EST

Technology and Society

EST 100: Computer Literacy in a Digital Era

Introduces computer applications and selection of computer-based tools and the skills necessary to be successful in an era of digital revolution including: electronic communication; application-based projects; information management and assessment; and the societal impacts of digital literacy. Emphasizes computer literacy skills used in education, industry, and other professional environments. Participation in weekly computer labs is required.

3 credits

EST 102 - E: Weather and Climate

Introduces the nature and causes of common meteorological phenomena, severe weather occurrences, and climatic patterns. Topics include formation and movement of air masses and large-scale storms; techniques for weather prediction; weather satellites; hurricanes, tornadoes, and thunderstorms; cloud and precipitation types; the climatic history of the earth; and actual and potential effect of human activities on weather and climate, and of weather and climate on humans. This course is offered as both ATM 102 and EST 102.

3 credits

EST 104: Projects in Technology and Society

Introduces students to technological issues in society. A new topic is presented each semester. Explores underlying scientific and engineering concepts, ethical issues, and technological risks. Students complete a project with faculty supervision.

Prerequisite: Permission of department

1 credit

EST 192: Introduction to Modern Engineering

Familiarizes students with systems and decision-making concepts of modern engineering and technology. The conceptual areas to be studied include an engineering approach to problem solving and design, modeling of dynamic systems, and technology assessment. The artificial heart program, solar energy technology, and building access for the handicapped are some of the socio-technological case studies that are used.

Prerequisites: Course is for students without prior engineering experience, permission of the department required

3 credits

EST 194 - C: Patterns of Problem Solving

A survey of techniques and methods of problem solving as developed by the engineer and applied scientist. Applications drawn from a broad range of fields. Intended for non-engineering majors.

Prerequisites: Course is for students without prior engineering or natural science experience, permission of the department required

3 credits

EST 201 - H: Technological Trends in Society

Explores the impact of technology and engineering design on society past, present, and future. The main themes as they relate to changing technology are: industry and the economy; the environment; social, educational, and psychological implications of computers; energy and society; warfare; and 21st-century emerging technologies.

Prerequisite: One D.E.C. category E course

3 credits

EST 202: Introduction to Science, Technology, and Society Studies

An introduction to the interrelationship between science and technology as dynamic and inseparable. Discusses the concepts, framework, and context of science-technology studies. Includes ethical issues, social influences, and public policies as they influence and interact with the social management of science and technology.

Prerequisite: EST 192

3 credits

EST 203: Technology in the City

This course covers the intersection of technology and society. Topics include, how different technologies play an essential element of urban society such as transportation systems, energy, and financial systems. It examines the changes in technology which causes changes in society.

3 credits

EST 210: Learning to Learn New Technologies

Developing processes for learning new technology that continues to change at an increasing rate. The key issues covered are: learning new software tools, the problem solving process, applying tools, debugging, choosing a tool, helping others to learn new software packages, how networks change the

use of tools, ethical issues, Internet and the information explosion. Classes are held in computer laboratories. Students are required to work in campus computer consulting situations.

3 credits

EST 213: Studies in Nanotechnology

The emerging field of nanotechnology develops solutions to engineering problems by taking advantage of the unique physical and chemical properties of nanoscale materials. This interdisciplinary, co-taught course introduces materials and nano-fabrication methods with applications to electronics, biomedical, mechanical and environmental engineering. Guest speakers and a semester project involve ethics, toxicology, economic and business implications of nanotechnology. Basic concepts in research and design methodology and characterization techniques will be demonstrated. Course is cross-listed as BME 213, MEC 213, and EST 213 and is required for the Minor in Nanotechnology Studies (NTS).

3 credits

EST 291 - H: Energy, Environment, and People

Case studies selected from topics such as radioactive wastes; Long Island's toxic wastes; Shoreham, Chernobyl, and nuclear safety; agriculture and the environment; and global resources. The course emphasizes the interplay between scientific and engineering considerations and human values and institutions.

Prerequisites: Two D.E.C. category E courses (except those designated ANP); any AMS or MAT course

3 credits

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.

Prerequisite: 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 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 examination 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 students with 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 310: Design of Computer Games

Fundamental ideas underlying the design of games, which occurs before the programming stage. How games function to create experiences, including rule design, play mechanics, game balancing, social game interaction and the integration of visual, audio, tactile and textual elements into the total game experience. Game design documentation and play testing. Students will design their own game during the semester. This course is offered as both EST 310 and ISE 340.

Advisory Prerequisite: Basic Computer Skills

3 credits

EST 320 - H: Communication Technology Systems

Emphasizes basic science and engineering concepts underlying design and usage of modern telecommunications systems. Considers effects 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 323: Human-Computer Interaction

A survey course designed to introduce students to Human-Computer Interaction and prepare them for further study in the specialized topics of their choice. Students will have the opportunity to delve deeper in the course through a course project, and through a two-three week special topic selected at the instructor's discretion.

Prerequisites: CSE 214 or CSE 230 or CSE 260 or ISE 208

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.

Prerequisites: Completion of D.E.C. category E

3 credits

EST 326: Management for Engineers

This course will introduce all the principals and theories in the area of operation management and quality control. The important issues relating to management of innovation and project management will also be included.

3 credits

EST 327: Marketing for Engineers

This course will introduce the important principles and theories of marketing, especially for new product design and development, for technical and eCommerce industries. The preparation and evaluation of a marketing plan will also be covered.

3 credits

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

A study of the physical causes of natural disasters; their societal impacts in developed and developing nations; 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 codes 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 341: Waste Treatment Technologies

This course will examine technologies such as wasterwater management, solid waste disposal, and drinking water treatments that minimize the effects of human wastes. Pollution prevention will be emphasized.

Prerequisites: EST 202; or MAT 123 and one D.E.C. category E course

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 power, 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: AMS 151 or MAT 125

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 400: Research and Nanotechnology

This is the capstone course for the minor in Nanotechnology Studies (NTS). Students learn primary aspects of the professional research enterprise through writing a journal-quality manuscript and making professional presentations on their independent research (499) projects in a formal symposium setting. Students will also learn how to construct a grant proposal (a typical NSF graduate fellowship proposal), methods to search for research/fellowship funding, and key factors in being a research mentor.

Prerequisites: EST 213; at least one semester of independent research (499 level)

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, 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 roles 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, patents, 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 393 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 a 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 488: Internship in Technology and Society

Participation in a private enterprise, public agency, or nonprofit institution. Students are required to submit a proposal to the department at the time of registration that included the location, immediate supervisor, nature of the project and hours per week for the project. One mid-semester report and one end of semester report are required. May be repeated up to a limit of 12 credits but only 3 credits of EST 488 may be used for either TSM major credit or specialization credit.

1-3 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