CHEM 4969/6969 Nanoparticle Technology: Synthesis and Applications

This course will cover nanoparticle technology, including synthetic methods of elemental and metal-oxide cores that use classical and advanced techniques, coating types for cores/approaches to surface-functionalization for matrix compatibilization, nanoparticle purification techniques, as well as methods of physicochemical characterization. Technological implications of nanoparticles will be discussed, with emphasis on practical applications in the field of medical diagnostic imaging (contrast agents). Lectures by the instructor and invited experts on various aspects of nanoparticle technology will be followed by student presentations in areas of their own particular interest. These talks will become the basis for students to craft their own ideas to pursue in the form of a written research proposal.

CHEM 6961 Applied Electrochemistry

This course intends to build understanding of the fundamental electrochemical principles and the background for research in modern topics in electrochemistry such as electroplating and electrosynthesis, corrosion and passivation, advanced batteries, supercapacitors and fuel cells. Intended for senior undergraduates and graduate students in Chemistry and related areas. It will cover basic principles and methods as necessary before a discussion of applications. Familiarity with thermodynamics is necessary.

ARCH4958.01 Projecting Light
The relationship between light, projective geometry and drawing existed since antiquity. Different aspects of light are examined in mini-labs through their literary origins parallel to physical and optical explorations with light. The concluding project is a light construction that explores a thesis about projection in physical form.

ARCH4959.01 PIP Performance Planning Seminar
The Production Installation Performance (PIP) Studio is an interdisciplinary studio linking Architecture and Arts with an invited artist to produce a public performance. This seminar will do the initial groundwork and conceptualization in collaboration with faculty and the invited artist Andrea Polli Professor of Art and Ecology Andrea at the University of New Mexico.
Krueger. W 10 – 11:50 am. Cr. 2.

ARCH4960.01 Building Envelopes
This course introduces students to the technical design of building enclosures. Students undertake an enclosure design project that evolves as the design intent is inflected by considerations of materiality, system typology, structural and environmental performance, and constructability. Through lectures, seminars, and workshops, students are introduced to the tools and methods of performance-based design, along with the technical documents and standards that define performance criteria. The execution of custom facades will be considered, along with
the role of contract documents in ensuring a positive outcome that meets the design intent.

Brainard. M 12–1:50. Cr. 2. Note Architecture student’s 4th and 5th year.

ARCH4961.01 Interfaces and Virtual Worlds: ‘Infra-VISION’
Influenced by different concepts of ‘vision’ and ‘intelligence’ as well as ‘cognition’, this Seminar uses the CRAIVE space to inquire upon potential dimensions of Augmented and Mixed Reality when framed in a spatial immersive environment. Hosted and inspired by the immersive space of the CRAIVE lab, the seminar installs an alternating sequence of discussions and experiments on augmented reality, virtual objects, sites and representation, and inquires upon the potential of space as an interface to virtual domains.

CRAIVE lab is a 360 digital projection room located in the RPI Tech Park. The room consists of a surface of projection for 8 projectors, and a surrounding array of speakers. Leitao. F 12-1:50. Cr. 2.

ARCH4962.01 Structural Anatomy of Buildings (through case studies)
This course will offer students a foundation and familiarity with the use of structural systems through various case studies and examples. Each case study will be presented holistically and then deconstructed and analyzed to determine structural systems used and the reasoning behind the selection. Through structural investigation, students will peel away the design and actively calculate loads and forces while discussing the possibility of modifying existing structures. Pilla. T 4-5:50 pm. Cr. 2.

ARCH4963.01 Casting Against Type
In its geometric rigor and formal character, typography's link to architecture is obvious: the arcs of a serif, the shear of an italicized font, the grid underlying a glyph's specific proportions. Yet the considerable level of craft involved in typography is obscured by its semantic role in text. This course argues that by freeing typography from its practical function, its remarkable design potential unfolds. Using fonts in the same way as plans and sections, this course investigates experimental drawing techniques at the intersection of language and architecture. Passeri. R 12 – 1:50 pm. Cr. 2.

