

# SCIENCE, TECHNOLOGY & SOCIETY (STSC)

## STSC 0013 A History of the University of Pennsylvania from the American Revolution to the Present

This course provides a well-contextualized journey through primary sources relating to the University of Pennsylvania from its inception as an idea to the present. Penn was both the first university and the first institution to combine the liberal arts and professional training in medicine. While the history of the university reflects broader patterns in American higher education, Penn nevertheless had its own unique trajectory in its relationship to the city of Philadelphia and to power in the United States. During our meetings, we will discuss the relationship between theoretical and practical sides of learning at the university, the nature of research, the changing structures of governance and its place in politics from the American Revolution to the Present.

Fall

1 Course Unit

## STSC 0100 Emergence of Modern Science

During the last 500 years, science has emerged as a central and transformative force that continues to reshape everyday life in countless ways. This introductory course will survey the emergence of the scientific world view from the Renaissance through the end of the 20th century. By focusing on the life, work, and cultural contexts of those who created modern science, we will explore their core ideas and techniques, where they came from, what problems they solved, what made them controversial and exciting and how they relate to contemporary religious beliefs, politics, art, literature, and music. The course is organized chronologically and thematically. In short, this is a "Western Civ" course with a difference, open to students at all levels.

Fall

Also Offered As: HSOC 0100

1 Course Unit

## STSC 0228 Studying Sex

The concept of "sex" has meant multiple things to science and medicine over the last few hundred years: a way of sorting bodies, a behavior to observe, a driving force behind reproduction and evolution, and a yardstick by which to measure normality. It has been both a binary of male and female, and a spectrum; both separate from gender, and inseparably entwined with it. It has been defined at different moments by anatomy, hormones, chromosomes, and even metabolism. In this course, we will explore how scientists have studied—and perhaps produced—the many-faceted thing called sex, and how historians have come to understand that past. This first-year seminar introduces students to primary source research; historical writing; and methods from both Science and Technology Studies (STS), and queer, trans, and feminist studies. Course materials will focus mainly on the United States in the 19th and 20th centuries.

Fall

Also Offered As: GSWS 0228, HSOC 0228

1 Course Unit

## STSC 0283 Medicine, Magic and Miracles

This course explores the nature of disease and the history of medical practice and healing in the medieval period, using methods from intellectual, cultural, and social history, as well as the life sciences, and incorporating material from Indonesia to England. The themes of this course include: 1) the diversity of healing practices and beliefs in this period; 2) specific rationalities of different methods of healing; 3) views of the human body and disease; 4) the wide array of practitioners that people turned to for medical care, including physicians, midwives, family members, herbalists, snake handlers, saints, and surgeons; 5) institutions of medicine, such as the hospital. Students will have their minds blown as they learn to question everything they thought they knew about how science and medicine work.

Fall

Also Offered As: HSOC 0283

1 Course Unit

## STSC 0313 Cane and Able: Disability in America

Disability is a near universal experience, and yet it remains on the margins of most discussions concerning identity, politics, and popular culture. Using the latest works in historical scholarship, this seminar focuses on how disability has been experienced and defined in the past. We will explore various disabilities including those acquired at birth and those sustained by war, those visible to others and those that are invisible. For our purposes, disability will be treated as a cultural and historical phenomenon that has shaped American constructions of race, class, and gender, attitudes toward reproduction and immigration, ideals of technological progress, and notions of the natural and the normal.

Fall

Also Offered As: HSOC 0313

1 Course Unit

## STSC 0343 Why Medical Interventions Work or Fail: A Search for Answers

The past is littered with interventions that worked or were thought to work that we hold in little regard today – from frontal lobotomies to bone marrow transplants for metastatic breast cancer. Since 1962 the FDA requires proof of efficacy for new drugs. Yet uncertainty surrounds the efficacy and safety of many drugs, technologies, and practices in use today. Will some future observer of today's practices wonder, as we do about the bleeding and purging of traditional medicine, why we do the things we do? This course will go deep into the social history of modern Western biomedicine to make sense of the ideological, economic, technical, scientific, and social forces shaping the modern medical interventions and the work they do. Students will be introduced to the rewards and challenges of studying medicine as a social and historical process. Case studies of the efficacy of contemporary biomedical interventions will be enriched by in-class meetings with prominent social scientists, biomedical researchers, and clinicians, as well as some potential visits to clinics and historical sites. Each student will develop a research project or essay review related to the efficacy of medical interventions. Most students will likely explore a current or historical controversy over the efficacy and safety of a particular intervention. In addition, there will be two shorter writing assignments.

Fall

Also Offered As: HSOC 0343

1 Course Unit

**STSC 0387 Epidemics in History**

The twenty-first century has seen a proliferation of new pandemic threats, including SARS, MERS, Ebola, Zika, and most recently the novel coronavirus called COVID-19. Our responses to these diseases are conditioned by historical experience. From the Black Death to cholera to AIDS, epidemics have wrought profound demographic, social, political, and cultural change all over the world. Through a detailed analysis of selected historical outbreaks, this seminar examines the ways in which different societies in different eras have responded in times of crisis. The class also analyzes present-day pandemic preparedness policy and responses to health threats ranging from influenza to bioterrorism.

Fall

Also Offered As: HSOC 0387

1 Course Unit

**STSC 0400 Medicine in History**

This course surveys the history of medical knowledge and practice from antiquity to the present. No prior background in the history of science or medicine is required. The course has two principal goals: (1) to give students a practical introduction to the fundamental questions and methods of the history of medicine, and (2) to foster a nuanced, critical understanding of medicine's complex role in contemporary society. The course takes a broadly chronological approach, blending the perspectives of the patient, the physician, and society as a whole—recognizing that medicine has always aspired to "treat" healthy people as well as the sick and infirm. Rather than history "from the top down" or "from the bottom up," this course sets its sights on history from the inside out. This means, first, that medical knowledge and practice is understood through the personal experiences of patients and caregivers. It also means that lectures and discussions will take the long-discredited knowledge and treatments of the past seriously, on their own terms, rather than judging them by today's standards. Required readings consist largely of primary sources, from elite medical texts to patient diaries. Short research assignments will encourage students to adopt the perspectives of a range of actors in various historical eras.

Fall

Also Offered As: HIST 0876, HSOC 0400

1 Course Unit

**STSC 0490 Comparative Medicine**

This course explores the medical consequences of the interaction between Europe and the "non-West." It focuses on three parts of the world Europeans colonized: Africa, South Asia, and Latin America. Today's healing practices in these regions grew out of the interaction between the medical traditions of the colonized and those of the European colonizers. We therefore explore the nature of the interactions. What was the history of therapeutic practices that originated in Africa or South Asia? How did European medical practices change in the colonies? What were the effects of colonial racial and gender hierarchies on medical practice? How did practitioners of "non-Western" medicine carve out places for themselves? How did they redefine ancient traditions? How did patients find their way among multiple therapeutic traditions? How does biomedicine take a different shape when it is practiced under conditions of poverty, or of inequalities in power? How do today's medical problems grow out of this history? This is a fascinating history of race and gender, of pathogens and conquerors, of science and the body. It tells about the historical and regional roots of today's problems in international medicine.

Fall

Also Offered As: HSOC 0490

1 Course Unit

**STSC 0600 Technology & Society**

Technology plays an increasing role in our understandings of ourselves, our communities, and our societies, in how we think about politics and war, science and religion, work and play. Humans have made and used technologies, though, for thousands if not millions of years. In this course, we will use this history as a resource to understand how technologies affect social relations, and conversely how the culture of a society shapes the technologies it produces. Do different technologies produce or result from different economic systems like feudalism, capitalism and communism? Can specific technologies promote democratic or authoritarian politics? Do they suggest or enforce different patterns of race, class or gender relations? Among the technologies we'll consider will be large objects like cathedrals, bridges, and airplanes; small ones like guns, clocks and birth control pills; and networks like the electrical grid, the highway system and the internet.

Spring

Also Offered As: HSOC 0600, SOCI 0600

1 Course Unit

**STSC 0613 How Is AI Changing Higher Education?**

This course will explore how generative AI and other forms of artificial intelligence are changing higher education. Topics include ethical questions about AI, how academic writing and publishing are changing in response to AI, and the historical and social contexts for adopting new educational technology. Students will use large language models (LLMs) and other AI tools to prepare for class, assess the educational value of AI tools for higher education, and discuss questions raised when individuals and institutions use AI. The class meetings will be organized using a structured, active, in-class learning or SAIL framework, so students will organize and lead many class activities. Sharing experiences and ideas about using AI will be foundational to the course. Students will use JeepyTA, an LLM-based teaching tool created by the Penn Center for Learning Analytics, to aid their learning and to gain practical experience using a generative AI model. We will approach AI as a technology that has the potential to improve learning, not to replace educational effort or to be used simply to complete assignments. We will consider the ethical problems and social risks, especially in the context of student use. Norms and expectations for using generative AI tools will be determined collaboratively by the students and instructor during the first week of class and subject to discussion and revision throughout the semester.

Fall

1 Course Unit

**STSC 0668 Rivers, Culture, Power**

Rivers provide and divide, they constrict and connect. Although a fundamental source of prosperity and transit for human societies, they resist even the most sophisticated attempts at human control. This class examines rivers as movers of history—as sites of contestation and transformation around the globe—with a focus on how diverse societies have understood and used them. Topics include: irrigation and political power, flooding and course changes, scientific measurement of river systems, the twentieth-century rise of the concrete dam, subsequent movements towards undamming, and recent efforts to grapple with climate change. For first-year students only.

