CIVIL AND ENVIRONMENTAL ENGINEERING (CEE)

CEE 198 Computer-aided Drafting, Design, and Modeling (3 Credits)
Engineering & Comp Sci
An introductory course in computer-aided drafting, design, and modeling in 2D and 3D. Basic commands, tools, multi-view drawing and dimensioning techniques. Review of software architecture, capabilities, application, and output formats.

CEE 271 Environmental Chemistry and Analysis (3 Credits)
Engineering & Comp Sci
Introduction to chemical principles in natural and engineered environmental systems. Thermodynamics and kinetics of reactions; acid-base chemistry; environmental organic chemistry; treatment process design applications.
Prereq: CHE 116 or CHE 150 Coreq: MAT 296
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/); Information Literacy and Technological Agility (https://coursecatalog.syracuse.edu/shared-competencies/information-literacy-and-technological-agility/)

CEE 273 Introduction to Geomatics and GIS (3 Credits)
Engineering & Comp Sci
Map reading, surveying, and theory of Geomatics. Application of 2D and 3D computer software for Geomatics. Application of Geographic Information Systems (GIS) in civil and environmental engineering.
Prereq: MAT 295; Coreq; MAT 296
Shared Competencies: Information Literacy and Technological Agility (https://coursecatalog.syracuse.edu/shared-competencies/information-literacy-and-technological-agility/)

CEE 274 Sustainability in Civil and Environmental Systems (3 Credits)
Engineering & Comp Sci
Introduction to systems theory and concepts applied to natural and built environments. Sustainability, ecosystems, mass and energy balances, chemical transformation and reactions. Basic principles for sustainable civil and environmental engineering design and decision making.
Prereq: CHE 106 or 109 and MAT 296
Shared Competencies: Civic and Global Responsibility (https://coursecatalog.syracuse.edu/shared-competencies/civic-and-global-responsibility/); Scientific Inquiry and Research Skills (https://coursecatalog.syracuse.edu/shared-competencies/scientific-inquiry-and-research-skills/)

CEE 275 Infrastructure and Society (3 Credits)
Engineering & Comp Sci
Cross-listed with BUA 275
Interdisciplinary view of urban infrastructure. Resilience, sustainability, economic and community impacts, finance, infrastructure development in the global economy, and smart cities.
Shared Competencies: Civic and Global Responsibility (https://coursecatalog.syracuse.edu/shared-competencies/civic-and-global-responsibility/); Communication Skills (https://coursecatalog.syracuse.edu/shared-competencies/communication-skills/); Ethics and Integrity (https://coursecatalog.syracuse.edu/shared-competencies/ethics-and-integrity/)

CEE 280 International Course (1-12 Credits)
Engineering & Comp Sci
Offered through SUAbroad by educational institution outside the United States. Student registers for the course at the foreign institution and is graded according to that institution's practice. SUAbroad works with the S.U. academic department to assign the appropriate course level, title, and grade for the student's transcript.
Repeatable

CEE 290 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 6 times for 6 credits maximum

CEE 325 Mechanics of Materials (3 Credits)
Engineering & Comp Sci
Theory of deformation, stress, stress resultants, transformation. Elastic and inelastic constitutive behavior. Equilibrium. Tension and torsion of bars; flexure and shear of beams; pressure vessels. Thermoelasticity. Elastic and inelastic stability. Credit cannot be given for both ECS 325 and CEE 325.
Prereq: ECS 221 and MAT 296 Coreq: MAT 397
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/); Scientific Inquiry and Research Skills (https://coursecatalog.syracuse.edu/shared-competencies/scientific-inquiry-and-research-skills/)

CEE 326 Engineering Materials (3 Credits)
Engineering & Comp Sci
Atomic, molecular, and crystalline structures of solid engineering materials. Explanation and interpretation of physical, mechanical, and electrical properties of materials based on these structures. Two one-hour lectures and one two-hour laboratory a week.
Prereq: CEE 325 or ECS 325
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/); Scientific Inquiry and Research Skills (https://coursecatalog.syracuse.edu/shared-competencies/scientific-inquiry-and-research-skills/)

CEE 327 Prin of Fluid Mechanics (4 Credits)
Engineering & Comp Sci
Dimensional analysis. Hydrostatics. Equations of motion. Bernoulli's equation. Euler's momentum theorem. One-dimensional analysis. Velocity potential. Stream function. Laminar viscous flow. Potential flow applications.
Prereq: MAT 296 and ECS 221

CEE 329 Probability, Statistics and Risk for Civil and Environmental Engineering (4 Credits)
Engineering & Comp Sci
Summary statistics and graphical representations of data. Elements of probability theory. Normal distribution. Simple regression. One- and two-sample inference. Elementary stochastic processes. Risk and reliability. Bayesian decision analysis. Applications in civil and environmental engineering.
Prereq: MAT 397
Shared Competencies: Information Literacy and Technological Agility (https://coursecatalog.syracuse.edu/shared-competencies/information-literacy-and-technological-agility/)

