EST

Technology and Society

EST 500: Foundations of Educational Technology for Administrators

This course is designed to teach administrators basic principles surrounding educational technology throughout the school and/or district. Students will explore and discuss critical issues surrounding technology in education. Students will understand administrative technology applications, web 2.0 presentation tools, Internet protocol, cyber safety and cyber bullying, Google Apps, social networking, collaboration tools, portable devices and apptivities. The semester project for this course is the development of a needs assessment and research of an educational technology for your school/district.

3 credits, Letter graded (A, A-, B+, etc.)

EST 501: Educational Technology Integration for Administrators

This course is designed to teach administrators how to integrate educational technology within their school/district. Students will understand ISTE Technology Standards for Administrators, the National Technology Plan and the Common Core Standards in relation to educational technology. Students will explore distance education, media streaming and communication tools such as Twitter and Facebook. They will review management systems, data collection/analysis tools and technology funding resources. Students will also learn how to evaluate technology integration throughout their school and/or district. The semester project for this course is the development of an implementation plan and the evaluation of an educational technology that may be used in your school or district.

3 credits, Letter graded (A, A-, B+, etc.)

EST 502: Ethical Decisions in Engineering

The engineering design process involves more than material choices and cost concerns. Individuals and organizations that create technological innovation must also address social and, more importantly, ethical issues. This course will review formal frameworks drawn from classical ethics. These frameworks will be used as a basis for considering case studies drawn from a variety of engineering disciplines. In addition, modern multi-disciplinary design approaches such as Value Sensitive Design and Biophilic Architecture will be considered as exemplar templates for the explicit incorporation of social and ethical principles into product development.

3 credits, Letter graded (A, A-, B+, etc.)

EST 508: Projects in Global Operations Management

This is a capstone course. Students will demonstrate what they have learned during their masters studies. This course will review several significant research areas in modern Global Processing Management Operations. Topics include Performance Management, Lean Management, Six Sigma Management in conjunction with Cloud Computing and Cloud computing applications. The students will be given a selected case study and asked to demonstrate their knowledge by proposing a comprehensive technical and management solution. Students will use software engineering tools such as Data Flow Diagram (DFD) and Unified Modeling Language (UML) to analyze and design an implementation plan using cloud computing infrastructure, platform and services.

3 credits, Letter graded (A, A-, B+, etc.)

EST 510: Fundamentals of Technology in Higher Education

Higher education is impacted by technology on an ever changing scale. Students are bringing in new technology every day. This course will show higher education instructors what technology is available, how higher education students are using technology and offer innovative ways to use that technology to motivate students to learn. Throughout the course students learn about best practices in higher education, a number of web based productivity and course management tools, cyber-ethics and digital footprint, organization of your digital world, collaborating with technology, social media, virtual worlds as well as presentation strategies and tools. The culminating project for this course is the research, assessment, analysis and presentation of a college student profile. Semesters offered

Fall, Spring, 3 credits, Letter graded (A, A-, B +, etc.)

EST 511: Infusing Technology into Higher Education Curriculum

The power of technology allows higher education instructors to teach and motivate students to learn in ways never thought possible. This course will show students how to fully integrate technology into the curriculum. For the semester project, students will review and modernize an existing course to make learning more effective and exciting for the higher education student. Students will learn the best way to update courses by understanding different instructional design models, content management systems and the Google Apps for Education suite. Students will enhance his/her web presence and digital profile by harnessing the power of social media and personal learning networks. Students will also explore potential technology grant opportunities for his/her curriculum, department or instructional area. Semesters offered,

Fall, Spring, 3 credits, Letter graded (A, A-, B +, etc.)

EST 516: Science for Society I

This is part one of an interdisciplinary course sequence (1 credit each) is designed for students in computer science (CS) and students of technology and society (DTS). Students taking this course will enhance their abilities to critically think and build awareness for science and technology (ST) and their societal aspects. They will learn strategies for assessing important questions such as: what should I focus my efforts on, where are societal needs, what policies are required or can be taken advantage of, how can I possibly influence policy, and finally, what are the dangers when developing new ST. To teach these topics the course takes a practical approach. The first section of the sequence examines historical science and technology successes and failures. Then, in the second section, teams composed of students from both the CS and DTS departments conduct case studies of existing ST or design and implement new ST under the perspectives of the course. 1 credit

1 credit, Letter graded (A, A-, B+, etc.)

EST 517: Science for Society II

This is part two of an interdisciplinary course sequence (1 credit each) is designed for students in computer science (CS) and students of technology and society (DTS). Students taking this course will enhance their abilities to critically think and build awareness for science and technology (ST) and their societal aspects. They will learn strategies for assessing important questions such as: what should I focus my efforts on, where are societal needs, what policies are required or can be taken advantage of, how can I possibly influence policy, and finally, what are the dangers when developing new ST. To teach these topics the course takes a practical approach. The first section of the sequence examines historical science and technology successes and failures. Then, in the second section, teams composed of students from both the CS and DTS departments conduct case studies of existing ST or design and implement new ST under the perspectives of the course. 1 credit

1 credit, Letter graded (A, A-, B+, etc.)

EST 519: Systems Engineering Management

This course serves as an introduction to two systems engineering methodologies that create effective and efficient paths to technical product development, and will discuss their respective advantages and limitations. One method is the classic top-down flow typically used in complex, large system product development as is found in defense industry firms. Traditional systems engineering management spans the complete product life cycle, from identifying user needs through product delivery and support. It includes event-driven technical reviews and audits that assess program maturity and determine the status of the technical risks associated with cost, scheduling, and performance goals. The other method is the Agile system development process, preferred by entrepreneurs and in Silicon Valley. Agile development emphasizes a design process that uses continuous input by customers/end users to define and refine their user needs which otherwise might not be captured by up-front design specifications.

3 credits, Letter graded (A, A-, B+, etc.)

EST 521: The Social and Global Impact of Technology in Education

This course will explore educational systems and practices globally and how the use or lack of use of technology within education impacts society. Inversely students will research how society dictates the use or lack of use of technology in education within the specified educational system. Throughout the course, students will focus on one region of the world and research the current educational system and specifically how they use technology within education. In their research they will find out what technology is available within the educational system, how that technology is used, explore the effectiveness of the technology and research the social impact of that technology use. Students will connect with a global participant via distance communication or video conferencing to gain real world knowledge of the educational system and the use of technology for the specified region. The culminating project is a research based project that assesses the use of technology within the selected global region, offers solutions on how to improve the use of technology and compares that system and the use of technology with our own use of technology locally in our current educational system.

Fall, Spring, and Summer, 3 credits, Letter graded (A, A-, B+, etc.)

EST 522: Integrating Educational Technology into Social Studies and Language Arts

Students will learn how to integrate technology into Social Studies and Language Arts curriculum using the ISTE/NETs standards and National Technology Plan to aid in the delivery of instruction. Students will develop a push-in training model focused on the Social Studies and Language Arts Core Curriculum and subject related needs. Students will meet with a Social Studies and Language Arts educator, assess their needs, design an educational technology push-in around those needs and push-in the training with the educator to their class. The culminating activity for this course is to conduct the push-in training with a Social Studies and Language Arts educator and their class. After the push-in training students will work with the instructor to evaluate the delivery and content of the lesson as well as assess the outcome and results of educator learning.

