

## SPRING 2010

### TOPICS COURSE DESCRIPTIONS

**ARCH-4962.OC Material Sensibility CRN53228** (TAUGHT IN NYC / SOM) Material sensibility explores the intersections between material effects, surface strategy, structural performance and spatial dimensions. The notion of sensibility refers to having awareness for and the ability to respond to the potential for innovation through a material driven design process. Contemporary processes and techniques in the design of architecture provide novel ways for creating and describing but often more robust in the generative processes which do not accurately take into account the tactile nature of architecture. What can architecture offer besides a formal value? Can architecture exhibit beauty and sensibility simultaneously? How does this affect the way architects conceive of design responses and form solutions? Fareh Garba. Limited NYC/SOM students only. Cr. 2.

**ARCH-4963 Production Installation Performance (PIP) CRN53229** An interdisciplinary opportunity grounded in the project of creating a time-based art in physical dimension and space. The performance design concept and its development shall be considered a commissioning: of a unique production based on the premise that performance: movement, sound and its situation; place, set, props be integral – in the design and execution of the commissioned piece. Participants: limited enrollment of 20 including a balanced number of upper –class undergraduate and graduate students under the guidance of Rensselaer faculty and a commissioned performing artist. Michael Oatman. T 2:00 – 6:00 pm GR206.

**ARCH-4969 Analogical Models: Contemporary Art Theory and Practice CRN53231** The discipline of architecture is anything but pure and is arguably a hybrid-like construct of disparate bodies of knowledge. In the current moment and immediate past, architecture has looked primarily towards technological or philosophical space as a vehicle for the advancement of architectural thought. A close and nuanced examination of contemporary art theory/practice yields a vast and dynamic field of possibilities for the re-thinking of architectural production. Through a close examination of key contemporary artists and theoretical arguments the seminar will examine the possibility of rethinking architectural space through the frame of critical art practices. Anthony Titus. W 10 – 12:00. Cr. 2. Limited to 16 students.

**ARCH-4961/CIVL4961 Bedford Seminar (T) CRN 51699/51700** This interdisciplinary course with students in architecture and civil engineering. The lectures are based on technology as a

form generator with particular emphasis on structural engineering and advanced structures. The course will examine how architectural concepts can be generated with appropriate structural systems. Specific projects will be examined and new projects will be explored by teams of architects and engineers. The course will focus on fundamentals for quick evaluations of ideas to develop schemes that satisfy specific project requirements. The students will be exposed to the collaborative methods inherent within the architect/engineer relationship. Limited Enrollment: 8 Arch / 8 Civil Eng students (selection based on seniority) Prerequisites: Architecture Students – Arch 2330 Structures 1, Arch 4330 Structures 2. Civil Engineering Students – Civil 2670 Intro to Structural Engineering. TW 6-9 pm – meets 2 evenings per month (TBA). Bedford Visiting Professor, TBA . Cr. 2.

**ARCH-4964.EXC URBAN NARRATIVES CRN 53225** (China Program Students Only). Cr. 2.

**ARCH-4965 Advanced Architectural Modeling CRN 53230** The course will focus on advanced modeling, visualization, and fabrication techniques. Topics covered will include 1) advanced NURBS, mesh, and SubD modeling; 2) visualization workflow – 3D render passes, HDRI lighting and 2D post-production work; 3) parametric modeling for complex surface fabrication – contouring method, paneling method, and component population method. Ted Ngai. W 10 – 12:00. Cr. 2 . Limited to 16 students.

**ARCH-4966 Chinese Arch & Urbanism CRN 53224** (China Program Students Only). Cr. 4.

**ARCH-4967 Design Philosophies: Towards a New Technique CRN 53093** This course will explore and critique the philosophical, intellectual, and aesthetic texts that have influenced recent design and theoretic trends in contemporary architecture, practice and criticism. Focusing primarily on the seminal texts that influenced the design and theoretical trajectories of the most influential minds in architecture over the last fifteen years, a comprehensive critique of the current trends in architectural design theory will emerge. Each student will be expected to make a presentation and write a paper on the subject of the course. Jefferson Ellinger. M 10:00 – 12:00. Cr. 2. Limited to 16 students.

**ARCH-4968 Sustainable Building Design Metrics (T) CRN 53094** A review of current and anticipated metrics associated with sustainable building design will be covered as well as changes in the building industry will be discussed. A review of how sustainable design practices can mitigate the climate change in a positive way will also be addressed. An understanding of energy terminology is useful for this course. Course Objectives: Impact of building design and

construction on the environment and associated climate change concerns. Design considerations for architecture and engineering in new construction and renovations. Opportunities for improvements in renovation projects. Oliver Holmes, T 9:00 – 9:50 pm, Cr. 1

**ARCH-4969 Analogical Models: Contemporary Art Theory and Practice CRN 53231**

Anthony Titus. W 10 – 12:00. Cr. 2. Limited to 16 students.

**ARCH-4970 Morphogenetic Structures CRN 53232** This course explores developments of complex and dynamic forms in context of their structural feasibility. Evolution of topologies are of special interest. The form finding investigation and evaluation will include lab testing of physical models in conjunction with computer simulation and optimization processes. In addition fragility of the forms will be conceptually assessed. This is a project based course that will also allow for deeper explorations of architectural designs driven by student interests. Prerequisites are ARCH 2330 and ARCH 4330.. Ivan Markov. TF 12:00 – 2:00 pm. Cr. 4. Limited to 16 students.

**ARCH- 4971 The Production of Space CRN 53233** This seminar re-examines the theories and projections of the critical production of space in hypermodernity, drawing upon the philosophy of Lefebvre to Deleuze, in dialogue with the marvelous architectural propositions of the Situationists, Archigram, and Metabolism. Students will develop their own theoretical mastery of spatial multiplicities through individual research programs. Thomas Mical. MR 10 – 12:00. Cr 4. Limited to 16 students.

