

The Blue Book

A Course Guide for the Secondary Field in

Global Health and Health Policy

2024-2025

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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 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 April 11, 2024. 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 2024-25 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 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
- GENED 1079: Why is There No Cure for Health?
- GENED 1093: Who Lives, Who Dies, Who Cares? Reimagining Global Health
- Sociology 1046: Life and Death by Design

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
- Supervised Reading and Research course (GHHP 91 or equivalent course 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.

Course Listings by GHHP Category

FOUNDATIONAL COURSES

GENED 1063: World Health: Challenges and Opportunities

Sue Goldie

Spring; MW 10:30-11:45

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.

GENED 1079: Why Is There No Cure for Health?

David Cutler

Not offered in 2024-25

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.

GENED 1093: Who Lives, Who Dies, Who Cares? Reimagining Global Health

Salmaan Keshavjee, Anne Becker

Not offered in 2024-25

How can health care systems be restructured to provide high quality care even to the poorest and most vulnerable people on our planet? If you are sick or hurt, whether you live or die depends not only on biological factors, but social ones: who you are and where you are, what sort of healthcare system is available to help you survive, what kind of care is available to help you recover, and whether society believes you deserve it. Recent pandemics have illustrated with dramatic urgency the role social forces play in patterning health inequities and determining individual fates. The vulnerabilities of those most likely to get sick and die from a variety of diseases are often linked to large-scale social forces that render health care systems dangerously weak or inaccessible for many communities. These social forces are often intersectional, and include, but are not limited to, the ongoing effects of systemic racism on racialized subjects, sex and gender discrimination, the devaluation of eldercare, the distribution of health care under neoliberal forms of governance, and extractive social relationships linked to colonial-era and post-colonial power structures. Because these forces define how health and care delivery problems are framed and addressed, now, as ever, it is imperative to develop frameworks and methodologies to identify and understand harmful social configurations that cause illness and suffering, and to intervene effectively. This course goes beyond a narrow focus on the biological basis of disease. Instead, drawing from various social science disciplines, including Anthropology and History of Science, this course takes a novel biosocial approach to reveal how governments, institutions, and histories

shape health and well-being. In doing so, this course challenges the conventional assumptions within the field of global health, broadening the understanding of how health inequalities persist over centuries, how the structures of powerful institutions influence the policies they develop, how caregiving and global health are urgent moral practices, and what can be achieved when the needs of patients are put first.

Sociology 1046: Life and Death by Design

Jason Beckfield

Not offered in 2024-25

In this course, we will study health differences between social groups. We will begin by examining the extent to which health is unevenly distributed across groups defined by nationality, neighborhood, race, gender, and class - differences highlighted in stark terms by the COVID-19 pandemic. We will then seek to pinpoint the reasons for these disparities with a detailed analysis of the pathways through which these factors are linked to health status. Finally, we will discuss new research on the sociology of population health that shows how health disparities depend on meso- and macro-scale causes like neighborhoods, social policy arrangements, global organizations, and climate change.

RESEARCH COURSES

Global Health and Health Policy 91: Supervised Reading and Research

David Cutler

Fall and 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; 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

Biological Chemistry and Molecular Pharmacology 230: Principles and Practice of Drug Development

Stan Finkelstein, Peter Sorger
Fall; W 3-6

Introduction to and critical assessment of the concepts, technologies and practical challenges of developing new medicines and bringing them to market. Pharmacology fundamentals, preclinical drug discovery, clinical trials, manufacturing and regulatory issues, as well as financing and marketing are discussed for small molecule, biologic and cellular therapies.

Course Notes: Suitable for individuals with a wide variety of backgrounds and interests from biology to engineering, business and medicine (undergraduate, graduates in MBA, MD and PhD programs). Taught by MIT and HMS faculty and by industry experts. Emphasizes a high level of student engagement via weekly news updates and projects involving collaboration across interdisciplinary teams.

Recommended Prep: No particular course is required. Knowledge of basic biology, biomedicine or bioengineering, and familiarity with basic economic principles will be helpful but not necessary for the course.

Economics 50A: Using Big Data to Solve Economic and Social Problems with Laboratory Component

Gregory Bruich
Spring; TBA

This course is a modified version of Economics 50, ordinarily taught by Raj Chetty and Gregory Bruich. Economics 50a will instead be taught by Gregory Bruich. Economics 50a 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, as well as for more advanced students. The course will include discussions with leading researchers and practitioners who use big data in real-world applications. Topics include equality of opportunity, education, racial disparities, innovation and entrepreneurship, health care, climate change,

criminal justice, tax policy, and poverty in developing countries. In the context of these topics, the course will provide an introduction to basic methods in data science, including regression, causal inference, and machine learning. In empirical projects and weekly labs, students will work with real data to learn how the methods discussed in the course can be implemented in practice. Students will participate in weekly labs, collaborative work, and discussions with leading researchers and practitioners. The class content will include short videos featuring Raj Chetty, Greg Bruich, and others.

Course Notes: Formerly listed as Economics 1152.

Economics 1333: Economics of Mental Health and Homelessness

Matthew Basilio
Spring; M 3:45-5:45
Description TBA

Economics 1343: The Economics of Development and Global Health

Matthew Basilio
Fall; M 3:45-5:45

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 requirements for Economics concentrators.

Global Health & Health Policy 20: Maternal & Reproductive Health and Health Policy: What Do We Know? How Do We Know It? What Are We Doing About It?

Jessica Cohen

Spring; M 3-5:30

Class Capacity: 20

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 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 high-income countries and low- and middle-income countries. A primary goal of the course will be to introduce students to different approaches to causal inference, with discussion focusing on how evidence is produced, disseminated, and adopted. 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. A few sessions will include guest speakers, who are experts in the field of maternal health, including clinicians, policy-makers, and advocates.

Course Notes: Lotteried course.

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

ENGINEERING SCIENCES AND STATISTICS

Applied Mathematics 101: Statistical Inference for Scientists and Engineers

Robert D. Howe

Spring; MW 3:45-5

Consent: Instructor

Introductory statistical methods for students in the applied sciences and engineering. Random variables and probability distributions; the concept of random sampling, including random samples, statistics, and sampling distributions; the Central Limit Theorem; parameter estimation; confidence intervals; hypothesis testing; simple linear regression; and multiple linear regression. Introduction to more advanced techniques as time permits.

Recommended Prep: Math 21a or Applied Math 21a or equivalent.

Biomedical Engineering 110: Physiological Systems Analysis

Maurice Smith

Fall; MW 11:15-12:30

A survey of systems theory with applications from bioengineering and physiology. Analysis: differential equations, linear and nonlinear systems, stability, the complementary nature of time and frequency domain methods, feedback, and biological oscillations. Applications: nerve function, muscle dynamics, cardiovascular regulation. Laboratory: neural models, feedback control systems, properties of muscle, cardiovascular function.