Fall, Spring, and Summer, 3 credits, Letter graded (A, A-, B+, etc.)

EST 523: Integrating Educational Technology into Mathematics and Science

Students will learn how to integrate technology into Math and Science curriculum using ISTE/NETs standards and the National Technology Plan to aid in the delivery of instruction. Students will develop an educational technology workshop focused on the Math and Science Core Curriculum and subject related needs. Students will meet with a group of Math and Science educators, asses their needs, design an educational technology workshop around those needs and deliver the workshop to the educators. The culminating activity for this course is to conduct the developed workshop to a group of Math and Science educators. After the delivery of the workshop, students will work with the instructor and classmates to evaluate the delivery and content of the lesson as well as assess the outcome and results of educator learning.

Fall, Spring, and Summer, 3 credits, Letter graded (A, A-, B+, etc.)

EST 524: The Role of Educational Technology Specialist

In this course students will learn the role and responsibilities of an Educational Technology Specialist. Students will connect with an administrator and work with the course instructor to develop a year-long technology integration plan. The development of the plan will include: a data driven needs assessment based on current goals and technology available, use of that data to address specific technology/curriculum needs, the integration plan proposal, creation of a professional development plan using workshops, push-ins or one-on-one sessions to deliver instruction and a peer evaluation of the effectiveness of the proposed technology integration plan. In addition, students will learn how to infuse the ISTE Standards and the National Technology Plan into the curriculum, research new technologies and educational resources, and understand the social, political, ethical and legal issues surrounding educational technology.

Fall, Spring, and Summer, 3 credits, Letter graded (A, A-, B+, etc.)

EST 525: Google for Education: Foundations

Google for Education (GfE) is a powerful suite that now seamlessly integrates into curricula and district technology goals. In this course, students will learn the tools necessary to become a Google Certified Trainer. Students will create and learn how to use Google for Education tools in their classroom. They will also develop a comprehensive knowledge of a number of different products within Google Apps including - Drive, Calendar, Gmail, Sites, Classroom and more. Students will focus on skills necessary to become a Google Certified Trainer through hands-on coursework, review and preparation for the Google for Education Exams. The culminating activities for this course are a showcase of best practices highlighting Google for Education tools, the preliminary work for your portfolio, and the completion of the certification requirements. This class cannot be used to satisfy master's degree requirements.

3 credits, Letter graded (A, A-, B+, etc.)

EST 526: Google for Education: Curriculum Integration

In this course, students will learn how to fully integrate the Google for Education products beyond the core apps, including Google Groups,Earth, Scholar, Blogger, and Google +. Students will complete the Google modules as well as they develop their portfolio. They will begin to deliver training by conducting a live webinar session which highlights Google tools or apps and sharing best practices. The culminating activities for this course are the development of a portfolio highlighting the lessons or trainings they conducted throughout this program. This class cannot be used to satisfy master¿s degree requirements.

3 credits, Letter graded (A, A-, B+, etc.)

EST 527: Google for Education: Professional Development

Students will explore educational best practices and examples of materials needed to submit the application to become a Google Certified Trainer. Students will thoroughly review Google for Education best practices, organize additional training materials and create their portfolio. Through the delivery of training sessions or lessons, students will focus on the power of Google for Education tools and their use in PK-12 education. Students will also create, run their own workshop. The culminating activity of this course is the completion of the portfolio with a screencast and the submission of the application to Google. This class cannot be used to satisfy master¿s degree requirements.

3 credits, Letter graded (A, A-, B+, etc.)

EST 528: Teaching with Interactive Whiteboards and Immersive Technologies

Interactive whiteboards and other immersive technologies have changed the way educators deliver instruction. They are a technology that has enormous potential to impact student learning in a hands-on, kinesthetic way. Throughout this course students will explore best practices using immersive technologies within education. Students will learn how to effectively integrate interactive whiteboards, interactive projectors and cameras, learner responses systems, document cameras as well as other technologies. The culminating project for this course a comprehensive lesson plan utilizing immersive technology hardware and the associated software within the curriculum.

3 credits, Letter graded (A, A-, B+, etc.)

EST 529: Supporting Common Core Standards Using Educational Technology

In this course students will learn how to support Common Core Standards through the infusion of educational technology by identifying, sharing, and exploring technology tools that support all curricula. Students will unpack the Common Core Standards and analyze and discuss best practices that effectively integrate technology to promote rigorous teaching and learning. The culminating assignment for this course is the design, delivery, reflection, revision and presentation of your technology infused Common Core lessons

3 credits, Letter graded (A, A-, B+, etc.)

EST 530: Internet Electronic Commerce

Topics addressed in this course include: technology infrastructure, business models and concepts, technological skills needed to build an E-Commerce web site, marketing, communications, security and encryption, payment systems in E-Commerce/M-commerce. Financial transactions, advertising models, content ownership and the prospects for E-Commerce are also covered.

Summer, 3 credits, Letter graded (A, A-, B+, etc.)

EST 531: Virtual Distance Management Course

In today's global corporations, the challenges associated with leadership and management has grown increasingly difficult and complex. More and more, companies are using networked organizational models to deliver work and interact with customers. As globalization and diffused networks of people and companies combine, issues related to virtual/distributed employees, partners and customers have moved front and center. Implications for leadership has grown beyond current skill sets drawn from traditional academic fields and training programs. The Virtual Distance Management course offers business students a powerful model and a set of proven practices to address these challenges in a unique way. Students will learn to: Understand and diagnose barriers to effective communication Develop ways to work with others using virtual technologies and social media Contribute to high performance, cross-discipline and cross-cultural teams Management strategies for the globally distributed workforce Virtual Distance, pioneered by Karen Sobel Lojeski, is a conceptual as well as quantitative approach that helps to explain organizational behavior changes when much of our communications are electronically mediated. Understanding these changes and how they impact organizational outcomes is critical to leaders and managers around the world. During this course, students will be exposed to both theoretical models and real-life case studies to more fully develop knowledge and skills for working in the digital age. Students will gain an in-depth understanding of Virtual Distance and how this growing phenomenon impacts critical success factors such as productivity, innovation, and employee engagement and satisfaction. Students will also get hands-on experience with Virtual Distance Index data. Drawing from over 700 project teams from around the world, students will learn how to interpret Virtual Distance data

3 credits, Letter graded (A, A-, B+, etc.)

EST 534: The Lean Launch Pad: Turning a great idea into a great company

This course provides real world, hands-on learning of what it's like to actually start a high-tech company. This class is not about how to write a business plan, and the end result is not a PowerPoint presentation to venture capitalists. Instead, students will get their hands dirty talking to customers, partners and competitors as they encounter the chaos and uncertianty of how a startup actually works. Students work in teams learning how to turn a great idea into a great company. They will learn how to use a business model to brainstorm each part of a company and customer development to get out of the classroom to see whether anyone other than themselves would want/use their product. Finally, they will see how agile development can help them rapidly iterate their product to build something customers will use and buy. Offered in Fall and Spring.

