FALL 2017 TOPICS COURSES

ARCH4730 Sustainable Building Design Strategies

An in depth analysis of conceptual planning strategies as well as building system strategies that produce environmentally responsible buildings. Building physics and environmental phenomena including solar, wind and geothermal; passive and active systems and addressing those defensive (e.g. insolation) vs. offensive strategies (e.g. energy harvesting) will be covered. Case studies will be utilized to demonstrate the integration of sustainable strategies into the design process. Oliver Holmes. T 8-9:50 pm. Cr. 2

ARCH4958.01 Contemporary Furniture Design

This course provides a platform, in the form of furniture, to execute and deploy digital design, material and engineering principles at full scale. It will be conducted as a seminar and workshop and will introduce design methodologies that are unique to product design through the process of designing a chair.
The course will engage in many of the considerations that are affiliated with CAD/CAM production; material optimization and human factors. Students will conduct research into industrial design processes, found especially in the automotive, aviation and maritime industries, and will adapt these processes into techniques to design a prototype for limited production. Instruction will include: the full scale production of a prototype, its detailing; Color/Material/Finishes (CMF), design for Computer Aided Manufacturing (CAM), and the possibility of mass customization. Rhett Russo. F 10-12. Cr. 2.

ARCH4962.01 Sculpting the Intangible

"Architecture mediates our body with the environment. It describes the way we understand our position in the world and how we perform within it. Light, intrinsically attached to the spatial experience, is able to affect, transform and stimulate not only our visual, but our mental and even bodily perception of things. As designers, we must understand the specifics of a given ambiance, its affects and mechanisms to cultivate a formal precision necessary to reproduce concrete experiences that we might be looking for. How can we use light, an intangible matter, as building material? How color, form and texture affect the ways light is diffused, reflected or aggregated? In other words, how they condition its different manifestations? What are the effects and the effects of the absence of light, shadow or twilight? This seminar intends to refine our ways of seeing and test these new observations through making. It is not about the use and interpretation of light through architectural history. It is about the study of light as a device that transforms or even generates space. It engages with the phenomenological and will compare different artifacts, buildings, and expressions that give an answer to similar questions with independence of the time and location they were created. We will study these different forms of light and their implicit meanings; their capacity to create different illusions, rhythms and relations." Elena Perez-Guembe. R 10 – 11:50 am. Cr. 2.

CIVL 4961 Bedford Digital Tools Development

Digital application instruction and related explorations are integral to the studio, designed to provide a critical forum and to facilitate both the development of the design and its systematic documentation. While the end results will be representational including diagrams, renderings, and graphic instructions for construction, explorations will target how digital tools can become procedurally integral with design and how they can open up greater opportunity for creative design study. Digital techniques will be investigated as developmental tools rather than an assistant representational technology. Parametric modeling will also be utilized to help manage and clarify complex relationships between systems and environments. We will be working with a master model / Building Information Modeling (BIM) logic, in which a single application software will be the predominant digital resource, and workflow becomes essential to the successful development of the project. The computer, like any other design tool, has its place. There are more and less appropriate applications for any method, and the various computational techniques will be used together with analog modes of working.

This course has a co-requisite of CIVL 6340, Bedford Design Studio.

ENVE 4961 Photobiology

This senior level course explores the fundamentals of light and its effects on living systems. Students will explore how light contains and distributes information as well as energy. Perception, photodamage, acclimation, the dynamics of plant physiological systems and the use of photobiological responses to produce nutrient rich foods through the engineering of lighting systems are discussed.

CSCI 4960/6960 01 Semantic Web Knowledge Graphs

Instructor: McGuinness

Credits: 4

Prerequisite: TBD

CSCI 4962/6962 01 Natural Language Processing

Instructor: Ji

Credits: 4

Prerequisite: CSCI 2300 and MATH 2010

This course introduces state-of-the-art Natural Language Processing (NLP) methods, covering major popular research topics via the most-cited and up-to-date papers for each topic, as well as other resources. This course also covers machine learning methods for NLP. Students implement some of these methods and apply machine learning toolkits to solve a variety of problems. Assignments incorporate linguistics, mathematics, and careful thinking.

CSCI 4963/6963 01 Topics in Software Development

Instructor: Goldschmidt

Credit: 4

Prerequisite: CSCI 4210

This course focuses on software development techniques in support of large-scale software projects and maintenance. Specific topics include various programming paradigms and techniques, approaches to testing and automation, debugging, refactoring, and inheriting code. If there are specific topics you wish to see covered, please email goldsd@cs.rpi.edu.