Recommended Prep: Engineering Sciences 53 (or equivalent); Physical Sciences 12b (or equivalent); and Math 21a and Math21b (or equivalents)

Biomedical Engineering 121: Cellular Engineering

Kit Parker

Spring; 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: Prerequisite: 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.

Biomedical Engineering 125: Tissue Engineering

David Mooney

Fall; MW 9:45-11

Fundamental engineering and biological principles underlying field of tissue engineering, along with examples and strategies to engineer specific tissues for clinical use. Students will prepare a paper in the field of tissue engineering, and participate in a weekly laboratory in which they will learn and use methods to fabricate materials and perform 3-D cell culture.

Recommended Prep: LS1a, Chem17 or 20, or biochemistry and cell biology background.

Economics 1123: Introduction to Econometrics

Davide Pettenuzzo (Fall), Gregory Bruich (Spring)

Fall; MW 9-10:15

Spring; TTh 3-4:15

An introduction to multiple regression techniques with focus on economic applications. Discusses extensions to discrete response, panel data, and time series models, as well as issues such as omitted variables, missing data, sample selection, randomized and quasi-experiments, and instrumental variables. Also develops the ability to apply econometric and statistical methods using computer packages.

Course Notes: Students may take both Economics 1123 and Statistics 139 for credit. However, Statistics 139 will not count as the econometrics requirement for the economics concentration. Only one course can count towards EC credit; either Economics 1123 or Economics 1126. Both courses can count towards college credit regardless of the order they are taken.

Recommended Prep: Statistics 100 and 104.

Economics 1126: Quantitative Methods in Economics

Instructor TBA

Spring; TBA

Topics include conditional expectations and its linear approximation; best linear predictors; omitted variable bias; panel data methods and the role of unobserved heterogeneity; instrumental variables and the role of randomization; various approaches to inference on causal relations.

Course Notes: Only one course can count towards EC credit; either Economics 1123 or Economics 1126.

Both courses can count towards college credit regardless of the order they are taken. Students who fulfill the econometrics requirement with Economics 1126 and who intend to pursue Honors should note that the Honors exam assumes knowledge of the material covered in Economics 1123.

Recommended Prep: Math 18, 21a, Applied Math 21a.

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.

Environmental Science and Engineering 168: Human Environmental Data Science: Agriculture, Conflict, and Health

Peter Huybers

Fall; MW 9-10:15

The purpose of this course is to develop understanding and guide student research of human and environmental systems. In class we will explore agriculture, conflict, and human health. Study of each topic will involve introduction data, mathematical models, and analysis techniques that build toward addressing a major question at each interface: How does climate change influence agricultural systems? Has drought or other environmental factors caused conflict? And how does the environment shape health outcomes? These topics are diverse, but are addressed using common analytical frameworks. Analytical approaches include simple mathematical models of feedback systems, crop development, and population disease dynamics; frequentist statistical techniques including linear, multiple linear, and panel regression models; and Bayesian methods including empirical, full, and hierarchical approaches. You will be provided with sufficient data, example code, and context to come to your own informed conclusions regarding each of these questions. Furthermore, topics covered in class will provide a template for undertaking independent research projects in small teams. Research will either extend on topics presented in class or address other human-environmental questions. Historically, such student projects have sometimes led to senior theses or publication in professional journals.

Course Notes: This class requires students to enroll in an untimed, placeholder section/lab during registration and to submit time preferences. Sections will be assigned by April 26. ESE 168 is also offered as E-PSCI 168. Students may not take both for credit. Undergraduate Engineering Students should enroll in ESE 168. Enrollment is by instructor permission.

Recommended Prep: There are no specific prerequisites but a background in environmental, physical or life sciences; experience in coding or statistical analysis; and/or facility with differential equations is useful.

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

Instructor TBA

Spring; TBA

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.

Molecular and Cellular Biology 111: Mathematics in Biology

Elena Rivas

Fall; MWF 10-11:15

Consent: Instructor

This course is meant for those looking to explore mathematical principles relevant to current biological research. The course covers topics on information theory, inference, statistics, probabilistic modeling, ML algorithms, statistical significance, neural networks and more. All methods are covered from first principles but always using examples relevant to biological problems. Each unit is devoted to one specific topic, and is based in one or more scientific papers selected from the recent life science literature.

Each unit includes a set of lectures (available online from mcb111.org), a practical session, and a homework.

Recommended Prep: Mathematics 19 or higher.

Psychology 1900: Introduction to Statistics for the Behavioral Sciences

Grace Lin (Fall and Spring)

Fall; TTh 10:30-11:45

Spring; TTh 9-10:15

Provides a conceptual and practical introduction to statistics used in psychology and other behavioral sciences. Covers basic topics in statistics including: measures of central tendency and variability; probability and distributions, correlations and regression, hypothesis testing, t-tests, analysis of variance, and chi-square tests. Includes a lab section with instruction in statistical analysis using a computer program.

Sociology 1156: Statistics for Social Sciences

Instructor TBA

Fall; MW 10:30-11:45

This course introduces students to quantitative data analysis in the social sciences. It covers the basics of research design and the use of empirical evidence. Students will learn about descriptive and inferential statistics, including regression analysis. The course aims to equip students with the skills needed to analyze data and effectively communicate their findings in research reports.

Course Notes: Formerly taught as Sociology 156.

Class Notes: Students should enroll in a timed section when registering. If you enroll in the Placeholder Section (SOCIOL 1156.DIS, date and time TBD) you are not guaranteed a spot in the course. Please see

<https://registrar.fas.harvard.edu/enrollment#register>

for more details about Placeholder Sections.

Sociology 1128: Models of Social Science Research

Emily Fairchild

Spring; MW 12-1:15

This course introduces students to core methodological concepts and strategies used in social science research including: research design, sampling and measurement, experiments, survey analysis, content analysis, network analysis, ethnography, and interviewing. Throughout the course we will develop the analytical skills necessary to interrogate epistemological assumptions in published social

science research specifically and truth-claims generally. In addition to critically evaluating previous research, students will collect and analyze data using the different methods discussed in class. By the end of the course, students should have acquired valuable research skills widely applicable in academic and professional settings.

Course Notes: Required of concentrators, ordinarily sophomores, and secondary concentrators. Formerly taught as Sociology 128.

Statistics 100: Introduction to Statistics and Data Science

Kelly McConville (Fall and Spring)

Fall and Spring; MW 1:30-2:45

An application-oriented introduction to statistics and data science where students develop their data acumen and learn exploratory and inferential techniques for analyzing and modeling data. The course covers the entire data analysis process and includes topics such as data collection, data wrangling, exploratory data analysis, visualization, simple/multiple linear regression, sampling distributions, hypothesis testing, confidence intervals, data ethics, statistical communication, and reproducibility. Students develop a reproducible workflow for analyzing data in R and learn several tidyverse R packages. No prior statistics or computing knowledge is expected.