3 credits, Letter graded (A, A-, B+, etc.)

EST 535: Electric Power Systems

This course introduces concepts in the design and operation of electric power systems including generation with focus on renewable power, transmission and distribution, and end use; key issues and challenges facing electric power industry. Topics include electric and magnetic circuits, fundamental of electric power, circuit and load analysis, reliability, planning, dispatch, integration of renewable power, organizational design, regulations, environment, end-use efficiency, new technologies, and other cross-cutting issues

3 credits, Letter graded (A, A-, B+, etc.)

EST 536: Resilience in Urban Environments

Resilience lacks a universally agreed-upon definition, in part due to its multi-dimensional nature that crosses disciplines, and this inconsistency in terminology and framing is reflected in current research. For this course, we adopt a newer, more dynamic framing of resilience that incorporates change and adaptation: Cities and buildings are operated by social actors; they may be stationary engineering structures, but they are not static, and during a disruption they evolve and change based on the decisions made by people. Thus, this class focuses on conceptual and theoretical frameworks for resilience but applies them to important social science questions in the urban built environment, such as vulnerability, decision making, risk perception, organizational behavior, and policy formation.

3 credits, Letter graded (A, A-, B+, etc.)

EST 540: Environmental Management

This is an introduction to environmental management, and will focus on the interplay between science and public policy. Concepts include problem identification and definition, collection and analysis of relevant data to produce information, and the roles of public perception and action in ultimately determining outcomes when consensus is not reached. Specific fields to which these concepts will be applied will be solid waste management and coastal management. Current local problems will be used to illustrate the broader conceptual issues. Offered as MAR 514, EST 540 and CEY 501. 3 Credits, ABCF Grading

3 credits, Letter graded (A, A-, B+, etc.)

EST 541: Long Island's Groundwater

This course will cover basic groundwater concepts in unconsolidated sediments, and examine contamination issues in light of Long Island's particular hydrogeology, land use, and waste management history. Mathematical principles will be discussed but not stressed; scientific and technical papers discussing particular concepts or problems, including important local examples, will be closely read.

Prerequisite: Permission of instructor. Offered as MAR 521 or HPH 673.
Offered in Fall, 3 credits, Letter graded (A, A-, B+, etc.)

EST 542: Water and Wastewater Engineering Practices

This course will provide basic engineering concepts and practices associated with water supply and wastewater management, with an emphasis on New York metropolitan area technologies. Topics covered will include water supply and distribution, wells, water quality testing and regulation, onsite, package and standard wastewater treatment, and stormwater collection. Policy issues considered will include source water protection and wastewater impact mitigation programs.

Offered in Fall, 3 credits, Letter graded (A, A-, B+, etc.)

EST 546: Integrating Technology, Policy and Financing Instruments to Catalyze Climate Finance

The sums involved in a shift to a low-carbon society are daunting but not impossible to achieve. The world is planning to invest over $15 trillion in fixed-asset investments in the next 10 years. Rather a problem of capital generation, the key challenge of financing the transition towards a low carbon society is to redirect existing and planned capital flows from traditional high-carbon to low-carbon investments. This course is designed to allow students to: (1) Review a number of public policies, public finance mechanisms and market-based instruments designed to shift investments from fossil fuels to more climate friendly alternatives over the past few years; (2) Gain knowledge of the global commercial, political, innovation and technological challenges and opportunities in the transition to a low-carbon society; (3) Develop and practice professional skills in raising and spending public finance to catalyze capital towards low carbon and climate resilient development; and (4) Develop and practice professional skills in accessing carbon finance and designing innovative financing instruments. This course is aimed at engineering students who are interested in the energy challenges in a carbon-constrained world and their implications to technology innovation; at business-and public-administration students and at mid-career professionals who want to develop innovative financing solutions to real-world energy and environmental problems. Offered: Summer

Fall, Spring, 3 credits, Letter graded (A, A-, B+, etc.)

EST 547: Advanced Problems in Integrated Planning: Theory, Practice, and Analytical Tools

This course explores in depth new theories and practical applications of integrated planning through the lens and land use, transportation and urban infrastructure systems. A series of problem sets is undertaken in close coordination with the instructor to produce a portfolio of networked research which, with further research, can be publishable quality.

Offered
Summer, 3 credits, Letter graded (A, A-, B+, etc.)

EST 551: The Atom and Environmental Radiation in the Nuclear Age

This course will address technical and societal aspects relating to nuclear power and the general issue of environmental radioactivity. It will cover basics of the nuclear industry and the nature of radioactivity. This includes the production, storage, and disposal of diverse radionuclides emanating from the nuclear fuel cycle and nuclear weapons testing. The properties of major radionuclides will be explored. The course will also consider the complex issue of biological risks posed by radionuclides at different doses to living organisms, including man. Economic and political constraints on nuclear power generation will be discussed for the US and other countries, as will the actual and perceived risks associated with environmental radioactivity.

3 credits, Letter graded (A, A-, B+, etc.)

EST 553: Nuclear Security

The course will familiarize students with the fundamentals of nuclear physics, radiation, mining, weapons and fuel cycle, other than producing electricity, as it pertains to nuclear power plants. Topics include nuclear detection, devices to safeguard nuclear materials from terrorist threats, needed physical protection for safe handling and its relevance to Homeland Security. The course combines lectures with hands-on experience at the newly installed nuclear detection facility located at the nearby United States Department of Energy's Brookhaven National Laboratory. Prerequisite: Undergraduate equivalent physics and chemistry.

Fall, Spring, 4 credits, Letter graded (A, A-, B+, etc.)

EST 554: Chemical & Biological Weapons: Safeguards and Security

This course deals with the fundamentals of chemistry and biochemistry related to chemical weapons (CW) and biological weapons (BW) that could be used by terrorists. Topics include CW and BW history, production, control, detection, identification, and emergency response measures to deal with intended or unintended release and escape, and security measures to protect and control stockpiles. Prerequisite: Undergraduate equivalent chemistry, biochemistry, and microbiology.

Fall, Spring, 4 credits, Letter graded (A, A-, B+, etc.)

EST 555: Preventing Weapons Proliferation

The student will learn: what some of the key international tools to stem weapons proliferation are, how they have developed over the last 50 years, and how they work; the kinds of technologies used to develop nuclear, chemical, or biological weapons & missile delivery systems; and the complexities & methods of controlling these technologies. The student will also learn about the use of UN Security Council sanctions, and about multilateral [e.g., EU, ECOWAS) and national sanctions; and about how interdicting illicit transfers does or does not work. The course will emphasize how technology, international law, and international and domestic politics all play important roles in the evolution, current practice, and effectiveness of the international nonproliferation regime.