1 Course Unit

**STSC 0823 Sport Science in the World**

This seminar is designed for first-year students who are interested in some big questions related to the topic of "sport science." Sport science may seem to be just a niche field where teams of physiologists, psychologists, geneticists, engineers and others work to make already very athletic people go "faster, higher, stronger." On the other hand, the work of sport scientists intersects everyday with far-reaching questions about how categories of sex, age, race, disability, and nationality are defined, measured, challenged, or maintained. Sport scientists weigh in on debates over what kinds of physical activity or bodies are "clean," what kinds of performance are "natural" or even human, and what kinds of sporting spaces or equipment are fair. In this class we'll read and discuss historical and contemporary accounts of sport science in the world. My hope is that students will enter the class interested in sports and leave interested in sports and in gendered science, objectivity and standardization, the politics of big data and more.

Fall

Also Offered As: HSOC 0823

1 Course Unit

**STSC 0883 Climate and Change**

What is climate? This course examines this question by exploring the diverse perspectives of various peoples at different times and in diverse locations. We will then investigate how the myriad of conceptualizations of climate influenced a wide array of topics, including health, race, historical change, human destiny, and responses to environmental challenges. We will investigate the changing ideas surrounding climate by examining historical texts, scientific literature, and cultural artifacts. By the end of the course, students will have developed a nuanced understanding of the complex relationship between climate and human society. Students will also be able to reflect on how the historical and cultural contexts that inform interpretations of climate impact contemporary discussion surrounding climate change and solutions for addressing climate-related challenges.

Not Offered Every Year

Also Offered As: HSOC 0883

1 Course Unit

**STSC 1101 Science and Literature**

Science fiction has become the mythology of modern technological civilization, providing vivid means for imagining (and proclaiming) the shape of things to come. This interdisciplinary seminar will consider SF in multiple manifestations – literature, film and TV shows, visual art and architecture. We will debate how the genre has shaped ideas about scientific knowledge, the position of humans in the universe, and our possible futures by examining themes including time travel, robots and androids, alien encounters, extraterrestrial journeys, and the nature of intelligent life. This seminar will consider SF from the perspective of the history of science and technology: critically and comparatively, with a primary focus on social and cultural contexts in addition to literary aspects.

Spring

Also Offered As: ENGL 1509

1 Course Unit

**STSC 1120 Science Technology and War**

In this survey we explore the relationships between technical knowledge and war in the nineteenth and twentieth centuries. We attend particularly to the centrality of bodily injury in the history of war. Topics include changing interpretations of the machine gun as inhumane or acceptable; the cult of the battleship; banned weaponry; submarines and masculinity; industrialized war and total war; trench warfare and mental breakdown; the atomic bomb and Cold War; chemical warfare in Viet Nam; and "television war" in the 1990s.

Not Offered Every Year

Also Offered As: HSOC 1120

1 Course Unit

**STSC 1151 Modern Biology and Social Implications**

This course covers the history of biology in the 19th and 20th centuries, giving equal consideration to three dominant themes: evolutionary biology, classical genetics, and molecular biology. The course is intended for students with some background in the history of science as well as in biology, although no specific knowledge of either subject is required. We will have three main goals: first, to delineate the content of the leading biological theories and experimental practices of the past two centuries; second, to situate these theories and practices in their historical context, noting the complex interplay between them and the dominant social, political, and economic trends; and, third, to critically evaluate various methodological approaches to the history of science.

Fall or Spring

Also Offered As: HIST 0877

1 Course Unit

**STSC 1160 Sustainability & Utopianism**

This seminar explores how the humanities can contribute to discussions of sustainability. We begin by investigating the contested term itself, paying close attention to critics and activists who deplore the very idea that we should try to sustain our, in their eyes, dystopian present, one marked by environmental catastrophe as well as by an assault on the educational ideals long embodied in the humanities. We then turn to classic humanist texts on utopia, beginning with More's fictive island of 1517. The "origins of environmentalism" lie in such depictions of island edens (Richard Grove), and our course proceeds to analyze classic utopian texts from American, English, and German literatures. Readings extend to utopian visions from Europe and America of the nineteenth and twentieth centuries, as well as literary and visual texts that deal with contemporary nuclear and flood catastrophes. Authors include: Bill McKibben, Jill Kerr Conway, Christopher Newfield, Thomas More, Francis Bacon, Karl Marx, Henry David Thoreau, Robert Owens, William Morris, Charlotte Perkins Gilman, Ayn Rand, Christa Wolf, and others.

Not Offered Every Year

Also Offered As: COML 1160, ENGL 1579, ENVS 1050, GRMN 1160

1 Course Unit

**STSC 1201 Darwin's Legacy: The Evolution of Evolution**

Darwin's conceptions of evolution have become a central organizing principle of modern biology. This lecture course will explore the origins and emergence of his ideas, the scientific work they provoked, and their subsequent re-emergence into modern evolutionary theory. In order to understand the living world, students will have the opportunity to read and engage with various classic primary sources by Darwin, Mendel, and others. The course will conclude with guest lectures on evolutionary biology today, emphasizing current issues, new methods, and recent discoveries. In short, this is a lecture course on the emergence of modern evolutionary biology—its central ideas, their historical development and their implications for the human future.

Spring

1 Course Unit

**STSC 1600 The Information Age**

We are said to live in an "information age." Information technologies have been credited with ushering in an era of unprecedented information creation, collection, storage, and communication. We experience the impact of this firsthand: these technologies increasingly pervade our homes, our workplaces, our schools, our most private spaces. But what exactly do we mean when we speak of the information age? When and how did it come into being? What developments—social, economic, political, or technological—made the digital world possible? How do these fit in the longer history of technology and society? And how is all this different from earlier eras? In this course, we explore these questions by looking to the history of information, information technologies, and information sciences, a history that long predates the digital computer. Although, at the center of our story will be the development of new information technologies—from the printing press and the telegraph to the computer and of course the Internet—our focus will not primarily be on machines, but on people and how individuals conceptualized, contributed to, made sense of, and dealt with the many transformational changes that have shaped the contours of our modern digital world. We will explore forms of identity, knowledge, and community that have emerged within this information age. Our goal will be to deepen historical perspectives and build analytical tools to critically evaluate the role of information in our increasingly digital world today.

Fall or Spring

Also Offered As: SOCI 2951

1 Course Unit

**STSC 1761 Nature and the City: Place, Memory, and Environment**

When news articles say that we've known about the climate crisis for decades, who is included in that "we"? What does place have to do with which events are memorialized and which are forgotten? In this course we'll explore the relationships among cities, environments, and ideas about the past in the United States. From problems of drinking water to climate change, we'll investigate how place and collective memory impact decisions and possibilities in facing environmental issues. Drawing on science and technology studies, anthropology, sociology, and history, this course offers students new ways to think about how people in the United States have understood their relationships to the places they live in and depend on. Using a combination of scholarly readings, primary sources, and field trips, this CWiC critical speaking seminar will focus on assignments designed to help students develop observation, critical reading, and public speaking skills to understand how stories about the past impact their lives.

1 Course Unit

**STSC 1788 Everyday Technologies and the Making of the Modern World**

Long before iPhones and Fitbits, personal technologies - small(ish), portable, purchasable - had a tremendous impact on the lives of people around the globe. Items such as wristwatches, bicycles, sewing machines, cars and radios could empower their users (or sometimes constrain them), creating economic, educational or recreational opportunities while also being associated with grander ideas and ideologies. This course will explore such everyday technologies across the nineteenth and twentieth centuries, in locations spanning the Americas, Europe, Africa and Asia. We will consider how the use and significance of particular technologies varied according to time and place; how these everyday items contributed to imperial and national identities and "self-fashioning" for individuals; and how, through use and modification, consumers themselves could become part of the story of technological change. In addition to reading a variety of classic and recent scholarship, students will work with a wide array of primary sources (newspapers, photographs, patent records, trade cards) and use digital tools to present their own research projects.

Fall

1 Course Unit

**STSC 1880 Environment and Society**

This course examines contemporary environmental issues such as energy, waste, pollution, health, population, biodiversity and climate through a historical and critical lens. All of these issues have important material, natural and technical aspects; they are also inextricably entangled with human history and culture. To understand the nature of this entanglement, the course will introduce key concepts and theoretical frameworks from science and technology studies and the environmental humanities and social sciences.

Fall or Spring

1 Course Unit

**STSC 1897 Environmental History**

This course provides an introduction to environmental history—the history of the interrelationship between humans and the rest of nature. In the words of historian J.R. McNeill, "Human history has always and will always unfold within a larger biological and physical context, and that context evolves in its own right. Especially in recent millennia, that context has co-evolved with humankind." In this course we will study this co-evolution between human actors and non-human actors in global history, analyzing political, social, cultural and economic factors that affect ideas about nature and material effects on nature. We will consider the concept of the Anthropocene and study current environmental changes and challenges.