Course Notes: Only one of the following courses may be taken for credit: Statistics 100, 101, 102, 104. This course requires students to choose timed sections during registration.

Statistics 102: Introduction to Statistics for Life Sciences

Instructor TBA

Spring; MW 3-4:15

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: Only one of the following courses may be taken for credit: Statistics 100, 101, 102, 104.

Course Requirements: Anti-Req: may not be taken for credit if STAT 139 or STAT 149 or 244 already complete.

Statistics 104: Introduction to Quantitative Methods for Economics

Kevin A. Rader

Fall; TTh 10:30-11:45

In a world where data is growing larger and more complex, it can be a challenge to turn an abundance of information into the knowledge from which sound decisions can be made. As a discipline, statistics aims to bridge the gap between knowledge and information. This course will motivate statistical methods through data analysis and visualization, in addition to discussing the underlying theory. We will discuss topics such as study design, descriptive statistics, probability, sampling distributions, hypothesis testing, linear regression, and Bayesian inference. A wide variety of applications from the economic and social sciences will be highlighted along with examples from biology, sports, politics, and more. Students with prior exposure to introductory statistics will find some overlap of material but be exposed to new applications and learn more advanced modeling techniques. This course makes use of the statistical programming language R, but no prior knowledge of computer science is required.

Course Notes: Only one of the following courses may be taken for credit: Statistics 100, 101, 102, 104.

Course Requirements: Anti-Req: may not be taken for credit if STAT 139 or STAT 149 or 244 already complete.

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

Pavlos Protopapas, Natesh Pillai

Fall; MWF 9:45-11

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).

Statistics 109B: Data Science 2: Advanced Topics in Data Science

Pavlos Protopapas; Alex Young

Spring; MWF 9:45-11

Data Science 2 is the second half of a one-year introduction to data science. Building upon the material in Data Science 1, the course introduces advanced methods for statistical modeling, representation, and prediction. Topics include multiple deep learning architectures such as CNNs, RNNs, transformers, language models, autoencoders, and generative models as well as basic Bayesian methods, and unsupervised learning. Students are strongly encouraged to enroll in both the fall and spring course within the same academic year. Part two of a two-part series.

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

Recommended Prep: CS 109a, AC 209a, Stat 109a, or Stat 121a required.

Course Requirements: Prerequisite: (Must take CS 1090A OR APCOMP 209A OR STAT 121A before taking STAT 109B) AND (Cannot take STAT 109B, if already taken STAT 121 OR CS 109B OR APCOMP 209B).

Statistics 110: Introduction to Probability

Joseph Blitzstein (Fall); Mark Glickman (Spring)

Fall; TTh 1:30-2:45

Spring; TBA

A comprehensive introduction to probability. Basics: sample spaces and events, conditional probability, and Bayes' Theorem. Univariate distributions: density functions, expectation and variance, Normal, t, Binomial, Negative Binomial, Poisson, Beta, and Gamma distributions. Multivariate distributions: joint and conditional distributions, independence, transformations, and Multivariate Normal. Limit laws: law of large numbers, central limit theorem. Markov chains: transition probabilities, stationary distributions, convergence.

Recommended Prep: Math 1b or equivalent or above.

Statistics 116: Biostatistics: Methods and Practices

Kevin A. Rader

Fall; TThW 1:30-2:45

An introduction to biostatistical methods and practices. The course is based on five canonical use

cases of statistical methods in the medicine: clinical trials, epidemiological studies, time-to-event studies, longitudinal studies, and surveillance. Weekly readings of journal articles will include a mix of modern and historical applications of statistical methods in medicine. The focus of the course will be on applying commonly used statistical methods and related practices, and communicating the methods, results, and critiques of real world medical studies.

Recommended Prep: Probability and Inference at the Stat 110 and Stat 111 level. Data Analysis in R at the Stat 100, 102, 104, or 139 level.

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; W 3-5

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.

GENED 1064: Brains, Identity, and Moral Agency

Steven Hyman

Spring; TBA

Class Capacity: 90

Consent: Instructor

Can we reconcile the scientific 'brain as a machine' view with our strong experience of moral agency? Advances in brain science have the potential to diminish many forms of human suffering and

disability that are rooted in disordered brain function. But what are the ethical implications involved in altering the structure and function of human brains? What’s at stake when we have the ability to alter a person’s narrative identity, create brain-computer interfaces, and manipulate social and moral emotion? In this course, you will ask and attempt to answer these questions, and discuss the implications of mechanistic explanations of decision-making and action for widely-held concepts of moral agency and legal culpability. This course will prepare you to be a thoughtful citizen of a world characterized by rapidly emerging understandings of human brain function, and by new technologies intended to repair or influence human brains.

Course Notes: For students who have taken MCB 80, it is contemplated that there will be a section that incorporates more advanced concepts from neurobiology.

Recommended Prep: LPS A or LS 1a, a 4 or 5 on the AP Biology exam, or equivalent experience in biology.

GENED 1115: Human Trafficking, Slavery, and Abolition in the Modern World

Orlando Patterson

Spring; TTh 1:30-2:45

Class Capacity: 300

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: Global Response to Disasters and Refugee Crises

Stephanie Kayden, Michael VanRooyen

Spring; F 12:45-2:45

Class Capacity: 30

Consent: Instructor

Climate change, urbanization, and conflict mean that global disasters are on the rise. How should the world respond when disasters force people from their homes? How can we better help the world's refugees? This course examines the past, present, and future of the international humanitarian response system. We will explore 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 – even during the COVID pandemic. Through interactive discussions and case studies, students will learn how aid workers interact with governments, militaries, and civil society to provide refugee aid. Students will also have the opportunity to learn about Boston-area response from interactions with a local refugee resettlement agency. At the end of the course, students can opt to participate as a 'refugee' in a large, three-day outdoor humanitarian response training exercise with other students and professional aid workers from around the world.

Course Notes: Lotteried course, enrollment limited to 30. No auditors or cross-registrants.

Government 94GK: The Politics and Ethics of Health Care

Gabriel Katsh

Fall; W 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, and the right to refuse care. The Fall 2024 iteration of the course will focus in particular on ethical and policy dilemmas that have arisen in the context of the coronavirus pandemic, including questions about the distribution of scarce resources, the health effects of inequality,

and balancing the needs of public health with concerns about individual freedom. Readings include classics of moral and political philosophy, writings by contemporary medical ethicists, Supreme Court decisions, and some empirical and historical studies.

Class Notes: This course is lotteried. Priority will be given to Government concentrators.

Stem Cell and Regenerative Biology 120: Biotech Ethics

Sergio Imperato

Spring; MW 1:30-2:45

This course explores moral issues related to business practices in the fields of healthcare, medicine, genetics, and biotechnology. The class is divided into four parts. The first part of the course draws on foundational concepts of ethics and applies them to biotech entrepreneurship. In the second and third part, we delve into a series of case studies and analyze common moral quandaries faced by well-known biomedical companies. In the fourth part, students develop ad-hoc ethical frameworks that apply to real-life business ideas.

