the contribution of normal sleep to emotional regulation, memory consolidation, and cognitive performance. For those with more cellular neuroscience interests, topics might focus on linkages between sleep and immunity or the role of sleep in disposal of abnormal proteins as it relates to neurodegenerative diseases.

Mind, Brain, and Behavior 980V | Neuroimaging and Big Data in Connectomics: Advances in Understanding the Wiring of the Brain

Lisa Nickerson
Fall; T 3-5
Class Capacity: 15
Consent: Instructor

Constructing a map of the connections between the 86 billion neurons in the human brain has been a goal of neuroscience since the field originated. Connectomics research, which aims to understand how the brain is wired together into this map, has shown the human brain to be a complex network with the same properties that other complex networks exhibit. Much like our social networks, the world wide web, and our travel systems, the brain demonstrates organization along similar principles as these networks and can be studied using techniques adapted from network science. Using this "network neuroscience" approach has shown that the brain's gray matter is organized into a functional connectome comprised of modules called brain networks that orchestrate their functions to support our everyday activities. More recently, advances in another MRI technique called diffusion MRI have made it possible to study the organization of the brain’s white matter "information highways", or structural connectome, that transmit information from brain region-to-brain region, brain network-to-brain network. MRI-based connectomics is a rapidly growing field, with new methods and applications evolving at an incredibly fast pace and there are now numerous large-scale neuroimaging initiatives across the world that are aimed at mapping the human brain connectome. These studies aim to map the human brain connectome across the lifespan, from in utero to the oldest old, and in brain disorders such as mental illnesses, developmental disorders, neurological disorders and other health conditions. The goal of this class is to understand how MRI can be used to study the living human brain connectome and the latest advances these approaches have revealed in our understanding of the wiring of the brain. We will also dive into some of the large-scale neuroimaging datasets to see how we can leverage these open access resources for connectomics research. This course is designed for students in the MBB programs who are interested in learning about how we study brain connectivity and how the brain is organized, including those who are interested in neuroscience applications and brain disorders and those interested in bioinformatics/computer science/statistics/physics applications in neuroimaging. To unlock the “black box” nature of the sophisticated MRI methods used for connectomics research, we will learn the basics of the workhorse MRI connectomics methods, functional and diffusion MRI, from a conceptual perspective. We will learn how each of these techniques is used for connectomics studies and some key methodological and interpretational issues for each. Then we will focus on the brain’s connectome. We will discuss brain organization, including how to construct a brain graph as the mathematical embodiment of the brain’s connectome and how to evaluate the brain’s network properties using graph theory and other approaches, the brain networks that have been reported in the literature, and the links between structural and functional connectomes. We will do a survey of widely used open access tools for connectivity and connectome analyses, and open access connectome datasets with sample sizes of hundreds up to a hundred thousand, including the Human Connectome Lifespan and Disease Connectome studies, the ABCD study, and the UK Biobank. These datasets will also be used as hypothetical data sources for your final research projects. Last, we will discuss ethical, computational, and

statistical issues when working with these large open access datasets.

Mind, Brain, and Behavior 980X | Translational Neuroscience: Limits of Adaptation from Extreme Environments to Clinical Practice

Gary Strangman, Vladimir Ivkovic
Spring; F 12-2
Class Capacity: 15
Consent: Instructor

