ENGINEERING & COMPUTER SCIENCE (ECS)

ECS 500 Selected Topics (1-6 Credits)
Engineering & Comp Sci
Exploration of a topic (to be determined) not covered by the standard curriculum but of interest to faculty and students in a particular semester. Repeatable

ECS 511 Sustainable Manufacturing (3 Credits)
Engineering & Comp Sci
Visions of sustainable manufacturing, systems approach to sustainable product development and design, manufacturing processes and systems, alternative energy systems for manufacturing, innovation and entrepreneurship opportunities. Senior standing.
Prereq: MFE 331
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/)

ECS 525 Probability for Engineers (3 Credits)
Engineering & Comp Sci
Sample spaces, events, and probabilities. Conditional probability and independence. Random variables, random vectors. Probability distributions and densities. Expectations. Moment-generating functions. Introduction to data analysis. Engineering applications.

ECS 526 Statistics for Engineers (3 Credits)
Engineering & Comp Sci
Point estimation, confidence intervals, simple hypothesis testing, nonparametric tests, curve fitting and regression, analysis of variance, factorial experiments, and engineering applications.
Prereq: ECS 525 or MAT 521

ECS 555 Virtual Design Studio for Green Building Systems (VDS-GBS) (3 Credits)
Engineering & Comp Sci
Integrative design methodology; Interactions between form, structure, and flows of energy & mass, and their impacts on building performance; Computer simulation tools for performance-based design. Exploration of green building design and technology through case studies

ECS 561 Data Centers: Infrastructure Design and Energy Efficiency (3 Credits)
Engineering & Comp Sci
Introduction to data centers and the infrastructure supporting the IT equipment. Focus on the energy efficiency aspects of various designs. Introduction of servers, storage and networking equipment that are housed in data centers. Power and cooling infrastructure that supports the IT equipment.
Repeatable 2 times for 6 credits maximum

ECS 570 Professional Practice (0 Credits)
Engineering & Comp Sci
Full-time practical engineering or computer work experience, with a participating employer, that is related to the student's field of study, and is of a semester's duration. May not be repeated.
Prereq: ECS graduate program

ECS 588 Principles of Wind Turbines (3 Credits)
Engineering & Comp Sci
Cross-listed with MAE 588, CEE 588
Aerodynamics, performance, control, and electrical aspects wind turbines.
Prereq: MAE 341

ECS 600 Selected Topics (1-6 Credits)
Engineering & Comp Sci
Exploration of a topic (to be determined) not covered by the standard curriculum but of interest to faculty and students in a particular semester. Repeatable

ECS 629 Modeling and Optimization Techniques (3 Credits)
Engineering & Comp Sci
Introduction to major deterministic and stochastic modeling techniques, including linear programming and its extensions, integer programming, dynamic programming, Markov chains, queuing theory, simulation, and other modeling techniques.

ECS 630 Simulation and Data Analytics (3 Credits)
Engineering & Comp Sci
Introduction to discrete-event simulation, system dynamics, and agent-based simulation; hybrid simulation modeling, input and output data analysis, tools and techniques needed for practice, uses of simulation for predictive and prescriptive analytics.
Advisory recommendation Prereq: ECS 526

ECS 636 Sustainable Development and Infrastructure Management (3 Credits)
Engineering & Comp Sci
Cross-listed with CEE 639
Introduction to public infrastructure systems. Management of infrastructure systems. Monitoring, planning, design, construction, maintenance/rehabilitation and operation. Emphasis on water, storm water, waste water, transportation, electrical power distribution and telecommunications systems.

ECS 650 Managing Sustainability: Purpose, Principles, and Practice (3 Credits)
Engineering & Comp Sci
Cross-listed with BUA 650
Dynamics and interdependence of economic, social, and environmental systems. Sustainable management frameworks, tools, and metrics. Local, national, and international implications. Relevance of technology, ethics, law, and policy. Interdisciplinary emphasis.

ECS 651 Strategic Management and the Natural Environment (3 Credits)
Engineering & Comp Sci
Cross-listed with BUA 651
Sustainability from firm perspective. Regulatory, international, resource, market, and social drivers of environmental strategy. Impact of sustainability-related strategies on competitive advantage and potential liability.
Advisory recommendation Prereq: ECS 650/BUA 650

ECS 656 Lean and the Growth Mindset (3 Credits)
Engineering & Comp Sci
Strategic planning and problem solving leveraging lean principles and techniques through deliberate practice. Project-based course incorporates modern management principles and practices including lean, agile, design thinking, and positive psychology to drive operational excellence.

ECS 666 Advanced Course in Engineering I (6 Credits)
Engineering & Comp Sci
Multidisciplinary course of study to develop engineering leadership skills. Weekly problems on engineering law, engineering mathematics, modeling, control theory, system and signals, thermodynamics, structural analysis, materials.

ECS 667 Advanced Course in Engineering II (6 Credits)
Engineering & Comp Sci
Continuation of ECS 666. Covers fluid mechanics, environmental engineering, computer hardware and software theories, modeling and simulation, network theory and implementation.
Advisory recommendation Prereq: ECS 666

ECS 670 Experience Credit (1-6 Credits)
Engineering & Comp Sci
Participation in a discipline or subject related experience. Student must be evaluated by written or oral reports or an examination. Permission in advance with the consent of the department chairperson, instructor, and dean. Limited to those in good academic standing.
Repeatable

ECS 681 Opns Resch/Decsn Mkg (3 Credits)
Engineering & Comp Sci

ECS 690 Independent Study (1-6 Credits)
Engineering & Comp Sci
Exploration of a problem, or problems, in depth. Individual independent study upon a plan submitted by the student. Admission by consent of supervising instructor(s) and the department.
Repeatable

ECS 691 Fundamentals of Research (1 Credit)
Engineering & Comp Sci
Subjects such as selection of a dissertation topic, state-of-the-art search, research proposal, intellectual property, and academic integrity will be examined within the context of a mini-research project.

ECS 697 Capstone Project in Operations Research and System Analytics (3 Credits)
Engineering & Comp Sci
Capstone course for MS in Operations Research and System Analytics. Focus on solving real-world and industry-inspired problems and generating professional outputs.
Advisory recommendation Prereq: ELE 603 and ELE 606 and ECS 629 and MAE 630 and CIS 662

ECS 700 Selected Topics (1-6 Credits)
Engineering & Comp Sci
Exploration of a topic (to be determined) not covered by the standard curriculum but of interest to faculty and students in a particular semester.
Repeatable

ECS 759 Sustainability-Driven Enterprise (3 Credits)
Engineering & Comp Sci
Cross-listed with BUA 759
CAS in Sustainable Enterprise capstone. Sustainable approaches to complex organizational challenges, opportunities: organizational, industry, stakeholder analysis, sustainability objectives, strategies, and metrics. Multidisciplinary team consulting project.
Advisory recommendation Prereq: (ECS 650 OR BUA 650) AND (ECS 651 OR BUA 651)

ECS 770 Professional Training (0 Credits)
Engineering & Comp Sci
Repeatable