EST 300 Computer Modeling and Experiments in Mathematics and Science Education

Focus on computer-based experimentation and modeling to enhance mathematics and science education. Students construct their own computer-enhanced experiments using probe/software systems to study the behavior of real-world systems and computer simulation software packages to model the behavior of those systems.

Prerequisites: EST 100 or CSE 101
3 credits

EST 302 Assessment of Computer-Based Technologies

Methodologies for assessing the impact of computer-based technologies on economics, decision making, division of labor, and societal issues such as privacy and ethics. Frameworks for assessing technologies, as well as applications of standard approaches such as benefit-cost analysis. Case studies drawn from robotics, banking, automation in the U.S. postal system, and other areas.

Prerequisite: EST 100 or any CSE course
3 credits

EST 303 Crisis Communications

Explores the emerging fields of crisis and risk communications through case studies. Oil spills, cyber crimes, medical device malfunctions, product tampering, and recalls are among the types of crises studied. Also examines crisis prevention, crisis plan development, media management, and the way organizations struggle to speak truthfully about risks that arouse public fears.

Prerequisite: U3 or U4 standing
3 credits

EST 304 Communication for Engineers and Scientists

Students learn how to write about technical concepts that make sense not only to other technologists and scientists, but also to audiences ranging from high school students to technical consumers in the world marketplace. Examines issues of rhetorical persuasion, ethical presentation, and emotional engagement (logos, ethos, pathos), and the basics of information

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design and use. Students work on polishing their prose voice and learn how to apply different technical communications styles to different audiences and for different applications.

**Prerequisite:** Level 5 on the writing placement exam or WRT 102

3 credits

**EST 305 Applications Software for Information Management**

Introduction to the role of applications software in various types of organizations with emphasis on methods of formulating the requisite information flows to engender adequate communications, operation, and control. The importance of audit ability, maintainability, and recoverability in systems design is stressed. Provides platform knowledge of basic techniques and elementary skills in representing system structure with application of the principles in practical case studies using spreadsheet and database software. Extensive interaction with applications software reinforces concepts presented.

**Prerequisite:** EST 100 or CSE 101

3 credits

**EST 320-H Communication Technology Systems**

Emphasizes basic science and engineering concepts underlying design and usage of modern telecommunications systems. Consideration of human factors and societal constraints on design and development of nascent technological systems. Includes the electromagnetic spectrum, analog and digital signals and resonance as well as societal considerations of government regulations, international competition, and environment.

**Prerequisites:** MAT 123; one D.E.C. category E course

3 credits

**EST 325-H Technology in the Workplace**

A study of automation and information technologies in both manufacturing and service industries. Considers how technology is changing the work and lives of everyone from production workers to executives. Case studies are used to understand how technology can improve quality and productivity and how incorrect use produces disappointing results.

**Prerequisite:** Completion of D.E.C. category E

3 credits

**EST 330-H Natural Disasters: Societal Impacts and Technological Solutions**

A study of the physical causes of natural disasters; their societal impacts, and how technology is developed and deployed in recovery; the use of engineering, architecture, and regional planning to reduce vulnerability and loss; and the institutional mechanisms, both domestic and international, for providing cross-cultural technology transfer, and post-disaster assistance. Case studies of disasters in a number of countries are included.

**Prerequisites:** U3 or U4 standing; one D.E.C. category E course

3 credits

**EST 331 Professional Ethics and Intellectual Property**

The study of ethical decisions confronting individuals and organizations in engineering and science. Related questions about moral conduct, character, ideals, and relationships of people and organizations involved in technical development are discussed. Ethics for engineers, computer scientists, and natural scientists are covered. Includes topics in intellectual property such as patents, trademarks, copyrights and copyright applications, licensing, and IP in cyberspace.

**Prerequisite:** U3 or U4 standing

3 credits

**EST 391-H Technology Assessment**

A multidisciplinary analysis of the environmental, economic, scientific, engineering, social, and ethical impacts of a technology and of policies for controlling them. Each class, often working with research teams and visiting area facilities, concentrates on topics such as plastics recycling, the future of the automobile, nuclear facilities, nanotechnology, space stations, virtual reality, biotechnology, smart weapons, and the Internet.