Course Notes: Previous experience in biology and economics is helpful but not necessary.

Sociology 1106: Humanitarian Activism and Civil Society

Shai Dromi

Spring; T 6-8

When global crises strike, humanitarian non-governmental organizations – NGOs – spring to action, offering emergency medical services, basic necessities, expertise, and innovation to affected communities around the world. This course provides a comprehensive view of humanitarian organizations and activism from a sociological perspective. We will examine the origins of humanitarian activism and the dilemmas and challenges that NGOs continually face in an unpredictable world. Through case studies of humanitarian crises like the Kosovo War, the Nigerian Civil War, and the 2004 Indian Ocean Tsunami, students will analyze the consequences, justifications, and limitations of relief efforts. Guest speakers will share accounts from the front lines of humanitarian aid and explore the various career paths available in this vital field. Students will research a crisis of their choice and write policy memos about how to improve humanitarian aid. They will gain valuable insights into the challenges of humanitarian logistics and advocacy.

HEALTH AND DEMOGRAPHY

Environmental Sciences and Engineering 161: Applied Environmental Toxicology

Elsie Sunderland

Spring; TTh 1:30-2:45

This course will examine the theory and practical application of environmental chemistry and toxicology for assessing the behavior, toxicity and human health risks of chemical contaminants in the environment. The goals of the course are to: (a) illustrate how various sub-disciplines in environmental toxicology are integrated to understand the behavior of pollutants; (b) demonstrate how scientific information is applied to inform environmental management decisions and public policy through several case studies; and (c) provide an introduction to the legislative framework in which environmental toxicology is conducted. This course will be directed toward undergraduate students with a basic understanding of chemistry and calculus and an interest in applied science and engineering to address environmental management problems.

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

Environmental Sciences and Engineering 169: Field and Lab-Based Seminar on Local Pollution Issues

Elsie Sunderland

Fall; TTh 10:30-11:45

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.

Class Notes: This class requires students to enroll in an untimed, placeholder section/lab during registration and to submit time preferences. Sections will be assigned by April 26.

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

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

Ken Thomas

Spring; MWF 12-1:15

Class Capacity: 10

Consent: Instructor

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.

First Year Seminar 22H: My Genes and Cancer

Giovanni Parmigiani

Fall; 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.

GENED 1063: World Health: Challenges and Opportunities

Sue J. Goldie

Spring; MW 10:30-11:45

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.

HEALTH, CULTURE, SOCIETY

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 1826: Medical Anthropology: Advanced Topics

Arthur Kleinman
Spring; TBA
Class Capacity: 15
Consent: Instructor

A review of the latest and most advanced contributions to theory, methods, especially ethnography, findings, as well as policy contributions in medical anthropology.

Course Notes: Open to advanced undergraduates with some background in social sciences or humanities (regardless of concentration), and to graduate and professional students. Because of the extent of the readings and the intensity of the analysis, the course will be limited to 25 students.

Class Notes: The Future of Medical Anthropology will draw upon Arthur Kleinman's half century in the field and the work of other senior medical anthropologists, a number of whom are his former students, to envisage the future of research, comparison, theory, and applied interventions of medical anthropology in global health and domestic health care. The course will address epidemics, chronic illnesses, the mental health crisis, and the failures of health care systems. It is open to undergraduates and graduate students.

First Year Seminar 23K: Insights from Narratives of Illness

Jerome Groopman
Spring; 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 Development

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 71X: Fat Talk and Thin Ideals: Culture, Social Norms and Weight

Anne Becker

Spring; TBA

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.

GENED 1053: The Global Heart Disease Epidemic: Stopping What We Started

Richard Lee

Fall; MW 9-10:15

Class Capacity: 90

Consent: Instructor

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.

GENED 1089: The Border: Race, Politics, and Health in Modern Mexico

Gabriela Soto Laveaga

Fall; TTh 10:30-11:45

Class Capacity: 150

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.

GENED 1186: The Age of Anxiety: Histories, Theories, Remedies

Beth Blum

Spring; MW 1:30-2:45

Class Capacity: 75

Consent: Instructor

How have authors throughout history channeled anxiety into meaningful and imaginative works of art? The poet WH Auden described the 1940s as “the age of anxiety,” but he could have been describing our own stress-ridden times: anxiety is today the most common class of contemporary mental health condition. This course pursues two guiding questions: how has anxiety changed throughout history and how has it stayed the same? And how have authors throughout history productively channeled anxiety into creating beautiful and meaningful works of art? Through a combination of readings and fieldwork, we’ll investigate anxiety’s potential causes, from the universal fear of death to the more historical contexts of urbanization and self-optimization, for instance, as well as its various treatments, such as stoicism, self-help, and psychopharmacology. The course combines practical and theoretical perspectives to examine the relation between anxiety and creativity and to engage with various aesthetic responses—from comedy to literature and film—to the troubles of being that anxiety designates. Smaller weekly assignments will include slow reading, technological unplugging, and proposing one improvement to the mental health culture on campus. Final project may be scholarly, creative, or a hybrid of both. Students will emerge from class readings and discussions with an understanding of anxiety as a social formation, literary preoccupation, and, when harnessed, a spur to aesthetic invention and political intervention.

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.

Class Notes: Enrollment via lottery; consult <https://mbb.harvard.edu/seminars> for lottery deadline, instructions, and link. Preference to juniors in MBB tracks or MBB secondary field. Course content inquiries to lmwong@fas.harvard.edu.

Psychology 980AD: Psychopathology and the Family

Jill Hooley; Katherine Powers

Fall; F 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.

Course Requirements: SLS20 or PSY1 or Psychology AP=5 or Psychology IB=7 or Psyc S-1 AND PSY18 or PSY1861.

Psychology 1009: Psychology of Women

Nicole Noll

Spring; TTh 12:45-2:45

Class Capacity: 16

Consent: Instructor

How does being a woman affect our behavior, our evaluations of ourselves, and our interactions with others? This course examines psychological science on women and girls in western industrialized societies, addressing such topics as gender stereotypes, girlhood, women and work, relationships, pregnancy and motherhood, mental health, violence against women, and women in later adulthood. We will consider these topics through an understanding of gender as a social construction, being mindful of the intersections of gender, sexuality, class, and race. Although focused on women's lives and experiences, this course is highly relevant to people of all genders.

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 15, PSY 16, or 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 PSY14 or PSY15 or PSY16 or PSY18.

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 brand-new 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.

Course Requirements: SLS20 or PSY1 or Psychology AP=5 or Psychology IB=7 or Psyc S-1 AND PSY18 or PSY1861.

Psychology 1845: Stigma, Discrimination, and Health

Mark Hatzenbuehler

Fall; MW 10:30-11:45

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.