ARCH4964.01 ‘Defamiliar’
“Creatives must do more than see the world how it is; they must create interest by making new visual decisions.” Susan Sontag
This seminar deals with creating an image in a viewer’s mind that is unfamiliar and strange in a sense that it causes one to think whether they have seen the image before. As said by artist and photographer George Powell “Everything has been done before, but its new visual decisions that makes old subjects seem new and interesting, the defamiliar is one tool that makes the viewer think they are seeing something original for the first time.”
In this seminar we will be looking at traditional and ornamental architectural elements in order to defamiliarize them through methods of estrangement. To transform an architectural object by using imagery and forms that it is not normally associated with, is to defamiliarize it. We will be fabricating these objects during the course of the seminar. Virgil. M 12-1:50. Cr. 2.
ARCH4965.01 Hooks and Loops – The Hyper Stitch
In this seminar, we will explore crochet as a conceptual method of design and examine its topological traits as well as its ductility. We will introduce the technique of crochet as research and as a hands-on assignment simultaneously.

The crochet stitch will be explored in its spatial and structural capacities and subsequently transformed to acquire radically new space-making and material qualities. Baurmann. F 12 – 1:50. Cr. 2.

ARCH4966.01 The Man Next Door: A. Hitchcock and the Arch of Fear
This seminar explores the cinema of Alfred Hitchcock via the urban condition. The narrative structures of Hitchcock’s films often move the characters from pastoral settings to urban contexts, and vice versa. These allegories track naive or innocent characters as they move into self-awareness, a transition always reflected in the costumes, music, lighting, editing and direction. Famously averse to shooting on location, Hitchcock invented and refined techniques for controlling shifts in scale, perspective and space – all part of his reliance on the studio for a kind of ‘world building’. For example, as a way to save on location costs, Hitchcock developed back-lit film transparencies at the scale of architecture. His techniques of sonic and visual abstraction, defamiliarization, continuous takes, color saturation and disorienting perspectives all have analogs in the operations of the modern city. His themes of voyeurism, doubling, mistaken identity and paranoia are hallmarks of the modern human condition. He made the first film to address psychoanalysis as a subject (Spellbound, 1945), shot an entire film on one set (Lifeboat, 1944), and his dark comedy Frenzy (1972) looked at the urban phenomenon of serial murder. From the 39 Steps to Rear Window to Psycho, Hitchcock torqued the city grid as a symbol for both freedom (anonymity), oppression and chaos. The Master of Suspense has also been seen as a misogynist, sadist, humorist and cultural critic. We will critically engage his works via screenings, writing and our own attempts at storyboarding and set design. Oatman. M 7 – 9:50 pm. Cr. 2.

ARCH4967.01 Architectural Apparatuses
The seminar will develop workflows focusing on tools for design and communication. Students will be given in depth tutorials in advanced digital and algorithmic modelling techniques focusing on formal qualities. In parallel with digital modelling, students will also interrogate the agency of various modes of representation. During the course of the seminar we will confront the problem of representation in relation to the object (form) and its properties (solidity, texture, transparency, etc...) through the use of multiple mediums of translation:
Model making: The digital to physical translation
Drawing: The orthographic translation
Rendering: The atmospheric translation

The aim is to develop a digital workflow for creating architectural artifacts and spaces through addressing the interrelationship between image, object, geometry and matter. Lintner. T 4-5:50 pm. Cr. 2.
ARCH4968.01 Architectural Evolutions between Art and Science
Architecture over centuries has been closely associated with art. We often attribute this discipline to the leading role in art disciplines such as painting and sculpture.

In recent decades, the development of computer technologies has enabled a huge development of science. The computer has discovered the biology again. New convergences and possibilities have been created.

In this context we will discuss changes which are taking place in architecture: shifting from forms to processes as well as increasing interest in digital and biological controlled systems. Oksiuta. R 12 – 1:50. Cr. 2

ARCH4969.01 The Arch of the Screen: Relationships Betw Film/Art
While architecture is one of the oldest forms of cultural expression, film, by comparison is one of the youngest. Although seemingly at odds with one another, due to the physicality of architecture, and the image based condition of film, architecture has learned a great deal from the expressive capacities of film. In this seminar we will study the manner in which certain filmmakers have captured the physical environment in dynamic and provocative ways. Anthony Titus. R 10 – 11:50 am. Cr. 2.