Not Offered Every Year

1 Course Unit



**STSC 2012 Introduction to Data Analytics**

In a time of abundant fake news and mis-information, it becomes ever important for students (for all, really!) to learn how to critically assess (and produce) robust empirical evidence to uncover patterns and trends about social life. The goal of this course is to do just that through the use of census microdata, video and photographs, with a focus on social inequality! Or, in other words...a first goal of this course is to introduce students to empirical work that will let them identify robust evidence on social inequality across a diverse set of topics and countries. A second goal of the course is to provide students with key analytical skills through working with microdata to uncover social inequality globally. Having exposure and hands-on experience with the correct tools to read (and produce) evidence on patterns and trends on social research is an important skill for students in any major. We will use publicly available census microdata on more than 100 countries from IPUMS and photographs from the Dollar Street Project. Students will work with a country, produce their own analysis and combine it with photographs and videos. As a Signature Course, a third key goal of the course is to teach students skills that will enable them to more easily read empirical work and write results more clearly and concisely. Students will practice reading academic research, do class exercises, write case studies, and complete a research paper/video/photo essay that will aid them in these goals.

Also Offered As: HSOC 2012, LALS 2012, SOCI 2020

1 Course Unit

**STSC 2018 Science in the Public**

How, where, and when does the public encounter knowledge generated by others? And what are the stakes of those encounters for knowledge and the public? This course examines the sites, methods, and media through which knowledge of the world (scientific and otherwise) is preserved, interpreted, and communicated to non-specialist audiences. We will consider what forms of knowledge are chosen for public dissemination, the expressive and affective dimensions of these encounters, and the ways in which cultures of public knowledge have changed over time. Possible topics include science journalism, nature films, World's Fairs, museums, parks, and historic sites. The course will also offer students the opportunity to develop skills and experience in the creation of a public-facing interpretive project.

1 Course Unit

**STSC 2078 Agriculture & Science in the Pacific World**

This course examines how agricultural science has shaped the modern world. It focuses on the lands touching the Pacific Ocean during the industrial era—from the late eighteenth century to the late twentieth century—to highlight how scientific knowledge of the natural world and regimes of agricultural production interacted to change spatial relations of power between distant places. We will explore the history of botany, chemistry, and entomology in the context of European and Euro-American exploration incursions into the Pacific. We will also explore the history of once-exotic but now commonplace things that sustain our existence, from sugar, rice, and palm oil to guano. In short, this course examines how ideas about nature, methods of converting nature into commodities, and nature itself all influence each other. Students will work throughout the semester to gain knowledge about the intersection of agriculture, science, and empire in the Pacific, while also developing and strengthening their ability to conduct historical research and produce original arguments.

Spring

1 Course Unit

**STSC 2080 Science and Religion: Global Perspectives**

This survey course provides a thematic overview of science and religion from antiquity to the present. We will treat well-known historical episodes, such as the emergence of Muslim theology, the Galileo Affair and Darwinism, but also look beyond them. This course is designed to cover all major faith traditions across the globe as well as non-traditional belief systems such as the New Age movement and modern Atheism

Not Offered Every Year

1 Course Unit

**STSC 2097 Race and Gender in Global Science**

This course critically examines the creation of scientific conceptions of 'race' and 'sex' in the modern era and their global impact. How did 'race' and 'sex' come to be the primary categories through which human variation has been classified in the modern West? What concepts of "race" and "sex" did colonial scientists, doctors, naturalists, and other experts invent, and how and why did they do this? How have scientific conceptions of 'race' and 'sex' been adapted to fit the sociopolitical projects of formerly colonized regions? And how have recent developments in genomic science sought to reinvent these categories? With these questions in mind, this course challenges us to think critically about the political contexts in which conceptions of 'race' and 'sex' have been crafted as well as how they have been contested and re-defined.

Spring

1 Course Unit

**STSC 2146 Science and Technology in Modern East Asia**

Technology from East Asia is ubiquitous in everyday life in the 21st century. You may be reading these very words on a device designed or assembled in Japan, China, South Korea, or Taiwan. The region, now a global center of research and innovation, contains some of the modern world's most impressive technological and scientific achievements. It also exhibits some of the most distressing—from mass facial recognition surveillance in China to nuclear disaster in Japan. This course explores how this state of affairs has taken shape from the 19th century through the present. Topics include industrialization, military technology, science and the rise of nationalism, the proliferation of consumer electronics, and environmental engineering in a warming world.

Fall or Spring

Also Offered As: EALC 2502

1 Course Unit

**STSC 2167 Science in the Middle East**

This course provides a long-term overview of science, learning and naturalistic practices in the Middle East, broadly defined, from the eighth century to the present. The students may expect to read state-of-the-field analyses of some of the turning points and major debates, including the Graeco-Arabic translation movement, occultism, decline, colonization and modernity. The course is built on a mixture of primary and secondary sources. The students are expected to contribute to class discussion and to write a final research paper. Some knowledge of the history of the region is desirable, but not required.

Fall, odd numbered years only

1 Course Unit

**STSC 2186 Climate Change: Science, Technology and Society**

Climate change is a sign that humans have become a force with planet-altering power. We need to understand how human societies work if we hope to respond to its dangers effectively. This course will use history to help students see climate change's social and political aspects. We'll examine how previous societies have responded to episodes of non-anthropogenic climate change, exploring market-based policies, power imbalances, and vulnerability. Through the history of science, we will investigate and critique how the growth of scientific knowledge often led climate change to be framed as a techno-scientific problem, best addressed through research and technological innovation. Students will learn how climate politics have been pushed by environmental and social justice activists, as well as by anti-communist scientists and corporate-sponsored cultivation of public doubt. Assignments will help students learn how to translate scholarly insights into engaging media that can reach various publics.

Fall or Spring

1 Course Unit

**STSC 2198 Race, Science, and Globalization**

Why do racist ideologies persist when a majority of scientists and scholars reject the premises they rely upon? Since the end of WWII, major scientific organizations like UNESCO and the American Anthropological Association have published statements rejecting race as an accurate representation of human biological variation. Yet despite widespread scientific opposition to the validity of race as an object of study, troublesome issues concerning race and racism abound in Western societies. If not an accurate description of human biology then what is race? And is racism an inevitable feature of human societies?

Fall or Spring

Also Offered As: HSOC 2198, LALS 2198

1 Course Unit

**STSC 2202 Journalistic Writing in Science, Technology, Society**

This workshop is intended for students interested in using popular science writing to broaden public understanding of science, technology, and society. Good science writing helps the public understand how to judge scientific claims; students will hone journalistic skills such as how to research a topic; how to identify interviewees and conduct interviews; and how to redraft and edit. To learn more about this course, visit the Creative Writing Program at <https://creative.writing.upenn.edu>.

Fall or Spring

Also Offered As: ENGL 3414

1 Course Unit

**STSC 2213 Herbs and Humors: Medieval and Early Modern Pharmacology**

What do gold, mummies, and rhubarb have in common? All were important ingredients in premodern pharmacy! This course surveys the history of pharmacology in the Medieval and Early Modern periods, beginning with the earliest European universities, through the professionalization of the medical field in the High and Late Middle Ages, and into the chymical medicine of the Renaissance. By engaging with a selection of both primary and secondary sources, students will learn about the development of the field of pharmacology and its relation to the broader field of medicine during its formation. Students will also learn how other emerging fields, such as alchemy and chemistry, and new technological advances made the development and advancement of pharmaceuticals possible. By the end of the course, students should expect to be able to address the following questions: How do theory and practice converge in premodern medicine and pharmacology? What is the relationship between the pharmacist and the physician, and how does this relationship shape medical practice? How does the invention of new technology shape the development of pharmacology during this period? No prior knowledge of medical history is needed for this course.

Also Offered As: HSOC 2213

1 Course Unit

**STSC 2227 Trauma and Healing in Historical Perspective**

This course considers the diverse range of theories and topics related to trauma in the 20th and 21st centuries, looking to understand how trauma has been mobilized at different moments in history for political, social, and personal ends. The point of the course is not to simply support or deny trauma as an interpretive framework for human pain and suffering, but instead to look critically at how it emerged as an object of study for medical and scientific circles and the benefits and ramifications of those biomedical frameworks that were felt at the time and stay with us into the present. We also consider how trauma has been taken up by actors outside of medicine and science, including popular media, fiction and activist communities. Using frameworks from feminist science studies, disability studies, black studies and queer studies, alongside more traditional histories of psychiatry, medicine and technology, students think about such diverse topics as sexual violence, racial violence, domestic and familial abuse, theories of psychological development, memory and trust, citizenship, the criminal justice system, the effects of our environments, intergenerational effects of violence, embodiment, biomedical models of risk and disease and narratives of the self. At the heart of this course is an interest in how we should understand humans' capacity to harm and be harmed by one another, and how we can attend to the enduring effects of inequality and structural violence while remaining firmly grounded in the day-to-day lived, felt realities of violence and interpersonal harm.

Fall

Also Offered As: HSOC 2227

1 Course Unit

**STSC 2296 Technologies of Self and Society**

As European empires expanded in the late eighteenth century, "social science" began to emerge in the lexicons of Western societies. Since these early beginnings in European imperialism, the social sciences have sought to represent, alter, and govern human existence while struggling to define "society" as something separate from "nature". This class examines how questions concerning the proper management of self and society are central to the ambitions and dilemmas of modern social sciences. We begin by tracing the origins of social science in late-eighteenth century thought and their professionalization in the nineteenth century. Continuing through to the twentieth century, we will observe how core social science disciplines like sociology, anthropology, and psychology attempted - in the name of anti-racism - to carve out distinct niches in opposition to biology and genetics. The course also examines the dramatic growth of the social sciences during the cold war period thanks to military funds. Our examination of cold war social science will focus on how social scientists began carving up the world into different "areas" of study and how they became increasingly oriented towards re-making individual psyches and societies in the "third world" to fit the image of an industrialized "West". The course will conclude by examining calls from indigenous scholars and scholars in the global South to decolonize social science.