Course Requirements: Pre-requisite: SLS20 or PSY1 or Psychology AP=5 or Psychology IB=7 or Psyc S-1.

Sociology 1110: Public Health and Environmental Injustice

Monique Ouimette

Spring; TTh 9-10:15

There is strong evidence that exposure to environmental pollution contributes to the onset and

severity of illness in humans, yet many medical and public health approaches to health and illness ignore environmental factors. The lack of focus on environmental contributors to illness helps to reinforce existing disparities associated with living in contaminated communities. Students in this class will explore the connections between environmental exposures and human health outcomes. Students will learn about the environmental factors that contribute to the onset of common non-communicable diseases, including asthma, cancer, and diabetes, as well as exacerbate the severity of infectious diseases. Students will examine cultural, economic, regulatory, medical, and scientific factors that contribute to health disparities and environmental injustice. Students will also explore efforts to incorporate environmental justice considerations into health care and public policy reforms.

Sociology 1146: Sociology of Health and Medicine

Instructor TBA

Fall; MW 12-1:15

This course provides a broad sociological perspective on the topics of health and medicine. First, we will discuss social determinants of health, and how intersecting forms of inequality affect exposure to health risks and access to health resources. Second, we will investigate how notions of health and illness are influenced by social relations, categories, and conflicts. Third, we will turn our attention to health care workers and organizations, exploring how they operate and how their activities are shaped by social contexts. Finally, we will consider the politics of health and health care, including how health-related issues are mobilized in social movements.

Class Notes: Students should enroll in the Placeholder Section (SOCIO 1146.DIS, date and time TBD) when registering. Section days/times will be assigned based on student preferences before the beginning of the semester.

Sociology 98DB: Junior Tutorial: Sociology of Health and Illness

Caitlin Daniel

Fall; W 3-5

Class Capacity: 10

Consent: Instructor

Why do non-Hispanic Black babies represent one-third of all US births, but three-fourths of infant deaths? Why do we see body fat, but not social isolation, as a public health crisis? How can the pursuit of health be used to perpetuate social inequalities—and to contest them? Addressing

questions such as these, this junior tutorial introduces students to a sociological approach to health and illness. We will focus on four areas: 1) the social determinants and social distribution of health—how social conditions and positions produce disease for some and wellness for others; 2) the social construction of health and illness; 3) the social experience of illness, including how our responses to illness are structured by social factors, and 4) health as a meaningful social practice that shapes social action and organization far beyond the individual body. Posing a research question of their choosing, students will conduct an original research project using qualitative methods such as interviews, observations, or content analysis.

Spanish 61PH: Spanish for Public Health

Adriana Gutierrez

Spring; 001,003: TTh 12-1:15; 002,004: TTh 1:30-2:45

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.

HISTORY AND PRACTICE OF MEDICINE

African and African-American Studies 189X: Medicine, Science, and Empire

Jean Comaroff

Spring; Th 3-5

Class Capacity: 30

This class examines the changing place of medicine in the long history of modernity. Focusing on key moments—the birth of the clinic, the colonial encounter, the consolidation of medicine as profession, the age of genomics and biocapital, and the empire of global health—it explores the distinctive role of medical knowledge and practice in the making of modernist persons, identities, economies, and political vocabularies. Readings are drawn from anthropology and the wider social sciences, with cases from Africa, Asia, Europe, and North America. The course is a mix of lecture and discussion.

Classical Studies 165: Medicine in the Greco-Roman World

Mark Schiefsky

Spring; T 12:45-2:45

Theories and practices of health and healing in the ancient Greco-Roman world, with emphasis on the relationship of medicine to philosophy. Key themes include medicine as a systematic discipline or art, dissection and the knowledge of human anatomy, gynecology and the female body, and the relationship between bodily and mental conditions. All readings will be in English and include both ancient texts (e.g. the Hippocratic writers, Galen, Plato, Aristotle) and modern secondary sources. The course welcomes students in any field of study, including the sciences, and encourages the drawing of connections between ancient medicine and modern medical practice. Some knowledge of philosophy and/or the ancient world is helpful but not required.

Class Notes: Some of the lecture sessions will take place over Zoom. All sections will be held in person. Please consult the course site for more details.

English 102M: Introduction to Old English: Charms, Herbals. Folk Medicine, Miracle Cures

Daniel Donoghue

Fall; TTh 1:30-2:45

This course combines language study with the investigation of a critical theme. The narratives set for translation provide a thematic coherence as we

dig into the language of Old English, which is the vernacular used in England from the sixth century until about 1100. Although some of its features remain recognizable today, Old English needs to be learned as a foreign language with its own spelling, pronunciation, syntax, and so on. The term begins with an emphasis on grammar, which will be covered in graduated steps until midterm, after which the readings and translation will take up more of our class time. The unifying theme of the readings will be remedies to preserve the health of the human body. Old English literature offers an abundance of medical texts, including herbal remedies and magical incantations. Some come from ancient Greek and Latin sources, while others are local folk recipes. Some are fantastical, some are known to be effective, and others clearly rely on the placebo effect. The readings will move from simple prose to intricate poetry. An end-of-term project will assign each student a short Old English magical charm—think of it as a human utterance charged with power to control nature. With the help of personal coaching, each student will produce a literal and a creative translation.

Class Notes: This course satisfies the “Pre-1700 Guided Elective” requirement for English concentrators and Secondary Field students. Fulfills the College language requirement if its continuation, English 103, is also completed.

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 editions 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 73C: Race Science: A History

Alejandro de la Fuente

Fall; W 9:45-11:45

Class Capacity: 12

Consent: Instructor

"Race," most social scientists and well-informed people agree, is a social construction with no basis in biology. It is an invention, a political instrument of power and subordination, deployed to naturalize social hierarchies. Yet "race" and racially based understandings of human difference continue to shape how we identify, classify, and group individuals. Scientific studies in various fields, from medicine to psychometric assessments of intelligence, continue to gather racial information for research purposes. Claiming strict adherence to data and the truth, some of these studies conclude that because of evolutionary and environmental influences, human groups are in fact different and that those differences are grounded in biology. In order to engage this body of knowledge critically, it is indispensable to examine the central claims of this "science," how such claims have evolved over time, and their policy implications. To start, should scientists even study "possible links between race, gender, and intelligence," as a top scientific journal, *Nature*, asked in 2009? Our seminar studies the development of "race science" from the 18th century to the present. Using a variety of primary and secondary sources, we examine the research questions pursued by these scientists, their possible merits, and policy implications. We will devote

special attention to the emergence of eugenics, the science of "racial improvement," in Europe and the United States, and its tragic development in Nazi Germany. The final segment of the seminar looks at scientific racism after World War II and to the possible connections between race and recent genomic research.