**ARCH-4974-EXC Chinese Lang & Culture CRN 53226** (China Program Students Only) Cr. 4.

**ARCH-4975-EXC Calligraphy Painting CRN 53227** (China Program Students Only). Cr. 2.

**ARTS-2961 Graphic Storytelling CRN 52033**

A studio arts course exploring the fundamental concepts, techniques, styles and mechanics used in the creation of graphic image making. Contents to be covered include purposes and formats of storyboards, basic terminology and concepts used in storyboarding, and the applications of storyboard techniques to the creation of storyboards with or without a written script. Key visual storytelling structures are explored for the following industry applications: comics, animated films, graphic novels, commercials, documentaries, live action feature films,

and video gaming. Note: Students who have taken IHSS Graphic Storytelling may not enroll. Prereq: ARTS 1020 OR ARTS 1200. Cr: 4 Instr: Blum

### **ARTS-4010 Interactive Arts Programming CRN 51068**

This special offering of IAP joins forces with IT and EMPAC for technical instruction, advanced projects and investigation of the resources of EMPAC. Email instructor for more detail. Meets w/ARTS-6965 and ITEC-4961. Cr: 4 Instr: Bahn

### **ARTS-4961 Advanced Video 3: TV Production CRN 52460**

This advanced video course puts the focus on content development and production for iEAR tv! which is on campus cable, channel 55. Class members will collaborate to develop, document and create content for the channel. As a class we will be conducting three camera shoot documentation for the iEAR Presents! series and develop an original television show. Students will solidify skills in pre-production, production and post production, as well as gain new experience in directing, writing and performing. This high energy and creative class will also be a great opportunity to add some production clips to your portfolio reel. Prereq: ARTS-1010 Cr: 4 Instr: Bustamante

### **ARTS-4962 Experimental Telepresence CRN 52035**

This semester will continue the investigation of the INTERNET as an experimental venue for audio and video performance through improvisation and composition. Building on the NSF CreativeIT funded research in telepresence developed by Arts professor Pauline Oliveros and Architecture professor Jonas Braasch at RPI with Post Doctoral research associate Doug van Nort we will connect with other institutions using a variety of media in local and co-located performances. Triple Point - the NSF lab trio will collaborate with the seminar multimedia ensemble Tintinnabulate. The Creative Artificially Intelligent Agent (CAIM) will be tested and included as a resource for projects. Prereq: ARTS 2020, or ARTS 4410, or permission of instructor. Meets w/Arts 6962. Cr: 4 Instr: Oliveros, Braasch (co-advisor, ARCH), van Nort

### **ARTS-4963 Senior EART Thesis Studio CRN 52461**

This seminar is the culminating course for senior EART majors to develop and complete a comprehensive thesis project including final documentation and graduation portfolio. The course will combine group discussions, readings and assignments, with independent meetings and guided research/artistic development. Your project may involve and integrate research/artistic production in all the electronic media. The final Thesis is expected to realize a unique accomplishment, demonstrating independent ideas, creativity, artistic production, research, and writing skills. Cr: 4 Instr: Miller

### **ARTS-4964 Advanced Computer Music CRN 53209**

This will be a project-based class with a special emphasis on how electronic music engages sound in space. Topics will include technological solutions for spatializing sound and compositional approaches that consider space as a principle element. Students will develop the practical skills needed to compose with sound in space. Final projects will consist of installations and performances. Cr: 4 Instr: Hopson

### **ARTS-4965 Advanced Digital 2D Projects: Advanced 2D motion graphics and compositing CRN 53280**

Using After Effects as the primary software platform, this studio class will focus on the development of individual art projects that use special effects to communicate the personal vision of the student. Using combinations of still and video images, students will learn the fundamentals of keyframing, applying effects over time, field and frame rendering, creating mattes and rotoscoping. More advanced techniques may include the integration of live action and 2D/3D environments using green screen techniques. Prereq: ARTS-4070 or permission of instructor. Cr: 4 Instr: Goldsmith

### **ARTS-6961 Arts Writing, Research, Laboratories CRN 52462**

This course will be an advanced seminar focusing on writing and research for the M.F.A. and Ph.D. in Electronic Arts. Writing techniques and conventions and research methods will be featured. There will be a number of visits with artists, researchers and curators whose work can serve as case studies for research, writing, and creative practice. The course is intended as a "laboratory" for experimentation and a forum to enhance the diverse components of graduate students' work. Cr: 3 Instr: Staniszewski

### **ARTS-6962 Experimental Telepresence CRN 52036**

This semester will continue the investigation of the INTERNET as an experimental venue for audio and video performance through improvisation and composition. Building on the NSF CreativeIT funded research in telepresence developed by Arts professor Pauline Oliveros and Architecture professor Jonas Braasch at RPI with Post Doctoral research associate Doug van Nort we will connect with other institutions using a variety of media in local and co-located performances. Triple Point - the NSF lab trio will collaborate with the seminar multimedia ensemble Tintinnabulate. The Creative Artificially Intelligent Agent (CAIM) will be tested and included as a resource for projects. Meets w/Arts 4962. Cr: 3 Instr: Oliveros, Braasch (co-advisor, ARCH), van Nort

### **ARTS-6963 Speculative Fictions CRN 53208**

Speculative Fictions is an advanced narrative video production and theory course that will look at the areas of science fictions, the fictions of science, the fictions of utopia and dystopia, paranormal and supernatural fictions, and alternative histories. 'Speculative fiction' is a genre that looks at the real world and extends what we know and think about it, building on the 'real'. Students will produce videos relating to their own particular area of interest falling under this umbrella of 'speculative fiction'. The readings for this class will include Margaret Atwood's latest novel, *The Year of the Flood*, as well as other related texts. Cr: 3 Instr: High