ARCH4963.70 Sensorial Creativity_The haptic experience in India
This seminar is intended to support and reflect on the studio work and the India experience. Drawing from texts of poet Rabindranath Tagore, Rudyard Kipling and Art historian Coomaraswamy as well as from the work of contemporary artist Anish Kapoor, pritzker prize laureate Balkrishna Doshi and others, it will give a glimpse on the complexities and richness of Indian Artistic Heritage to inspire the studio work. Perez-Guembe. India studies students only. Cr. 4.

MATH-6590 Applied Stochastic Differential Equations
Course Description:
We will introduce and develop mathematical frameworks for analyzing complex dynamical systems where some interactions are modeled statistically. Techniques from stochastic differential equations and other stochastic process theory will be developed and illustrated in applications drawn from finance, physics, and biology.
Prerequisites: Familiarity with differential equations at an undergraduate level. Some background in probability would also be helpful, though we will quickly review the key concepts.
Credit Hours: 4

MATH-6890 Numerical Solution of Wave Equations
Course Description:
Wave phenomenon play a critical role in the physical sciences, and numerical methods for computing solutions to these problems face a unique set of challenges. Applications of interest include fluids, solids, electromagnetics, and plasmas. In this course we will discuss construction
of numerical methods for linear and nonlinear equations with traveling wave solutions. Topics may include discretization of classical non-dispersive equations (acoustics, elasticity), dispersive equations (Schrodinger), and hyperbolic conservation laws (Euler equations). Prerequisites: MATH-6840 or permission of instructor. Credit Hours: 4

ECSE 4962 Fundamentals of RF/Microwave Engineering
Fundamentals of RF/microwave systems. Study of noise, linearity, transmission lines, impedance matching. Working with S-parameters and experiment with the use of Smith chart. Introduction to microwave CAD tools for 2D and 3D electromagnetic simulations and microwave testing. The course will cover passive and active microwave circuits such as low noise amplifiers, filters, mixers, and power amplifiers. Emphasis on intuitive design methods, physical understanding, quantitative performance evaluation using both hand calculations and EM simulations. A module on RF measurements will include multiple labs to characterize basic building blocks. A final project is required where students build an RF receiver or transmitter and characterize it using a network and a spectrum analyzer.

ECSE 4964/6964 Internetworking of Things
The course provides an in-depth study of the technologies and protocols involved in building the Internet-of-Things (IoT), with specific focus on networking at the edge of the Internet. This includes understanding of wireless communication and link layer technologies, multi-access and scheduling mechanisms, mobility models, routing in disconnected networks, energy-efficient edge networking, loss tolerant transport protocols, and their applications to emerging areas such as vehicular networks, RFID systems and smart buildings. The course also discusses IoT Security and data/content distribution, aggregation, and compression. This course has a strong emphasis on hands-on experience utilizing Raspberry Pi’s, Arduino’s, and NI software radio boards, and a significant part of the course assessment will be based on a final project focused on building a wireless based application such as indoor localization for IoT devices. Students are encouraged to suggest their own individual projects.

ECSE 6966 Electric Power Distribution Engineering, Power Quality and Smart Grid
An electric power system consists of four general parts: the load, the substation including power transformers or converters, the transmission or distribution line, and the source or generator of power. This course will focus mainly on electric power distribution systems, power quality, smart grid, and distributed generation and storage, with sufficient coverage of relevant information on high voltage AC and DC transmission lines. We will study load characteristics, components of the power system, distribution and subtransmission substations, primary and secondary overhead and underground distribution systems including safety considerations, power quality and system reliability, system protection planning, and the Smart Grid concept. We will also study special topics such as corona and gap discharges, partial discharges in insulation, high-temperature conductors, inspection and repair including live working, novel line and support structure design concepts, underground and underwater cables, and selected mechanical design issues such as conductor sag/tension calculations. We will review alternate and renewable energy sources (wind, solar, tidal, etc.), energy storage (batteries, thermal, mechanical, electrochemical, and other) and new technologies and challenges. We will finally touch on future trends such as changing load profiles, use of sensors, artificial intelligence and visualization, use of robots and drones, and electric and magnetic fields and regulatory limits.
Network Science and Engineering is an emerging field that aims at modeling and analyzing the behavior of complex networks, and controlling and optimizing such networks to attain desired system properties and performance goals. Such networks are ubiquitous in our everyday lives, emerging from social and economic connections as well as networked engineering systems. This course will cover the mathematical tools and techniques commonly used in analysis of such networks, which include graph models and algorithms, network flows and optimization, distributed control, and network game theory. These analysis methods will be discussed in the context of four major networked structures and systems that exist today: communication networks, online social networks, power networks, and economic networks. Time permitting, other emerging topics such as financial (contagion) networks, biological networks, and smart thermal grids will be briefly discussed.

