

CORE SCIENCE & ENGINEERING (CSE)

CSE 602 Statistics for Science and Engineering **3 Credits**

Grade Mode: Standard Letter, Audit/Non Audit

This course covers probability and statistical methods for data analysis and experimental design. The course emphasizes on fundamental principles of statistics and their applications in science and engineering. Topics include: probability distributions and probability models; hypothesis testing based on single and multiple samples; single and multi-factor ANOVA; linear, logistic, and nonlinear regression; design, analysis, validation of experiments; nonparametric techniques; advanced statistical methods in scientific research.

CSE 603 Advanced Mathematics **3 Credits**

Grade Mode: Standard Letter, Audit/Non Audit

This course introduces advanced math topics such as differential equations and their applications in energy and other engineering domains

CSE 605 Computational Data Analytics **3 Credits**

Grade Mode: Standard Letter, Audit/Non Audit

It gains common computational tools for rapid analysis of several energy, environment and sustainability data sets.

CSE 606 Numerical Methods for Scientists and Engineers **3 Credits**

Grade Mode: Standard Letter, Audit/Non Audit

Numerical Methods for Scientists and Engineers

CSE 607 Advanced Systems Optimization **3 Credits**

Grade Mode: Standard Letter, Audit/Non Audit

This course focuses on introducing selected optimization tools for energy, environment and sustainability applications.

CSE 730 Hardware Security **3 Credits**

Grade Mode: Standard Letter

This course explores vulnerabilities and defenses at the intersection of hardware and system security. Students will study microarchitectural side channels, memory attacks, firmware/boot chain threats, trusted execution environments, and emerging hardware threats in cloud and IoT. Emphasis is placed on understanding the underlying computer engineering principles and evaluating real-world exploits and defenses.

CSE 770 Nano-Bio-Technology **3 Credits**

Grade Mode: Standard Letter, Audit/Non Audit

Introduction to nanoscale bio-systems and the application of nano-bio-technology. Topics covered include nanomaterials synthesis and characterization, surface and interfaces properties, biohazard risk assessment, toxicity, drug deliver, diagnostics, lab-on-chip systems, hyperthermia, antimicrobials.

CSE 785 Innovation Entrepreneurship and Leadership I **3 Credits**

Grade Mode: Standard Letter, Audit/Non Audit

This course first provides introductory discussions on theories of design innovation, entrepreneurship and leadership. Then, it focuses on experiential learning for design and development of products, processes, systems and business models. Topics include design thinking, system thinking, design process; understanding and developing user/stakeholder needs/input for a sustainable solution; generating technical and marketing specifications; and prototyping methods to reduce development time.

CSE 786 Innovation Entrepreneurship Leadership II **3 Credits**

Grade Mode: Standard Letter, Audit/Non Audit

This course first provides introductory discussions on theories of design innovation, entrepreneurship and leadership. Then, it focuses on experiential learning for design and development of products, processes, systems and business models. Topics include design thinking, system thinking, design process; understanding and developing user/stakeholder needs/input for a sustainable solution; generating technical and marketing specifications; and prototyping methods to reduce development time.