Spring

1 Course Unit

**STSC 2303 Fundamentals of Epidemiology**

This course introduces students to the basic tenets of epidemiology and how to quantitatively study health at the population level. Students learn about measures used to describe populations with respect to health outcomes and the inherent limitations in these measures and their underlying sources of data. Analytic methods used to test scientific questions about health outcomes in populations then are covered, again paying particular attention to the strength and weaknesses of the various approaches. Multiple large epidemiologic research and field studies are used as in-class exemplars.

Spring

Also Offered As: HSOC 2303

1 Course Unit

**STSC 2304 Insect Epidemiology Pests, Pollinators and Disease Vectors**

Malaria, Dengue, Chagas disease, the Plague- some of the most deadly and widespread infectious diseases are carried by insects. The insects are also pernicious pests; bed bugs have returned from obscurity to wreak havoc on communities, invasive species decimate agricultural production, and wood borers are threatening forests across the United States. At the same time declines among the insects on which we depend- the honeybees and other pollinators-threaten our food security and ultimately the political stability of the US and other nations. We will study the areas where the insects and humans cross paths, and explore how our interactions with insects can be cause, consequence or symptom of much broader issues. This is not an entomology course but will cover a lot about bugs. It's not a traditional epidemiology course but will cover some fascinating epidemiological theory originally developed for the control of disease vectors. It will cover past epidemics and infestations that have changed the course of the history of cities and reversed advancing armies. HSOC 241. Stem Cells, Science and Society. Gearhart/Zaret.

Fall or Spring

Also Offered As: HSOC 2304

1 Course Unit

**STSC 2317 Slavery and Disease: Medical Knowledge in the Atlantic World**

How did the development of Atlantic World slave societies give rise to new knowledge about bodies, health and disease, race, and medical therapeutics? In this course we explore the relationship between slavery and disease and its impact upon European, Native American, and African descended populations in the Americas during the era of early contact to the early nineteenth century. We pay special attention to slavery's economic, environmental, and human costs, as we investigate the development of the medical profession and the acquisition of formal and informal medical knowledge in this epoch. Beyond that, we will investigate how perceptions of disease susceptibility and overall experiences with specific illnesses proceeded along raced and gendered lines. Topics we cover include the exchange of ideas about health and healing, responses to epidemics, the racialization of disease, slavery and commerce as conduits of disease.

Fall

Also Offered As: HSOC 2317

1 Course Unit

**STSC 2418 Engineering Cultures**

Modern engineering, technology, science, and medicine converge with each other in countless places, landscapes, institutions, and households. The profession of the engineer has been distinct from that of the scientist, and the "doctor," since its inception in the 1880s, however. In our class we trace overlaps and boundaries among engineers and other key experts of modern society, government, and public health, covering spaces in the Americas, Asia, and Europe. We explore rivalries, the roles of management and the state, class status and prestige, and we listen to engineers themselves and their understandings of their roles, functions, and purpose in modern societies. We cover fields such as civil engineering, mining, chemical-industrial engineering (including pharmaceuticals and oil refinery), mechanical engineering and machine design/maintenance, computer science, and the engineering of information technologies. No pre-requisites, no prior knowledge required.

Also Offered As: HSOC 2418

1 Course Unit

**STSC 2421 Manufacturing Minds: From Babbage to ChatGPT**

When asked to tell its own history, ChatGPT answers literally, describing (vaguely of course) its own training data set. When pressed to describe the longer history of "technology like you," it mentions early computer science, programs that played chess or solved math problems, before naming deep learning algorithms and big data as the key breakthroughs. This lineage is not untrue, but it ignores the wider context in which individuals and organizations have come to pursue this strange dream of crafting an intelligent object. As an uncannily lucid conversation partner who freely performs all manner of textual tasks, ChatGPT participates in a longstanding tension in the history of information technology between the goals of manufacturing minds and making mindless clerical workers. In this course we historicize that tension in three domains—calculation, knowledge work, and games—all of which directly inform our efforts to imagine what ChatGPT and its ilk might be. Throughout, we will attend to the ways machinery shaped specific tasks' construction in relation to gender, race, and class identities. We will see how technologies often imagined as disembodied are always material, interacting with human bodies and physical environments.

Not Offered Every Year

Also Offered As: HSOC 2421

1 Course Unit

**STSC 2607 Cyberculture**

Computers and the internet have become critical parts of our lives and culture. In this course, we will explore how people use these new technologies to develop new conceptions of identity, build virtual communities and affect political change. Each week we'll see what we can learn by thinking about the internet in a different way, focusing successively on hackers, virtuality, community, sovereignty, interfaces, algorithms and infrastructure. We'll read books, articles, and blogs about historical and contemporary cultures of computing, from Spacewar players and phone phreaks in the 1970s to Google, Facebook, World of Warcraft, WikiLeaks, and Anonymous today. In addition, we'll explore some of these online communities and projects ourselves and develop our own analyses of them.

Fall or Spring

1 Course Unit

**STSC 2644 Artificial Subjects: Golems, Homunculi, Robots, and Cyborgs**

What is the difference between a cyborg and an automaton? How are golems and homunculi similar? Are the droids in "Star Wars" slaves? For at least three millennia, humans have been grappling with the idea of creating artificial people and animals. Exactly how life-like these creations are has never been constant, but neither have definitions and ideas about mimesis and life. How do artificial subjects enforce and expose the boundary between made and born? How are they used to configure or complicate notions of human subjectivity and autonomy? This course focuses on the relationship between the artificial and the natural, the representation of that relationship, and the various cultural meanings inscribed in the bodies of robots. Course materials will be drawn from literature, myth, religious texts, critical theory/STS, historiography, scientific treatises, images, and film/tv.

Not Offered Every Year

1 Course Unit

**STSC 2692 Digital Infrastructures & Platforms**

Platforms ranging from ride-hailing and food delivery apps (Uber and Swiggy) to subscription based audiovisual content providers (Netflix and SonyLIV) mediate multisided transactions (markets) and operate based on algorithmic collection, circulation, and monetization of user data. In this course, we will engage with a variety of readings about multi-situated study of apps, paying attention to both app interfaces as well as their connection to backend systems and infrastructures like content delivery networks and software development kits. In what ways do processes of data storage/distribution, content encryption/decryption and encoding/decoding make "seamless" streaming on Hulu/Prime Video and instantaneous digital payments on Venmo and PayTM possible? We will begin with how infrastructures have been studied in the past, and then in particular focus on media infrastructures such as satellite systems, optical fiber cables, cell antennas, and data centers. The course readings will consider the varied definitions of platforms and examine the socio-political effects of the proliferation of platforms in different regions of the world. In studying superapps and platforms like WeChat (China), LINE (Japan), and Jio (India), we will try to comprehend in what ways have discourses of platformization been shaped by governmental regulation, cultural practices, and socio-politics of regions. We will explore questions like: in what ways are infrastructures and apps related? How do content creators and SVoD audiences navigate algorithmic opacity? Why do BigTech companies float competing discourses about platforms? What are the connections between infrastructural investments and platform capitalism? What does it mean to have digital lives in a platform society? In what ways do digital infrastructures and platforms create the foundations for smart cities and Internet of Things?

Not Offered Every Year

Also Offered As: CIMS 2953, ENGL 2953

1 Course Unit

**STSC 2707 Data and Death**

Digital tools and data-driven technologies increasingly permeate twenty-first century life. But how have they affected death? Do we conceive of death differently in a digitally mediated world? How do we mourn in the age of Facebook? How is "big data" put to work in the medical world that seeks to diagnose and treat fatal illness? What new forms of death and violence have been imagined or developed with digital technologies in hand? And what of those who believe that they could live forever, defying death, by uploading "themselves" into some new digital form? This course offers a historical exploration of these questions, looking at different intersections between data and death. We will work with a range of different sources ranging from science fiction to medical journals to the often-controversial death counts that follow natural and political disasters. Our goal will be to map the many contours of death in a digital world, but also to recognize the longer histories of counting, mourning, diagnosing, dreaming, and dying that have shaped them.

Fall

Also Offered As: HSOC 2707

1 Course Unit



**STSC 2708 Digital Democracy**

Technological infrastructure shapes what forms of political life are possible within a society. Political campaigns, investigative journalism, public engagement, protest, government - all unfold on different time scales, in different forms, and with different consequences depending on what machines mediate them. This course explores the forms of American political life that have taken shape in and through modern digital computing. We will investigate especially a perceived tension at the heart of computing technologies - from artificial intelligence to social media - as they have been introduced to so many corners of American political life: Are computing technologies agents of liberation, or of control? The internet, for example, was embraced by some as an inherently democratizing and liberating force, giving users equal access to voice and information. On the other hand, many feared the internet as an unprecedented platform for corporate and government surveillance and manipulation. This course will analyze and historicize this tension, looking to unpack the complex and controversial role of computers in American political life from the Cold War to @POTUS.