CSCI 4964/6964 01 Cognitive Computing

Instructor: Hendler

Credits: 4

Prerequisite: CSCI 2300 or permission of instructor

Cognitive Computing is a term being used for a new generation of artificially intelligence computers that interact with humans in new and important ways. Rather than human-machine interaction, cognitive computing is said to be leading to a new generation of human-machine collaboration, where computers help humans gain new insights into problems via a suite of technologies ranging from natural language to machine learning. The "coming of age" of cognitive computing was demonstrated when IBM's Watson program beat the world's experts at the TV gameshow Jeopardy! The 2015 announcement of the Cognitive and Immersive Systems Lab (CISL), a collaboration between the IBM Research and RPI, explores new research in human-scale situations rooms for human-machine partnership. In this course, we will explore several types of cognitive computing architectures, including Watson, neuromorphic computing, and agent-based modeling, and try to discover, via team projects motivated by the students in the class, what, if anything, is truly new and exciting in this technology space. Students should be willing to work in small teams on research-related projects requiring the teams to define, plan and implement their approaches. (Note that some of the classes will be held in CISL research spaces).

CSCI 4965 01 RCOS

Instructor: Krishnamoorthy; Turner

Credits: 0

Prerequisite: CSCI 1200 and a 2000-level course in CSCI, ECSE, or ITWS

This 0-credit non-graded course offering is an administrative means to obtaining a full roster of students participating in RCOS. RCOS (Rensselaer Center for Open Source) is an eclectic group of undergraduate students that embark on individual and team-based open source projects, primarily software, but also open hardware projects. Many new projects are introduced each semester, though many ongoing and higher-profile projects are undertaken, as well. Students are required to work on and contribute to open source projects, maintain a blog, and present to the group during the semester. Students may earn independent study credit hours, a limited stipend, or do RCOS for the experience only.

CSCI 4966 01 Programming for Cognitive Science and AI

Instructor: Schoelles

Credits: 4

See COGS 4410

CSCI 4967 01 Game AI

Instructor: Si

Credits: 4

See COGS 4420

CSCI 4968/6967 01 Approximation Algorithms

Instructor: Anshelevich

Credits: 4

Prerequisite: CSCI 4020

Algorithms with provable guarantees on the quality of their solutions are a powerful way of dealing with intractable problems. This course is an advanced course in approximation algorithms; it will cover fundamental techniques for designing approximation algorithms as well as more specialized topics. Possible topics include: semi-definite and linear programming, inapproximability and the PCP theorem, iterated rounding, metrics and cuts, primal-dual methods, online algorithms, and approximation in game theory. We will look at algorithms in a variety of settings; some of these may include social networks, graph partitioning, network design and routing, traveling salesman problems, and many applications in communication networks. Students who successfully complete this course will be able to analyze and design efficient approximation algorithms for a variety of computational problems.

CSCI 4969/6966 01 Networking in the Linux Kernel

Instructor: Holzbauer

Credits: 4

Prerequisite: CSCI 2300

TBA

CSCI 4970/6970 01 Computational Social Choice

Instructor: Xia

Credits: 4

Prerequisite: CSCI 2300

This is a research-oriented course on the theory and application of computational techniques and computational thinking in preference representation and aggregation. Applications include but not limited to: voting, fair division, rating systems, recommender systems, learning to rank. A student with strong backgrounds and skills in mathematics, computational complexity theory, algorithm design, or statistics will likely enjoy the course.

CSCI 4971/6968 01 Algorithmic Robots

Instructor: Trinkle

Credits: 4

Prerequisite: CSCI 2300 and permission of instructor

"This course will cover the basics of mobile robotics in a hands-on format using the platforms and props develop in MIT's Duckietown project (http://duckietown.mit.edu/). Students will purchase and assemble their own Duckiebots (about $150 each), and then use them throughout the course to test theories and algorithms studied. The topics include: motion control, obstacle avoidance, the “bug” algorithms, simultaneous localization and mapping (SLAM), and motion planning. Students interested in taking this course should send email to trink@cs.rpi.edu. If there are particular topics that you hope will be covered in the class, please include them in the email."

