Global Sumer Institute  
College of Engineering & Applied Sciences Course List

**General Interest Courses**

**EST 106: The Digital Generation: Creating a Professional Web Presence (3 credits)**
Creating a positive digital profile can be a challenging task for the 21st century student. In this course, learn how to utilize the power of the Internet and social media to enhance your web presence and digital profile. We will explore a number of topics including building a strong web presence, leveraging social media, creating and uploading video content, blended and distance learning as well as mobile devices as a learning tool. The culminating activity for this course is the creation of a positive and sustainable web presence and digital profile.

*Prerequisites:* None.

**EST 201: Technological Trends in Society (3 credits)**
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:* None

**EST 291: Energy, Environment, and People (3 credits)**
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.

*Prerequisite:* None

**Beginner-level Courses (for STEM Majors)**

**AMS 151: Applied Calculus I (3 credits)**
A review of functions and their applications; analytic methods of differentiation; interpretations and applications of differentiation; introduction to integration.

*Prerequisite:* Above average performance in pre-calculus mathematics

**BME 100: Introduction to Biomedical Engineering (3 credits)**
A rigorous introduction to biomedical engineering that provides the historical and social context of BME though contemporary emerging areas within BME. Specific areas covered in depth include: bioelectricity and biosensors (action potentials to signal processing), bioimaging (invasive and non-invasive), genetic engineering (with ethical discussions), and biostatistics. Hands-on computational modeling introduces the physiological concept of positive and negative feedback loops in the body. Emphasis is placed on ways engineers view the living system by using design based approaches and computation.

*Prerequisites:* None.
Intermediate-level Courses (for STEM Majors)

**AMS 210: Applied Linear Algebra (3 credits)**

*Prerequisite:* Calculus 1

**AMS 361: Applied Calculus IV: Differential Equations (4 credits)**
Homogeneous and inhomogeneous linear differential equations; systems of linear differential equations; solution with power series and Laplace transforms; partial differential equations and Fourier series.

*Prerequisite:* Calculus 2

**CSE 214: Computer Science II (4 credits)**
An extension of programming methodology to data storage and manipulation on complex data sets. Topics include: programming and applications of data structures; stacks, queues, lists, binary trees, heaps, priority queues, balanced trees and graphs. Recursive programming is heavily utilized. Fundamental sorting and searching algorithms are examined along with informal efficiency comparisons.

*Prerequisite:* Object-oriented programming

**ESE 124: Computer Techniques for Electronic Design I (3 credits)**
An extensive introduction to problem solving in electrical engineering using the ANSI C language. Topics covered include data types, operations, control flow, functions, data files, numerical techniques, pointers, structures, and bit operations. Students gain experience in applying the C language to the solution of a variety of electrical engineering problems, based on concepts developed in ESE 123 (Introduction to Electrical and Computer Engineering). Knowledge of C at the level presented in this course is expected of all electrical engineering students in subsequent courses in the major.

*Pre- or Corequisites:* Calculus 1 and Introduction to Electrical or Computer Engineering

**ESE 231: Introduction to Semiconductor Devices (3 credits)**
The principles of semiconductor devices. Energy bands, transport properties and generation recombination phenomena in bulk semiconductors are covered first, followed by junctions between semiconductors and metal-semiconductor. The principles of operation of diodes, transistors, light detectors, and light emitting devices based on an understanding of the character of physical phenomena in semiconductors. Provides background for subsequent courses in electronics.

*Prerequisites:* Calculus 4 (Differential Equations) and Classical Physics 2 (Electromagnetism & circuit theory)

**EST 391: Technology Assessment (3 credits)**
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:* Calculus 2 and College-level Physics, Chemistry, or Biology.
Advanced-level Courses (for STEM Majors)

AMS 311: Probability Theory (3 credits)
Probability spaces, random variables, moment generating functions, algebra of expectations, conditional and marginal distributions, multivariate distributions, order statistics, law of large numbers.
Prerequisites: Finite Mathematical Structures, Probability & Statistics, and Calculus 2.

AMS 315: Data Analysis (3 credits)
A continuation of AMS 310 (Survey of Probability and Statistics) that covers two sample t-tests, contingency table methods, the one-way analysis of variance, and regression analysis with one and multiple independent variables. Student projects analyze data provided by the instructor and require the use of a statistical computing package such as SAS or SPSS. An introduction to ethical and professional standards of conduct for statisticians will be provided.
Prerequisite: Calculus 2 and Probability and Statistics

AMS 394: Statistical Laboratory (3 credits)
Designed for students interested in statistics and their applications. Basic statistical techniques including sampling, design, regression, and analysis of variance are introduced. Includes the use of statistical packages such as SAS and R. Students translate realistic research problems into a statistical context and perform the analysis.
Prerequisite: Calculus 2 and Probability and Statistics

ESE 372: Electronics (4 credits)
The pertinent elements of solid-state physics and circuit theory are reviewed and applied to the study of electronic devices and circuits, including junction diodes, transistors, and gate and electronic switches; large- and small-signal analysis of amplifiers; amplifier frequency response; and rectifiers and wave-shaping circuits.
Prerequisite: Electrical Circuit Analysis I