Fall or Spring

1 Course Unit

**STSC 2757 Prove It: Mathematics and Certainty**

Mathematical knowledge is often held up as our most reliable and certain knowledge. The truths of mathematics serve as exemplars of certainty that are not tied to any specific time and place. Yet, throughout history, mathematics has been understood and practiced in quite different ways, for quite different reasons, and by quite different people. Mathematical certainty has been shaped by different beliefs and practices. Mathematicians and their work have been shaped by rich interactions with different dimensions of social life from religion and politics to architecture and war. Mathematics is not simply surrounded by a society external to it, it is an integral and complex part of it. What concerns have motivated mathematical research through history? How has mathematics been put to work in different domains of culture? What does it mean to be a mathematician in different times and places? Does mathematical knowledge bear traces of the conditions in which it was produced? What counts as proof and to whom? How do we reconcile the changing character of mathematical research with the traditional understanding of mathematical knowledge as time and place independent? This course takes up these questions by looking to different worlds in which mathematics and mathematical certainty have taken shape.

Fall

1 Course Unit

**STSC 2829 Nature's Nation: Americans and Their Environment**

The United States is "nature's nation." Blessed with an enormous, resource-rich geographically diverse and sparsely settled territory, Americans have long seen "nature" as central to their identity, prosperity, politics and power, and have transformed their natural environment accordingly. But what does it mean to be "nature's nation"? This course describes and explores how American "nature" has changed over time. How and why has American nature changed over the last four centuries? What have Americans believed about the nation's nature, what have they known about the environment, how did they know it and how have they acted on beliefs and knowledge? What didn't or don't they know? How have political institutions, economic arrangements, social groups and cultural values shaped attitudes and policies? How have natural actors (such landscape features, weather events, plants, animals, microorganisms) played roles in national history? In addition to exploring the history of American nature, we will look for the nature in American history. Where is "nature" in some of the key events of American history that may not, on the surface, appear to be "environmental?"

Not Offered Every Year

1 Course Unit

**STSC 2867 Nature and Disaster in East Asia**

This course explores how societies across East Asia have contended with earthquakes, flooding, pollution, typhoons, and tsunamis from pre-modern times through the present. Did people understand these events as part of nature—"natural disasters"—or as unnatural aberrations? What might responses to destruction teach us about scientific and political authority? How did communities protect themselves, and how did people re-make their lives in post-disaster wreckage? Through textual, visual, and audio sources, we will examine case studies drawn from across China, Korea, and Japan. Students will learn to apply critical perspectives drawn from disaster studies, environmental history, and the history of science and technology.

Fall or Spring

1 Course Unit

**STSC 2999 Independent Study**

Approved independent study under faculty supervision.

Fall or Spring

1 Course Unit

**STSC 3017 Biology and Society**

From environmental crises to medical advancements and global food shortages, biology and the life sciences are implicated in some of our most pressing social issues. By looking at these issues, this course scrutinizes how developments in biology have shaped, and are shaped by, society. In the first unit, we'll look at how institutions and technologies influence the modern life sciences, including the role of universities, public health departments, and museums in the development of biology. In the second unit, we'll explore areas of biology that have raised controversies about regulation and access, including issues ranging from health to the environment. In the third unit, we'll examine how scientists and the public invoke biological facts when addressing what it means to be human (or of a particular race, gender, ability, etc.).

Not Offered Every Year

Also Offered As: HSOC 3017

1 Course Unit

**STSC 3028 Normal People**

For most of us, what's normal feels downright natural. The normal is our baseline, invisible and unconsidered until something abnormal draws our attention to it. But a little prodding shows the contradictions within bland, boring normality: it's defined by our internal feelings as much as by quantified standards, it describes individuals as well as populations, and it is intensely difficult to describe on its own merits without comparison. So what does it mean to be normal, anyway? This seminar examines "the normal" as a medical and scientific concept from the Renaissance until today. Has the concept of normal always existed? What makes a person or body normal? How has such a thing been assessed? Can the normal exist without deviance – and is this relationship inherently one about power? We will examine how scientific ideas of "the normal" – and its conflation with "the natural" – shaped medical knowledge and ideologies about racial difference, sex and gender, socioeconomic class, anatomical difference and disability, and human behavior. How have the "normals" of the past shaped our current scientific understandings of ourselves and the people around us? Our goal will be to make visible the ways that "normal" gets normalized in order to deepen our critical engagement with modern medicine, wellness culture, and racial and gender politics.

Not Offered Every Year

Also Offered As: HSOC 3028

1 Course Unit

**STSC 3087 Science and Spectacle: Seeing is Believing**

In the 10th century, the Byzantine emperor received visitors on a levitating throne, surrounded by robotic animals. In the 17th century, Galileo gave public demonstrations to prove the existence of the moons of Jupiter (and the power of the telescope). In the 20th century, an estimated 650 million people watched the Apollo 11 moon landing. These are only a few examples of the ways that scientific and technological knowledge have been displayed for large numbers of people who are not themselves also involved in making scientific or technological knowledge. If seeing is believing, what do performances of scientific or technological virtuosity or discovery depict, and to what ends? This course explores the relationship between scientific and technological knowledge and public display, using examples taken from the medieval period to the 20th century.

Fall or Spring

1 Course Unit

**STSC 3088 Science, Labor and Capital**

This course looks at the intertwined history of science, labor and capital since the fifteenth century. Starting with the surge of patents for labor-saving devices in fifteenth century Italy and coming all the way down to the contemporary neoliberal university, the culture of science and the cultures of labor and capital have always remained in intense conversation. The first half of the course will focus on the early relations between science, labor and capital. We will discuss patterns of employment for scientists, the relationship between manual work and intellectual work, the scientific aspects of commercial capitalism as well as the debates on the transition to capitalism. The second half of the course will focus on the period from the nineteenth century to the present. We will talk about colonialism and science, the social ascendance of the scientist in relation to the technician, as well as the political economy of contemporary science and of the contemporary university. This is a seminar course and will require regular participation. Some knowledge of the existing literature on capitalism, especially the writings of Ellen Wood and E.P. Thompson, are recommended but not required.

Also Offered As: HIST 0878

1 Course Unit

**STSC 3097 Indigeneity in Health, Science, and Technology**

In recent decades, Indigenous Studies has emerged as a trans-national and interdisciplinary academic discipline that seeks to understand the historical experience, social reality, and political aspirations of Indigenous peoples. This course examines how theories and methods from Indigenous Studies offer new perspectives on core issues in the social study of science and technology and of health and society. Through films, podcasts, literature, and academic articles we will examine the historical role that science, technology, and medicine have played in the colonization of Indigenous people in the Americas, Australia, and New Zealand. We will also examine how Indigenous groups have resisted scientific and technological projects and participated in their development in ways that foster self-governance and territorial sovereignty.

Spring, even numbered years only

Also Offered As: HSOC 3097

1 Course Unit

**STSC 3136 Queer Science**

This course gives students a background in the development of sex science, from evolutionary arguments that racialized sexual dimorphism to the contemporary technologies that claim to be able to get at bodily truths that are supposedly more real than identity. Then, it introduces several scholarly and political interventions that have attempted to short-circuit the idea that sex is stable and knowable by science, highlighting ways that queer and queering thinkers have challenged the stability of sexual categories. It concludes by asking how to put those interventions into practice when so much of the fight for queer rights, autonomy, and survival has been rooted in categorical recognition by the state, and by considering whether science can be made queer. Along the way, students will engage with the tools, methods, and theories of both STS and queer studies that emphasize the constructed and political underpinnings of scientific thought and practice.

Spring

Also Offered As: GSWS 3136

1 Course Unit

**STSC 3145 The Universe: Historical Inquiries in Physics, Philosophy and Religious Belief**

The National Science Foundation's decadal review states that "Today, astronomy expands knowledge and understanding, inspiring new generations to ask, How did the universe form and the stars first come into being? Is there life beyond Earth? What natural forces control our universal destiny? Because of the remarkable scientific progress in recent decades, in particular the explosion over the last decade of interest in and urgency to understand several key areas in astronomy and astrophysics, scientists are now poised to address these and many other equally profound questions in substantive ways. The opportunities for the future fill us with awe, enrich our culture, and frame our view of the human condition." Undergraduates today encounter some of the most profound discoveries about the physical universe – discoveries of dark energy, quantum theory, exoplanets. These discoveries also prompt some of the most profound philosophical and theological questions. This course interrogates the astrophysical sciences and traditions of philosophy and religious belief in order to explore the universe, its nature, origins and destiny. It serves as an introductory course for undergraduates who are seeking a historical and philosophical context to scientific studies, especially in physics, and/or to develop their interdisciplinary skills of global thinking. This course does not attempt to resolve perennial questions about the universe, but rather to expose historical and scientific ways of reflecting on them.

Fall

1 Course Unit

**STSC 3147 Scientific Instruments and the Making of Knowledge**

This course surveys the history of scientific proof and authority through the instruments used to collect and interpret data. In stories of discovery, scientists' tools often take a back seat to their ideas, but instruments play a crucial role as physical intermediaries. All scientific instruments have been built and used by human beings according to their own ideas of what data are important to collect and how the data should be interpreted. How have the design and function of instruments affected scientists' perspectives, and vice versa? What intellectual, political, and symbolic roles have instruments played beyond simply collecting data, and how do they continue to do so? We begin by examining the instruments of the "Scientific Revolution" and the ways their owners put them to use constructing not just data sets, but a new scientific authority in describing previously invisible realms of nature. Next, we look at the reciprocal relationship between scientific theory and physical tools, assessing how each has shaped the other, both individually and for entire fields of study in the nineteenth and twentieth centuries. We conclude by expanding the view to include the ways instruments interact with and affect the general public, from doctor-patient interaction to national politics and policy.