CSCI 4972 01 Computational Vision

Instructor: Stewart

Credits: 4

See CSCI 6270

CSCI 4973 01 Randomized Algorithms

Instructor: Gittens

Credits: 4

See CSCI 6220

CSCI 4974/6971 01 Parallel Graph Analysis

Instructor: Slota

Credits: 4

Prerequisite: CSCI 2300

This class is an introduction to computational graph analysis and mining, with a focus on large scale parallel methods. Students will learn about research challenges related to the study of graphs on modern parallel systems. Analysis algorithms such as community detection, centrality measurements, subgraph search, alignment, partitioning, compression, and visualization will be covered with an emphasis on scalable parallel implementations and the study of real-world social, interaction, and biological network data. Students will implement their own low-level code with MPI and OpenMP as well as learn about and use popular graph processing frameworks, potentially including GraphX, Giraph, and GraphLab variants.

CSCI 4975/6975 01 LLVM: A Compiler Case Study

Instructor: LaPre

Credits: 4

Prerequisite: CSCI 2300

A compiler-oriented course with a focus on the LLVM compiler. LLVM is a state-of-the-art compiler that enjoys both academic interest as well as widespread industry adoption. It is a large codebase written using modern C++ techniques and design patterns; students are expected to not only read but learn from existing code. Seminal compiler/LLVM-specific papers will be assigned and critiqued on a weekly basis. Topics will include compiler backend issues such as control flow graphs, intermediate representation (IR), and compiler optimizations. Assignments will include writing various LLVM passes as well as a significant final project.

CSCI 4969/6966 Networking Topics Course

"A project-oriented coding course in which we will examine Linux kernel code and make modifications to the operating system. Part of the course will be a survey of the kernel and organization of subsystems, but the primary focus will be in the networking code.

Students should have a good grasp of operating systems concepts and C programming before taking this course, and be willing to run a virtual machine on their computer. Projects may be open-ended and will likely involve group work."

ECSE 4964 Fundamentals of Solid State Lighting Systems

The course covers the basics of LEDs and drivers (including dimming challenges), LED fixture design and engineering challenges (optics, thermal management), control topics (sensors for lighting control, how sensors are integrated into lighting control systems), current lighting control platforms, and some future of lighting topics (lasers for lighting, semantic lighting).

Prerequisite: ECSE 2050

3 credit hours

ECSE 4961/6961 Computer Vision for Visual Effects

Until the early 1990's, visual effects for movies generally meant practical effects such as forced-perspective shots, highly detailed matte paintings on huge glass plates, and stop-motion animations with physical miniatures. However, technological advances in computer vision and graphics have ushered in a major shift to an all-digital pipeline in which most visual effects are added semi-automatically in post-production. Furthermore, a home enthusiast can now generate convincing visual effects with a small investment of time, hardware, and software, resulting in an explosion of user-generated content on video-sharing sites.

The main objective of this course is to describe the computer vision problems that underlie modern visual effects in movies, in which original video footage is transformed or augmented to create fantastic, yet plausible environments. We will critically overview the important literature for several problem categories, describing "under-the-hood" concepts and algorithms in mathematical detail. In many cases, the relevant academic research is only a few years old and has only recently been applied to movies, TV shows, and commercials.

Prerequisites: MATH 2010 and general understanding of digital images and their manipulation. Courses like ECSE 4540, CSCI 6270, or ECSE 6650 may be helpful but aren't necessary.

3 credit hours

ENGR-1960 ***Introduction to Engineering a Better World***

This course offers all engineering students a common overview of the impact of engineering on the world, and presents problem areas that each of the engineering disciplines contribute to solving in today's complex engineering challenges. Students will gain insight into the critical role of engineering in a global society, and the importance of environmental, cultural, economic, and social concerns on optimizing engineering solutions. Students will be introduced to these issues through a focus on complex multi-disciplinary real-world problems, including the National Academy of Engineering's grand challenge problems for the 21st century.
1 credit

ITWS-6962 – Big Data Policies

Learn about: what data policies really are, and how buzz words muddy the waters; the 'hot topics' in data policy right now (hint – they include privacy, security, and sharing); how to critically analyze and evaluate the effectiveness of data policies; what other countries are thinking about with respect to data policies; who makes these policies anyway, and why; what technologies have to do with all of this; what roles politics, culture, economics, and other seemingly unrelated disciplines have to do with data policies; and how specific implementation of some data policies may help address current societal issues. Who should enroll: Students who are interested in how data policies are made and evaluated; anyone who will be working in the data analytics, informatics, or other data-related field; anyone who likes to critique an argument, or who wants to learn how; anyone who has wondered what happens to all of that collected data; anyone who wants to understand the broader connections inherent in policy formulation. You will work in teams to analyze and evaluate specific aspects of current data policies, and present your analysis to the class.