Law & Society
STSS/STSH 2961
Lawrence Howard
(Please insert 75 word or less course description)

Environment and Law
STSH/STSS 4960
Lawrence Howard
This is an introductory environmental law and policy course, with emphasis on the practical use and application of legal concepts.

American History
STSH-2960
Kate Sohasky
This course surveys the history of the United States from the colonial era through the present. The course introduces major themes and tensions in United States politics, society, and culture. Topics will include encounters between American Indians and colonial peoples, independence, the formation of the American government, slavery, immigration, citizenship, rights, social movements, colonialism, war, and the changing identity of the United States in the world.

Environment and Society
STSS 2300/STSH 2962
Guy Schaffer
Environmental sociology recognizes the role of environment in maintaining social systems, and of society in creating and maintaining environmental health. This class offers an advanced introduction to the key concepts and debates within environmental sociology, and examines how these ideas might open up new pathways toward solutions to the pressing environmental issues of today. Students will use concepts from environmental sociology to pursue a semester-long research project that examines environmental issues from a sociological perspective.

History of Science & Technology
STSH/STSS-4961 (meets together)
Chris Tozzi
This course examines the evolution of science and technology from prehistoric times through the present. In addition to surveying how science and technology have changed over time, we will
strive to understand the social, political and economic consequences of such change. We will also consider the extent to which advances in science and technology result in so-called progress.

History of Mental Health  
STSH 4962  
Kate Sohasky  
This seminar surveys the history of mental health through discussion and analysis of secondary literature that explores central and key themes from the late eighteenth century up through recent history. Topics will include the history of mental health institutions and professions, the classification, diagnosis and treatment of mental illness, public health and policy, historical memory, the I.Q. controversy, the state, and race, class and gender in the history of mental health.

Contemporary Political Thought  
STSS 4962/6962  
Langdon Winner  
(Please insert 75 word or less course description)

Disability, Society, and Design  
STSS-6961  
Raquel Velho  
(Please insert 75 word or less course description)

Race, Class, Gender, and Technology  
IHSS-1970  
Michael Stanford  
One of the most important things to learn about race, class and gender is that they are systemic forms of inequality. This does not make them irrelevant as individual or group characteristics but points us to the analysis of social structure to think about how race, class, and gender operate, what they mean, and how they influence people’s lives. Using a social structural analysis of race, class gender and technology turns our attention to how they work as systems of power-systems that differentially advantage and disadvantage groups depending on their social location. This course seeks to explore the convergence of gender, class, race and technology in the workplace by analyzing policies and investigating the way management organizes work around new technology and identifying the personnel practices that shape the workforce and the application of new technology.

Sociology of Inequality  
IHSS-1971  
Michael Stanford  
Social inequality results from a society organized by hierarchies of class, race, and gender that broker access to resources and rights in ways that make their distribution unequal. It can manifest in a variety of ways, like income and wealth inequality, unequal access to education and cultural resources, and differential treatment by the police and judicial system, among others. Social inequality goes hand in hand with social stratification. Social inequality is characterized by the existence of unequal opportunities and rewards for different social positions or statuses within a
group or society. It contains structured and recurrent patterns of unequal distributions of goods, wealth, opportunities, rewards, and punishments. Racism, for example, is understood to be a phenomenon whereby access to rights and resources is unfairly distributed across racial lines. In the context of the U.S., people of color typically experience racism, which benefits white people by conferring on them white privilege, which allows them greater access to rights and resources than other Americans. This course will examine and explore the sociology of inequality from varying theoretical perspectives, how it operates and/or functions within social institutions.