Spring

Also Offered As: HSOC 3147

1 Course Unit

**STSC 3167 Global Radiation History: Living in the Atomic Age 1945-Present**

In this Collaborative Online International Learning Seminar, students will engage with broad experiences of radiation risk since 1945. We will explore the history of the global rise of nuclear weapons and nuclear power with special attention to those exposed to radiation, including Navajo uranium miners, indigenous groups in Australia, atomic bomb survivors at Hiroshima and Nagasaki, Marshall Islanders, and residents near Fukushima and Three Mile Island. We also consider the work and experiences of scientists and physicians working with those exposed around the world, and look at artistic and literary responses to atomic bombs and radiation risk. We will engage with protracted and complex ethical debates about bombs and power plants. Our virtual meetings will include a visit to see the "Lucky Dragon" boat in Tokyo, to the Atomic Bomb Museum in Hiroshima, to visit with a "downwinder" in Eastern Washington State, go on a tour of the B-Reactor at Hanford Nuclear Facility, discuss the atomic bombings with survivors on the Peace Boat, and go on a virtual tour of the Daigo Fukuryu Maru Exhibition Hall, where artists inspired by survivor accounts produce murals that reflect their stories.

Spring

1 Course Unit

**STSC 3183 Profit and Knowledge**

The goal of capitalism is profit; the goal of science is knowledge. These pursuits may seem different on the surface, but they often overlap in surprising ways. This course uses the tools of science and technology studies to explore the relationship between capitalism and science. By examining how people have pursued both profit and knowledge in different times and places, we'll look at how financial interests have shaped the practice of science and how science has shaped the pursuit of wealth. We'll also consider efforts to imagine new possibilities for economic and knowledge systems that have generated both rewards and risks, both pleasures and pains. Topics include the public goals and values of capitalism and science; case studies such as global trade and logistics, biotechnology, and the service economy; and challenges such as white supremacy, violence, and climate change.

Fall or Spring

1 Course Unit

**STSC 3185 Global Radiation History: Living in the Atomic Age 1945-Present**

In this seminar, students will engage with broad experiences of radiation risk since 1945, of Navajo uranium miners, scientists producing and testing nuclear weapons, physicians studying those exposed to radiation, Japanese survivors of the atomic bombings, and of the Fukushima nuclear disaster, and others. We will read novels and poetry relating to the atomic bombings and other radiation incidents, consider the protracted and complex ethical debate about nuclear risk, meet with artists who have contributed to the public debate, participate in meetings with survivors and scientists, museum professionals, activists, and others, and work together to come to understand the impact of the atomic bombs, the rise of nuclear energy, and the continuing legacies of radiation exposure and risk today. This is a Penn Global Seminar that involves travel.

Spring, even numbered years only

Also Offered As: HSOC 3185

1 Course Unit

**STSC 3216 Toxicity in Context**

We live amidst a constant stream of messages, practices, and regulations about things, behaviors, or relationships deemed "toxic." Within environmental health in particular, all sorts of actors grapple with complex decisions about what it means to live with materials and anticipate the ways they can interact with human health and the environment - at present through the distant future. What exactly do we mean when we categorize some substances as toxic, and by extension others as safe? Are there other ways of managing uncertainty or conceptualizing harm? How are these concepts built into broader social structures, economics, and regulations? What other work are they used to do? In this course, we will explore major social science approaches to toxicity and apply these theories to our own analysis of examples from the contemporary United States, and in particular, to a robust oral history collection with residents, developers, and government scientists grappling with these questions just outside of Philadelphia. This course grows out of scholarship in the history and anthropology of environmental risk, and health, as well as direct ethnographic, historical, and oral history research at a site outside of Philadelphia grappling with the meaning of materials that remain on site after past industrial manufacturing. In this course, students will gain an introduction to oral history and analysis of in-depth interviews, and introduction to key approaches in theorizing toxicity. By connecting life experiences of residents, government scientists and others, at an actual site, with the literatures we read in class, students will think critically about the ways the literatures we engage do and do not fully encompass the experiences and concerns that are intertwined with toxicity for actual people grappling with making sense of uncertain harms amidst urban planning.

Also Offered As: HSOC 3216

1 Course Unit

**STSC 3217 Weird Science**

What do we mean by "science"? How did we come to agree on a common definition? Do we agree on a common definition? What about when we don't? This course explores histories of heterodox science and the construction of sciences and pseudosciences. In doing so, we will focus on expertise, authority, and legitimacy in science, as well as public consumption of science. This course will also introduce students to fundamental questions in the philosophy of science, as well as offering instruction in reading and methods of historiography. Topics include: phrenology, parapsychology, cryptozoology, UFOs, climate change denial.

Also Offered As: HSOC 3217

1 Course Unit

**STSC 3247 Why Not Magic? Magic, Esoterica, and the Occult in the History of Science**

What is magic? How (or why) does it differ from "science?" What is the difference between preparing a medical recipe under a full moon, using amulets to heal a physical malady, casting horoscopes, or summoning demons? Many types of knowledge considered practically and intellectually "valid" in other times and cultures - divination, alchemy, use of talismans, summoning the aid of non-corporeal entities - have since been dismissed as magic or superstition. Yet often the boundaries between legitimate and illegitimate knowledge is extremely porous and hotly contested. Who decided what constitutes magic, and how do those definitions change over historical periods? What can those definitions tell us about historical constructions of knowledge, as well as issues of class and gender? How is magic related to philosophy and science, and to an understanding of the physical and metaphysical worlds? This course examines these questions with a focus on practices and beliefs in pre-modern Christendom and Islamdom.

Not Offered Every Year

1 Course Unit

**STSC 3279 Nutritional Modernities: Food, Science, and Health in Global Context**

How has food shaped the global transition to modernity? Columbus' 1492 voyage to the Americas sparked a global process that transformed the eating habits and environments of humans throughout the world. Using approaches from food studies, STS, environmental history and global history, this class examines how the production, consumption, and study of food has been central to the emergence of the modern capitalist system and its discontents. Topics include the role of diet and food in European colonial conquest, the links between racial anxieties and the creation of modern nutritional standards, the rise of dietary 'technologies of the self' such as calorie-counting and the BMI index, and the emergence of microbial regimes of health.

Fall or Spring

Also Offered As: HSOC 3279

1 Course Unit

**STSC 3283 Sciences of Kinship**

What does it mean to say that someone is family? How have humans made sense of our relations to others, both human and animal, past and present? Why have these ties so often been articulated in the idiom of blood? This course will explore the varied contested meanings of "kinship," specifically through the lens of anthropological theory, the history of science and emergent technologies that all seek to understand the connections between "us" and "others." We will explore topics such as assisted reproductive technologies, the history of genetics, and the role of kinship theory in shaping understandings of racial and cultural difference.

Fall or Spring

1 Course Unit

**STSC 3288 What is Prediction?**

This course is an investigation into the notion of prediction from antiquity to the present. By looking closely at key practices from Homeric divination to modern actuarial science and from early modern astrology to contemporary climate models, the course seeks to historicize the way we engage with the future. As part of the course, students also explore the role that methodology, models, causation and big data have played in predictive practices. The readings include a mixture of primary sources, modern scholarship and journalism.

Not Offered Every Year

1 Course Unit

**STSC 3299 CSI Global: History of Forensic Science**

Genetics may have transformed criminal detection, but it has built upon a long history of many different types of forensic science. The use of science in the pursuit of criminals has a long, complex and global history, involving diverse forms of knowledge and types of professionals. A range of skills and techniques ranging from trackers who followed traces in the mud to recover stolen cattle to criminal physiognomists who sought to read bodily signs of criminals, from Sherlock Holmes' analysis of types of cigar ash in Victorian Britain to Charles Hardless' chemical analysis of different types of ink in colonial India, have informed and influenced the development of our contemporary forensic modernity. This course will explore a range of different forensic techniques and their histories along with the rich cultural history, in the form of detective fiction and films from across the world.

Fall

Also Offered As: HSOC 3299

1 Course Unit

**STSC 3334 Hybrid Science: Nature, health, and society in Latin America**

What role did science and medicine play in the creation and growth of the Spanish and Portuguese empires? And why was the creation of science and health institutions crucial to the revolutionary movements for independence in Latin America? This course examines science and medicine in Latin America by attending to the ways that knowledge of nature and health has been central to the political struggles of the countries in this region. A crucial dynamic shaping the history and culture of this region is the interplay between the healing practices and cosmologies of European settlers, indigenous Americans, and the descendants of African slaves. Bearing this interplay in mind, this course explores how Latin America has been a fertile site of scientific creativity. It also examines the ways in which Latin American scientists and medical experts have refashioned concepts and practices from Europe and North America to fit local circumstances.