#### **ARTS-6964 Advanced Computer Music CRN 53210**

This will be a project-based class with a special emphasis on how electronic music engages sound in space. Topics will include technological solutions for spatializing sound and compositional approaches that consider space as a principle element. Students will develop the practical skills needed to compose with sound in space. Final projects will consist of installations and performances. Cr: 3 Instr: Hopson

#### **ARTS-6965 Interactive Arts Programming CRN 52545**

This special offering of IAP joins forces with IT and EMPAC for technical instruction, advanced projects and investigation of the resources of EMPAC. Email instructor for more detail. Meets w/ARTS-4010 and ITEC-4961. Cr: 3 Instr: Bahn

#### **ARTS-6966 Art, Community, Technology CRN 51702**

Through direct experience in the community, this course explores the complex roles and relationships of art, education and technology. Students will develop a plan to work with a media arts center, community organization or school; final teams will produce real-world arts and education projects that ultimately will be realized as significant additions to their professional portfolio. The projects can include a range from traditional arts practice to creative writing, creative IT models to community art and activism. Students from a wide interdisciplinary range of studies are encouraged to enroll: a strong interest in how you can integrate creativity into your own knowledge base, and a desire to do field work in the community, are all that is required. Meets w/ARTS 4080. Cr: 3 Instr: Miller

#### **BMED 4968/6965 BIOL 6964 CRN 52055/52056/52064 MUSCLE MECHANICS**

An examination of the structural and physiologic properties that affect muscle force production and overall biomechanical function. Muscle structure and function will be explored at the protein, single fiber and whole tissue levels. Topics include muscle morphology, cross-bridge theory, molecular motor and actomyosin interaction, Hill-type and Huxley-type models, electromyography, fatigue, muscle inhibition, history-dependent phenomena, in vitro and in vivo muscle function, and the response to injury.

### **BMED 6963 DISCUSSIONS IN GRADUATE RESEARCH CRN 52015**

This graduate level lecture-seminar course will introduce various models, tools and contemporary practices for conducting and establishing a successful biomedical research enterprise in academic and industrial environments. The emphasis of the course will be on the following: models and types of research relevant to federal funding agencies (NIH, NSF) and venture capital funding; the art of grantsmanship; research design for hypothesis and non-hypothesis driven research; scientific publications, networking, collaboration, communication and scientific presentation.

### **BMED 6962 INTRO TO CELL/TISSUE ENGINEERING CRN 53267**

"This course teaches the use of engineering principles to describe cellular processes of biological, chemical, and physical nature. This course will also cover the essential tissue engineering technologies to manipulate, produce and deliver collection of cells to achieve desired functional properties."

### **CHEM-4961/6962/6964 Entrepreneurship in Plastic Materials**

#### **CRN – 53080/53079/53269**

This course will examine how plastic materials are developed and commercialized in start-up companies and large corporations for commodity and specialized industrial applications. In addition, the course emphasizes the development of ideas and understanding beyond the knowledge of plastics to provide students with a comprehensive understanding on the intellectual properties and entrepreneurship of new plastic materials. The course will include the case studies how entrepreneurship efforts have been made by small R&D laboratories to commercial scale as commodity and industrial products. Topics to be discussed will include (1) the chemistry and commercialization of plastic materials starting from the monomer/polymer chemistry to their use in emerging applications including green technology and nanotechnology, (2) grant proposal writing, intellectual property and patents in collaborations with Rensselaer Incubator Program and Office of Technology Commercialization at RPI. Finally, (3) industrial guest speakers will be invited to share their experiences in the development and commercialization of new plastic materials in a format of start-up companies or large corporations.

**CHEM-6961 Glycochemistry, Glycobiology and Glycotechnology CRN 53078**

This course is a modern version of carbohydrate chemistry that focuses on the biological and materials properties and applications of carbohydrates. Carbohydrate nomenclature, structure, analysis, synthesis and activity will be discussed. The well prepared student should have a basic understanding of organic chemistry, analytical chemistry and biochemistry.

**CHME 4965/6965 Single Molecules to Complex Fluids CRN 53253/53186**

This class will focus on how the behavior of single molecules (and interactions between them) lead to macroscopically complex fluids. Complex fluids are materials that have some properties of a liquid and some properties of a solid. They include polymers, colloidal suspensions, emulsions, foams, gels, liquid crystals, and surfactants. They also include many biological materials such as DNA, RNA, and cellular filaments. We will study these systems both at the microscale and the macroscale. At the microscale, we will discuss the use of fluorescence microscopy and computer simulations to understand the behavior of single molecules. At the macroscale, we will discuss experimental rheological measurements and non-Newtonian constitutive equation models. This class will help prepare students for a number of industries including petroleum, consumer products, microelectronics, and pharmaceutical. Prerequisite: CHME 4020 (or equivalent) or permission of instructor.

**CIVL 4962 – 53127 INTELLIGENT TRANSPORTATION SYSTEMS CRN 53127**

The course discusses Intelligent Transportation Systems (ITS) technologies and its application areas. ITS technologies. ITS Architecture. ITS applications. A number of outside speakers will complement the lectures. The students are expected to give at least two technical presentations and write a final paper on an ITS topic of their choosing. Prerequisite: CIVL 2030 or equivalent. 3 Credit Hours. M R 2:00-3:50 PM.

**COGS-4960-01 TOPICS IN COGNITIVE SCIENCE: GAME DEVELOPMENT II. CRN 532365**

Game Development II is the culminating experience of the Game and Simulation Arts & Sciences degree. It is a studio course in which interdisciplinary groups of students (artists, designers, programmers) develop an advanced, large-scale 3D digital interactive experience, to be evaluated at the annual GameFest symposium. Prerequisite: Game Development I. 4 crs.