**Prerequisites:** PHY 132/134 or CHE 132 or BIO 201 or 202 or 203; MAT 127 or 132 or 142 or 171 or AMS 161

3 credits

**EST 392-F Engineering and Managerial Economics**

Applications of fundamental economics principles and systems analysis to problems of planning and design in manufacturing or service sectors of industry. Includes the time value of money, analysis of various types of cash flows, development of rate of return, and benefit-to-cost ratios in their use to evaluate competing investment programs. The role of depreciation and investment tax credits on the level of corporate taxation leading to the determination of after-tax rates of return.

**Prerequisite:** U3 or U4 standing in a CEAS major or economics major

3 credits

**EST 393 Project Management**

Lays the foundation for an understanding of project management principles. Project initiation, implementation, and conclusion are explored, and the software tools for implementation of project management are studied. Case studies are presented and discussed in each part of the course.

**Prerequisite:** EST 391

3 credits

**EST 411-H Science, Technology, and Arms Control**

A study of the application of scientific technology to national defense, covering nuclear weapons and delivery systems, chemical and biological weapons, conventional weapons systems, defense research and development, arms control and disarmament negotiations, and international technology transfer. This course is offered as both EST 411 and POL 411.

**Prerequisites:** U3 or U4 standing; one D.E.C. category E course

3 credits

**Prerequisite:** S/U grading

**EST 412 Intelligence Organizations, Technology, and Democracy**

The role of intelligence organizations in decision making through analysis of agency practices in support of U.S. national security policy. The course also explores the role of intelligence agencies and practices in democratic societies. This course is offered as both EST 412 and POL 412.

**Prerequisites:** U3 or U4 standing; POL 101 and 102; one D.E.C. category E course

3 credits

**EST 420 Seminar on Information-Age Society**

The characteristics of and current trends in telecommunication technology. Science and engineering concepts are applied as students analyze case studies focusing on the migration of entertainment media into the digital era, computer-generated speech, interactive cable television, and other current technologies. Engineering technology design constraints, critical success factors, and ethics for a technological world are explored.

**Prerequisite:** EST 320

3 credits

**EST 421 Starting the High-Technology Venture**

Introduces engineering and applied science students to start-up and early development of a new high-technology venture. Turning a concept into a new venture. Identifying and evaluating product and market. Issues of feasibility, partnerships, and prototypes.

**Prerequisites:** CEAS major; U4 standing

3 credits

**EST 440 Interdisciplinary Research Methods**

Uses scientific research and related engineering technology problem-solving as a framework for the synthesis of diverse disciplines studied by students in the first three undergraduate years. Provides students with experience in team problem-solving. Students develop a proposal for interdisciplinary research or project to be carried out in the final semester of study.

**Prerequisites:** EST 395 and TSM major

3 credits

**EST 441 Interdisciplinary Senior Project**

Students carry through to completion their own research, development or product evaluation project based on the proposal submitted and approved in EST 440. Requires practical steps including garnering faculty mentorship, creating a schedule, assembling resources, conducting research or working on prototype, and a final paper and presentation.

**Prerequisite:** EST 440

3 credits

**EST 475 Undergraduate Teaching Practicum**

Students assist the faculty in teaching by conducting recitation or laboratory sections that supplement lecture course. The student receives regularly scheduled supervision from the faculty instructor. May be used as an open elective only and repeated once.

**Prerequisites:** U4 standing; a minimum g.p.a. of 3.00 in all Stony Brook courses and a grade of B or better in the course in which the student is to assist; permission of department

3 credits

**EST 499 Research in Technology and Society**

An independent research project with faculty supervision. Permission to register requires a B average in all engineering courses and the agreement of a faculty member to supervise the research. May be repeated, but only three credits of research electives (AMS 487, CSE 487, ESE 499, EMS 499, EST 499, ISE 487, MEC 499) may be counted toward engineering technical elective requirements.

**Prerequisite:** Permission of instructor

0-3 credits

**EUR European Studies**

**EUR 101-G Foundations of European Culture**

This course presents students with the thinking from a variety of disciplines that influenced the development of the diverse national cultures of Europe. Students are exposed to a chronological representation of the major ways that classical Greek, Roman, Judeo-Christian, and Islamic cultures contributed to the making of individual national cultures and identities of the major countries of Europe.

3 credits

**EUR 201-I Development of European Culture**

An introduction to the important literary works that arose from major European cultural and intellectual movements and an examination of their continued influence on the modern world. Readings focus on central texts pertaining to core religious issues, the Renaissance, the Enlightenment, Romanticism, Realism, Modernism, and Post Modernism. Examples from the arts, including film, music, and theatre, are used to illustrate the influence of the literary works.

**Prerequisite:** Completion of D.E.C. category B

3 credits

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