GENED 1179: Psychotherapy and the Modern Self

Elizabeth Lunbeck

Fall; TTh 10:30-11:45

How can we understand the appeal of psychotherapy, widely recognized as the preferred antidote to human unhappiness and misery, and what does it offer that friends, family, self-help, and psychopharmacological remedies do not? The demand for therapy is currently at an all-time high, bolstering its century-long dominance as the preferred antidote to human unhappiness and misery, even as it is under sustained attack from critics characterizing it as self-indulgent as well as from platforms that would replace human therapists with chatbots and analysts with algorithms. This course explores the conflicts and controversies that characterize today's psychotherapeutic landscape, addressing questions concerning its present condition and future prospects. We will look at the development, methods, aims, efficacy, and limitations of a range of psychotherapeutic modalities—among them psychoanalytic, psychodynamic, cognitive, behavioral, manualized, evidence-based, and AI-informed treatments as well as family, sex, and group therapies—and explore how each took shape, who it is intended to treat, and how clinicians evaluate its effectiveness. We will examine therapy's long-overdue, on-going reckoning with racial issues, gendered identities, and access to treatment. We will explore the various modern selves envisioned by psychotherapy, from the highly relational to the independently sovereign. You will leave the course prepared to recognize and evaluate claims regarding therapy's rationale and impact in a range of sites, from the clinician's office to the modern workplace to the media, as well as to assess the ways in which happiness, contentment, and satisfaction in life are subject—or not—to therapeutic intervention. Does psychotherapy work, and, if so, how? Do we suffer less and enjoy greater self-knowledge one hundred years after the invention of the talking cures?

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

Anupam Jena

Fall; TTh 3-4:15

Class Capacity: 42

Consent: Instructor

Offers information and experiences regarding the most important issues and challenges in health care quality. Overview of the dimensions of quality of care, including outcomes, overuse, underuse, variation in practice patterns, errors and threats to patient safety, service flaws, and forms of waste. Each session focuses on one specific issue, exploring patterns of performance, data sources, costs, causes, and remedies. Explores desirable properties of health care systems that perform at high levels in many dimensions of quality.

Course Notes: Lotteried course.

History 1924: Violence and Healing, Pandemics and Everyday Life: Mental Health and Illness in Africa

Emmanuel Akyeampong, Guiseppe Raviola

Fall; Th 9:45-11:45

Consent: Instructor

An introduction to African perspectives on mental illness, exploring the development and practice of psychiatry as a medical field in Africa, examining the grey areas within psychiatric knowledge, and engaging the ongoing debates about the interface between race, culture and psychiatry. Will review African therapeutic systems; witchcraft, causation and mental health; substance abuse; violence and mental illness; and more recent links between HIV/AIDS, loss and depression.

Class Notes: This course meets the "Beyond North America" History Concentration requirement.

History of Science 1410: Health and Climate Crises: A History

David Shumway Jones

Fall; T 9-11:45

Class Capacity: 14

Consent: Instructor

Physicians and epidemiologists have already begun to document the adverse health effects of global warming. The myriad impacts are only going to get worse. While these specific health threats are new, concerns about health and the environment have ancient origins. This course will explore the long history of theorizing about the impact of the environment on health, paying particular attention to

changing climates: what happens when people travel to new climates, and what happens when a place's climate changes. Topics range from health in the ancient world to modern theories of planetary health.

History of Science 1445: Medicine and Health in America

Eram Alam

Spring; TTh 9-10:15

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 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.

History of Science 1684: Race, War, and Medicine

Leslie-William Robinson

Spring; TTh 10:30-11:45

This course explores the historical and contemporary relationship between three prominent pillars of our daily lives: race, war, and medicine. How did each influence the development of the other, and through this process construct modern societies? We will examine the role played by medical practitioners and military personnel in the creation of social and racial hierarchies that in turn abetted the appropriation of land and the extraction of labor. We will begin in the seventeenth century and predominantly track the

history of the triumvirate within modern Western imperialist powers, especially the US. Nonetheless, an important priority of the course is to de-center imperial and top-down narratives, and the scholarship we engage with reflects that goal.

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

Anne Harrington

Spring; Th 3-5:45

Class Capacity: 30

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.”

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

Mark Blanchard

Spring; M 3-5

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.

POLITICS OF HEALTH

Anthropology 1716: Neoliberalism: Empire, Extraction, and the Making of the Global Social Order

Salmaan Keshavjee

Spring; TBA

Class Capacity: 15

Consent: Instructor

This seminar course is designed primarily for advanced undergraduates and graduate students who are interested in the relationship between neoliberalism, the global social order, and inequities in health and wellbeing. It examines neoliberalism as a political ideology that, paradoxically, both sustains and masks deeply extractive social relations of production whose harms and benefits are unevenly distributed across time, place, and communities. The course is designed to enable students to develop the skills and knowledge necessary to understand, theorize, and critique how neoliberal regimes of governance shape politics and sociopolitical subjectivities, structure and constrain life opportunities, and perpetuate enduring forms of social injustice.

First Year Seminar 271: 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. Student will explore in-depth a topic of their choice and prepare a manuscript potentially for publication in a peer-reviewed journal.

History 1957: Healthcare and the Welfare State

Instructor TBA

Spring; TBA

Class Capacity: 15

Consent: Instructor

This conference course examines state-based guarantees to healthcare through an initial comparative analysis of different welfare states, largely focused on the United States' experience. It asks why the United States has not guaranteed a right to healthcare, unlike most other advanced, industrialized, and wealthy countries. Within the United States' federated system, the place of healthcare varies widely amidst other demands for social insurance, which includes unemployment benefits, parental leave, childcare, and pensions. From comparative to national perspective, this course engages American political economy's public-private mix; anti-immigration sentiments and segregation's limits on national health insurance; the Civil Rights Movement's healthcare reforms; the persistent reproduction of health inequality despite de jure desegregation; resistance to and breakthroughs for Medicaid expansion in the contemporary era; and prospects for future reform.

History of Science 1441: On Health and Migration

Eram Alam

Spring; M 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

Matthew Reichert

Fall; W 9:45-11:45

Class Capacity: 10

Consent: Instructor

How does politics shape health in America? In this multidisciplinary class, students explore the historical origins of institutions like Medicare and Medicaid, the FDA, the CDC 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 Affordable Care Act, Covid-19, and the medical ecosystem here in Boston. Finally, students also observe how public health researchers make use of social science methods, from the clinical trial to the ethnographic case study. This is a junior tutorial.

Course Notes: This course will be lotteried and is open to non-concentrators if space permits.

SCIENCE OF HEALTH AND DISEASE

Anthropology 1270: Sick: 10,000 Years of Health and Disease

Christina Warinner

Fall; MW 3-4:15

This course surveys the concept of health and the major nutritional and infectious diseases that have impacted human populations over the past ten thousand years. Special attention is paid to the methods used to detect and identify disease in the past, including skeletal paleopathology, paleodemography, and pathogenomics, as well as human social factors that have influenced human disease exposure and susceptibility, including long-distance migration, agriculture and pastoralism, urbanization, and industrialization.