Technology and Social Interactions
IHSS-1972
Michael Stanford
This sociological course deals with the psycho-social effects of the use of technology on social interactions in American society. The use of technology and its varying forms is ultimately shaping and changing the way people interact and communicate on a daily basis. One could argue, that as a society people are becoming more and more socially detached. Observations made in “public spaces” clearly suggest that people are becoming more socially disconnected from each other and that individuals are increasingly living in cyber-worlds void of affable exchanges. The psycho-social effects of technology has in fact, very subtly and sadistically seduce us. The use of technology in American society has in many ways created a social pathology that is troubling and concerning. There is strong anecdotal and empirical evidence which clearly suggest that technology, is a significant factor related to increased rates of bullying, social isolation, drug addiction, alcoholism, racism, xenophobia, depression and suicide. Social research and investigation is warranted. This course seek to explore the psycho-social implications, and its use in American Society.

Global Health Challenges
IHSS-1973
Cynthia Cook
This course explores current and emerging global health problems and possible solutions. We will compare problems in low, middle and high-income countries, examining different health challenges (associated with malaria and child birth, for example), ethno-medical practices, medical ethics, and ways environmental problems impact human health.

War & Society
IHSS-1967
Patrick Royer
This course examines how culture and society shape war, and inversely how war shapes culture and society. It views war through the lens of social sciences, particularly of cultural anthropology, political science, and philosophy. Some of the issues we will discuss include the study of different types of war (for example, civil war, asymmetric war), the notions of pacification and nation-building, the role of rituals and of discipline in the military institution, the relations between weapons / technology and culture, between war and religion, and even between war and sports. Students will be introduced to a few major thinkers and to key concepts and themes in social science related to war, culture, and society. We will also examine war from an ethnographic perspective (the description of different cultures) with case studies ranging from the role of war in non-western societies to the ways in which war has affected American culture.
While the course includes some history of warfare, it is not primarily concerned with military history, and it will not cover debates not directly associated with the institution of war such as the relation between violence and human nature.

Aging & Experience  
COGS-6963  
Wayne Gray  
The construct of “Time on Earth” encompasses phenomenon sometimes attributed to experience, sometimes attributed to biological aging, and other times to “simple” decay or forgetting due to disuse (regardless of biological age). Adopting a cognitive science framework, this seminar will explore both of these constructs on human skilled performance and expertise while also exploring the often unvoiced causal assumptions of the researchers who investigate them. For our purposes, “skilled performance” includes aspects of human perception, motor behavior, memory, and decision-making, as well as the discovery or invention, by individual performers, of new methods of task performance. Examples of the skilled tasks to which we aspire to explain include action video games, medical diagnosis, surgery, driving a car, juggling, and any other situation where “even hesitating requires a decision to hesitate.” Our emphasis will be on the basic research and theories which shed light on skilled performance and which might be use to guide training. The syllabus may change during the semester with new readings being added and old ones pruned.

Research Problems in Cognitive Science  
COGS 6961  
Ron Sun  
The research problems in cognitive sciences seminar is aimed to provide graduate students with in-depth information concerning a broad range of research problems and domains in cognitive sciences. It includes talks by invited speakers, as well as research progress reports by graduate students and faculty. Its goal is to establish some broad understanding of current, ongoing cognitive sciences research and to stimulate further research.

Great Ideas in Philosophy  
IHSS-1965  
Dan Thero  
This course invites you into the world of philosophical ideas and reasoning -- to join a great conversation that has unfolded over the past 2,500 years. We will explore such issues as whether some ways of acting and living are morally better than others, as well as philosophical issues concerning the relationship between mind and body. This course will include both frequent discussion and written assignments, and will aim to help you develop your skills in each of these modes of communication. This is a communication intensive course.

Science/Scientific Misconduct  
IHSS-1979  
Susan Smith  
This course will provide a comprehensive introduction to the field of ethics of scientific research. Why do seemingly good people do bad things? What is science? What is “bad” science? What
constitutes misconduct. We will explore the answers to these questions through fields such as sociology, history, philosophy, psychology, etc. Using evidence from both the Stanford Prison Experient and the Milgram Shock Experiment we will try to understand why researchers might commit scientific misconduct such as fabrication of results, plagiarism, and falsification of data. A brief overview of several professional/scientific codes of ethics will be covered.