What can we learn about the limitations of human neurobehavioral function through exposure and adaptation to extreme environments, as well as readaptation to "normal" environment, or onset of neuropsychiatric disorders? Within the translational neuroscience paradigm, this course explores the concepts of neurobehavioral adaptation, stress, resilience, and neuropsychiatric disorders, in relation to the underlying neurophysiologic mechanisms that regulate them. We will explore adaptations to extreme activities such as spaceflight, expeditionary (polar, underwater, desert exploration, military deployments), emergency response services (e.g. firefighting), and impact sports (e.g. football). These will be discussed in the context of mental and occupational health, gender differences, and understanding the etiology of neuropsychiatric conditions such as, post-traumatic stress disorder (PTSD), traumatic brain injury (TBI), Chronic Traumatic Encephalopathy (CTE), intracranial hypertension, etc. This course may be particularly interesting to Mind Brain and Behavior students pursuing careers in translational neuroscience, psychology, medicine, and related fields. features expert guest lecturers (e.g. NASA researchers, Antarctic expeditionary physicians, underwater explorers, etc.), demonstrations of unique experimental methodologies and equipment (e.g. ambulatory brain and physiologic monitoring) used in extreme environments, and potential visits to field / operational facilities.

Molecular and Cellular Biology 60 | Cellular Biology and Molecular Medicine

Dominic Mao, Marissa Gredler, Emma Nagy
Fall; MW 10:30-11:45

MCB 60 provides an introduction to the principles of molecular and cellular biology and their connections to biomedicine. The course explores how medical syndromes provide insights into biological processes and how biological mechanisms underlie human disease and physiology. Topics range from DNA repair, protein folding and vesicle transport to metabolism, cell migration, and cancer. Content for lecture topics comprising of reading and viewing material will be released weekly followed by mandatory, interactive live sessions with the instructors. Weekly sections will combine a laboratory that focuses on experimental design and data analysis, primary literature reading, and review of lecture materials.

Recommended Prep: LS 1b recommended.

Course Requirements: LS1A, LPSA, or LS50.

Molecular and Cellular Biology 165 | Interplay between Viruses and their Hosts

Victoria D'Souza
Spring; MW 10:30-11:45

This course provides a foray into virology, advanced cell biology, biochemistry and structural biology topics through the lens of viruses as they invade their hosts. Lectures first demonstrate concepts by placing a particular emphasis on the human immunodeficiency virus (HIV), which provides well-studied examples of intricate virus-host interactions that occur throughout its complex life cycle. Discussion sections then solidify these concepts by analysis of primary literature on other viruses, for example SARS-CoV2, Ebola, etc.

Course Requirements: MCB 60.

Molecular and Cellular Biology 169 | Molecular and Cellular Immunology

Shiv Pillai
Fall; TTh 10:30-11:45

The immune system is the frontier at which molecular biology, cell biology, and genetics intersect with the pathogenesis of disease. There is no area of modern biology that is as intimately linked to disease as Immunology. This field has given us the first rational therapies in medicine, actual cures for many cancers, and new innovative therapies harnessing immunology are being created at breakneck speed! In this course we examining the underlying scientific bases of how the immune system works and its contributions to disease pathogenesis, protection, treatment and prevention. We will discuss the biology of the host response to infections, autoimmunity, allergic disorders, primary immunodeficiency syndromes, transplantation, and cancer.

Recommended Prep: Some understanding of basic cell biology and genetics is very helpful.

Course Prerequisite: LPS A OR LS 1a.

Neuroscience 101V | Sculpting Activity: Neural Inhibition in Health and Disease

Saad Hannan
Fall; T 3-5
Class Capacity:12
Consent: Instructor

Although the vast majority of neurons in the mammalian brain are excitatory, inhibitory neurons working via GABA inhibition shape excitability to play crucial roles in normal brain function. Consequently, GABAergic dysfunction features prominently in various neurological and neuropsychiatric disorders. This course explores molecular, cellular, neural circuit and behavioral mechanisms underlying brain disorders along with treatment strategies targeting this essential synapse.

Recommended Prep: Ls1a (or LPSA or LS 50) and MCB/Neuro 80.

Organismic and Evolutionary Biology 50 | Genetics and Genomics

Daniel Hartl, Robin Hopkins
Fall; TTh 10:30-11:45

Fundamental concepts in genetics and genomics forming a critical foundation for biology approached from two perspectives: (1) as a body of knowledge pertaining to genetic transmission, function, mutation, and evolution in eukaryotes and prokaryotes; and (2) as an experimental approach providing a toolkit for the study of biological processes such as development and behavior. Topics include structure, function, transmission, linkage, mutation, and manipulation of genes; genetic approaches in experimental studies of biological processes; and analysis of genomes in individuals and populations. Related ethical issues also discussed include genetically modified organisms, gene therapy, genetic testing, personalized medicine, and genetic privacy.