3 credits, Letter graded (A, A-, B+, etc.)

EST 556: Nuclear Nonproliferation & International Safeguards

The student will learn the history of the nuclear nonproliferation regime since 1946,

with emphasis on the evolution of concepts & practice. The student will also learn the variety and complexity of motivations for governments to seek nuclear weapons, and in many cases, to foreswear nuclear weapons. The course will emphasize how nuclear energy technologies, verification technologies, international legal practice, and politics all play important roles in the evolution, current practice, and effectiveness of the international nuclear nonproliferation regime.

3 credits, Letter graded (A, A-, B+, etc.)

EST 557: Nuclear Energy-the nuclear fuel cycle & technologies

Nuclear energy has many applications beyond the well known (and controversial) civil nuclear power plant. These applications include medical and industrial isotope production, research reactors, particle accelerators, propulsion reactors, and nuclear weapons. Supporting these applications is a complex infrastructure involving several diverse scientific, engineering, and industrial processes. One of the key processes is the nuclear fuel cycle, involved principally in civil nuclear power and related civil nuclear activities, from uranium mining to spent fuel reprocessing. However, the same set of technologies can be used to manufacture nuclear weapons ¿ thus these technologies become a double-edged sword. This course provides a comprehensive first look at this complex of technologies for those interested in nuclear weapons proliferation, nuclear energy, or nuclear safety. It is directed at those with no foundation in nuclear physics or nuclear engineering, but who seek to understand these technologies in terms well beyond those of the layman, but short of the nuclear engineer. Individuals interested in taking this course should have completed a course in algebra. Students should be familiar and comfortable working with exponents and logarithms. Higher levels of math such as calculus will not be utilized in this course.

3 credits, Letter graded (A, A-, B+, etc.)

EST 558: Digital technologies in disaster risk reduction

The course explores the use of a variety of sensing technologies for public safety and disaster management and risk reduction. These include national and commercially available satellites, manned and unmanned aerial "drone" systems (sUAS), closed circuit cameras, small-footprint remote-sensor monitor"tng in wireless networks, and a wide number of IP-based (loT) systems. Technically, the course starts with the fundamental character"1stics of electromagnetic radiation and how these energies interact with Earth materials such as vegetation, water, soil and rock, as well as humans. It describes how the energy reflected or emitted from these materials is recorded using a variety of sensing instruments (e.g., cameras, multispectral scanners, hyperspectral instruments, RADAR). The course also teaches how to interpret fundamental biophysical or land use information from the sensor data. The history of sensing technologies, the principles of visual photo-interpretation, and issues of surveillance are also presented.

3 credits, Letter graded (A, A-, B+, etc.)

EST 559: Mobile Revolution in Disaster Risk Reduction

This course will explore three themes: [1] current and future trends of development and digital information technology toward mobility, [2] combined with many other technologies increasingly repurposed and adapted toward mobility and sustainability (wearable, lOT), [3] along with skills required for employing such arrangements effectively toward the part they play in risk assessment and in advancing risk reduction whether in natural hazards and/or human disasters and inequitable development.

3 credits, Letter graded (A, A-, B+, etc.)

EST 560: Risk Assessment, Regulation, and Homeland Security

The course focus is on risk assessment associated with nuclear, chemical and biological weapons as it relates to Homeland Security. Topics include air dispersion, uncertainty analysis, exposure measurements, epidemiology, toxicology, regulatory issues, risk management, risk communication, risk perception, and risk preparedness. The course will also cover laws and regulation, discouraging terrorism, and disaster preparedness, various acts passed by the U.S. Congress to regulate water, air, and controlled substances. Offered as EST 560 or HPH 656.

Prerequisite: Undergraduate or equivalent physics, math and chemistry.
Fall and Spring, 4 credits, Letter graded (A, A-, B+, etc.)

EST 561: Sensing Technologies for Disater Risk Reduction

This graduate seminar will survey the main topics in the emerging field of digital technology management for disaster risk reduction. Throughout it will introduce relevant theoretical concepts and relate them to policies and practices. Topics will include the evolution of next-generation public safety networks, related digital technologies such as robotics, augmented and virtual reality, big data, mobility, innovation and entrepreneurship as well as conceptual approaches to distorters and the relationship of disaster to broader environment and sustainable development issues. Departmental faculty and guest lecturers from partner organization (UN office for Disaster Risk Reduction, Korean Red Cross, International Federation of Red Cross Red Crescent Societies, SafeNet Forum) will participate.

3 credits, Letter graded (A, A-, B+, etc.)

EST 562: Decision Support Systems

A decision support system (DSS) is a computer system that combines, data, analytical tools, and models to support decision making. A DSS may be model-driven or data-driven. A model-driven DSS is a stand- alone system that uses some type of model to perform ¿what-if¿ and other kinds of analysis. A data- driven DSS is a system that supports decision making by allowing users to extract and analyze useful information that was previously buried in large databases. In this course, both model-driven and data-driven decision support services will be considered. Students will identify an appropriate engineering or management application. By collecting relevant data, building suitable mathematical models, designing an accessible user interface, and connecting these components via computer code, students will develop a deliverable DSS. Through a series of presentations, they will demonstrate how their DSS addresses the stated engineering or management problem. In doing so, students will gain insight into the interrelationships among information systems, statistics and management science.

Prerequisite: EMP 504 or permission of instructor
Spring, 3 credits, Letter graded (A, A-, B+, etc.)

EST 563: Computer Literacy for Educators

This course is an introduction to computer and software basics and was formally listed as EST 583. Students will develop an understanding of the underlying concepts and principles behind computers. Students will gain sufficient knowledge to successfully navigate the digital world. Emphasis will focus on computer literacy areas used in education and other professional environments. Students will leave this course with the ability to grasp the risks and benefits surrounding new and current computer technologies. The following skills will be addressed; electronic communication, application-based projects, information management, assessment, and the societal impacts of computer based technologies. Students having completed EST 565 in a prior semester can not receive credit for EST 563.

EST 563 and EST 565 may be taken in the same semester.

Fall, 3 credits, Letter graded (A, A-, B+, etc.)

EST 565: Foundations of Technology in Education

Throughout this course students will explore the basic pedagogical issues and social impact of using technology in education. This course examines the basic principles of integrating technology and computer applications into the curriculum. Students will learn how to use and integrate word processing, spreadsheet, and presentation applications for educator planning and student project work. Students will also learn how to use a number of online based Web 2.0 applications within school curriculum. The culminating activity for this course is the design and a presentation of a micro-lesson using one these applications as they would in the classroom.

Fall, Spring, Summer, 3 credits, Letter graded (A, A-, B+, etc.)

EST 567: The Internet, Social Networking and Collaborative Environments

In this course students will learn the basic principles of using the Internet for instruction, the science and engineering concepts behind modern communication systems and their impact on education as well as the evolution of the Internet in education. Students will design and create a website and explore the use and social impact of collaborative learning environments and social networking. Students will learn how to evaluate and effectively integrate a variety of educational resources, such as web 2.0 tools and modern communication devices for active learning. Students will also develop a clear understanding of the issues surrounding cybersafety, cyberbullying, and the ethical issues raised by the use of technology in education. The culminating activity for this course is the development and publishing of a collaborative website that showcases the material and skills mastered throughout this course.