3 credits

Instr. – Fontaine

Time – Tuesday's 9-12

ITWS-4960/6960 – Database Systems

Discussion of the state of practice in modern database systems, with an emphasis on relational systems. Topics include database design, database system architecture, SQL, normalization techniques, storage structures, query processing, concurrency control, recovery, security, and new directions such as object-oriented and distributed database systems. Students gain hands-on experience with commercial database systems and interface building tools. Programming projects are required.

Prerequisites/Corequisites: Prerequisite: CSCI 2300 or permission of instructor.

3 credits

Instr. – TBD

Time – W 6:00-8:50 pm

48875 – MANE-4961 Propulsion Systems

This course is the 4-credit version of MANE-4080 Propulsion Systems. Aeronautical Engineering students who took the 3 credit version of Aerodynamics I in Fall 2016 or earlier should take this course.

Prerequisite: MANE-4070 Aerodynamics I or MANE-4010 Thermal and Fluids Engineering II

48418 MANE-6964 Control Systems Engineering

This is a cross-listing in MANE of ECSE-4440 for MANE students concentrating on control systems. Application of linear feedback theory to the design of large-scale, integrated control systems. Derivation of complex mathematical models of physical systems. Synthesis of appropriate control laws to provide stability. Simulation of complex control systems on digital computers.

Prerequisite: ECSE-2410 Signals and Systems or MANE-4050 Modeling and Control of Dynamic Systems

47750 MANE-6960 Advanced Heat Transfer

Graduate level cross-listing of MANE-4710 Heat Transfer. Students may not get credit for both courses.

48874 MANE-6961 Additive Manufacturing

Additive Manufacturing technologies are a direct result of the layer-based, additive material build processes developed since the early 1980s. As compared to traditional prototyping and manufacturing methods and approaches, these technologies allow designers, engineers, manufacturers, architects, artists and other professionals in a variety of industries to quickly produce part and assembly prototypes, net-shape and near-net-shape production parts, tooling, master patterns, and workholding devices based on CAD models or reverse-engineered artifacts. The purpose of this course is to teach you about these technologies, some of the science and engineering behind them, and how they can be used in practice through a series of lectures, hands-on activities (both individual and group-based), equipment demonstrations, and facility tours.

47565 MANE-6962Structural Dynamics

The goal of this course is to study vibrations and dynamics of flexible structures including rods, beams, and strings. Topics include the following. Single and multiple degree of freedom systems. Modeling mass, stiffness and damping of structural elements. Damping treatments including viscous, structural, and coulomb damping. Free and forced response of flexible structures. Influence coefficient methods. Bending, axial and torsional vibrations of flexible structures, natural frequencies and mode shapes, vibration testing and methods to quantify damping. Introduction to numerical methods in structural dynamics including finite element (FEM), Rayleigh-Ritz, and Galerkin methods. Energy methods in structural dynamics – Hamilton's principle and Lagrange equations.

Prerequisites: basic matrix algebra, methods to solve ordinary differential equations, and MATLAB programming.

48152 MANE-6963 Advanced Design Optimization

Graduate level cross-listing of MANE-4280 Design Optimization: Theory and Practice. Students may not get credit for both courses.

MATH-6790 Introduction to Hydrodynamic Stability

Course description

Instability of flows and their transition to turbulence are widespread phenomena in engineering and the natural environment. The course introduces these phenomena by modeling them mathematically, and describing numerical simulations and laboratory experiments.

Prerequisites: MATH-4500 or MATH-4600 and basic knowledge of Fluid Mechanics.

Credit Hours: 4

Course Time: Fall 2017, WF 2:00 – 3:50 PM

Instructor: Isom Herron (660002871)

MATH-6890 Numerical Methods in Fluid and Solid Mechanics

Course Description

This course explores the mathematical theory and application of numerical methods in fluid and solid mechanics. Particular focus will be given to finite difference and finite volume methods, and their application to hyperbolic systems for inviscid flow and elastic solids. In addition, methods for incompressible flow, including staggered and non-staggered approaches, fractional-step and multigrid schemes, will be discussed. Numerical issues involving moving overset and adaptive grids, and fluid-solid couplings will be discussed.

Prerequisites: MATH 6800 and MATH 6840, or equivalent, or permission of instructor.