Genome and You
IHSS-1978
Susan Smith
In April of 2003, the Human Genome Project reached their goal of sequencing the human genome. No, over ten years later, we are still working to understand the possibilities, significance, and impact of that discovery. The ability to sequence completes genomes, has had a revolutionary impact on medicine, agriculture, our environment and the very idea of what it means to be “human”. Genomic medicine will impact virtually everyone in the United States in the coming decades. As informed citizens, it is important that we have a working understanding of the genomics and its implications for individuals and for society at large. These conversations are critical to ensure the ethical and accessible use of genomics and to allow us to make informed decisions on both personal and public-policy levels. This course will explore both the science and the this of genomics, suing case studies to illustrate and personalize the issues at hand.

AI and Society
IHSS-1966
Ralph Noble
(Please insert 75 word or less course description)

Principles of Economic Mechanics
PSYC-4961
Yingrui Yang
(Please insert 75 word or less course description)

Math Methods in Psych Science
PSYC-4960-01, 02
Chris Sims
This course will provide students with a systematic overview of practical and important mathematical tools and skills used in modern psychological sciences. Students completing the course will gain experience using mathematical tools drawn from diverse fields including calculus, linear algebra, probability theory, nonlinear optimization, and other closely related disciplines. Rather than providing complete coverage of each field or focusing on formal proofs, the goal will be to provide students with the essential elements necessary to understand and use these tools to solve current and outstanding problems in the field today. This class will be hands-
on, using examples drawn from across the cognitive sciences. Students will also gain experience implementing mathematical models in the R programming language.

Gauge Theory of Higher Cognition
PSYC-2960
Yingrui Yang
(Please insert 75 word or less course description)

Economics Methods for Big Data
ECON-4961/6961 (meets together)
Chad Stecher
Examine advanced econometric and statistical methods for the analysis of high-dimensional data, otherwise known as “Big Data.” In this setting, detailed information for each unit of observation informs machine learning techniques such as decision trees; neural nets; deep learning; classification and regression trees; penalized regressions; boosting; and bagging. Application of these techniques will include study of healthcare demand and supply modeling, and behavior of consumers and businesses.

Behavioral Economics
ECON-4962/6962 (meets together)
Chad Stecher
Integrate theory from psychology, neuroscience, and other social sciences into traditional economic models of human behavior. By relaxing the standard assumptions of perfect rationality and selfishness, more realistic modelling features such as loss aversion, myopia, framing, mental accounting, information salience, and social norms can improve the accuracy of economic analyses. These techniques are used to analyze decision-making across a wide range of settings with an emphasis on health behaviors, health insurance markets, and healthcare policy.

Health Economics and Policy
ECON-
Jason Huh
Application of microeconomic theory and tools will be used to: analyze healthcare demand and supply; examine the impact of public policies; study market segments such as health insurance and pharmaceuticals; explore economic choices of healthcare professionals; identify potential socioeconomic and demographic determinants of health status and healthcare; and gain insights into issues related to the ongoing healthcare policy reform.

Economics of Biotech and Medical Innovations
ECON-496X/696X (meets together)
Vivek Ghosal
Study markets related to pharmaceuticals, biotechnology and medical devices. Examine economic issues, models and quantitative analysis related to firms’ activities in areas such as innovation, R&D expenditures, patenting, pricing, mergers and acquisitions, and competition in markets. Examine role played by health insurance systems. Study the economic implications of regulations, such as those by the U.S. FDA. Economic and policy aspects will be examined
within the context of the U.S. healthcare sector, along with comparisons to selected European national healthcare systems.

Applied Game Theory  
ECON-496X/696X (meets together)  
Jianjing Lin  
Game theory has been emerging as a branch of mathematical economics and applied to analyze situations where each decision maker needs to think strategically about others’ perspectives and actions in order to determine one's own optimal choice. This course provides an introduction and presents selected topics in game theory. We will look into basic definitions and equilibrium concepts and develop a wide range of applications in Economics, Biology, Sports, Health care and various fields. The goal of the lecture is to improve our understanding of strategic interaction in economic, business and social situations.

