**STSC 001 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.
For BA Students: Hum/Soc Sci or Nat Sci/Math Sector
Taught by: Kucuk
Course usually offered in fall term
Also Offered As: HSOC 001
Activity: Lecture
1.0 Course Unit

**STSC 002 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.
For BA Students: History and Tradition Sector
Taught by: Barnes
Course usually offered in fall term
Also Offered As: HIST 036, HSOC 002
Activity: Lecture
1.0 Course Unit

**STSC 003 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.
For BA Students: Society Sector
Taught by: Benson
Course usually offered in spring term
Also Offered As: HSOC 003, SOCI 033
Activity: Lecture
1.0 Course Unit

**STSC 026 Philosophy of Space and Time**
This course provides an introduction to the philosophy and intellectual history of space-time and cosmological models from ancient to modern times with special emphasis on paradigm shifts, leading to Einstein's theories of special and general relativity and cosmology. Other topics include Big Bang, black holes stellar structure, the metaphysics of substance, particles, fields, and superstrings, unification and grand unification of modern physical theories. No philosophy of physics background is presupposed.
For BA Students: Natural Science and Math Sector
Taught by: Skillings
One-term course offered either term
Also Offered As: PHIL 026
Activity: Lecture
1.0 Course Unit

**STSC 028 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.
Taught by: Truitt
Course usually offered in fall term
Also Offered As: HSOC 028
Activity: Seminar
1.0 Course Unit
STSC 041 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. Taught by: Linker
Course usually offered in fall term
Also Offered As: HSOC 041
Activity: Seminar
1.0 Course Unit

STSC 048 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. Taught by: Barnes
Course usually offered in fall term
Also Offered As: HSOC 048
Activity: Seminar
1.0 Course Unit

STSC 082 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. Taught by: Johnson
Course usually offered in fall term
Also Offered As: HSOC 082
Activity: Seminar
1.0 Course Unit

STSC 118 Advanced Journalistic Writing
A workshop in creative writing devoted to original student work in journalism. See the English Department’s website at www.english.upenn.edu for a description of the current offerings. One-term course offered either term
Also Offered As: ENGL 158
Activity: Seminar
1.0 Course Unit

STSC 123 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. For BA Students: Living World Sector
Taught by: Gil-Riano
Course usually offered in spring term
Activity: Seminar
1.0 Course Unit

STSC 135 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. For BA Students: Natural Science and Math Sector
Taught by: Ceccatti
One-term course offered either term
Also Offered As: HIST 035
Activity: Seminar
1.0 Course Unit
STSC 140 Histories of Race and Science in Philadelphia
The history of race and science has its American epicenter in Philadelphia. Throughout this Academically-Based Community Service (ABCS) course, we will interrogate the past and legacy of racial science in the United States; the broad themes we broach will be met concretely in direct engagement with Penn and the Philadelphia community. As an extended case study, students will undertake independent research projects using primary source documents from local archives, tracing the global history of hundreds of human skulls in the 19th century Samuel G. Morton cranial collection at the Penn Museum, a foundational and controversial anthropological collection in the scientific study of race. These projects will be formed through an ongoing partnership with a Philadelphia high school in which Penn students will collaborate with high school students on the research and design of a public-facing website on the Morton collection and the legacy of race and science in America. In our seminar, we will read foundational texts on the study of racial difference and discuss anti-racist responses and resistance to racial science from the 19th century to the present. Throughout, we will work directly with both primary and secondary sources, critically interrogating how both science and histories of science and its impacts on society are constructed. Throughout this course, we will explore interrelated questions about Penn and Philadelphia’s outsized role in the history of racial science, about decolonization and ethics in scholarly and scientific practice, about the politics of knowledge and public-facing scholarship, and about enduring legacies of racial science and racial ideologies. All students are welcome and there are no prerequisites, save for intellectual curiosity and commitment to the course. This course will be of particular interest to those interested in race, American history and the history of science, anthropology, museum studies, education, and social justice.
Taught by: Mitchell
Also Offered As: AFRC 141, ANTH 140, HIST 154
Activity: Seminar
1.0 Course Unit