Psychology 18 | Psychopathology

Rebecca Shingleton
Spring; TTh 12-1:15

Introduction to the study of psychological dysfunction. Focuses on abnormal behavior as it relates to the definition, etiology, and treatment of major symptom domains. This course will emphasize critical evaluation of the causes and mechanisms of mental illness, with special attention paid to how these disorders present clinically.

Course Notes: Formerly named "Abnormal Psychology". This course counts toward foundational requirements for Psychology and should be taken before courses at the 1000 level or higher.

Recommended Prep: The Psychology Department requires completion of Science of Living Systems 20 or Psychology 1 or the equivalent of introductory psychology (e.g. Psych AP=5 or IB=7 or Psyc S-1) before enrolling in this course; or permission of instructor.

Psychology 980JL | Clinical Psychology in Everyday Life

Jill Hooley, Katherine Powers
Spring; M 9:45-11:45
Class Capacity: 16
Consent: Instructor

The goal of this course is to give you exposure to the types of evidence-based psychological interventions available for many clinical and non-clinical conditions, such as sadness, anxiety, substance use, and arguments with your significant other. Through this seminar, you will learn to notice and apply principles of psychological intervention to the world around you, not only in theory but also in practice. The seminar is not a self-help program or a training program for providing therapeutic services to others. Instead, the weekly discussions, exercises, and assignments will help you view the world through the lens of a scientist-practitioner – and apply those insights to everyday life in a scientific manner.

Course Notes: This is the same course as PSY 1852 Clinical Psychology in Everyday Life, which has been offered previously. Students who have taken 1852 cannot enroll in this course.

Class Notes: The instructor is Lauren Santucci, lsantucci@fas.harvard.edu.

Recommended Prep: The Psychology Department requires completion of Science of Living Systems 20 or Psychology 1 or the equivalent of introductory psychology (e.g. Psych AP=5 or IB =7 or Psyc S-1) and one of PSY 18 or PSY 1861 before enrolling in this course; or permission of instructor.

Psychology 980PS | Psychosis

Jill Hooley, Katherine Powers
Spring; F 12-2
Class Capacity: 16
Consent: Instructor

Psychosis is among the most mysterious states of the human mind. When someone experiences psychosis they can struggle to tell the difference between what is real and what is not. Psychosis, which can result from mental illness, exposure to trauma, stress, illness, substance use and even surgery, impairs overall functioning and may leave a person confused and distressed. In this course, we will gain a comprehensive understanding of this dynamic area of clinical science research by focusing on the following topics: 1) the psychological and neurological characteristics of psychosis; 2) the biological and environmental contributions to psychosis as well as its developmental trajectory; 3) the epidemiology, diagnosis, and treatment of psychosis; 4) the impact of psychosis, including discussion of stigma, quality of life, policy, and advocacy; and 5) the continuing debate as to how the range or spectrum of psychotic disorders should be regarded.

Class Notes: The instructor of this course is John Knutsen, john_knutsen@g.harvard.edu.

Recommended Prep: The Psychology Department requires completion of Science of Living Systems 20 or Psychology 1 or the equivalent of introductory psychology (e.g. Psych AP=5 or IB =7 or Psyc S-1) and either PSY 18 or PSY 1861 before enrolling in this course; or permission of instructor.

