CORE SCIENCE (CCST-SHU)

CCST-SHU 125 Interconnected: The History and Theory of Networks (4 Credits)
Typically offered Fall
Since the formation of trade routes connecting early civilizations, networks have been central to human exchange. Silk, jade, gold, and other goods, as well as the cultural elements of language, art, scientific discovery, philosophy and religion traveled the 6,500 km between southeast Asia and southern Europe on an elaborate system of trails, roads and waterways. This course will explore the development of several human made networks beginning with these early trade routes. Further consideration will be given to the construction of transcontinental railways, the development of electrical telegraph and telephone systems, in addition to the evolution of modern digital communication platforms such as the world wide web. The cultural conditions that encouraged the emergence of these networks, as well as the social outcomes resulting from their adoption, will both be explored through readings and critical dialog. Students will become familiar with: economic principles; network theories and topologies; the development and standardization of protocols; methods for encoding information; concerns about infrastructure, logistics, and security; as well as legislation governing information ownership, privacy, and censorship. Students will also be asked to consider the future of networks as it relates to themes such as crowd-sourcing, software-defined networks, and the Internet of Things. Prerequisite: None.
Grading: Ugrd Shanghai Graded
Repeatable for additional credit: No

CCST-SHU 126 From Ancient Cosmology to Science (4 Credits)
Typically offered Spring
This course will consider the origins of science in ancient cosmologies. What principles are preserved? Considering the classical Chinese, Indian and Western traditions, the question of how and to what extent culture determines the paradigms of science will be investigated. We begin with formative texts from the Chinese, Indian and Western traditions, including the Rig Veda, the Upanishads (India), the I Jing, Dao De Jing, and the neo-Confucian synthesis (China) and the pre-Socratic Ionian physicists (Western), then turn to the development of modern science. Representative works of Bacon, Descartes, Galileo and Newton will be read in parallel with seminal texts describing the rise of modern science in China and India. The course will conclude with a survey of contemporary cosmological theories to see how some ancient ideas are retained in modern science.
Grading: Ugrd Shanghai Graded
Repeatable for additional credit: No

CCST-SHU 128 The Rise of Modern Science (4 Credits)
Typically offered occasionally
This is a survey of the history of scientific disciplines and scientific methods from the "Scientific Revolution" of the seventeenth century to the present. We will discuss the ways of knowing such as reason, observation, experiment, and modeling. Our topics include science and religion, science and war, and the development of key scientific disciplines, institutions, and forms of communication. While focusing on physical and life sciences we will also ask about connections between a science of things and a science of human beings and human society. Students read original works by Newton, Lavoisier, Darwin, Freud, and Einstein, among others.
Grading: Ugrd Shanghai Graded
Repeatable for additional credit: No

CCST-SHU 129 Information Societies (4 Credits)
Typically offered occasionally
Proclamations of the "personal computer revolution" and the advent of the "Information Age" are now history, if only three decades old. Recently developed digital media have also been associated with radical changes and even the "death" of traditional forms of communication. This class will evaluate the relationship between information technology and society, "the media and the message," from a broad historical perspective. Students will learn about the major material transformations in information support, from scroll to web, with a focus on Western civilization. A comparative attention to the Middle East and East Asia for the Early Modern period and the Soviet political project for twentieth century developments will allow for a more nuanced interpretation of the notion of "modernity" associated with the "from printing press to Internet" narrative arc. We will build toward an understanding of the interdependencies between technological and social systems in several steps. First, we will establish a longue duree perspective by surveying the scroll-to-codex transformation, and sketch contours of a Eurasian geographical plane by following paper's transition from China to the Middle East and Europe. Next, we will read foundational texts on the history of the printing press with a special focus on transformations in science and religion. We will then overview the famous nineteenth-century developments in information and communication technologies. We will ask about their roles in shaping individuals' gender and professional identities as well as in the governance of transatlantic empires. The emergence of big corporations in parallel with the modern bureaucratic apparatus and new recording and data processing technologies is our fourth step. Toward the end of the class, we look at how the WWII calculating machine, the computer, acquired the functions of a "media machine" and took center stage in the debates about alternative political systems. We conclude with an exploration of contemporary visions for blurring space and time, ubiquitous computing, and promises of ultimate technological transcendence: trans-humanism. To preserve a uniting element in this wide ranging material, each of these steps will systematically explore particularly important locations where technological and social changes are negotiated, such as the library, the printing workshop, the publishing house, the office, and, finally, the classroom and the body itself. Fulfillment: CORE STS
Grading: Ugrd Shanghai Graded
Repeatable for additional credit: No
  • SB Crse Attr: NYU Shanghai: Science, Technology and Society