STSC 145 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.
For BA Students: History and Tradition Sector
Taught by: Mukharji
Course usually offered in fall term
Also Offered As: HIST 146, HSOC 145
Activity: Lecture
1.0 Course Unit

STSC 160 The History of the Information Age
Certain new technologies are greeted with claims that, for good or ill, they must transform our society. The two most recent: the computer and the Internet. But the series of social, economic and technological developments that underlie what is often called the Information Revolution include much more than just the computer. In this course, we explore the history of information technology and its role in contemporary society. We will explore both the technologies themselves—calculating machines, punched card tabulators, telegraph and telephone networks, differential analyzers, digital computers, and many others—and their larger social, economic and political contexts. To understand the roots of these ideas we look at the prehistory of the computer, at the idea of the post-industrial or information society, at parallels with earlier technologies and at broad historical currents in the United States and the world.
For BA Students: Humanities and Social Science S
Taught by: Dick
One-term course offered either term
Also Offered As: SOCI 161
Activity: Lecture
1.0 Course Unit

STSC 162 Technology and Medicine in Modern America
Medicine as it exists in contemporary America is profoundly technological; we regard it as perfectly normal to be examined with instruments, to expose our bodies to many different machines; and to have knowledge produced by those machines mechanically/electronically processed, interpreted and stored. We are billed technologically, prompted to attend appointments technologically, and often buy technologies to protect, diagnose, or improve our health: consider, for example, HEPA-filtering vacuum cleaners; air-purifiers; fat-reducing grills; bathroom scales; blood pressure cuffs; pregnancy testing kits; blood-sugar monitoring tests; and thermometers. Yet even at the beginning to the twentieth century, medical technologies were scarce and infrequently used by physicians and medical consumers alike. Over the course of this semester, we will examine how technology came to medicine’s center-stage, and what impact this change has had on medical practice, medical institutions and medical consumers - on all of us!
Taught by: Johnson
Course usually offered summer term only
Also Offered As: HSOC 152
Activity: Seminar
1.0 Course Unit

STSC 168 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.
For BA Students: Humanities and Social Science S
Taught by: Benson
Course not offered every year
Activity: Lecture
1.0 Course Unit
STSC 178 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.
Taught by: Petrie
Course usually offered in fall term
Activity: Seminar
1.0 Course Unit

STSC 179 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.
Taught by: Greene, A
Course not offered every year
Also Offered As: HSOC 179
Activity: Lecture
1.0 Course Unit

STSC 207 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.
Taught by: Kessler
Course usually offered in spring term
Activity: Seminar
1.0 Course Unit

STSC 208 Science and Religion: Global Perspectives
This 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.
Taught by: Dorsch
Course not offered every year
Activity: Seminar
1.0 Course Unit

STSC 209 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.
Taught by: Gil-Riano
Course usually offered in spring term
Also Offered As: HSOC 209
Activity: Seminar
1.0 Course Unit

STSC 212 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.
For BA Students: Humanities and Social Science S
Taught by: Lindee
Course not offered every year
Also Offered As: HSOC 212
Activity: Lecture
1.0 Course Unit
STSC 218 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.
Taught by: Turner
One-term course offered either term
Activity: Seminar
1.0 Course Unit

STSC 219 Race, Science, and Globalization
This course examines how the practice of sorting humans into distinct races is connected to the rise of modern science and to the economic globalization sparked by Columbus' arrival in the Americas in 1492. By examining the trajectory of race in science from the Iberian conquest of the Americas until the present, we will examine the ways in which colonial logics and structures persist in the present and the ways they've been disrupted by various revolutionary, anti-colonial, and anti-racist movements. Along the way, we will observe how cultural ideas about race have been woven into the conceptual fabric of modern scientific disciplines such as anthropology, biology, psychology, and sociology and how these disciplines have sought to redeem themselves from their racist pasts.
For BA Students: Humanities and Social Science S
Taught by: Gil-Riano
One-term course offered either term
Also Offered As: HSOC 219
Activity: Seminar
1.0 Course Unit