Psychology 980T | Eating Disorders

Rebecca Shingleton
Fall; W 9:45-11:45
Class Capacity: 16
Consent: Instructor

The goal of this course is to provide a comprehensive overview of DSM-5 feeding and eating disorders (EDs) with a primary focus on anorexia nervosa, bulimia nervosa, and binge eating disorder. We will explore the etiology (i.e., biological and environmental factors), symptom presentation, and empirically supported treatments across these EDs. Additional topics will include cultural

considerations, gender and EDs, medical complications, impact of media/social media, and novel directions and treatments for these disorders.

Recommended Prep: The Psychology Department requires completion of Science of Living Systems 20 or Psychology 1 the equivalent of introductory psychology (e.g. Psych AP=5 or IB =7 or Psyc S-1) and one of PSY 18, PSY 1861 or Psyc S-1240 before enrolling in this course; or permission of instructor.

Psychology 1005 | A Positive Psychology Perspective

Ellen Langer
Fall; TTh 10:30-11:45

Why does it seem that some people are so resilient and content? This course looks at psychological and physical health from the perspective of Positive Psychology. The major focus will be on mindfulness theory and its relationship to stress/coping; illness/wellness; decision-making; and placebos. The medical model, the biosocial model, and a unified mind-body model will be compared to examine their role in becoming mindful and thus healthier, happier and less stressed.

Recommended Prep: The Psychology Department requires completion of Science of Living Systems 20 or Psychology 1 or the equivalent of introductory psychology (e.g. Psych AP=5 or IB =7 or Psyc S-1) and at least one foundational course from PSY 11, PSY 14, PSY 15, PSY 16, and PSY 18 before enrolling in this course; or permission of instructor.

Course Requirements: SLS20 or PSY1 or Psychology AP=5 or Psychology IB=7 or Psyc S-1 AND PSY11 or PSY14 or PSY15 or PSY16 or PSY18.

Psychology 1201 | Your Brain On Drugs: Psychopharmacology

Scott Lukas
Fall; T 12-2:45

An introduction to how psychoactive drugs affect mood, sensation, consciousness, and other psychological and behavioral functions in both healthy people as well as individuals suffering from drug abuse or psychiatric disorders. Introduces concepts in the neuropharmacology and pharmacokinetics of drugs and blends psychology, neuroscience and pharmacology together to understand how drugs work and are used to treat disease states. The course covers the mechanism of action and treatment options of many CNS drugs including those used to treat depression, bipolar disorder, psychosis, ADHD, autistic spectrum disorder, anxiety as well as drugs of abuse such as alcohol, nicotine/tobacco, cannabis, opiates, inhalants, amphetamine/cocaine, hallucinogens, and steroids. Special topics on vaping, drug interactions, sleep disorders, over the counter drugs, and selecting generic medications are covered. During the last two lectures students will participate in debates on controversial topics such as novel treatments for psychiatric disorders, ethical use of placebos, diagnosing ADHD, cannabis legalization, and needle exchange programs.

Recommended Prep: The Psychology Department requires completion of Science of Living Systems 20 or Psychology 1 or the equivalent of introductory psychology (e.g. Psych AP=5 or IB =7 or Psyc S-1) and at least one foundational course from PSY 14, PSY 18, MCB/NEURO 80, MCB 81 or Psyc S-1240 before enrolling in this course; or permission of instructor.

Course Requirements: SLS20 or PSY1 or Psychology AP=5 or Psychology IB=7 or Psyc S-1 AND PSY14 or PSY18 or MCB80 or NEURO80 or MCB81 or Psyc S-1240.

Psychology 1816 | Mechanisms and Markers of Mental Illness

Mayron Pereira Piccolo Ribeiro
Spring; M 12-2
Class Capacity: 20
Consent: Instructor

This course integrates clinical psychology and cognitive neuroscience to explore the biological underpinnings of mental illness. We will adopt a systems-level approach, examining the relationship between the function and dysfunction of specific brain circuits and networks and their contribution to mental health disorders. For instance, the brain's reward system has been linked to diagnoses such as addiction, disordered eating, depression, anxiety, post traumatic stress disorder, and psychosis. Understanding this common neural foundation provides insights into how these disorders are interconnected and how this knowledge can advance treatment options.