CCST-SHU 130 Animals, Nature, Environment (4 Credits)
Typically offered occasionally
This course will explore urgent issues concerning the relation of human civilization to the natural environment in which it is embedded. There are three main components: The first investigates the human relationship with animals, starting from what are the differences between us and animals, and what these differences mean today. Second, we explore broader issues of "nature": how we humans have conceived of ourselves as distinct from, or even superior to Nature; or, alternatively, enslaved to our inner nature. Third, we study global environmental issues, including how environmentalism emerged in the industrial era, what is its place in today's world, and what the prospects are for finding solutions to the most urgent global problems. Fulfillment: CORE STS
Grading: Ugrd Shanghai Graded
Repeatable for additional credit: No
  • SB Crse Attr: NYU Shanghai: Science, Technology and Society

CCST-SHU 131 Introduction to the Use of Scientific Data in Historical Research (4 Credits)
Typically offered occasionally
Scientific data potentially useful for the study of the past are today available in unprecedented quantity to historians and archaeologists. The scientific contributions most useful to the study of human activity and historical events involve genetics, palynology (the study of sediments), isotopic analysis (the study of chemical compounds in plants, soil, and human remains), and the reconstruction of ancient climates, based on the study of tree rings (dendrology), ice cores, and stalagmites. The availability of high resolution data makes it possible to gain a better understanding of the environmental and climatic conditions in which human events took place. Moreover, genetic data may be useful to trace migrations and demographic movements. Finally, the reconstruction of ancient diets can provide valuable information on the economic activities of ancient societies. The course will provide a broad-gauged introduction to the historical application of a variety of scientific data, with a special focus on Chinese and Central Asian history. Course requirements Students are asked to prepare a short position paper and a class presentation during term time. Presentation may be prepared in groups or individually. The Mid-Term and Final exams will consist of four multiple choice essays related to the material presented in the course. The final grade will consist of: Class presentation (20%); Mid-Term Exam (30%) and Final Exam (50%).
Grading: Ugrd Shanghai Graded
Repeatable for additional credit: No

CCST-SHU 133 Water Energy Food Nexus (4 Credits)
Billions of people on earth lack adequate access to water, food, and energy. What might be gained by recognizing the interdependencies that exist between these resources? It is well known that water is fundamental to agriculture and to the entire agro-food supply chain. Moreover, it is clear that energy is required to produce and distribute water and food: to pump water, to power irrigation machinery, and to process and transport agricultural goods. But a global society requires industry and policymakers to take even broader views. For instance, how are water security, energy security, and food security linked, so that actions in one area will likely have impacts in one or both of the others? How will population growth, economic development, and climate change affect international efforts to eradicate poverty? Additionally, what roles might renewable energy technologies play in providing access to cost-effective, secure, and sustainable energy supplies? Students will approach these questions through multidisciplinary lenses and cultivate the skills required to address the social, economic, and environmental challenges posed by the water-energy-food nexus. Fulfillment: CORE STS.
Grading: Ugrd Shanghai Graded
Repeatable for additional credit: No
  • SB Crse Attr: NYU Shanghai: Science, Technology and Society