Spring

1 Course Unit

**STSC 3509 Bioethics and National Security**

At least since Augustine proposed a theory of "just war," armed conflict has been recognized as raising ethical issues. These issues have intensified along with the power and sophistication of weapons of war, and especially with increasing engineering capabilities and basic knowledge of the physical world. The life sciences have had their place in these developments as well, perhaps most vividly with the revelations of horrific experiments conducted by the Nazi and Imperial Japanese militaries, but with much greater intensity due to developments in fields like genetics, neuroscience and information science, and the widely recognized convergence of physics, chemistry, biology and engineering. The fields of bioethics and national security studies both developed in the decades following World War II. During the cold war little thought was given to the fact that many national security issues entail bioethical questions, but this intersection has been increasingly evident over the past two decades. In spite of the overlapping domains of bioethics and national security, there has been remarkable little systematic, institutional response to the challenges presented by these kinds of questions: - What rules should govern the conduct of human experiments when national security is threatened? - Is it permissible to study ways that viruses may be genetically modified in order to defeat available vaccines, even for defensive purposes? - What role may physicians or other health care professionals play in interrogation of suspected terrorists? - Must warfighters accept any and all drugs or devices that are believed to render them more fit for combat, including those that may alter cognition or personality? - What responsibilities does the scientific community have to anticipate possible "dual purpose" uses or other unintended consequences of its work? Deploying the resources of ethics, philosophy, history, sociology and theory, this course will address these and other problems.

Spring

Also Offered As: HSOC 3383

1 Course Unit

**STSC 3607 Data Dreams**

The idea of solving problems by collecting as much data as possible about them is an old dream that has recently been revitalized. This course examines the hunger for data from a historical and social perspective, seeking to understand when, why, and how the collection of vast amounts of data has come to seem valuable and desirable, sometimes in ways that exceed any reasonable expectation of utility or feasibility. Topics include state surveillance, online tracking, the quantified self, citizen science, civic hacking, human genomics, bioinformatics, and climate science.

Fall or Spring

1 Course Unit

**STSC 3627 Waters, Roads and Wires**

This course studies infrastructures: how and why they develop, how they are maintained, how they reshape environments, and how they interconnect with other infrastructures. We begin by reading about infrastructure and about large technological systems, then explore some specific American structures. Possible topics: the electrical grid, the interstate highway system, hydroelectric dams, Amtrak, urban mass transit systems, disasters and infrastructure (Katrina, Harvey, etc.). As the semester progresses, students will spend more time in class on individual research topics of their choice, and in working groups producing a group project.

Fall or Spring

1 Course Unit

**STSC 3644 Minds, Bodies, and Machines**

This course interrogates the historical connections between minds, bodies and machines in science and technology by taking a critical look at the history of Artificial Intelligence and cognitive science in the 20th century. We will consider how AI has shaped our understanding of what it means to be human, just as ideas of the "human" have shaped our hopes, fears and plans for AI over time. Students will be reading primary sources alongside historical and theoretical interventions from the history of science, science studies and affiliated fields to interrogate and better understand our current moment and reimagine the future of AI.

Fall

Also Offered As: HSOC 3644

1 Course Unit

**STSC 3657 Technology & Democracy**

What is the relationship between technology and politics in global democracies? This course explores various forms of technology, its artifacts and experts in relation to government and political decision-making. Does technology "rule" or "run" society, or should it? How do democratic societies balance the need for specialized technological expertise with rule by elected representatives? Topics will include: industrial revolutions, factory production and consumer society, technological utopias, the Cold War, state policy, colonial and post-colonial rule, and engineers' political visions.

Not Offered Every Year

1 Course Unit

**STSC 3708 The Many Lives of Data: Population, Environment, and Planning in the United States**

This is a class about the live(s) and afterlives of information from 1850 to the present. Not only can information be reproduced (in a variety of material conditions); it can be repurposed and funneled through a variety of different applications, some of them serving radically different purposes than the first purpose of gathering it. Thoreau's journals of plant flowering, for instance, have become important indicators of climate change. More controversial is the sale of biomedical information by personal genomics services for drug discovery, or the construction of forensic databases consisting of the DNA of suspects arrested as a result of racial profiling. We will study the ways in which data has become a way for us to understand and define change, stability, place, and time, beginning in the mid-nineteenth century, a period of accelerated and increasingly systematic gathering of data, particularly medical, forensic, and environmental data. The class will proceed both chronologically and thematically in three units, from the gathering and use of biomedical data as a way to make patient populations "legible" (to borrow from James Scott), to data as a way to make the environment understandable, and finally to data as a tool for producing and reproducing social relations. As a final project, students will trace a particular data set from its original gathering to its latest usage. Students will also have an opportunity to create their own course content in the final three weeks of class.

Fall or Spring

1 Course Unit



**STSC 3709 Rifle and Compass**

This course looks at the scientific and technological aspects of warfare during what is often called the Military Revolution. The main focus will be navigation and gunpowder warfare. The first part of this course will focus on magnetism, military drilling, architecture, geography and physics. The second part of the course will turn to case studies: the fall of Constantinople in 1453, the Ottoman-Austrian War of 1663-4 and the expansion of Russia in the early eighteenth century. Our goal generally is to interrogate the widespread belief that science and warfare are inextricably linked.

Fall

1 Course Unit

**STSC 3766 Cultures of Surveillance**

Developments in digital technology have generated urgent political discussions about the pervasive role of surveillance in our everyday life, from the mundane to the exceptional. But surveillance has a much longer history. In this course, students will learn to think and write critically about the historical, socio-cultural, and political dynamics that define surveillance today. This course asks: how can we historicize what we call surveillance to understand its political and social implications beyond what appears in the document caches of the NSA or on a Black Mirror episode? What role does identity and identification play in surveillance? How do surveillance and computational technologies produce racializing effects? Students will apply course concepts to technologies of daily use, such as self-tracking devices like fit bits or identity documents, and reflect on debates surrounding race, policing, imperialism, and privacy. Through primary source materials, films, podcasts, and key texts, we will engage in a cross-cultural exploration of the multi-faceted phenomena of surveillance technology. Through regular writing assignments, such as surveillancediaries, students will analyze and articulate how they understand surveillance to operate in various domains of everyday life. In this course, students will: (1) Apply course concepts to their lived experience, from securitized architecture to search engines, in order to understand how surveillance operates in everyday life; (2) Analyze how historical context has shaped the current configuration of securitization and surveillance on a global scale; (3) Use ethnographic approaches to study the interaction between individuals, their social relations, and technologies of surveillance.

Fall

Also Offered As: ANTH 3766

1 Course Unit

**STSC 3824 Animals in Science Medicine Technology**

This course explores human-animal relationships: the wide range of these relationships, why they originated and how they have changed over time. How have humans classified, valued, utilized, consumed, behaved toward and understood animals? Where is the boundary between humans and other animals, and how do we know, since humans are also animals? How is that boundary been maintained and redefined? Are humans part of the animal "natural" world- or apart from it? How are humans similar to and different from other kinds of animals? How do we know about animals and what is it we know? To what extent are questions about animals really questions about humans? How has the meaning of animal changed over time? The course focuses in particular to the roles and relationships of animals within science and medicine, and as biotechnologies.

Fall or Spring

Also Offered As: HSOC 3824

1 Course Unit

**STSC 3889 Trans Method**

What are the subjects of trans studies? What does "trans" as a category afford us in looking at texts, people, systems, and objects? To what extent is trans an identity? What might it mean to think of it as a methodology? How might the tools of trans studies intervene in conversations and practices beyond the field itself? What are the stakes of such an expansive approach? This course introduces students to "trans" as a still-forming analytic that has emerged out of academic spaces, activist movements, and trans cultural production. We will engage with texts and questions that build on trans studies' connections to (and divergences from) queer and feminist studies, history, critical race studies, disability studies, and science studies, among other fields, and we will also consider how trans knowledge can act beyond the theoretical.

Not Offered Every Year

Also Offered As: GSWS 3500, HSOC 3889

Prerequisite: GSWS 0002 OR GSWS 0003 OR ENGL 1300

1 Course Unit

**STSC 3923 Animals and America**

This course looks at animals in the American past, to find out what a focus on an individual animal, a species, or a kind of animal (such as work animals, food animals, wildlife, zoo animals, pets and pests) can reveal by exposing the inner workings of different periods and events. When we make animals the focus of how we look at the past, things change. Making animals visible makes other things visible; hidden, surprising or even shocking aspects of the past appear. Americans have always lived with and employed animals. They also have "thought with" animals, using animals to work out their understandings of society, nature and power. How Americans perceived, named, classified, behaved toward and worked with animals bares the workings of race, class and gender, uncovers power structures, and reveals environmental and legal choices. If we want to understand how the current world came to be, taking a critter approach to history provides a way to explain how we got to now. Changing our view of the past can change our ideas of what the present can be. Though animals are everywhere in the past, they are often hidden from view. We will embark on a hunt for animals, foraging through historical writing, political documents, literature, and primary sources. We will watch movies, examine photographs and study cartoons. We will draw on knowledge from the fields of science, technology, health and environments, and employ the classifications of race, class, gender, nature and culture. We'll talk about evolution, domestication and wildlife. We will look at zoomorphism, when people or things are labeled as animals (calling people pigs or snakes, or talking about bull or bear stock markets), and anthropomorphism, when animals are thought of or portrayed as people. In this seminar, we'll begin with case studies from the nineteenth century, then start seeking the animals of the twentieth and twenty-first centuries. Writing, much of it informal, will be a regular part of this course, as will research exercises. There will be different options for writing and for research projects. Course materials will focus on American history and society but projects and exercises may look at places and times from around the globe and across the centuries.

Fall

1 Course Unit

**STSC 4000 Capstone Research Seminar in Science, Technology and Society**

This is the capstone research seminar for STSC majors. It is designed to provide the scholarly tools necessary to undertake original research in the field of Science and Technology Studies. All students in the course will produce a research paper by the end of the term; those intending to write an honors thesis (who must take the course in the spring of their junior year) will also complete a proposal for further research. Each student will work on a specific topic of their own choosing, while also learning about general methods of historical and social scientific research and reading key texts in Science and Technology Studies.