Credit Hours: 4

Course Time: Fall 2017, MR 10:00 – 11:50 AM

Instructor: William Henshaw (661326701) and Donald Schwendeman (660002257)

MATH-6890 Numerical Methods in Fluid and Solid Mechanics

Course Description

This course explores the mathematical theory and application of numerical methods in fluid and solid mechanics. Particular focus will be given to finite difference and finite volume methods, and their application to hyperbolic systems for inviscid flow and elastic solids. In addition, methods for incompressible flow, including staggered and non-staggered approaches, fractional-step and multigrid schemes, will be discussed. Numerical issues involving moving overset and adaptive grids, and fluid-solid couplings will be discussed.

Prerequisites: MATH 6800 and MATH 6840, or equivalent, or permission of instructor.

Credit Hours: 4

Course Time: Fall 2017, MR 10:00 – 11:50 AM

Instructor: William Henshaw (661326701)

48952/48923 MTLE 4960/6960 – Functional Ceramics

Monday and Thursday, 12:00 to 13:20 pm

Instructor: Jian Shi, RIN 661495450

3 credits

Course description: Structures and properties of functional ceramic materials: atomic structures, defects, electrical, optical, magnetic, electrochemical and dielectric properties. Phase and defects equilibria, charge transport, structural and electronic phase transitions. Case studies on oxide ceramics: ferroelectricity, piezoelectricity, pyroelectricity, electro-optics, shape memory ceramics and solid electrochemistry.

Prerequisites: corequisite MTLE 4100 and MTLE 4150.

48954/48955 MTLE 4961/6961 - Energy Materials

Monday and Thursday, 10:00 to 11:20

Instructor: Ganpati Ramanath, RIN 660059244

3 credits

Course description: Structure-processing-property relationships underpinning the key roles of materials for applications in energy harvesting, conversion, storage and conservation. Topics will include advances and challenges in realizing high-figure-of-merit advanced materials with specific electronic, chemical, mechanical, thermal, electrochemical properties for high efficiency and performance in conventional, sustainable and emergent energy paradigms (e.g., solar cells, thermoelectrics, nuclear fission, fuel cells, batteries, supercapacitors, fossil fuels, bioenergy)

PHYS-4* Condensed Matter Theory Seminar**

Course description

The weekly condensed matter theory seminar will bring together graduate students, postdocs, researchers, and faculty to discuss current topics in the physics of condensed matter theory. The students will earn one credit for their participation. Advanced topics such as many-body quantum physics, use of modern computational techniques to solve new solid state physics problems, and other contemporary subjects will be treated.

Prerequisites: none

Notes: students need to manually register to get into this course. It is limited to students actively involved in CMT research.

Credit Hours: 1

Course Time: Fall 2017, Thursday 12:00-1:00PM (to be repeated each semester)

Instructor: Vincent Meunier

SCHOOL OF HUMANITIES, ARTS & SOCIAL SCIENCES TOPICS COURSES:

ARTS 6960 Composition Seminar

Studio

3 credits

W

12-3:50

Nina Young RIN 661-76-5997

ARTS 696X - Composition Seminar

Composition Seminar focuses on music composition designed to prepare students for the more extensive creative work involved in the Senior Thesis. The course asks students to model a variety of compositional types of as a means to

exposing them to different systems of musical organization and to help them discover a musical linguistic practice that resonates with their own creative aims.

48958 IHSS 6960 – Research Methods

Studio

3 credits

M 10-12:50

Michael Century

IHSS 6960

This course provides a forum for interdisciplinary graduate discourse and community at Rensselaer. Students will curate a series of presentations by guest speakers, faculty, and graduate students. Related readings and writing assignments will be based on colloquium presentations.

ECON 4960 The Economics of Business Cycles [4 credits]

Professor Arturo Estrella

Examines theoretical economic models that can help explain the existence of business cycles (expansions and recessions), looking in particular at the effects of monetary and fiscal policy. The grade will be based on tests, an individual paper, and an in-class presentation.

Prerequisite: ECON 2020 or ECON 4130

ECON 4960 - X1: Applied Game Theory for Economics

* Also cross-listed as 6000 level course

Provide set of tools to analyze strategic interactions among rational decision-makers. Introduce basic concepts in game theory: Nash Equilibrium, pure/mixed strategies, sequential games, subgame perfect equilibrium, backward induction, and games with incomplete information. The concepts will be illustrated by numerous business applications with an emphasis on the healthcare industry and markets, including quantity and price competition, entry and exit, bargaining, and issues of adverse selection.