Educational Studies 125: Children with Learning and Developmental Differences

Nadine Gaab

Spring; T 10:30-12:30

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

Instructor TBA

Spring; MW 4-5:15

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 24Q: Microbial Symbioses: From the Deep-Sea to the Human Microbiome

Colleen Cavanaugh
Fall; W 3-5:30
Class Capacity: 12
Consent: Instructor

This seminar examines the remarkable diversity of microbial symbioses, ranging from giant tubeworms and lichens to the human microbiome, exploring their ecology, evolution, and roles in human health and disease, agriculture, and biotechnology. Microbial associations with animals (including humans), plants, fungi, and protists will be discussed, complemented by microscopy and field trips to local environs including Harvard Yard, the New England Aquarium, and your own microbiome.

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

David Fisher
Fall; T 3-5:45
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 53D: The Cure Within: Fighting Cancer with Your Immune System

Ruth Franklin
Fall; W 3-5:45
Class Capacity: 12
Consent: Instructor

Cancer touches countless lives. The search for a cure has driven the development of innovative therapeutic approaches focused on a once unconventional target: the immune system. In this seminar, we will dive into the exciting world of cancer research and discover how our own immune cells can be harnessed to fight this formidable disease. Through collaborative discussions, presentations, and the examination of popular science writing and research articles, students will explore the fundamental principles of cancer biology, the immune system, and tumor immunotherapy. We will consider questions such as: Why do tumors grow? How does the immune system “see” tumor cells? How can we manipulate immune cells to eradicate growing tumors? This course also features a field trip to a tumor immunology lab at the Dana Farber Cancer Institute, providing a firsthand encounter with groundbreaking science. To conclude the semester, students will craft group presentations to illuminate a cutting-edge cancer immunotherapy tailored for a lay audience. Empowered with a solid foundation in the basics of cancer immunology and the ability to think critically about scientific information, students will leave this seminar equipped to join the ongoing conversation about cancer and its treatment.

GENED 1027: Human Evolution and Human Health

Daniel Lieberman, Bridget Alex
Spring; TTh 1:30-2:45

How and why did humans evolve to be the way we are, and what are the implications of our evolved anatomy and physiology for human health today? How can we use principles of evolution to promote health and prevent disease? To address these questions, this course reviews the major transitions that occurred in human evolution, from the divergence of the ape and human lineages some 8 million years ago to the origins of *Homo sapiens* about 300,000 years ago. We also consider the many health effects of the recent cultural and technological transitions from hunting and gathering to farming and then to industrialization.

GENED 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 114: Gut Microbiome and Human Health

Rachel Carmody

Fall; W 12:45-2:45

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 Human Evolutionary Biology concentrators fulfilling a research seminar requirement and Human Evolutionary Biology graduate students.

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

Barbara Natterson-Horowitz

Spring; W 3-5

Class Capacity: 12

Consent: Instructor

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

Daniel Lieberman, George Lauder, Stephanie Pierce, Joanne Clark Matott
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 the instructor.

Mind, Brain, Behavior 980CC: The Microbiota-Gut-Brain Axis: How Gut Microbes Modulate Human Cognition and Mental Health

Elizabeth Phelps
Fall; W 3-5
Consent: Instructor

The idea of a brain-gut connection has long been recognized. From Hippocrates' famous declaration that "all diseases originate in the gut," to contemporary idioms such as "trust your gut," and "feeling butterflies in your stomach," it seems evident that the gut is somehow connected to cognition and feelings. Today, we not only know that they are anatomically connected but are also functionally intertwined. More interestingly, evidence emerging from various fields of study underscores the pivotal role of the gut-residing microbes in the gut-brain communication and the preservation of cognitive and mental health. Excitingly, the plasticity of the gut microbiota composition opens up exciting potential for innovative therapeutic interventions. In this course, students will explore the microbiota-gut-brain axis and its role in human cognition and mental health. We will discuss literature coming from different research fields, including studies in rodents and humans, investigation involving patients with gastrointestinal, metabolic, and neurodegenerative diseases, and epidemiological studies related to nutrition and mental well-being. We cover the evolutive significance of the gut-brain connection and discuss how contemporary lifestyles may be

influencing its composition and, consequently, human health. By the conclusion of this seminar, students will acquire insights into the pathways through which gut microbes influence diverse brain functions, the external factors shaping the gut microbiota, the repercussions of its disruption, and the current methodologies employed to study and modify its composition. The course will comprise a mix of brief lectures and discussions centered around papers previously curated by the instructor or suggested by the students. Students will be encouraged to ask questions and pursue the answers by exploring the available literature and propose experimental ideas. In this way, students will be able to shape the class content according to their own interests. Additionally, we have two guest speakers scheduled to join us.

Class Notes: Enrollment via lottery; consult <https://mbb.harvard.edu/seminars> for lottery deadline, instructions, and link. Preference to juniors in MBB tracks or MBB secondary field. Course content inquiries to joyarzun@fas.harvard.edu.

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.

Class Notes: Enrollment via lottery; consult <https://mbb.harvard.edu/seminars> for lottery deadline, instructions, and link. Preference to juniors in MBB tracks or MBB secondary field. Course content inquiries to pkumar@mclean.harvard.edu.

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

William Milberg

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.

Class Notes: Enrollment via lottery; consult <https://mbb.harvard.edu/seminars> for lottery deadline, instructions, and link. Preference to juniors in MBB tracks or MBB secondary field. Course content inquiries to william_milberg@hms.harvard.edu.

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

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.

Class Notes: Enrollment via lottery; consult <https://mbb.harvard.edu/seminars> for lottery deadline, instructions, and link. Preference to juniors in MBB tracks or MBB secondary field. Course content inquiries to dsilbersweig@bwh.harvard.edu.

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.

Class Notes: Enrollment via lottery; consult <https://mbb.harvard.edu/seminars> for lottery deadline, instructions, and link. Preference to students in Germanic Languages and Literatures and to juniors in MBB tracks or MBB secondary field. Course content inquiries to lisa_nickerson@hms.harvard.edu.

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

Gary Strangman, Vladimir Ivkovic

Spring; F 12-2

Consent: Instructor

Class Capacity: 15

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.

Class Notes: Enrollment via lottery; consult <https://mbb.harvard.edu/seminars> for lottery deadline, instructions, and link. Preference to juniors in MBB tracks or MBB secondary field. Course content inquiries to vivkovic@mgh.harvard.edu.

Molecular and Cellular Biology 60: Cellular Biology and Molecular Medicine

Dominc Mao, Vladimir Denic, 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: LS1B recommended

Course Requirements: Prerequisite – LS1A, LPSA, or LS50.