Throughout the course, we will draw on both traditional and cutting-edge methodologies that have produced critical insights and key breakthroughs. Additionally, you will create resources aimed at individuals suffering from specific psychiatric disorders to support them as they await treatment.

By the end of this course, you will be able to:

- Describe the brain's reward system and its involvement in psychopathology.
- Relate symptoms in psychopathology to specific brain mechanisms and regions.
- Describe various methodologies used to connect mental illness symptoms to brain mechanisms.
- Responsibly translate scientific research into accessible information for the general population.

In addition to gaining these insights, you will also have the opportunity to improve your writing and communication skills through the creation of practical, psychoeducational resources.

Recommended Prep: The Psychology Department requires completion of Science of Living Systems 20 or Psychology 1 or the equivalent of introductory psychology (e.g. Psych AP=5 or IB =7 or Psyc S-1) and one of PSY 18 or PSY 1861 before enrolling in this course; or permission of instructor.

Stem Cell and Regenerative Biology 145 | From Cells to Tissues, in Sickness and in Health

Ya-chieh Hsu
Fall; TTh 10:30-11:45
Class Capacity: 28
Consent: Instructor

Every cell is a part of a larger "community", working together to enable tissue function. This course will explore the principles of building complex tissues from cells. How do cells know what tissues to make and when to make them? How do cells communicate with one another? What diseases can arise when these principles go awry? How can we build tissues in the lab? In addition to lectures, students will engage deeply in primary literature.

Recommended Prep: One year of life sciences introductory sequence - either [LIFESCI 1A / LPS A and LIFESCI 1B] or LIFESCI 50; SCRB 10, SCRB 50 or MCB 60, or permission of the instructor.

Stem Cell and Regenerative Biology 155 | Epigenetics and Gene Regulation of Human Development and Disease

Jason Buenrostro
Spring; MWF 3-4:15

Are we destined to be our parents? In this course we will study topics in epigenetics and gene regulation to challenge some of Mendel's ideas on genetic inheritance. To do this, we will learn about the biochemical processes that control the expression of genes as cells change across human development, aging and disease. Together with genetics, we'll use science to discuss whether "nature or nurture" defines who we are. Finally, the human genome is huge, employing diverse mechanisms of epigenetic regulation, we'll learn about data rich experimental tools and work together to use computational methods to study epigenetic processes within cells

Recommended Prep: Life and Physical Sciences A or Life Sciences 1a; Life Sciences 1b; MCB 52; SCRB 10 or permission of the instructor.

Stem Cell and Regenerative Biology 167 | Stem Cell Therapeutics: Exploring the Science and the Patient Experience

Leonard Zon, David Breault
Spring; W 9-11:30
Consent: Instructor

Stem cells are the basis for tissue maintenance and repair, thus, are essential elements of normal organ and tissue physiology. Stem cells are also targets for disease processes and through transplantation are important therapeutic agents. This course will allow advanced undergraduates to explore how stem cells and tissue regeneration impact human disease pathogenesis and how stem cells might be exploited to advance new therapies for disease.

Recommended Prep: Life and Physical Sciences A or Life Sciences 1a; Life Sciences 1b; SCRB 10.

Stem Cell and Regenerative Biology 177 | Demystifying the Immune System

Ruth Franklin
Fall; MW 10:30-11:45
Class Capacity: 25
Consent: Instructor

What happens during an infection? This course will follow the progression of an immune response while exploring the following questions: What is inflammation? How can it both protect us and contribute to disease? Which physiologic processes are regulated by immune cells? In addition to participation in lectures, discussions, and analysis of primary literature, each student will create an original piece of science communication to engage with the general public.

Course Notes: Weekly section to be held during Friday lecture time.

Recommended Prep: SCRB 50 or MCB 60 or equivalent.