Spring

1 Course Unit

**STSC 4094 Science and Disability**

How have ideas about ability and disability shaped the questions we ask about the world and the methods we use to answer them? How do assumptions about who can and ought to be a scientist, engineer, or physician intersect with constructions of disability and difference? How might studying the lived experiences of people with disabilities in the context of STEM(Medicine) help us begin to answer these questions? This course explores the exciting intersection between disability studies and the history and sociology of science and medicine through weekly readings, discussions, and original research. Using materials ranging from archival and online sources to oral history interviews and museum collections, students in this course will learn how scientific ideas and institutions have helped shape 20th- and 21st-century categories and experiences of disability as an embodied and socio-political identity. At the same time, students will learn how to use disability as a critical theoretical lens for investigating the cultures, tools, and institutions behind the creation and application of modern scientific and medical knowledge. Collaborative and analytical writing work throughout the course will build towards the completion of a final original research project.

Fall or Spring

Also Offered As: HSOC 4094

1 Course Unit

**STSC 4114 Sports Science Medicine Technology**

Why did Lance Armstrong get caught? Why do Kenyans win marathons? Does Gatorade really work? In this course, we won't answer these questions ourselves but will rely upon the methods of history, sociology, and anthropology to explore the world of the sport scientists who do. Sport scientists produce knowledge about how human bodies work and the intricacies of human performance. They bring elite (world-class) athletes to their laboratories-or their labs to the athletes. Through readings, discussions, and original research, we will find out how these scientists determine the boundary between "natural" and "performance-enhanced," work to conquer the problem of fatigue, and establish the limits and potential of human beings. Course themes include: technology in science and sport, the lab vs. the field, genetics and race, the politics of the body, and doping. Course goals include: 1) reading scientific and medical texts critically, and assessing their social, cultural, and political origins and ramifications; 2) pursuing an in-depth semester-long research project that will focus on "un-black-boxing" the metrics sport scientists and physicians use to categorize athletes' bodies as "normal" or "abnormal." For example, you may investigate the test(s) used to define whether an athlete is male or female, establish whether an athlete's blood is "too" oxygenated, or assess whether an athlete is "too" fast (false start). Requirements therefore include: weekly readings and participation in online and in-class discussions; sequenced research assignments; peer review; and a final 20+page original research paper and presentation.

Not Offered Every Year

Also Offered As: HSOC 4114

1 Course Unit

**STSC 4187 Sound in Science, Medicine and Technology**

How do listening and knowing relate? This capstone will analyze sound as an object, an instrument, a product and a process of research in science, technology, and medicine. From anthropological field recordings to experiments in acoustics, readings will address the ways in which researchers have isolated and investigated sonic phenomena during the modern period. We will consider sound as a tool for knowing about other phenomena as well: bodily functions, seismic events, animal communication, and the like. Technologies of sound production, reproduction, storage, manipulation, and analysis will be front and center in this course. What can you do with magnetic tape that phonography does not allow? How might the hospital soundscape inform clinical decision-making? Why is Amazon's Alexa female? How has scientific communication changed over time? In addition to wrestling with questions like these, the course will provide undergraduate majors with the opportunity to research and execute an original paper of significant length in the humanistic social sciences. Students must be in their last three semesters for it to fulfill the capstone requirement, but any student may enroll.

Fall

Also Offered As: HSOC 4187

1 Course Unit

**STSC 4242 The History & Future of Genetic Medicine**

Nearly twenty years after the Human Genome Project was completed, genetic research continues to garner attention and resources. From news coverage to governmental initiatives and commercial investment, genetics is a force in medicine, industry, and society more generally. Using scholarship from diverse disciplines, this capstone seminar focuses on how genetic medicine came into existence. We will explore the field's early history in eugenics and its transformation via technological advancements like prenatal testing and targeted therapies. Through case studies of select genetic conditions, we will examine scientific innovations alongside the lived experience of those advancements, broaching critical questions about disability, race, and inequality. This will provide students with the opportunity to debate historical changes and continuities, taking on some of the most vexing questions in bioethics.

Spring

Also Offered As: HSOC 4242

1 Course Unit

**STSC 4288 Invisible Labor in the Human Sciences**

This course looks at those disciplines that take people as their subjects of research—including biology and biomedicine as well as anthropology, linguistics, and sociology—to explore the contributions of a wide range of research participants. We will focus on the sciences of human behavior, information, and medicine to analyze the labors of behind-the-scenes actors including tissue donors, survey respondents, student subjects, patients, translators, activists, ethics review boards, data curators, and archivists. Our job will be to analyze the experiences of these technoscientific laborers with a view to systems of knowledge and power in the production and maintenance of Knowledge about humans and their bodies.

Fall or Spring

Also Offered As: HSOC 4288

1 Course Unit

**STSC 4317 Slavery and Disease: Medical Knowledge in the Atlantic World**

This capstone course examines the various methods historians use to understand the economic, medical, environmental, and human costs associated with the Atlantic slave system from roughly the 1600s to the 1850s. Students will learn how slavery, settlement, and disease contributed to the development of Atlantic World societies in North America and the West Indies and reinforced the enduring concept of embodied racial differences. This latter concept in particular fueled Enlightenment Era knowledge production and the development of the medical profession in the Americas. In this course we focus on the close and often coerced contact between disparate groups of people—Europeans, Native Americans, and Africans. We will examine how interactions between these groups contributed to the development racialized disease, the social construction of disease, and the ways in which race became (erroneously) theorized as an aspect of biology). We will consider how perceptions of health and sickness in the disease environment of the Americas gave rise to enduring racial and gendered identities.

Fall or Spring

Also Offered As: HSOC 4317

1 Course Unit

**STSC 4326 Medicine and the Criminal Justice System**

This course interrogates the connections, collaborations and conflicts between medicine and the criminal justice system throughout the 20th and 21st century United States. We will look at the historical feedback loops between these two institutions, giving attention to how medical experts have become involved in, suggested reforms and bolstered punitive and carceral practices as well as instances when incarcerated people, bodies and minds were used and abused for medical research. We will consider the role of medicine in different parts of the carceral system, including expert witnesses in courtrooms and access to medical care in jails and prisons, and look at moments in history when carceral institutions and spaces became clinical laboratories aiding in critical moments of medical “progress.” The course gives special attention to the role of sex, gender, race and disability in these interactions, both intimate and institutional, and students will engage with frameworks from black studies, disability studies, queer studies, science studies as well as histories of psychiatry, medicine and technology.

Fall or Spring

Also Offered As: HSOC 4326

1 Course Unit

**STSC 4364 Biopiracy: Medicinal Plants and Global Power**

Biopiracy has emerged as the name of conflict between multinational pharmaceutical companies attempting to get genetic patents on medicinal plants and indigenous communities in the Global South who have long known and used these plants for medicinal purposes. Today the story of Biopiracy is an unfolding story of plants, patents and power. The extraction and commercial exploitation of plants and knowledge about them from the Global South however is not new. It has been happening at increasing pace for at least the last two centuries. Both the anti-malarial drug quinine and the cancer drug vincristine for instance have their plant-origins in the Global South where local communities used them medicinally long before their discovery by biomedicine. This course will put the current debates around Biopiracy in context and explore how the entanglements of plants and power have changed or not changed.

Not Offered Every Year

Also Offered As: HSOC 4364

1 Course Unit

**STSC 4427 Technology and Medicine**

Medicine as it exists in the United States today is profoundly technological. Many folks residing in the U.S. regard it as perfectly normal for clinicians to examine patients with instruments, for specialists to expose people's bodies to many different machines, and for those machines to produce data that is mechanically/electronically processed, interpreted and stored. People are billed technologically, prompted to attend appointments technologically, and buy everyday consumer technologies to protect, diagnose, or improve our health. (Consider, for example, air-purifiers, heart rate monitors, pregnancy testing kits, blood-sugar monitoring tests, and thermometers.) Yet even at the beginning of the twentieth century, devices such as these were scarce and infrequently used by American physicians and medical consumers alike. Over the course of this semester, we examine how “technology” came to medicine's center-stage in the U.S., and what impact this change has had on medical practice, institutions, and consumers alike. Technology & Medicine in Modern America fulfills the Capstone research requirement for the HSOC major. By the end of the course, students will have honed their skills in primary and secondary source research and in constructing an academic argument and paper.

Not Offered Every Year

Also Offered As: HSOC 4427

1 Course Unit

**STSC 4595 Defining Disability**

Live long enough, and you are almost certain to experience some kind of disability if you haven't already. What, then, does it mean to be 'disabled?'

This capstone takes as its premise the idea that disability has meant different things to different stakeholders (e.g. activists, physicians, politicians, families, employers, artists, clergy, engineers) across cultures and over time. We will historicize and analyze these various definitions in order to better understand the complex socio-cultural construct of disability while simultaneously cultivating the research skills necessary for advanced work in the humanistic social sciences. Assignments will be scaffolded to help students write an original research paper of significant length by the end of the semester.

Fall

Also Offered As: HSOC 4595

1 Course Unit

**STSC 4980 Honors Thesis**

Research and writing of a senior honors thesis under faculty supervision.

Fall

1 Course Unit

**STSC 4999 Undergraduate Independent Study**

Independent primary research under faculty supervision to fulfill the capstone research requirement.

Fall or Spring

1 Course Unit