Fall, Spring, Summer, 3 credits, Letter graded (A, A-, B+, etc.)

EST 568: Networked Communication Technologies

EST 568 Network Communication Wired and Wireless

This course examines the range of technologies used in teaching, learning, and communication. Instructional technologies both stand-alone and networked are surveyed with a focus on how they can be used effectively to enhance learning. Students will learn fundamental hardware and software principles underlying the development of the Internet and other networked communications tools. Emphasis will be placed on assessment of these technologies in terms of societal impacts and learning outcomes. This course combines topics from EST 565 and EST 567. Fall, Spring, Summer, 3 credits, Letter graded (A, A-, B+, etc.)

EST 569: Technology in the City

Will technology transform our cities, making them more livable, efficient, and desirable? Will technology erode our cities, making them more dangerous, chaotic, and insufferable? This course is at the intersection of two trends. First, the world is undergoing a wave of urban growth. Second, the pace of technological change is quickening and, with it, the pace of social change and even social transformation. Course modules will cover technology and society in urban contexts with particular attention to: 1) energy, 2) environments, 3) transportation, and 4) health and human safety (including security). This class will involve trips to sites in New York City, and will involve the use of IT technologies in creative ways to advance our learning.

Offered Fall, Spring and Summer, 3 credits, Letter graded (A, A-, B+, etc.)

EST 570: Educational Technology Lesson Development

In this course students will learn principles of instructional design and how to fully integrate technology into daily curriculum. Throughout the course students will plan, develop and evaluate a lesson plan that demonstrates an expertise in the integration of educational technology. Students will apply the skills, techniques, resources and research necessary to effectively create an educational technology inspired lesson plan. The lesson plan may include the use of emerging technologies, distance learning, multimedia projects, collaborative environments, computer applications and Internet resources. The culminating project for this course is the completion of a lesson plan in a specific content area that incorporates multiple modalities of technology into pedagogical practices.

Fall, 3 credits, Letter graded (A, A-, B+, etc.)

EST 571: Educational Technology Research Methodologies

This course evaluates the impact and value of educational technology uses through detailed research based on a number of current topics. Course goals include understanding research methodology and literature and exploring assessment design and implementation. The course includes class discussions and project work based on student learning with technology, access and the digital divide, the National Education Technology Plan, Internet literacy, emerging technologies, virtual schools, and data driven research.

Fall, Spring, and Summer, 3 credits, Letter graded (A, A-, B+, etc.)

EST 573: Interactive Multimedia Curriculum Design and Development

This course allows students to learn how to use a variety of multimedia tools for the classroom. Principles of user interface and interaction design will be covered. Throughout the course students design an interactive unit plan using multimedia authoring software. Students will work with audio/video editing software, collaborative learning software, and learn how to embed online games, activities and video within their unit plan. Development of the interactive multimedia unit requires students to: submit a proposal, use graphic organizers to plan and design, create a draft version, create assessment tools, test market with a specific target audience, then evaluate the unit before the final version is completed. The culminating activity is the presentation and delivery of the finished interactive multimedia unit.

Fall, Spring, and Summer, 3 credits, Letter graded (A, A-, B+, etc.)

EST 574: Distance Learning and Virtual Environments

Web-based distance learning applications are quickly growing within higher education institutions, K-12 schools, and corporate environments. The focus of this course is on the underlying theories, design, and implementation of effective modes of e-learning. Students will explore virtual schools, virtual learning, virtual environments and other forms of distance education. The social differences between face-to-face and virtual learning will also be examined and discussed throughout the course. Students will explore virtual learning resources and design their own virtual learning lesson. The culminating project for this course will be the demonstration and write up of the experience.

Fall, Spring, and Summer, 3 credits, Letter graded (A, A-, B+, etc.)

EST 575: Developing Grants and Managing Projects

This course will develop the skills necessary to take a program proposal from idea through reality with an emphasis on new technological resources available to help with this process.

Topics include: techniques for successful fundraising, grant writing, program design, staffing, publicity and outreach, and reporting and evaluation. It is designed for current educators and administrators as well as students about to enter the education, social service and health fields.

3 credits, Letter graded (A, A-, B+, etc.)

EST 576: Geographic Information Systems in Education and Research

Students use Geographic Information Systems (GIS) software to create, manipulate and interpret layers of interactive maps and databases. Students collect and modify geographical materials from the Internet, satellite and aerial imagery, and field data. They design and test scientific inquiry-driven educational modules and/or visualizations for research and analysis on global and local geography, for use in economics, earth science, politics and civic action, history and sociology, global studies, and environmental planning and assessment. Prerequisite: EST 565 or EST 595 or permission of instructor.)

Spring, 3 credits, Letter graded (A, A-, B+, etc.)

EST 577: Environmental Information Systems (EIS)

Due to the complex nature of environmental and spatial data, these systems require state-of-the-art computer technology to achieve environmental science and information technology. This course will address the technical and conceptual bases of data capture, data storage, data analysis and decision support, and metadata management.

This course will address the technical and conceptual bases of data capture, data storage, data analysis and decision support, and metadata management. Environmental Information Systems are concerned with the management of data about the rock of soil, the water, the air, and the species around us.
Spring, 3 credits, Letter graded (A, A-, B+, etc.)
May be repeated for credit.

EST 578: Human-Computer Interaction Design for Construction

Principles of human-computer interaction applied to the design of educational courseware. Usability engineering, with a focus on the audience and learning objectives. Interface design principles. Human computer dialogs. Multimedia as a communication tool, using images, audio and video. Multimodal input devices and strategies. Students will use a multimedia authoring tool to create a prototype of an educational application or learning tool.

3 credits, Letter graded (A, A-, B+, etc.)

EST 579: Educational Games

Simulations and computer games as a learning tool. Traditional game and simulation genres, and their appropriate uses in education. Gameplay design. Game development process, from storyboarding to delivery. Assessing games as learning tools. Students will use a multimedia tool to prototype an educational game or simulation of their own design.

3 credits, Letter graded (A, A-, B+, etc.)

EST 580: Advanced Technology assessment: Business, Government and Strategy

This course has a two-fold objective: (1) to help students develop strong conceptual foundations for understanding and addressing issues at the intersection of science, technology, public policy, and business strategy; and (2) to provide students with knowledge of analytical frameworks and tools that are essential to technology assessment in business, government, and government, and other organizations with understanding of their strengths, limitations, and underlying assumptions. Topics covered include utility/ profit maximization theory, its limitations and alternative theories, business and government interactions, technology innovation and management, technology forecasting, impact assessment, technology valuation, and basic tools for technology assessment (monitoring, simulation, expert opinion, scenario analysis, cost-benefit analysis, AHP method, etc.).

Summer, 3 credits, Letter graded (A, A-, B+, etc.)