CEE 331 Analysis of Structures and Materials (3 Credits)
Engineering & Comp Sci
Analysis of statically determinate and indeterminate trusses, beams, and frames by traditional and computer-based methods. Physical, mechanical, and thermal properties of conventional and environmental friendly construction materials.
Prereq: CEE 325 or ECS 325
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/); Information Literacy and Technological Agility (https://coursecatalog.syracuse.edu/shared-competencies/information-literacy-and-technological-agility/)

CEE 332 Design of Concrete Structures (3 Credits)
Engineering & Comp Sci
Analysis and design of environmentally friendly reinforced concrete structures subjected to flexural, shear, and axial loads. Analysis of stresses and deformations and their relation to codes and specifications.
Prereq: CEE 331
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/); Civic and Global Responsibility (https://coursecatalog.syracuse.edu/shared-competencies/civic-and-global-responsibility/); Scientific Inquiry and Research Skills (https://coursecatalog.syracuse.edu/shared-competencies/scientific-inquiry-and-research-skills/)

CEE 337 Introduction to Geotechnical Engineering (4 Credits)
Engineering & Comp Sci
Nature and composition of soils. Formation and classification of natural soils and man-made construction materials. Compaction, permeability and seepage, consolidation and settlement, shear behavior and strength.
Prereq: CEE 325 or ECS 325
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/); Communication Skills (https://coursecatalog.syracuse.edu/shared-competencies/communication-skills/); Information Literacy and Technological Agility (https://coursecatalog.syracuse.edu/shared-competencies/information-literacy-and-technological-agility/)

CEE 338 Foundation Engineering (3 Credits)
Engineering & Comp Sci
Subsurface investigation, bearing capacity, lateral earth pressures. Design of retaining structures, shallow and deep foundations. Slope stability, foundations on difficult soils, and soil-improvement methods.
Prereq: CEE 337
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/); Scientific Inquiry and Research Skills (https://coursecatalog.syracuse.edu/shared-competencies/scientific-inquiry-and-research-skills/)

CEE 341 Introduction to Environmental Engineering (3 Credits)
Engineering & Comp Sci
Fundamental principles of environmental processes, pollution, and pollution control, including mass transfer, water chemistry and microbiology, water and air pollution, and solid- and hazardous-waste management.
Prereq: CHE 106 and CHE 107
Shared Competencies: Communication Skills (https://coursecatalog.syracuse.edu/shared-competencies/communication-skills/)

CEE 352 Water Resources Engineering (4 Credits)
Engineering & Comp Sci
Analysis and design of hydraulic facilities including pipe systems, open channels, pumps and turbines, and ground water wells. Analysis of rainfall and riverflow; surface and subsurface water storage. Laboratory experiments and problem solving.
Prereq: CEE 327 or MAE 341
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/); Information Literacy and Technological Agility (https://coursecatalog.syracuse.edu/shared-competencies/information-literacy-and-technological-agility/)

CEE 361 Evolution of an Infrastructure Project (3 Credits)
Engineering & Comp Sci
Cross-listed with BUA 361
Lifecycle stages of infrastructure projects. Needs assessment, feasibility analysis, project delivery, public budgeting, project financing, risk allocation, urban design, permitting and zoning, sustainability criteria, project detailed design, construction management and troubleshooting, asset management, and disaster-response infrastructure.
Prereq: BUA 275 or CEE 275

CEE 362 Infrastructure Design Capstone (3 Credits)
Engineering & Comp Sci
Cross-listed with BUA 362
Review and integration of fundamental principles of infrastructure systems including smart city applications. Hands-on infrastructure design projects allow student teams to demonstrate competency in applying concepts and tools introduced in prerequisite courses.
Prereq: (CEE 275 and CEE 361) OR (BUA 275 and BUA 361)

CEE 380 International Course (1-12 Credits)
Engineering & Comp Sci
Offered through SUAbroad by educational institution outside the United States. Student registers for the course at the foreign institution and is graded according to that institution's practice. SUAbroad works with the S.U. academic department to assign the appropriate course level, title, and grade for the student's transcript.
Repeatable

CEE 400 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 6 times for 6 credits maximum

CEE 401 Construction Engineering and Project Management (3 Credits)
Engineering & Comp Sci
Double-numbered with CEE 601
Overview of various aspects of construction engineering and project management. Construction contracts, resource management, scheduling, equipment, quality control, productivity, construction safety, cash flow concepts, legal and management structures. Additional coursework required of graduate students.
Shared Competencies: Information Literacy and Technological Agility (https://coursecatalog.syracuse.edu/shared-competencies/information-literacy-and-technological-agility/)

CEE 405 Construction Estimating and Scheduling (3 Credits)
Engineering & Comp Sci
Double-numbered with CEE 605
Cost and schedule estimations based on project specifications. Construction drawings and specifications, quantity take-off, cost estimation, scheduling through deterministic and probabilistic methods, resource management, accelerated construction, and schedule updating. Additional work (research presentation and report) required of graduate students.
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/); Communication Skills (https://coursecatalog.syracuse.edu/shared-competencies/communication-skills/); Scientific Inquiry and Research Skills (https://coursecatalog.syracuse.edu/shared-competencies/scientific-inquiry-and-research-skills/)