**COGS-6961-01 ISSUES IN COGNITIVE SCIENCE. CRN 50919**

Each Wednesday features a different speaker, faculty, grad student, or undergraduate, discussing their research. Every other Wednesday the course meets with the undergraduate Minds & Machine program. On the other Wednesdays the graduate faculty and students meet to discuss work in progress, or newly published research papers. All participants are expected to present a minimum of once per semester. All are expected to read the papers and participate in the discussions. 2 crs.

### **COGS-6962-01 ORIGINS OF MUSIC CRN 53150**

Why do we listen to music? In this seminar course we will read current scientific thought about what music is and why we humans like it. Each student will come up with a scientific hypothesis related in some way to the origins of music, and spend the semester testing it. Meets with PSYC-4968.

4 credits.

### **COGS-6964-01 COGNITIVE SCIENCE AND ECONOMICS CRN 52368**

Noble Prize winner Douglass North once used about the same title for his speech (2004). Cognitive and experimental economics is a fast growing domain. It will cover game theoretical framework (Nash, Noble Prize in Economics, 1994), behavioral game theory (C. Camerer, 2001), standard decision theory (Savage, 1954), bounded rationality (Simon, Noble Prize in Economics, 1978), and psychology of decision making (Kahneman, Noble Prize in Economics, 2002), and much more recent developments. The instructor's approach is also introduced. Meets with PSYC-4966. 4 crs.

### **COGS-6966-01 TOPICS IN INTERACTIVE BEHAVIOR CRN 51704**

Is an advanced research seminar for students who are actively pursuing research in the area of interactive behavior. Each student will be required to create a reading list of new and classic research papers devoted to their area of study. Each will be required to collect empirical data and to create computational cognitive models of that data. Each student will meet once a week with the instructor for a 1-hr meeting. All students will be expected to participate in

a weekly research meeting where research and modeling issues are defined and discussed. In addition, all students will meet in a second weekly session devoted to reading and discussing recent and classic papers on interactive behavior. As part of this course, all students will be expected to attend and participate in the weekly Issues in Cognitive Science series. All students

are expected to write up and submit the results of research conducted for this seminar to a conference or journal. 4 crs.

### **COGS-6967-01 HUMAN-LEVEL INTELLIGENCE CRN 53152**

Topics in cognitive models of human intelligence and human-level artificial intelligence will be covered. Readings and discussion will concentrate on a broad theme, begin with some foundational and historical perspective and then proceed to more recent work. Example topics include integrating cognitive models based on different computational formalisms, integrating reasoning and learning, metacognition and models of language use and acquisition. 4 crs.

### **COMM-1961-01 History and Culture of Games CRN 51705**

History and Culture of Games surveys 5000 years of game history, from ancient Sumeria to the latest next-generation consoles and MMOGs.

In parallel with this historical tour, we will examine several major theories about the nature of play and the nature of games. Along the way we will also look at how games and play influence the cultures they are found in, and how culture in turn influences how people structure their leisure time.

### **COMM-2960-01 Religion in the Media CRN 53202**

How are religious fundamentalists using new media? Can religious conversion take place in a theme park? How are religious “crossover” films transforming political and popular cultural landscapes? This course maps the complex intersections of religion, culture, and media in the global transformations of religious traditions and explores, through a media frame, “the return of religion” within the secular consensus of modernity. 4 credit hours.

### **COMM-4963-01 Interactive Technology: Designing for the Future CRN 52427**

In this course students will work in interdisciplinary teams to develop innovative projects using interactive electronic technology. The course will focus on principles of interaction design, creative problem solving, and entrepreneurship. Teams will work with local entrepreneurs who will provide feedback throughout the design and development of the projects. Guest speakers will include successful entrepreneurs who will cover topics such as opportunity and market assessment, intellectual property, business plans, funding, and networking opportunities.

### **COMM-6960-01 Research Methods in HCI CRN 53203**

This course will cover the most common research methodologies utilized within the field of human-computer interaction. At the completion of the course students will have been introduced to and have functional knowledge of both quantitative and qualitative research methods. Methodological topics will include experimental design, user observation in both experimental and naturalistic settings, usability studies and methods for technology evaluation, in addition to an array of other HCI methods. 3 credit hours.

**COMM-6961-01 Social and Emotional HCI CRN 53204**

The field of Human-Computer Interaction is concerned not just with the physical, cognitive, and goal-oriented aspects of interaction, but also with the design of interfaces and the underlying technologies that engage peoples' emotions, values and social interaction strategies. Social and emotional context is an important part of user engagement with interaction systems. Students will engage in dialog and activities around the theory, design and evaluation of the social and emotional aspects of interactive technologies. 3 credit hours.

**COMM-6965 -01 Human-Media Interaction CRN 52430**

An advanced survey of the literature with regard to how the human mind has evolved and/or 'not' adapted to, interact with media and computers; how people socially respond to interactive environments; how media & interactivity create a sense of 'being there' and/or 'being together with someone,' and how properties of human cognition and affect (e.g., emotion, arousal, attention, memory, attitude) are influenced by the form, content, and use of media and computers.

**CSCI 4961/01 Web Systems Development CRN 53141**

Instructor: Jim Hendler

4 credits

TF 2:00 - 3:50, W 4:00-5:50

This course involves a study of the methods used to extract and deliver dynamic information on the World Wide Web. The course uses a hands-on approach in which students actively develop Web-based software systems. Additional topics include installation, configuration, and management of Web servers. Students are required to have access to a PC on which they can install software such as a Web server and various programming environments. Meets with ITEC-2110

**CSCI-4963/01 / 6963/01 E-Commerce, Social Networks, and Collective Intelligence CRNs 53143/53144**

Instructor: Sanmay Das

MR 10:00-11:50

Max 40

The internet has transformed how people interact with each other, lowering the cost of communication, and enabling us to rapidly both discover and pass on new information. This transformation has had major impacts in how we conduct market transactions (think of eBay, Orbitz, or Amazon), how we maintain our social personae (Facebook, Twitter), and how we accumulate and produce knowledge for consumption (Wikipedia,

Yelp). This course will cover theoretical foundations of e-commerce and social networks, as well as focusing on practical aspects of understanding how the design of online venues affects the interactions of participants and the success of the venue.