Applied Econometrics  
ECON-6964b  
Rui Fan  
This course provides skills to apply econometrics to diverse economic topics. Mathematical methods of econometrics are developed for tools such as alternative estimation strategies, instrumental variables, regression discontinuity, nonparametric and quantile estimators, and simultaneous equation models. Methods to identify causal effects are emphasized. Students do hands-on data work that puts to use these econometric tools.

Panel Data Econometrics  
ECON-696X  
Rui Fan  
This course is designed to prepare students a solid ground for the analysis of ‘panel’ or ‘longitudinal’ data sets using advanced econometric techniques. Particular attention is given to identification strategies and causal inference. Topics to be studied include specification, estimation, and inference for the classic linear static panel data models. Using econometric methods, such as generalized method of moments, maximum likelihood, and instrumental variables, we will further extend the static models to dynamic panel data models.

Economics of Growth and Innovation  
ECON-696X  
Michael Klein  
Dynamic models of national and international economic growth are introduced and analyzed. Technological innovation is central to growth, and models consider the endogenous determinants of technological innovation and diffusion. National institutions that affect growth, such as law, education, and infrastructure, are considered. Variation in intellectual property rights across countries are examined, together with their effects on economic growth and development. Theories of growth are compared to empirical fact.

Applied Microeconomics  
ECON-6967  
Michael Klein
Core topics of microeconomic theory are covered: consumer demand, firm production, decisions under uncertainty, game theory, markets for goods with perfect and imperfect competition, and market failures. Microeconomic theory is applied to real cases. Examples include product pricing, technological innovation, firm growth, consumer and producer welfare, social welfare impacts of government policy, monopoly and oligopoly, and resource allocation.

Playwriting
ARTS 4963
Rebecca Rouse
Tuesday Noon - 3:50pm
Students learn all aspects of writing for the stage, and are also introduced to related practices of acting and directing. Assignments include a variety of short plays, design sketching, and acting and directing activities. Final projects are one act plays, and will be directed and acted by students, and presented on campus as staged readings. Students with interest in theater, writing for games, interactive media, or other creative writing genres are welcome.

Radical Graphic/Screenprinting
ARTS 2960
Nathan Meltz
Radical Graphics seeks to expand on the definition of print graphics from one that traditionally creates multiple images on paper to a practice that includes art-making activities as varied as mud-stenciling, t-shirt printing, “fine art” prints, animation, sculpture, and political protest graphics. Students will focus on the concept of the art “matrix”; a template for image-making that can work across media. Students will create matrices that can be applied across multiple art-making platforms.

Deep Listening
IHSS 1961
Loveless, Stephanie
Deep Listening is a practice developed by pioneering composer Pauline Oliveros to enhance and expand listening abilities and to encourage creative work. In this course, students will develop a heightened awareness of sound, both as a medium of expression and in their daily lives. Classes are designed around experiential exercises, sound pieces, readings, and discussion. Musicians and non-musicians of all abilities and backgrounds are welcome!

Music and Nature:
IHSS 1963
Loveless, Stephanie
Music and Nature explores the intersections between music and nature from a variety of perspectives – artistic, ecological, musicological, and experiential. Music will be approached as cultural and artistic expression, as well as a form of knowledge that can heighten our sensitivity and awareness of the environment and natural processes. Classes are designed around participatory activities such as group discussion, journaling, and workshop. Assignments will range from reading responses and essays to individual creative projects.
Science Fictions
ARTS 4640/6640
High, Kathy
Science Fictions is advanced narrative video production and theory course. The class looks at thematic areas of science fiction, utopia and dystopia, cli-fi, ‘slipstream’ fiction (Sterling, Bruce), paranormal and speculative fiction. ‘Speculative fiction’ is a genre that looks at the real world and extends what we know about it, building on the ‘real.’ The class has two threads: to study narrative structure and create a series of sci-fi videos; discuss and analyze mainstream and avant-garde science fictions films and themes from early 1900s-present.

Speech as Music
ARTS 6960
Fisher-Lochhead, Christopher
Beyond its ability to carry linguistic meanings, speech is a powerful sonic and bodily medium for the expression of emotion, participation in social rituals, and the articulation of individual identity and group membership. By considering speech utterances as musical objects, we will examine how meaning and affect merge in an embodied act of “performed language.” The class will draw on linguistics, neuroscience, cognition, performance studies, and music to develop a deep and multi-dimensional understanding of this comple