Prerequisites: ECON 1200 and MATH 2010. ECON 2010 is highly recommended.

ECON 4960 - X2: Econometric Methods for Big Data

* Also cross-listed as 6000 level course

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.

Prerequisites: ECON 1200, MATH 2010, and one of: ENGR 2600 or MGMT 2100 or MATP 4600 or PSYC 2310. ECON 2010 is highly recommended

ECON 4960 - X3: Health Economics

* Also cross-listed as 6000 level course

Examine various facets of the healthcare industry. 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.

Prerequisites: ECON 1200, MATH 1010. ECON 2010 is highly recommended.

ECON 4960 - X4: Behavioral Economics

* Also cross-listed as 6000 level course

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.

Prerequisites: ECON 1200, MATH 1010. ECON 2010 is highly recommended.

ECON 4150: Economics of Government Regulation

* Also cross-listed as 6000 level course

[This course is already in the catalog, but will undergo description changes.]

Faculty: Vivek Ghosal.

Examine regulations related to the environment, intellectual property rights, healthcare, and antitrust. Examine the interaction between regulatory policies and how businesses respond to them with respect to innovation, production, and pricing. Some of the industries and markets examined to highlight the regulatory policy issues include automobiles, information technology, telecommunications and media, healthcare services, pharmaceuticals, medical devices, retail sector, high-speed rail, and taxi and ridesharing.

Prerequisites: ECON 1200, MATH 1010. Econ 2010 is highly recommended.

COGS 4961 Hormones, Brain, & Behavior

(cross-listed with PSYC4961)

Meets: T/W 6:00-7:50

Course description: This course will examine hormone and brain/behavior relationships across the lifespan. Hormones are molecules that are secreted by glands (the majority of which are located outside the brain) and have distal effects on their targets, such as the brain, throughout development. A focus will be on hormones' effects, mechanisms, and brain regions of interest for cognitive processes, such as perception, learning/memory, social cognition, motivation, and emotion.

Prerequisites: PSYC1200 or permission of instructor

COGS 4964 Sensibilities: WritingXDiscipln

Meets: Th 4:00-7:50

Course description: "Sensibilities"—a special ART_X@Rensselaer (Art Across the Curriculum) seminar—draws from the tremendous resource of EMPAC to inspire students to cultivate writing skills through the cross-disciplinary theme of the senses/perception. During the semester students will have opportunities to observe unique art/science presentations and performances in an intimate setting at EMPAC, providing rich experiences for discussions and writing. Classes include reading science and art texts, as well as writing workshops to develop authorial voice and experimentation.

Prerequisites: PSYC1200, or PHIL/PSYC 2120, or permission of instructor

Notes: This course is Communication Intensive. Meets in EMPAC Studio Beta.

PHIL 4960: Introduction to Inductive Logic

Selmer Bringsjord & Naveen Sundar G.

A new paradigm for (formal) logic, an intrinsically computational one, has been invented: LAMA. Hitherto, the bulk of effort in setting out the LAMA paradigm has been invested in the part of logic that is deductive in nature. The hallmark of deductive logic is that the proofs and arguments featured in it follow established inference schemata that, if applied correctly, cannot possibly lead to a reduction in semantic value. For example, if it's certain that a given triangle in Euclidean 2-space has an angle of 45 degrees, it's equally certain that the sum of the remaining two angles is 135 degrees, because there are inference schemata (going back to Euclid) that allow us to reason deductively, and correctly, from the first proposition to the second. In contrast, inductive logic revolves around arguments that allow reductions in semantic value. For instance, even though it may be certain that (1) most beans in the jar are blue, and that (2) bean-22 is in the jar, it's not certain that (3) bean-22 is blue — despite the fact that (as we shall see) one can reason inductively, and correctly, from (1) and (2) to (3) . This class is overall an introduction to the side of the LAMA paradigm that is currently nascent: the inductive-reasoning side. Prerequisites: Introduction to Logic at Rensselaer (in either the "Stanford" or LAMA form), traditional high-school mathematics.

ARTS 2963 DESIGNING MUSICAL GAMES

Students will explore the artistic role of music and sound in gaming by building their own interactive sound and music - rich games and 2D/3D rendered environments. Within the context of their own creative game projects, students will learn the basics of designing sound and composing music for interactive game spaces. Using workflow programming languages and software tools, students will program basic gaming interactions, link them to interactive audio software, and create musical gaming experiences.