**CSCI 4964/01 / 6964/01 Computational Biology CRNs 53145 / 53146**

Instructor: Mohammed Zaki

MR 10:00

Max 40

This course is about computational methods for understanding biological systems at the molecular level. It introduces the main concepts in computational biology and bioinformatics, including sequence analysis, structure analysis, and systems biology. Topics of interest include sequence alignment, motif finding, phylogenetic trees, whole genome comparisons, protein structure prediction, gene expression analysis, with special emphasis on the analysis of biological networks such as gene regulatory & signaling networks, and protein-protein interaction networks.

**CSCI 4966/01 / 6966/01 Approximation Algorithms CRNs 53147 / 53148**

Instructor: Elliot Anshelevich

TF 12:00 - 1:50

Max capacity 40

This course is an advanced topics course in approximation algorithms; previous experience with approximation algorithms is recommended.

Possible topics include: semi-definite programming, inapproximability and the PCP theorem, iterated rounding, metrics and cuts, primal-dual methods, online algorithms, and the unique games conjecture. We 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.

Prerequisites: CSCI 4020 or equivalent

**CSCI-6961 Open Problems in Graph Theory CRN 53142**

Instructor: Mark Goldberg

W 2:00-4:50

Max enrollment: 15

The objective of this course is to study the background of several open problems in Graph Theory. Examples include: The reconstruction conjecture; the Erdos-Faber-Lovasz Conjecture; and the Goldberg-Seymour Conjecture;

**DSES-4963/01 Theory of Production Scheduling CRN 52498**

See the catalog description for DSES-6210

**ECON 4962/01 Law and Economics CRN 53272**

Market-based economies depend upon legal systems that establish and protect property rights. In this and many other instances the law is designed to encourage and support economic activity; in others it is designed to restrain certain types of otherwise rational, economic behavior. This course will apply fundamental economic concepts, such as supply and demand, competition, monopoly, externalities, and pareto efficiency to a range of legal topics, including contracts, torts, and criminal law to explain the economic motivation and

consequences of the legal framework.

Prerequisite: ECON 1200

MR 6-7:50

Instructor: Bob Jones

**ECSE 4966-01/6966-01 High Speed Comm ICs CRNs 53292/53293**

Analysis and design of high-speed communication circuits for wireless and wire-line communications.

Emphasis on understanding

electromagnetic effects in silicon-integrated RF/microwave circuits. Study of noise, linearity, and bandwidth enhancement techniques in narrowband/broadband amplifiers. Emphasis on intuitive design methods, physical understanding,

quantitative performance evaluation using both hand calculation and simulation. Understanding of technology limitations. Topics include passive devices' design and modeling, narrow-band and wide-band amplifier design, noise in

communication circuits, design of low noise amplifiers, mixers, oscillators, power amplifiers, types of wireless transceivers,

design of transimpedance amplifiers, clock and data recovery circuits, and wire-line transceiver architectures.

Pre-req: Basic Analog Circuits (Introduction to Electronics/Analog Electronics ECSE-2050), Electromagnetic Basics (Field and Waves I ECSE-2100), Properties of Transistors (Microelectronic Technology ECSE-2210).

**ENGR-1962/01,02,03,04 Engineering Communication, Visualization, and Documentation  
CRNs 52298, 52299, 52300, 53048**

Engineers interact with a variety of stakeholders to attain goals. If they cannot transmit understandably and persuasively the results of their work, they can accomplish very little. Moreover, if engineers cannot communicate with others what they are doing and why it is important, they and their contributions will be neither recognized nor appreciated. Good communication skills are essential for success and survival in the real world. This hands-on course introduces the methods and tools for visualizing technical information, planning projects, and communicating engineering work. Topics include system modeling, data visualization, engineering graphics and CAD, project planning and proposal writing, and effective uses of software tools. Students may choose ENGR-1962 as an alternative to ENGR-1200.

Cr. 1

**ENGR-2960/01 Computer Aided Machining II CRN 53054**

CAM II will expand on CAM I fundamentals focusing on the use of CAM systems for creating and producing parts. Students will import CAD data into NX CAM and/or MasterCAM to create NC code to produce parts under the guidance of SOE staff.

Course Objectives

1. Gain a more in-depth knowledge and appreciation of CNC programming for both the milling and turning using CAM systems to create NC code,

2. Gain a more in-depth knowledge of CNC machine setup and operation,
3. Gain knowledge in the use of measuring tools, including CNC coordinate measurement machines, to ensure the critical tolerances on machined parts are correct,
4. Gain a better understanding of the CAD to CAM process,
5. Apply CAM programming methods to machine parts.

Prerequisite - ENGR-2720 Computer Aided Machining (CAM)

Cr. 1

### **ENGR 4961/01 - PDI Design Studio 6 CRN 50591**

This design studio course is the sixth in the PDI studio sequence. It explores the variety of challenges confronted in moving a product idea from concept to market including new product and production economics, financial modeling of new ventures, market analysis, distribution planning, product risk and safety analysis, consumer trends analysis, social/environmental impact analysis, and advertising design.

Prerequisites: ENGR 2050 (IED) and STSH 4610 (PDI Design Studio 5).