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. This year the entire course will be taught through the lens of COVID19, examining the underlying scientific bases of pathogenesis, protection, treatment and prevention. The course examines in depth the cellular and molecular mechanisms involved in the development and function of the immune system and also analyzes the immunological basis of human diseases in general. Apart from COVID19, we will discuss AIDS, autoimmunity, allergic disorders, primary immunodeficiency syndromes, transplantation, and cancer.

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

Course Requirements: 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.

Class Notes: Enrollment for this course will be via lottery with preference given to junior Neuroscience concentrators. Lottery instructions, deadlines, and a link to the google form can be found here:

<https://www.mcb.harvard.edu/undergraduate/neuroscience/neuro-courses/?course-button=tutorials>.

Recommended Prep: Ls1a (or LPSA) 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 10:30-11:45

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.

Course Requirements: SLS20 or PSY1 or Psychology AP=5 or Psychology IB=7 or Psyc S-1.

Psychology 980PS: Psychosis

Jill Hooley, Katherine Powers

Spring; TBA

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 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 1005: Health: 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 14, PSY 15, PSY 16, or 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 PSY14 or PSY15 or PSY16 or PSY18.

Psychology 1032: Psychology of Addiction

Chloe Jordan

Spring; TTh 12-1:15

Class Capacity: 40

Consent: Instructor

The human mind has been sculpted over millennia to pursue rewarding and pleasurable experiences. Addiction ensnares our mind's pleasure systems, replacing otherwise adaptive behaviors with a restless pursuit of reward. Addictions can occur not only to psychoactive drugs such as alcohol, stimulants, opioids, and cannabis, but also to behaviors such as gambling, sex, exercise, video games, and social media. Why are addictive behaviors so prevalent, and how can we treat them? What can we learn about our own minds, motivations, and desires, by understanding the psychology of addiction? This course will seek to answer these questions by examining everyday, reward-seeking behaviors and their dopamine underpinnings that can become hijacked to form the basis of addictions. We will interrogate how addictive drugs and behaviors can change the brain over time, leading to compulsive habits and disorders of substance use and impulse control. We will inspect societal systems designed to capitalize on our brain's reward systems, resulting in monetary profit for some and challenging addictions for others. We will also discuss innovative treatments for addiction, including medications, controversial substances like cannabis and psychedelic drugs, and magnetic brain stimulation protocols. Course content will range from preclinical studies on brain mechanisms and behaviors of reward and reinforcement to clinical and public health studies on the factors leading to addiction from individual, community, economic, and sociopolitical perspectives.

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.

Psychology 1201: Your Brain on Drugs: Psychopharmacology

Scott Lukas

Fall; TTh 12-1:15

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.

Enrollment Instructions: Only Juniors and Seniors who have passed the pre-requisite courses will be permitted to enroll. If you do not have all of the pre-requisites, but have other experiences (such as AP courses in High School, hands on work or intern experience, other related coursework, etc.) you may petition to enroll via My.Harvard. Also, students who are non science concentrators (e.g., economics, math, computer science, government) may petition to enroll Pass/Fail. All petitions, regardless of your concentration, must be completed by following the detailed instructions provided in the uploaded FAQ document in the Files folder on this site. Incomplete or blank petitions will be denied.

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 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 1618: Developmental Disabilities and Neurodiversity

Jesse Snedeker

Spring; MW 3-4:15

An introduction to developmental disorders from the perspective of psychology and cognitive neuroscience. We will focus on the most commonly diagnosed developmental difficulties such as autism,

ADHD, and dyslexia. We will take an integrative approach and consider the clinical presentation of each disorder, theoretical frameworks, research on the causes and consequences, and issues in education and treatment.

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.

Psychology 1801: Anxiety Disorders

Richard McNally

Spring; MW 10:30-11:45

Concerns current theory and research on the etiology and treatment of anxiety disorders (e.g., panic disorder, obsessive-compulsive disorder, social phobia, post-traumatic stress disorder). Cognitive, behavioral, and biological approaches are emphasized.

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.

Course Requirements: SLS20 or PSY1 or Psychology AP=5 or Psychology IB=7 or Psyc S-1 AND PSY18 or PSY1861.

Psychology 1816: Broken Brains: Mechanisms and Markers of Mental Illness

Mayron Pereira Piccolo Ribeiro

Spring; T 9:45-11:45

Class Capacity: 20

Consent: Instructor

This course will integrate clinical psychology and cognitive neuroscience to explore the biological underpinnings of mental illness. We will adopt a systems-level approach, examining the relationship between function and dysfunction of specific brain circuits and networks and mental health disorders. For example, addiction, disordered eating, depression, and psychosis have all been linked to the brain's reward system. What does this common neural foundation indicate and how has this discovery advanced treatment options? Throughout the course, we will draw on findings from traditional and cutting-edge methodologies that have produced critical insights and key breakthroughs. We will also discuss how large-scale neuroimaging studies, like the Human Connectome Project, can be used to trace

disordered behaviors such as criminality, depression, and hallucinations to specific brain networks. As we explore these topics, we will discuss how these research findings inform mental health treatment and potentially complement discussions around important societal issues such as racial bias and criminal responsibility.

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.

Course Requirements: SLS20 or PSY1 or Psychology AP=5 or Psychology IB=7 or Psyc S-1 AND PSY18 or PSY1861.

Psychology 1857: Psychotherapy: Science and Practice

John Weisz

Spring; W 12-2

Class Capacity: 15

Consent: Instructor

Psychotherapy is a healing art, a subject of scientific inquiry, and—for many—a business venture. In this course we will bring these strands together, focusing on how psychotherapy is practiced in the real world and how clinical science is used to test claims of success. We will examine competing approaches to therapy and evaluate their scientific status. Each iteration of the course will have a distinctive emphasis. Contact the instructor to learn what the specific focus will be during the semester in which you are considering enrolling.

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.

Course Requirements: SLS20 or PSY1 or Psychology AP=5 or Psychology IB=7 or Psyc S-1 AND PSY18 or PSY1861.

Stem Cell and Regenerative Biology 140: Biology of Human Growth and Cancer

Fernando Camargo

Spring; TTh 10:30-11:45

This course will focus on the biology of tissue growth from a developmental perspective. We will first learn about the genetics, biochemistry, and function of basic developmental pathways that are involved in normal growth. We will then understand how

dysregulation of these pathways contributes to diverse malignancies. By exploring the cellular origins of cancer, the nature of mutations driving tumor progression, and the interactions of cancer cells with their niche, we will gain valuable insights into the complexities of this disease. Moreover, we will examine the current challenges faced in the clinic regarding cancer therapies. One crucial aspect we will address is how to identify and develop specific targets for cancer treatment without adversely affecting normal adult tissues. We will also dive into the advancements made in the genomics era and explore how they have revolutionized cancer treatment approaches.

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

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 195: The Translational Science of Stem Cells: Present and Future

Lee Rubin

Fall; TTh 12-1:15

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.

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