Stem Cell and Regenerative Biology 185 | Brain Development, Risk of Mental Illness, and New Approaches to Treatment Development

Instructor TBA

Spring; TTh 12-1:15

What is mental illness? How well can we distinguish illness from normal variation in cognition and behavior? Why in most cases do patients present with symptoms by age twenty? This course will explore mechanisms underlying neuropsychiatric disorders through the lens of autism spectrum disorder, which begins in early childhood, and schizophrenia, which begins during adolescence. In exploring vulnerability and pathogenesis, the course will weave together material that spans human genetics and environmental exposures, human brain development and neural circuit formation, and remodeling of brain circuits by experience. Given the complexity of the brain and its disorders and the limited access to living human brains, the course will also explore and evaluate our sources of knowledge, our model systems such as human brain organoid models, and our technologies such as brain-computer interfaces. The course will highlight experimental approaches poised to elucidate disease mechanisms and deliver much needed therapeutics for some of the most devastating pathologies of our time.

Recommended Prep: LS1A/LSPA; LS1B

Stem Cell and Regenerative Biology 195 | The Translational Science of Stem Cells: Present and Future

Lee Rubin
Fall; MW 3-4:15

Information about the biology of stem cells and their uses in understanding and treating diseases -- particularly those that cannot be studied adequately in non-human model systems -- has increased enormously in the last decade. In this seminar/lecture course, students will learn about transplanting functional human cells (such as pancreatic beta cells or dopaminergic neurons) derived from pluripotent cells to treat disease. They will also discover how to use these cells to model diseases, such as neurodegenerative and cardiovascular diseases, with the goal of identifying more effective, possibly patient-specific, therapeutics. Students will hear about treatments, including small molecules (conventional medicines), whose therapeutic actions can be attributed to the regulation of tissue-specific stem cells that reside in key adult tissues including the bone marrow and brain, but, interestingly, not including the heart or pancreas. Finally, they will be exposed to relatively new work that demonstrates the possibility of creating new cells from old by using genetic methods to swap cell identities. A typical type of question that we will debate is: When should Parkinson's disease patients be treated with a drug to slow the death of neurons, with transplanted neurons made from pluripotent cells or with a viral vector that produces new neurons from existing glial cells in the brain?

This course will highlight the theoretical, as well as the practical, aspects of drug development. How are therapies progressed from conception to patient (bench to bedside)? How can academic investigators commercialize research? Importantly, while this is a science course, not a health economics course, we intend to discuss ways of reducing drug costs. At the same time, we will introduce the new trend of treating rare (even N=1) genetic diseases and how this is or isn't accommodated within our existing healthcare framework.

We believe that students with different backgrounds (biology, chemistry, engineering, business) and at different levels (undergraduate, graduate) can benefit from taking the course and will help enrich the discussions by providing different perspectives on topics that we'll cover. However, basic knowledge of cell and molecular biology will be needed to understand the course fully.

Course Notes: Permission of the instructor is required to enroll for students who have not taken the courses below. Ability to work in a less structured environment will be essential, as will the ability to work with other students.

Recommended Prep: Life Sciences 1a or Life and Physical Sciences A, Life Sciences 1b, and preferably SCRB 10.

Stem Cell and Regenerative Biology 197 | Frontiers in Therapeutics: Science of Health

Mark Fishman, Douglas Melton, Navid Ghaffari
Fall; MW 1:30-2:45

We ask in this class how fundamental science can be harnessed to change human health. We explore fundamental biological pathways related to unsolved medical needs (such as addiction, pain, obesity, and schizophrenia), and think about how best to target these using a range of therapeutic approaches (such as chemicals, proteins, CRISPR, and gene therapy). Discussions are led by fundamental, medical, and biotechnological scientists. Students will learn to evaluate the credibility of proposed novel therapeutic opportunities.

Course Requirements: Prerequisites are Life and Physical Sciences A or Life Sciences 1a; Life Sciences 1b; MCB 60, SCRB 50, or permission of the instructor.

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