Credit Hours: 4

Contact, Lecture or Lab Hours: 6 contact hours

### **ERTH 4962/01 Texture Forms & Geochemistry of Rocks CRN 53268**

Lecturer: T. Mueller

Credits: 3

Time: Wed 10:00 – 11:50

Grade: 3 Homeworks (30%) + final exam (70%)

The crystallization history of a rock is typically recorded in several ways and on different scales. On the scale of a thin section, interpretation of mineral textures of igneous and metamorphic rocks is commonly based on equilibrium thermodynamic calculations that lead to information on P-T-X conditions during crystal growth. Compositional changes within single metamorphic mineral grains are taken as a record of evolving P-T conditions that are constrained by appropriate mineral reactions and phase equilibria and element as well as isotope profiles in magmatic minerals have been used to constrain parental magma compositions and temperatures of crystallization. However, all of these interpretations assume that equilibrium was reached at the scale of interest. In contrast, there are significant indications for non-equilibrium textures highlighting the need to invoke kinetic effects on texture formation. Exploring the kinetic effects on compositional profiles and textures provide a variety of information on timescales and

rates of crystallization.

This course will briefly review the basic concept of thermodynamics and discuss mechanisms and rates of nucleation and growth of minerals in both igneous and metamorphic systems. Further topics will cover crystal size distributions (CSD's), transition state theory, meta-stability as well as diffusion, cooling rates and rates of geological processes (geospeedometry).

### **ERTH 4961/01 / 6961/01 Plates and their Boundaries CRNs 53134 / 53133**

2 credit course

This class will explore the kinematics, mechanics, and geography of the Earth's tectonic plates. We will discuss how we describe plate motions, methods to measure plate motions (GPS, magnetics, earthquakes), plate interactions at boundaries, plate driving mechanisms, and a global overview of tectonic settings. Course material will be published papers and selected chapters from books (no specific textbook). Students will give occasional presentations to the class and be expected to keep up on the required readings. Grades will be based on the presentations and general participation in the discussions. Meeting time and place will be determined to meet the needs of the participants. If interested, contact Prof. McCaffrey ([mccafr@rpi.edu](mailto:mccafr@rpi.edu)).

### **IHSS-1970/01 Design History & Society CRN 52010**

How have the relationships between place and culture changed over time, and how does design mediate these two ideas? What role do boundaries play in today's world-and what effect does globalization have on the distinctiveness of places? How do different groups lay claim to urban space? Does space have a politics? The readings, lectures, films and projects which make up this course are designed to help you think expansively about the relationship between space and culture in an historical and contemporary context, and examine the difference space, place and design make in shaping our experiences of the world.

This class consists of a mix of lecture and multi-media session. Part of each class will be devoted to discussion of ideas brought up in class and in weekly readings, group projects, and student presentations. Since this is a writing intensive course, your evaluation will be based almost entirely on written work. These activities are designed to give you a variety of ways to think about the world around you with 'new eyes'. We will examine urban design in an historical context in an effort to excavate the different layers of meaning in the built environment, as well as examining the contemporary urban scene as observers, seeking to understand the dynamic relationship between design and society in the present. The projects are designed to strengthen your different skills as a researcher. The newspaper project (individual) will give you a taste of historical research. The urban field trip is an exercise in "learning by doing," that is, actually going out in the world and making sense of what you see.

### **ITEC-4961/01 ARTS 6965/01 IT FOR ARTS AND PERFORMANCE CRN 52620 / 52545**

This course will cover IT based, multi-modal systems (systems that address human perception and expression) and standards used within the arts and for immersive environments. Topics will include discussion of control vs. recording vs. generative systems and their relationship to one another in a facility such as EMPAC. An emphasis will be placed on the practical issues faced by IT professionals in arts

applications and in immersive environments (visualization etc.). Students will take on a project of their own design to interactively control some part of an EMPAC system with a connected computer. Students will also be given the opportunity to interact in a meaningful way with resident EMPAC artists/researchers, and to participate in “basic training” on IT, lighting, video, audio and rigging systems operation at EMPAC.

Prerequisites: Proficiency in a “real-time-capable” programming language (Java, C++, Max/MSP et al.).

*4 credits*

Instrs. – Curtis Bahn and Eric Ameres

### **MANE 6961/01 Aerodynamic Flow Control CRN 53254**

*(3 credit hours)*

The course covers the fundamental aspects of hydrodynamic stability and active/passive flow control techniques, including open and closed-loop control. The objectives of the course are to provide the students with familiarity of traditional and modern flow control techniques, and to introduce the students the topic of laminar-to-turbulent transition via hydrodynamic stability analysis, which is a crucial component in designing and implementation of intelligent flow control strategies.

### **MATH-4960 Undergraduate Research in Applied and Computational Mathematics**

**CRN: 51730**

This course will present four open research problems as an introduction to a year-long research traineeship. Four introductory project-like assignments will be given during the course.

The projects will be chosen largely from the area of applied and computational differential equations, with applications from biology, fluid mechanics, optics, kinetics, and combustion.

Eight of the participants in the course will be awarded research grants so they can continue their research during the summer and senior year.

Prerequisites: MATH-2400

Cr: 4

Instr: Holmes, Mark

Scheduled TW 2-3:50 PM

Enrollment: 30

### **MATH-6790/01 Introduction to Stochastic Processes CRN 53184**

This course will show how one can model the dynamics of systems with discrete state spaces which have some uncertain inputs or too many variables to track explicitly. Markov processes, point processes, and renewal processes will be developed and illustrated on examples from physics, biology, industry, and finance.

Prerequisites: ordinary differential equations (MATH-2400), elementary linear algebra (MATH-2010), elementary probability theory (MATP-4600).

Cr: 4

Instr: Kramer, Peter

Scheduled:

Enrollment: 30

### **PHIL-2960-01 DEMOCRACY AS DEMOCRATISM CRN 53153**

Resolved: the defining features of democracy characterize a social way of life and outlook, not a form of government. If so, most practices associated with democracy are undemocratic or anti-democratic including the (US) federal Republic and Constitution, voting by majority rule, presidential leadership (an independent chief executive), patriotism and good citizenship, major political parties and ideologies (liberal-Democrat, conservative-Republican), war policy (just or otherwise) a military pledged to government or constitution not society, and public school curricula in history, citizenship, and civic engagement that teach otherwise. Resolved further: early Americans adhered to these propositions. We will debate and evaluate such notions pro and con, considering ways to further democratize social institutions, distinguishing America from the US. Meets with PSYC-2961. 4 crs.