EST 581: Heuristics and Quantitative Decision-Making

Complex problems (choices) need to be resolved in the course of socio-technical processes. Quantitative decision-making techniques have been evolved to address these situations. We will investigate a number of these techniques in detail, in order to understand the advantages that can be gained by using them. We will also discuss common criticisms and issues associated with these methods, and consider the heuristic methods that are often used instead to resolve complicated problems.

3 credits, Letter graded (A, A-, B+, etc.)

EST 582: Introduction to Systems Concepts

Understanding phenomena as "systems" requires some changes in overall analytical approaches, and a new vocabulary. General systems theory concepts such as feedback, stability, tipping point, resilience, recursion, hierarchy, and complexity will be discussed, with regard to complex systems drawn from nature, business, technology, and education. The course will address the use of feedback, information and communication, structure, and cybernetics in the management of complex systems. The role and importance of "agents" in current systems thinking will be emphasized. Students will prepare a study of a complex system and its management incorporating these general concepts.

3 credits, Letter graded (A, A-, B+, etc.)

EST 583: National Energy Decision Making

Today's decision about fuel exports, power plant siting, and R&D support for emergent technologies often hinge on underlying priorities tied to self-sufficiency and markets, among possibilities. Such dimensions are examined in this graduate course through the lens of diverse players in the national energy system. Competing interests in infrastructure, cost, equity, and societal buy-in will be evaluated with technology systems and policy frameworks. Takeaways will provide a basis for work in the private or public sector. Graduate Students in engineering and science, social sciences and humanities, as well as management are encouraged to join. Semesters Offered: Fall

3 credits, Letter graded (A, A-, B+, etc.)

EST 585: Assessment of Technology in Learning Environments

This course is designed to provide educators with an overview of the uses of technology to improve instruction. Students will understand the design and function of learning environments, individual applications related to the student's area of professional practice, and assessment of educational uses of technology today and tomorrow. Students will chose a current technology used in a specific learning environment and analyze and evaluate its effectiveness within instruction including practical classroom use and staff development for the particular technology. Students will then research and make recommendations on how the particular technology could be integrated most effectively to increase teacher understanding and enhance student learning. Students then present their findings about the current use of the chosen technology, possible improvements on its use as well as future technology recommendations.

Fall, Spring, and Summer, 3 credits, Letter graded (A, A-, B+, etc.)

EST 590: Seminar for MS, TSM Students

This seminar is a forum for the discussion of research methods, project ideas, proposal preparation and the written and presentation of research proposals and results. It is designed to meet the needs of early career researchers at both the Masters and Ph.D. level. For Masters students, final product of this seminar is an approved master¿s project proposal. Ph.D. students will present progress on their own research. All students will participate in peer review of each others¿ work and learn the basics of the responsible conduct of research.

3 credits, Letter graded (A, A-, B+, etc.)

EST 591: Independent Study in Technology and Society

The primary objective of independent study is to provide a student with opportunities to interact with faculty members who can be of assistance in his or her master's project. Students should consult individually with faculty members on workload and credit(s).

1-3 credits, Letter graded (A, A-, B+, etc.)
May be repeated for credit.

EST 592: Sustainable Energy: Technologies, Systems, Markets, and Policies

The ample supply and appropriate use of energy is critical to the well being of human society. Energy plays an enormous role in environmental degradation, national insecurity, international conflict, and in solutions to these problems. This course aims to introduce the major energy issues to students in engineering, business, and public policy areas. It discusses the energy choices to meet regional and global energy needs. Major renewable and conventional energy sources, energy supply technologies, and end-use efficiency options will be assessed in the context of political, social, economic, and environmental goals.

3 credits, Letter graded (A, A-, B+, etc.)

EST 593: Risk Assessment and Hazard Management

A case-study approach to the assessment of risk and the management of natural and technological hazards, with emphasis on those that can harm the environment. The course focuses on technological hazards involving energy, transportation, agriculture, natural resources, chemical technology, nuclear technology, and biotechnology, and on natural hazards such as climactic changes, droughts, floods, and earthquakes. The first part of the course consists of readings on risk assessment and hazard management and discussions of published case studies. During the second part of the course, students conduct Offered as EST 593 or HPH 686.

3 credits, Letter graded (A, A-, B+, etc.)

EST 594: Diagnosis of Environmental Disputes

Diagnosis of disagreements about environmental and waste problems. Tools for evaluating disputes about (a) scientific theories and environmental models, (b) definitions and analytical methodologies for estimating risk, "real" cost, net energy use, and life-cycle environmental impact, (c) regulatory and legal policy, (d) siting of controversial environmental facilities, and (e) fairness and other ethical issues. These diagnostic tools are brought to bear upon case studies of pollution prevention, recycling, nuclear waste disposal, and climate change.

3 credits, Letter graded (A, A-, B+, etc.)

EST 595: Principles of Environmental Systems Analysis

This course is intended for students interested in learning systems engineering principles relevant to solving environmental and waste management problems. Concepts include compartmental models, state variables, optimization, and numerical and analytical solutions to differential equations.

Prerequisites: MAT 132 and one year of quantitative science such as physics, chemistry, or geology; or permission of instructor. Offered as EST 595 or HPH 688.
Fall, 3 credits, Letter graded (A, A-, B+, etc.)

EST 597: Waste Management: Systems and Principles

Students will learn about the technologies and policy options in waste management, emphasizing recycling, incineration, landfilling, and source reduction options for municipal solid waste on Long Island. Problems concerning paper, glass, plastic, organic materials, and other waste stream components will be explored. Environmental impacts and economics of landfills, materials recovery facilities, and waste-to-energy systems are examined. The institutional and regulatory climate, current and planned practices in the region, and hazardous waste will be discussed. Cross-listed as CEY 597 or HPH 663 or EST 597.

3 credits, Letter graded (A, A-, B+, etc.)

EST 598: Teaching Practicum

Designed to give graduate students teaching experience.

3 credits, S/U grading

EST 599: Special Projects and Topics

A technology assessment laboratory for emerging problems and focused research. May be run as a hands-on, group research study of an important educational, environmental or waste problem (perhaps to provide an assessment to a regulatory agency or administrative system).

1-12 credits, Letter graded (A, A-, B+, etc.)
May be repeated for credit.

EST 600: Technology, Policy, and Innovation: Theory and Practice

This course provides students with frameworks and models for analysis of issues at the intersection of science, technology and public policy, and business strategy; and helps students develop skills to work on policy issues that require deep understanding of the technical details. Topics include utility/ profit maximization theory, its limitations and alternative theories, business and government interactions, technology innovation and managements, policy process (agenda setting, problem definition, framing the terms of debate, formulation and analysis of options, evaluation of policy outcomes). Cases drawn from energy and environmental policy, educational technology, STEM education will be used to illustrate stakeholders and their value structures, high levels of uncertainty, multiple levels of complexity, and their influence on policy intervention. This course emphasizes quantitative policy analysis methods, and critical thinking.