Professor Rob Hamilton

IHSS 496X Generative STEM

This class trains students in STEM education techniques based on "bottom-up" value flow. Using ethnomathematics, heritage algorithms, ecological value circulation and other examples of generative justice, we will develop tools and test out learning materials in formal and informal learning environments.

Professor Ron Eglash

IHSS 1974 DESIGN AS GLOBAL CHALLENGE

This course explores the roles of design, technology, and engineering in addressing complex global challenges spanning environmental, economic, and cultural domains. Using a project-based learning approach, the class allows students to work in interdisciplinary teams to design, propose, and advocate their own creative solutions to enduring global challenges. In addition to project work, students will be expected to do weekly reading, to discuss readings in class, and to write reflection pieces based on their readings. This course is designed to help students draw connections between modes of inquiry commonly found in the humanities, arts, and social sciences and those of engineering and the sciences. The class will meet in a once-weekly lecture and twice-weekly breakout sessions that include hands-on project work.

Instructor: Prof. Dean Nieusma

STSS 2961-Society by the numbers

Study of global and national population trends with an emphasis on how population growth and decline affects migration, urbanization, economic development, sustainable development, environmental degradation, food scarcity, and political conflict.

Instructor: Cynthia Cook

Human Rights in History

-- 4 credits (IHSS 1973) Sohasky MR 10-11:50

This course explores the historical development of modern international human rights through the lens of American foreign policy. Through lecture and discussion, this course will guide students in critical analysis of the narratives and national myths surrounding human rights in the history of the United States and the world. Major themes include the origins of human rights, human rights abuses, the human rights regime, human rights institutions, and problems of enforcement. Freshmen only.

Open Source Art, Music and Culture

-- 4 credits (IHSS 1965) Malazita M 4-5:50, W 12-1:50 or 2-3:50

The concept of "Open Source," once exclusively linked to a certain kind of politically and economically engaged set of software production, has experienced a period of growth and transformation in the 21st Century. "Open Source" projects can now be found in disciplines and activities ranging as wide as computer science, hardware development,

artistic practice, design, bio hacking, and social justice work, as well as in artistic and technological experimentations in LGBTQ and racially intersectional communities. Though “Open Source” practices across all these domains vary wildly, a common thread that runs through all these groups is the commitment to collaboration and to distributed “making” tools. Through a hybrid of readings, discussions, and collaborative papers and art projects, this class will explore the dynamics and politics of Open Source knowledge, collaboration, and distributed technical and artistic production. Freshmen only.

Religion in a Global World

-- 4 credit (IHSS 1967) Royer MR 4-5:50

This course explores the role of religion and ritual in the everyday lives of people around the world. It will introduce students to key concepts, themes, and debates in social science and their relevance to present-day issues. We will read classic texts and recent ethnographic reports relating to very different types of societies, from traditional non-western cultures to modern American culture. Freshmen only.

Global Health Challenges

-- 4 credit (IHSS 1963) Cook MR 4-5:50

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), ethnomedical practices, medical ethics, and ways environmental problems impact human health. Freshmen only.

2000 LEVEL COURSES

American History

-- 4 credits Sohasky TF 12-1:50pm (STSH 2962)

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.

Medicine and Society

-- 4 credits (STSH 2960/STSS 2400) Cook MR 12-1:50

This course explores the social dimensions of health and medicine, examining factors shaping disease, access to health care, and therapeutic choices. It also explores the different stakeholders in health (doctors, nurses, patients, parents) and their interaction.

Society by Numbers

-- 4 credits (STSS) Cook (STSS/H 2961) TF 2-3:50

This course studies global and national population trends with an emphasis on how population growth and decline affects migration, urbanization, economic development, sustainable development, environmental degradation, food scarcity, and political conflict.

4000 LEVEL COURSES

STS Research Design

-- 4 credits (STSS 4969) Kinchy MR 10-11:50

This is the first part of a two-semester senior project sequence for majors in STS Sustainability Studies and Science and Technology Studies. Students who successfully complete this course will be able to identify and investigate important research topics, construct theoretically-informed research questions, select research methods that are appropriate to their questions, review the relevant research literature, and compose compelling research proposals. Students will practice methods of locating, generating, managing, and analyzing diverse forms of data, as relevant to their senior projects. The course also addresses research ethics and the practical challenges of carrying out a research project.