### **PSYC-2960-01 THINKING CRN 52372**

The contents covered are deductive reasoning, inductive reasoning, judging probability, decision making, and rationality analysis. Psychology of reasoning and decision making studies how people reason and decide, while logic and game theory tell us what are reasoning and decision making. Both theoretical conceptual architectures and empirical evidence will be introduced.

Meets with PSYC-4967. 4 crs.

**PSYC-2961-01 DEMOCRACY AS DEMOCRATISM CRN 53154**

Resolved: the defining features of democracy characterize a social way of life and outlook, not a form of government. If so, most practices associated with democracy are undemocratic or anti-democratic including the (US) federal Republic and Constitution, voting by majority rule, presidential leadership (an independent chief executive), patriotism and good citizenship, major political parties and ideologies (liberal-Democrat, conservative-Republican), war policy (just or otherwise) a military pledged to government or constitution not society, and public school curricula in history, citizenship, and civic engagement that teach otherwise. Resolved further: early Americans adhered to these propositions. We will debate and evaluate such notions pro and con, considering ways to further democratize social institutions, distinguishing America from the US. Meets with PHIL-2960. 4 crs.

**PSYC-4964-01 PSYCHOLOGY OF GAMES CRN 52026**

Board games and video games have been the topic of many scientific studies, and have been. This course covers topics such as perception, memory, problem solving and decision making, development, intelligence, emotions, motivation, education, and neuroscience as they relate to the understanding and development of games. . It also critically discusses how current theories of expertise as they relate to games. Finally, it evaluates the extent to which an understanding of games and game behavior, have a wider relevance for the understanding of human psychology in general. 4 crs.

**PSYC-4965-01 ORIGINS OF MUSIC. CRN 53151**

Why do we listen to music? In this seminar course we will read current scientific thought about what music is and why we humans like it. Each student will come up with a scientific hypothesis related in some way to the origins of music, and spend the semester testing it. Meets with COGS-6962. 4 crs.

**PSYC-4966-01 COGNITIVE SCIENCE AND ECONOMICS CRN 52374**

Noble Prize winner Douglass North once used about the same title for his speech (2004). Cognitive and experimental economics is a fast growing domain. It will cover game theoretical framework (Nash, Noble Prize in Economics, 1994), behavioral game theory (C. Camerer, 2001), standard decision theory (Savage, 1954), bounded rationality (Simon, Noble Prize in Economics, 1978), and psychology of decision making (Kahneman, Noble Prize in Economics, 2002), and much more recent developments. The instructor's approach is also introduced.

Meets with COGS-6963. 4 crs.

### **PSYC-4967-01 THINKING CRN 52375**

The contents covered are deductive reasoning, inductive reasoning, judging probability, decision making, and rationality analysis. Psychology of reasoning and decision making studies how people reason and decide, while logic and game theory tell us what are reasoning and decision making. Both theoretical conceptual architectures and empirical evidence will be introduced.

Meets with PSYC-2960. 4 crs.

### **STSH 4962/01 / STSS 4961/01 Women Leaders, Feminist Innovators and Entrepreneurs CRNS 53124 / 52347**

This course explores leadership roles that have been held by women in politics, social movements, science, engineering, business, religion, and the arts, using readings, movies, and guest lectures, and drawing on the fields of history, communications, management, sociology, and anthropology. In each case, we consider what difference gender makes.

What constrains and enables the unique contribution of these women leaders? What barriers did they face? What are the qualities of a good leader? Are they the same for men and women? The same no matter which historical period or social setting? Are women better able to lead women than men and vice versa? What are the qualities of being a good "follower"? If a woman is "the first" woman to do something, does that make her a leader? If one holds a leadership position is one necessarily a leader? What can we learn from failures? Are entrepreneurs leaders?

Innovators? Inventors? How might we define feminist innovation? Feminist entrepreneurship? Are women leaders by definition feminist? Can men be feminist entrepreneurs? Feminist leaders? What can we do to encourage feminist innovation and entrepreneurship?

### **STSH 6963/01 U.S. History of Technology CRN 53122**

Instructor: Atsushi Akera

This is a graduate readings seminar for M.S./Ph.D and Ph.D. students interested in incorporating historical perspectives into their thesis or dissertation project. (It is not necessary for students to be planning on writing a historical thesis to benefit from this course.) Offered alongside our department's graduate seminar on "History/Ethnography" (which will presumably focus on methods), this course will provide students with an opportunity to delve into the basic body of scholarship on the history of US technology. The principal aims of this course will be to teach students how to master a body of historical literature and its dominant and contrary interpretations, and to provide them with a foundation of historical knowledge sufficient for lending historical perspective to broader projects. While we will work with one or two core texts, and proceed chronologically through U.S. History, students will have considerable opportunity to choose supplemental texts that intersect with their specific projects and interests, including non-US topics approached through comparative perspective.

**STSS/STSH-4963/01 WAR IN AFGHANISTAN CRN 52350/53273**

INSTRUCTOR: STEVE BREYMAN

**STSS 4965/01 Sustainability Studies Research: Asthmatic Spaces CRN 53118**

Instructor: Fortun, K

STS Sustainability Studies Research: Asthmatic Spaces

This course involves students in a collaborative social science research project focused on "asthmatic spaces." The goal is to produce new understandings of asthma patterns, drivers and experiences in New York State. Real-time results will be shared with researchers undertaking similar research in Houston, Knoxville and New Orleans. Results will contribute to The Asthma Files, a public archive of knowledge about asthma designed to promote scientific and environmental health literacy.