Fall, 4 credits, Letter graded (A, A-, B+, etc.)

EST 601: Grand Challenges in Energy and Environmental Policy

The survey course will be taught by the faculty of Technology and Society and provide an introduction to the major energy and environmental issues of our time. The course will take an interdisciplinary perspective drawing from policy, engineering, social and physical sciences, the course will cover challenges and opportunities related to society's demand for energy and resources, and resulting environmental impacts. It is a required course for all elective for all PhD candidates and advanced Masters students outside of the energy and environmental program who may take the course with the permission of the senior faculty member responsible for the course. The course will be conducted in a mixture of lecture and seminar styles. An extensive reading list will be provided on each issue. Responsible Instructor: Gerald Stokes Co-instructors: Elizabeth Hewitt, Gang He

3 credits, Letter graded (A, A-, B+, etc.)

EST 602: Energy, Technology and Society: Energy Nexus Research Frontiers

Energy is at the center of the nexus challenges-energy, water, food, land, environment and development-that human being faces, critical linkages between those issues demand system integrative thinking and of growing interest in research and policy communities. This course will provide a deep working knowledge, technically and socially, of the energy technologies, policies, and transition. This course will survey the energy nexus concepts and principles, introduce tools of analysis, and engage students in case studies of critical energy nexus issues: energy and development, energy and water, energy and food, energy and land, energy and environment, and energy and climate change. This course aims to explore the frontier of energy nexus research and empower students to contribute in the energy nexus debate and policy design.

Spring, 3 credits, Letter graded (A, A-, B+, etc.)

EST 603: Energy Modeling and Energy Systems Analysis

"All models are wrong, but some are useful". This class offers a systems analysis approach and introduces useful modeling tools to capture and reveal the complexity of energy systems. The scope of this class includes main forms of energy, major energy production, conversion, and consumption activities, and technology innovation and transition embedded in the energy systems. We'll first discuss the theoretical and empirical knowledge base and data sources to understand the energy-environmental and climate problems. The class will then introduce the modeling tools and skills to analyze energy systems or individual energy projects so to understand energy systems and enable evidence based decision making. This class encourage students to design research projects, using the modeling tools, and presenting results. The objective of this course: Develop comprehensive understanding of energy systems, i.e. the interaction of technological, social, economic, and regulatory forces that shaping energy production, conversion, and consumption; Gain an understanding of main data sources and key methods used to analyze energy systems and their strengths and weaknesses; Get introduced to major analytical concepts and modeling tools used in energy systems and policy analysis; Develop basic analytical skills to translate energy systems analysis into effective policy discussion and debate. Prerequisite: Some programming knowledge recommended. Offered Spring

3 credits, Letter graded (A, A-, B+, etc.)

EST 604: Grand Challenges in English, Education, Management & Policy

New technologies are created by and for people. In this course, we examine how that happens¿or fails to happen. We will examine policies at the organizational, community, sectoral, national, and cross-national levels and how they influence the lives and work of the many and varied people who create, use, benefit from, and suffer from new technologies. We will cover six grand challenges in engineering education, management and policy (EEMP): Educating wisely with technology (i.e., effectively and efficiently); Ensuring equity; Sparking and sustaining innovation; Managing, organizing, and leading engineering enterprises; Harnessing the power of emerging technologies; and Coexisting with technology to maximize rewards and minimize risks (i.e., our individual and collective health, well-being, and happiness).

3 credits, Letter graded (A, A-, B+, etc.)

EST 605: Economics and Public Policy

The course is the first in a two part economics sequence for students in Technology, Policy, and Innovation. This first course is designed to prepare policy analysts to learn the conditions necessary for markets to function well, and how the central government intervenes when markets fail. Micro economic tools are developed and applied to markets for public goods. The impact of these markets on the marco economy is also examined. Fall semester, 3 credits, A,B,C,F

3 credits, Letter graded (A, A-, B+, etc.)

EST 606: The Economics of Technology, Policy, and Innovation

This course is the second in a two part economics sequence that applies the tools from Part 1 to evaluate sectors of the economy related to technology, public goods, and innovation. Readings cover the literature related to the cross between public economics and technology / innovation. Policies related to technology and innovation enhancements will be assessed using the criteria of effectiveness, efficiency, equity, economic growth, and economic stability. How technology and innovation impact the economy and industry, how well advances are being implemented, will all be examined from the economist¿s perspective. Pre-Requisite: EST 605, Economics and Public Policy with a grade of C + or better Fall semester, 3 credits, A, B, C, F.

3 credits, Letter graded (A, A-, B+, etc.)

EST 607: Energy and Environmental Economics and Markets

The landscape of global energy markets over the past decades has largely driven by economics and regulations. This course will draw the theories and tools of economics and regulations to study the evolution of the energy and environmental markets and the policy implications of such evolution. This course will examine the development of effect of organized energy markets, the industry structure and evolution of competition in the energy and environmental markets, the political economy of regulation and deregulation, market power and antitrust, climate change and environmental policy and their impacts in energy and environmental markets. This course will also discuss the emerging markets for clean energy, energy efficiency, and transport and storage of energy. This course aims to analyzing the rationale for and effects of public policies in energy and environmental markets.

Spring, 3 credits, Letter graded (A, A-, B+, etc.)

EST 610: Data Analysis for Technology, Policy and Innovation

This course covers many of the common empirical tools used for research in Technology, Policy, and Innovation. Topics include: descriptive statistics, clustering, discrimination analysis, estimation, hypothesis testing, and regression analysis. To learn these topics, students will use modern statistical software programs to analyze data sets with socio-technological applications. After this course, students will have the tools to conduct robust data analyses and present the work in written and visually appealing formats. This course assumes that students have basic knowledge of statistics or data analysis.

3 credits, Letter graded (A, A-, B+, etc.)

EST 620: Decision Making in Socio-Technological and Global Contexts

Methodologies and applications to enhance students' abilities to use qualitative and quantitative approaches to examine decision problems within socio-technological and global contexts. Psychological, social and cultural influences on decision making in organizations. Power and limitations of the theories, models and tools of decision analysis. Applications to decision problems in a variety of areas, including energy and environmental systems, educational technology and education in science and engineering, technology management, and science and technology policy.

3 credits, Letter graded (A, A-, B+, etc.)

EST 625: Advanced Theory and Practice in Technology and Policy

Technology change entails more than the commercialization of an invention. Likewise, policy making encompasses much more than

cost-benefit analysis and regulation. This advanced, graduate level course examines critical theory for both subjects by drawing on ideas from systems and science, policy and management, economics, and STS. Emphasis is placed on deconstructing theoretical applications in the context of policy-based problem-solving and innovation objectives. Topics will include policy cycles, regulatory capture, innovation systems, dimensions of technology change, and lock-in, among others. Students will develop skills to work in roles at the interface of technology and management.

3 credits, Letter graded (A, A-, B+, etc.)

EST 650: Directed Study

Individual studies under the guidance of a faculty member. Subject matter varies according to the needs of the student. May be repeated for credit.