STSC 231 Insect Epidemiology Pests, Pollinators and Disease Vectors
Malaria, 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 threaten 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, while general declines of insects threaten ecosystems. 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 course is not an entomology course but will cover a lot about insects. It is not a traditional epidemiology course but will explore the approaches and study designs that epidemiologists use to uncover associations and evaluate interventions. It is not a history course but will cover past epidemics and infestations that have changed the course of the history and reversed advancing armies.
Taught by: Levy
Course usually offered in spring term
Also Offered As: HSOC 231
Activity: Seminar
1.0 Course Unit

STSC 252 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.
Taught by: Dick
Course usually offered in fall term
Also Offered As: HSOC 252
Activity: Seminar
1.0 Course Unit

STSC 260 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.
Taught by: Dick
One-term course offered either term
Activity: Seminar
1.0 Course Unit

STSC 270 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.
Taught by: Dick
One-term course offered either term
Activity: Seminar
1.0 Course Unit
STSC 278 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.

Taught by: Dick
Course usually offered in fall term
Activity: Seminar
1.0 Course Unit

STSC 279 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?’

Taught by: Greene, A
Course not offered every year
Also Offered As: ENVS 279, HIST 320, HSOC 279
Activity: Seminar
1.0 Course Unit

STSC 289 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.

Taught by: Gil-Riano
Course usually offered in spring term
Activity: Seminar
1.0 Course Unit

STSC 308 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 different worlds were used to test hypotheses, represent science, and gain access to the public. This course explores the changing public display of science and technological knowledge and public display, using examples taken from the medieval period to the 20th century.

Taught by: Truitt
One-term course offered either term
Activity: Seminar
1.0 Course Unit
STSC 309 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.
Taught by: Kucuk
Course usually offered in fall term
Activity: Seminar
1.0 Course Unit

STSC 313 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.
Taught by: Cheely
Course usually offered in fall term
Activity: Seminar
1.0 Course Unit

STSC 316 The Atomic Bomb: Science, Art, History
In this Penn Global Seminar students will learn about the culture and religion of Japan, read novels and poetry engaging with the atomic bombings, meet survivors and scientists, and come to understand the impact of the bombs in world history, the global arms race, the rise of nuclear energy, and the continuing legacies of radiation exposure today. Our work will explore the development and use of the atomic bomb in 1945, engaging with Japan as a site of nuclear disasters, at Hiroshima and Nagasaki in 1945, and also in Fukushima Prefecture in 2011 (the so-called ‘third atomic bombing of Japan’). It will end with a trip to Japan to visit Hiroshima, Nagasaki, and sites in Tokyo, in May 2021.
Taught by: Lindee
Course usually offered in spring term
Activity: Seminar
1.0 Course Unit

STSC 317 Images in Science
Pictures, diagrams, graphs, and (more recently) computer images are ubiquitous in modern science. Visualizations are crucial in the process of research; for communicating evidence, theories, and experiments to other scientists; and for transmitting scientific ideas to the public. But serious questions about the validity of using images to convey knowledge about nature have been raised from the earliest natural philosophers onwards, and understanding precisely what any particular scientific image does can be surprisingly difficult. In this class we will investigate, as historical and cultural artifacts, images related to the generation or transmission of knowledge about nature, knowledge that has claims to a privileged epistemological status. The focus will be on three kinds of visual depictions: images of the macrocosm (the universe as a whole), images of the microcosm (the body and its parts), and the visualization of theories and data. What are the material and technological conditions underlying these images? What can the images we examine tell us about the communities and societies, including our own, in which they were created? What do they reveal about the nature of the scientific enterprise, about the relationship between the sensible world and the mind, and about ideals concerning truth, objectivity, and morality?
Taught by: Baker
Course usually offered in spring term
Also Offered As: VLST 213
Activity: Seminar
1.0 Course Unit