**STSS 4967/01 STSS Topics: Sustainability Problems CRN 53117**

Many factors and forces make environmental sustainability difficult: Consumer culture, how news is reported, problems with the way policy and law is written, the bottom-line focus of corporations, the complexity of environmental science, the diversity of approaches to sustainable design. All these and still other factors and forces need to be understood to effectively pursue sustainable solutions. This course provides students opportunities to extensively map sustainability problems as a strategy for envisaging sustainable solutions.

**STSS 4580 Self-organization in Science and Society, Eglash CRN 53046**

Self-organization has become an increasingly important phenomenon in both the natural sciences and engineering. Self-assembly of molecular structure is critical to nanotechnology; self-regulating ecosystems are modeled in biology, and so on. But recursive loops in which things govern themselves are also foundational to society: democracy is the people governing the people; social networks on the internet arise by self-assembly, and many indigenous societies use self-organization to create sustainable ways of life. This course will introduce students to models of self-organization in natural science and engineering, and examine their potential application to society, politics, and ethics. No prerequisites are required.

**STSH/STSS-4968/01 Religion and Politics CRN 53149/ 53121**

Instructor: Sal Restivo

In this course, we will draw on principles in the sociology of religion to explore issues and problems of religion and politics in American society. We will cover topics ranging from God and the founding fathers to the debates over creationism and evolutionary theory

**STSS-4850 /01 / STSH 4960 The Thomas Phelan Seminar: Democracy and the Internet  
CRN 53040/ 53123**

This is a honors-style undergraduate seminar exploring ideas and practices of democracy as modified by the presence of the Internet. We will study a variety of political movements and election campaigns that employ information systems as a way to mobilize citizens and exercise power. Broader circumstances that affect prospects for American democracy will also be studied, including corporatism, militarism, cable television, and political extremism. Students will do a considerable amount of reading and writing.

**STSS-6961/01 History and Ethnography CRN 53120**

Instructor: Campbell

A graduate theory and methods seminar that outfits students to undertake original empirical and interpretive work in the interdisciplinary field of Science and Technology Studies (STS). It is geared to graduate students who want to combine historical and ethnographic approaches in their understanding of the cultures of science, medicine, and technology. There are substantial fieldwork and archival components to the course.

**STSS 4966/01 / STSH 4967/01 Globalization and Development CRNs 53115 / 53116**

Globalization can be seen as the culmination of 400 to 600 years of systematic economic and political expansion. This current world system has been heralded by many advocates as the most successful (most democratic, most just and fair, etc.) system ever seen, and its technology, and growth have come to be seen as a measure of genuine human flourishing. Yet globalization and development have also caused much creative destruction in the form of growing social and economic inequality, environmental destruction, mass starvation, and social unrest. Furthermore, most of the so-called winners of this system perceive these problems as distant from themselves or as challenges for them to meet. This course connects the culture of capitalism and development with the growing contemporary social and environmental problems that threaten to undermine everything this culture has accomplished and represents.

**STSS-4960/01 FOOD, FARMS AND FAMILIES CRN 52349**

Instructor: ABBY KINCHY

What is the future of food on this planet? How will we feed a growing population? Does “sustainable agriculture” offer a viable alternative to environmentally-destructive farming practices? We will address these questions and more in this advanced undergraduate course that provides students with a wide-ranging understanding of the environmental and social context of food, farming and hunger. Drawing primarily on sociological concepts and research, the class will take a “food systems” approach, analyzing food as it travels from farm to table as part of an interconnected process. Students will examine the production, distribution, marketing,

preparation and consumption of food to understand why we eat the way we do and how our food choices affect other people and the environment.

Expertise and Democracy Seminar, Spring 2010 (Instructor: Dean Nieuwma)

### **STSS/STSH 4964/01 Consumer Culture CRN 53111 / 53112**

This course explores consumption through the lens of culture? Is there such a thing as consumer culture? If so, what is it? What are its roots?

Its consequences? Alternatives? Focus is on contemporary US but comparisons will be made with other societies. Topics include buying and selling, shopping, retail, manufacture, material culture, pricing, consumer goods, disposal, kinship, identity, exchange, and advertising, with attention paid to differences in race, class, and gender.

### **STSS/STSH -2960/01 A Century of Environmental Thought CRNs 53113 / 53114**

Instructor: Abby Kinchy

This course examines the development of the various worldviews, organizations and practices that shape what we know as the environmental movement today. In the past 100 years, environmental concerns have generated diverse social movements and organizations, both in the United States and globally. These environmental movements range widely, encompassing conservation, preservationism, deep ecology, labor struggles, indigenous rights, sustainable development, environmental justice, anti-nuclear and anti-toxics campaigns, consumer movements, and many other approaches to addressing the relationship between humans and the natural environment. We will explore the social origins and distinct impacts of these distinct movements and organizations, with an emphasis on their conflicting and converging goals, tactics, strategies, ideologies and followers. Students will read the original writings of some of the most important thinkers and activists in the history of environmentalism, and examine the cultural and political contexts for the emergence of these ideas and struggles.

### **WRIT-2961/01 Writing in the Digital Age CRN 52027**

This writing course approaches technology from the perspective of the humanities, emphasizing Technology's influence and impact on identity, culture, society, and citizenship. Students will develop critical, digital literacies that enable them to better understand the changes new technologies bring to our conceptions of writing and our personal, professional, and social lives. Students will also produce new media "writing" projects using a variety of modes that may include visual, audio, video, and/or Internet components. 4 credit hours.

**WRIT-4960 /01 Technical Writing in Print & Digital Media CRN 53205**

Technical Writing prepares students to design effective technical documents for both written and digital media, with particular emphasis upon technical memos, problem-solving and decision-making reports, and organizational, product-support, and technical-information webs. To support these writing tasks, the course provides an introduction to principles of audience analysis, research and documentation, drafting and revision processes, readability and accessibility of written texts, and basic web technologies. 4 credit hours.

**WRIT-4961/01 / 6961/01 Research Writing CRN 53206/53207**