1-9 credits, Letter graded (A, A-, B+, etc.)
May be repeated for credit.

EST 680: Teaching, Learning, and Technology

A professional development seminar that is designed to help Ph.D. students develop the competencies needed to become effective teachers in colleges and universities. Students will learn relevant teaching and learning theories and their applications to teaching courses and laboratory sessions. Students will learn methods for the design and assessment of courses, including courses that integrate appropriate technologies to enhance learning and teaching. Students will learn how to create learning environments that build on the strengths and address the varied needs of a diversity of learners.

Restricted to Ph.D. students registered in the Certificate Program on College Teaching.
Fall and Spring, 0-3 credits, Letter graded (A, A-, B+, etc.)

EST 688: Internship in Research

Participation in private corporations, public agencies, or non-profit institutions. Students will be required to have a faculty coordinator as well as a contact in the outside organization to participate with them in regular consultations on the project, and to submit a final report to both. At most one credit can be accepted toward the degree.

1-3 credits, S/U grading
May be repeated for credit.

EST 690: Seminar in Theory Building

Science is about discovering facts as well as explaining what the facts mean. Theories provide explanations and interpretations of empirical phenomena and building and modifying theories are at the heart of core scientific activities. Good theory is essential to many new fields for several reasons. First, good theory provides guidance for practical action and therefore should be at the foundation of curricula. Second, without good theory in any particular field, researchers must borrow theories from other academic disciplines. While this can be useful, sometimes these theories might not fit our subject matter well. For example social theories based on behavioral assumptions stemming from non-digital communications do not fully address substantive features of social behavior in a digital age. Research courses commonly emphasize empirical research methods and formal modeling approaches to theory development. There is much less guidance for those who want to build a theory for managerial and behavioral studies-Yet every researcher must do so to develop a good research proposal. This seminar aims to fill that gap by focusing on theory types and evaluation criteria, theory development processes, and theoretical writing.

Offered in Spring, 3 credits, Letter graded (A, A-, B+, etc.)

EST 691: Seminar on Innovation, Invention, and Diffusion

Innovation is viewed as central to progress for any individual, organization, nation or global effort. In this seminar we will discuss invention, the two main phases of innovation, exploration and exploitation, the notion of diffusion of innovation and finally innovation policy as well as policy innovation. We will explore a number of types of innovation including radical versus incremental, technological versus administrative, product versus process and more. Using relevant case studies and selected readings from the most influential voices on innovation, including those in academia, corporate America as well as policy-making organizations, we will explore the many different sides of innovation, why it is one of the most critical issues of our time and how seminar participants can contribute to overall innovative efforts. Offered

Fall, 3 credits, Letter graded (A, A-, B+, etc.)

EST 692: Research Seminar

This seminar is a forum for the discussion of research methods, project ideas, proposal preparation and the written and presentation of research proposals and results. It is designed to meet the needs of early career researchers at both the Masters and Ph.D. level. For Masters students, final product of this seminar is an approved master¿s project proposal. Ph.D. students will present progress on their own research. All students will participate in peer review of each others¿ work and learn the basics of the responsible conduct of research.

1-3 credits, Letter graded (A, A-, B+, etc.)
May be repeated for credit.

EST 694: Energy and Buildings: Technology, Policy, and Behavior

Graduate Seminar (PhD students preferred; Masters students welcome w/permission of instructor) Buildings consume vast amounts of energy and resources, and are one of the largest contributors to greenhouse gas emissions. Major advances in building design and technology over the past decade have given us tools to make buildings more energy efficient, but buildings lag far behind their potential. There are many avenues to green the built environment sector, including technological innovations, occupant behavior programs, retrofits of existing buildings, and innovative building codes. Ultimately, reducing energy consumption in the building stock will require an interdisciplinary approach and some combination of a range of program and policy types. This course will introduce students to the many interdisciplinary issues surrounding energy use in buildings, with a particular focus on the intersection of policy with technology, economics, social science, and behavior. The course will combine lectures, student-led practicum discussions, and guest speakers. Possible field trip(s) to green buildings will be explored, depending on scheduling. Topics covered will include: Regulatory schemes such as tax incentives, mandates, and building codes,Voluntary certification schemes such as LEED, EnergyStar, and their international counter parts,Equity and environmental justice issues surrounding access to/affordability of green buildings,Economic issues: Rebound effects, principal-agent misalignments, elasticity of demand,Architecture, design and engineering innovations,Occupant behavior challenges,Retrofits and energy efficiency for existing buildings,Distinctions in scales of actors: Individual, household, building management, organization,Distinctions in sectors

3 credits, Letter graded (A, A-, B+, etc.)

EST 695: Topics in Technology, Policy, and Innovation

Topics selected on the basis of the needs of the graduate program and research interests of the staff.

0-3 credits, Letter graded (A, A-, B+, etc.)
May be repeated for credit.

EST 696: Advanced Topics in Technology, Policy and Innovation

Advanced topics selected on the basis of the needs of the graduate program and research interests of the staff.

1-3 credits, Letter graded (A, A-, B+, etc.)
May be repeated for credit.

EST 697: Directed Study

Individual studies under the guidance of a faculty member.. Subject matter varies according to the needs of the student.

1-9 credits, Letter graded (A, A-, B+, etc.)
May be repeated for credit.

EST 698: Practicum in Teaching

This course enables graduate students to gain experience in teaching and interacting with students enrolled in Technology, Policy, and Innovation courses. Students enrolled in EST 698 are expected to perform various teaching duties required by the course instructor, such as attending lectures, providing office hours, holding review/recitation session, proctoring exams, grading, etc...

Fall, Spring, and Summer, 1-3 credits, S/U grading
May be repeated for credit.

EST 699: Dissertation Research on Campus

Dissertation research under direction of advisor.

1-9 credits, S/U grading
May be repeated for credit.

EST 700: Dissertation Research Off Campus - Domestic

Prerequisite: Must be advanced to candidacy (G%). Major portion of research will take place off-campus, but in the United States and/or U.S. provinces. Please note, Brookhaven National Labs and Cold Spring Harbor Lab are considered on-campus. All international students must enroll in one of the graduate student insurance plans and should be advised by an International Advisor.

1-9 credits, S/U grading
May be repeated for credit.

EST 701: Dissertation Research Off Campus - International

Prerequisite: Must be advanced to candidacy (G5). Major portion of research will take place outside of the United States and/or U.S. provinces. Domestic students have the option of the health plan and may also nroll in MEDEX. International students who are in their home country are not covered by mandatory health plan and must contact the Insurance Office for the insurance charge to be removed. International students who are not in their home country are charged for the mandatory health insurance. If they are to be covered by another insurance plan they must file a waiver by the second week of classes. The charge will only be removed if other plan is deemed comparable. All international students must receive clearance from an International Advisor. May be repeated for credit. Offered every semester, 1-9 credits, S/U Grading

1-9 credits, S/U grading
May be repeated for credit.

EST 800: Summer Research

May be repeated for credit.