Economic Policy

-- 4 credits (STSS 4963) Gowdy MR 10-11:50

The purpose of this course is to apply economics, broadly defined, to an examination of current events and crises. The course will examine differing economic viewpoints and the theoretical frameworks that underlie various policy positions. Topics covered are health care, inequality, sustainability and the Anthropocene, globalization and modernization, and economic development. As we move through the course we will look for connections among these issues and the underlying economic drivers of the many crises the modern world is facing at this juncture in human history.

International Economics and Globalization STSS 4961

-- 4 credits Duchin MR 10-11:50 (SUST)

This course provides a broad perspective on the critical issues surrounding economic globalization in terms of a number of specific, interrelated topics: the aftermath of the Great Recession of 2007-2008, international trade and financial flows, technological innovation and intellectual property, the roles of national governments and transnational corporations, access to natural resources and environmental challenges, what is happening in selected industries and selected countries, and social and demographic changes. We examine the roles of major inter-governmental organizations such as the World Trade Organization and the International Monetary Fund. Throughout the course we consider the economic, social, and environmental challenges associated with globalization -- namely poverty and development, resource depletion and pollution -- and what can be done about them. You are no doubt familiar with many parts of this picture; in this course we relate them to the current events you will find in the news and assemble the parts into an integrated whole. We identify some of the major controversies regarding globalization and use an evidence-based approach to evaluate alternative views about them.

Economy, Technology, and Sustainability

-- 4 credits STSS 4960 Duchin MR 2-3:50 (SUST)

This course is about critical challenges to sustainable economic development on local to global scales and focuses on ways of addressing them. We examine options surrounding water, food, materials and energy, technological alternatives, consumption behavior, public policy, and civil society institutions. Each student will conduct independent research on a subject area of his or her choosing, report progress on it in an oral presentation, and write up the study as a term paper.

Gender In Culture

– 1 credit (STSS 4963) K Fortun T 6:30 – 9:30 pm

This course revolves around documentary films that examine diverse gender issues in settings around the world. Following film screenings, facilitated discussion will encourage critical perspective and

Gender in History

-- 4 cr (STSH 4960/STSS 4962) Costelloe-Kuehn T 6:30 – 9:30 pm + W 12-12:50

This course is designed to compliment Gender in Culture, a one credit film-based course (that students will be auto-enrolled in) exploring how gender and culture intersect in settings around the world. Gender in History will provide an opportunity to dive deeper into the topics covered by the films, discussing resonant readings and conducting original research. Researchers, activists and other members of the community will join the class as guest discussants.

Futurism: Utopias and Dystopias

– 4 credits (STSS 4965) Woodhouse TF 2 – 3:50 pm

Fiction-based, including sci fi, but also social and scientific scenarios on future work/leisure, radical abundance via nanotechnology, virtual realities, real democracy, transhumanism, space colonization. Classroom: Discussion, videos, oral presentations – not lecture. Major research project of student's choice. Considerable reading.

Digital Design in History

- (STSS 4972) Malazita TF 10-11:50 am

This course will trace the history of digital media, design, and art from the 18th to the 21st century, focusing not only on the development of new technologies and design practices, but also on the philosophical and cultural shifts about knowledge, art, and design that occur through and with digital and electronic technology. Through a combination of readings and hands-on interactions with digital design tools, students will think through how the social and technical qualities of digital design tools influence the ways in which we construct and create art, technology, and knowledge.

Social Movements

- 4 credits (STSS 4964) Mascarenhas TF 2:00 - 3:50pm

This interdisciplinary seminar links #blacklivesmatter" movements with populist nationalism movements. We will examine these movement within four broad phenomena: 1) the rise of the U.S. prison industrial complex and its relationship to the increasing militarization of inner city communities 2) the role of the media industry in influencing national conversations about race and racism and 3) the state of racial justice activism in the context of a neoliberal Obama Presidency and 4) the increasingly populist nature of anti-Muslim and nationalism movements in the contemporary United States and Europe.

Archive Politics

– 4 cr (STS 4964/STSS4970) Sohasky MR 4-5:50pm

How do nations choose what information to preserve and protect, and what are the mechanisms by which nations conceal or forget? This discussion-based course will interrogate the politics of archives, museums, memorials, and other repositories of national memory. Topics include the history of collecting, the preservation and destruction of electronic data and materials, collective and national memory, barriers to access of information, the protection of information, and information in the digital age.