CCST-SHU 141 Innovation in/of Daily Spaces (2 Credits)
Typically offered occasionally
How does a physical world – its objects, spaces, textures, infrastructures – circumscribe one's life – his mental growth, working paces, leisure time, practical decisions? This course is designed for college students who are interested in learning about innovative designs through thinking, tooling, presenting and experimenting -- in the context of "daily space." Students: No design background needed for this course. Please note that the course does NOT aim at exclusive design topics or technical training purposes. It is a comprehensive study that mixes in-class lectures with hands-on workshops, and enhances frontier research with low-tech (for example, ordinary objects) and intuitional experiences. Fresh comers will get a hands-on and fun introduction to the design world. Already design-minded students will benefit from its innovative and comprehensive approach. Course Design: Each student will be asked to propose an innovative project in the very beginning of the class. Students will accomplish site-specific assignments on a weekly basis, working towards the "ending products" that realize the full potential of innovative ideas by finding appropriate physical embodiments and in-context presentation of them. Students will have chances to communicate and negotiate their proposals directly with their would-be "clients," i.e. prospective buyers of the projects/products, and test the advantages and limits of their "ending products" in a mocked environment. The class exercises are primarily project-based while required readings and topical discussions take place every week. Final projects will be judged by the absolute "quality" of your "ending products" as well as the consistency and integrity of your design thinking. When available, there will be class visitors serving the roles of guest critics and helping to evaluate class performance. Pre-Requisites: None. Fulfillment: CORE STS; IMA/IMB elective.
Grading: Ugrd Shanghai Graded
Repeatable for additional credit: No
  • SB Crse Attr: NYU Shanghai: IMA Elective
  • SB Crse Attr: NYU Shanghai: IMB Interactive Media Arts/Business Elective
  • SB Crse Attr: NYU Shanghai: Science, Technology and Society

CCST-SHU 142 Environment Connections: Water, Waste, and Wellness (4 Credits)
Typically offered occasionally
This course provides a unique opportunity for students to make connections from their lives to the environment, focusing on the human relation to the natural world. The goal of this class is to escort the engaging student through their individual path connecting popular environmental topics with how they affect their lives and others. Everyone has heard the environmental rhetoric, but what does it really mean to each of us and how is it connected to what has occurred in the past and our future. Specific, contextual examples will be explored including connections between Henry David Thoreau's Walden to contemporary novelist. Learners will overlay these literary connections with actual environmental projects. This class encourages students to make connections between science, technology and society (STS) outside of the classroom and their natural world. The primary method for discovery will be the science process skills, where students will research, propose, design, and troubleshoot their own environmental stewardship models. Topics include groundwater flow models, sampling and analysis, chemical and biological data interpretation as well as contaminant remediation designs. Assignments will include formal and informal writing and presentations, as well as a critical thinking activity and project-based learning. This learner-centered experience utilizes active learning methodology to assist participants in making connections between societal attributes, informal education and the natural world. The approach is conceptually-based and subsequently process driven, engaging learners to observe, communicate, classify, infer and predict. A learning environment will facilitate learners to build on their prior knowledge and value of education expanding into models of learning, critical thinking and methods of teaching. Participants will ultimately deliberate the attributes of 'environmentally friendly' or green companies, buildings, fuel and the philosophy of green." Pre-requisite: None. Fulfillment: CORE STS.
Grading: Ugrd Shanghai Graded
Repeatable for additional credit: No
  • SB Crse Attr: NYU Shanghai: Science, Technology and Society

CCST-SHU 205 Rhythm (4 Credits)
Typically offered occasionally
Rhythm consists of patterns of events in time and space, and is a prominent feature of life. This interdisciplinary course examines what rhythm is and how it manifests itself in a variety of domains that range from music and the visual decorative arts traditions spanning cultures across the globe and throughout history, to how it emerges in, and is informed by, areas such as mathematics, computer science, music theory, music technology, biology, psychology, linguistics, sociology, evolution and human migrations, ethnology, crystallography, nuclear physics, calendar design, radio astronomy, architecture, computer graphics, and the visual arts. Students read, listen to music, learn the rudiments of drumming, use computer software to analyze and generate rhythms, solve puzzles of musical time patterns, and write on various topics. They complete an individual research project that showcases the application of knowledge in their selected discipline and culture to an open question concerned with rhythm. They discuss progress on their projects during the term, and present their results to the class at the end of term. No computer programming experience or musical training is required.
Grading: Ugrd Shanghai Graded
Repeatable for additional credit: No