STSC 318 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.
Taught by: Smith
One-term course offered either term
Activity: Seminar
1.0 Course Unit

STSC 321 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.
Taught by: Dorsch
Activity: Seminar
1.0 Course Unit
STSC 328 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.
Taught by: Kucuk
Course not offered every year
Activity: Seminar
1.0 Course Unit

STSC 329 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.
Taught by: Mukharji
Course usually offered in fall term
Also Offered As: HSOC 329
Activity: Seminar
1.0 Course Unit

STSC 338 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.
Taught by: Gil-Riano
Course usually offered in spring term
Also Offered As: HSOC 338
Activity: Seminar
1.0 Course Unit

STSC 360 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.
Taught by: Benson
One-term course offered either term
Activity: Seminar
1.0 Course Unit

STSC 362 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.
Taught by: Greene
One-term course offered either term
Activity: Seminar
1.0 Course Unit

STSC 363 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.
Taught by: Voskuhl
Course not offered every year
Activity: Seminar
1.0 Course Unit

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.

Taught by: bergman

One-term course offered either term

Also Offered As: HSOC 370

Activity: Seminar

1.0 Course Unit

**STSC 372 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 we 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.

Taught by: Greene

Course usually offered in fall term

Activity: Seminar

1.0 Course Unit

**STSC 379 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.

Taught by: Greene, A

One-term course offered either term

Also Offered As: HSOC 379

Activity: Seminar

1.0 Course Unit
STSC 381 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.
Taught by: Dahlberg
Also Offered As: HSOC 381
Activity: Seminar
1.0 Course Unit

STSC 391 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 militarists, 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.
Taught by: Moreno
Course usually offered in spring term
Also Offered As: HSOC 391
Activity: Seminar
1.0 Course Unit

STSC 400 Undergraduate Seminar in Science Technology and Society
This is a capstone seminar for STSC majors, and a required seminar for any STSC junior who wishes to write a senior thesis for honors in the major. It is designed to provide the tools necessary to undertake original research by guiding students through the research and writing process. Students will produce either a polished proposal for a senior thesis project, or a completed research paper by the end of the term. Although each student will work on a different topic, the class will focus on general aspects of historical, and social scientific research and guide students through a close reading of key texts in science and technology studies.
Course usually offered in spring term
Activity: Seminar
1.0 Course Unit
**STSC 409 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.

Taught by: Martucci
One-term course offered either term
Also Offered As: HSOC 409
Activity: Seminar
1.0 Course Unit

**STSC 411 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 fab 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. The course fulfills the Capstone requirement for the HSOC/STSC majors. Semester-long research projects 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.

Taught by: Johnson
Course not offered every year
Also Offered As: HSOC 411
Activity: Seminar
1.0 Course Unit

**STSC 418 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.

Taught by: Kaplan
Course usually offered in fall term
Also Offered As: HSOC 418
Activity: Seminar
1.0 Course Unit

**STSC 436 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. Taught by: Mukharji
Course not offered every year
Also Offered As: HSOC 436
Activity: Seminar
1.0 Course Unit

**STSC 482 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.

Taught by: Kaplan
One-term course offered either term
Also Offered As: HSOC 482
Activity: Seminar
1.0 Course Unit
**STSC 498 Honors Thesis**
Research and writing of a senior honors thesis under faculty supervision.
Course usually offered in fall term
Activity: Independent Study
1.0 Course Unit

**STSC 499 Undergraduate Independent Study**
Independent primary research under faculty supervision to fulfill the capstone research requirement.
One-term course offered either term
Activity: Independent Study
1.0 Course Unit