CEE 413 Physical Hydrology (3 Credits)
Engineering & Comp Sci
Cross-listed with EAR 413
Double-numbered with CEE 613, EAR 613
Fundamentals of watershed hydrology presented from a physical hydrology perspective; course topics include: the water cycle, hydrologic processes, streamflow generation, groundwater-surface water interactions, and introduction to hydrologic modeling concepts. Additional work required of graduate students.
Shared Competencies: Information Literacy and Technological Agility (https://coursecatalog.syracuse.edu/shared-competencies/information-literacy-and-technological-agility/); Scientific Inquiry and Research Skills (https://coursecatalog.syracuse.edu/shared-competencies/scientific-inquiry-and-research-skills/)

CEE 415 Timber Design (3 Credits)
Engineering & Comp Sci
Double-numbered with CEE 615
Structural design using timber. Topics covered include dimensional features, structural properties, and behavior under loads using current NDS and ASCE 7 in both ASD and LRFD. Additional work is required of graduate students.
Prereq: CEE 331
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/)

CEE 430 Environmental Organic Chemistry (3 Credits)
Engineering & Comp Sci
Double-numbered with CEE 630
Movement and fate of organic chemicals in aquatic systems. Thermodynamic principles and molecular descriptors for predicting the partitioning in environmental phases. Mechanisms and kinetics of chemical transformation processes including hydrolysis, reduction, oxidation, and photolysis. Additional work required for graduate students.
Prereq: CHE 116 and CEE 271

CEE 433 Intermediate Structural Analysis (3 Credits)
Engineering & Comp Sci
Analysis of cables and arches. Classical and matrix methods of truss, beam, and frame analysis. Computer and numerical methods of structural analysis. Relation of analysis to design.
Prereq: CEE 331

CEE 442 Treatment Processes in Environmental Engineering (3 Credits)
Engineering & Comp Sci
Double-numbered with CEE 642
Fundamental engineering concepts and principles used for the design and operation of water and wastewater treatment systems. Estimating water demand and wastewater flows in the urban water use cycle. Significance of government regulations and standards.
Coreq: CEE 327 and CEE 341
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/)

CEE 443 Transportation Engineering (3 Credits)
Engineering & Comp Sci
Double-numbered with CEE 643
Transportation systems, modes and significance. Traffic engineering fundamental relationships and field studies. Intersection design and control. Geometric design of road alignments. Introduction to transportation planning. Additional work required of graduate students. A research report is required for CEE 643.
Prereq: CEE 273

CEE 450 Environmental Risk Assessment & Toxicology (3 Credits)
Engineering & Comp Sci
Cross-listed with BEN 450, CEN 450
Double-numbered with BEN 650, CEE 650, CEN 650
Students will analyze the human health impact of exposure to toxic chemicals in air, water, and soil according to USEPA Risk Assessment Guidance for Superfund. Additional work required of graduate students.
Shared Competencies: Scientific Inquiry and Research Skills (https://coursecatalog.syracuse.edu/shared-competencies/scientific-inquiry-and-research-skills/)

CEE 457 Biogeochemistry (3 Credits)
Engineering & Comp Sci
Double-numbered with CEE 657
Biogeochemical relationships as a unifying concept for ecological systems, including importance of biogeochemical relationships in ecosystems and global cycles. The interface between abiotic and biotic components of ecosystems is explained. Additional work required of graduate students.
Prereq: CHE 106 and 107
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/); Scientific Inquiry and Research Skills (https://coursecatalog.syracuse.edu/shared-competencies/scientific-inquiry-and-research-skills/)

CEE 463 Introduction to Sustainable Engineering (3 Credits)
Engineering & Comp Sci
Double-numbered with CEE 663
Introduction to principles underlying engineering decisions to improve our quality of life without jeopardizing quality of life for future generations. Application of these principles to qualitative and quantitative engineering problems. Additional coursework required of graduate students.
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/); Ethics and Integrity (https://coursecatalog.syracuse.edu/shared-competencies/ethics-and-integrity/); Scientific Inquiry and Research Skills (https://coursecatalog.syracuse.edu/shared-competencies/scientific-inquiry-and-research-skills/)

CEE 465 Modern Urban Infrastructure (3 Credits)
Engineering & Comp Sci
Double-numbered with CEE 665
Interdisciplinary view of urban infrastructure (transportation, water supply, electric power, etc.). Considerations of resilience, sustainability, design objectives, politics, economic/community impacts, finance, and smart cities. Challenges and possibilities inherent in modern infrastructures. Additional work required of graduate students.

CEE 470 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

CEE 471 Environmental Chemistry and Analysis (3 Credits)
Engineering & Comp Sci
Cross-listed with CEN 461
Double-numbered with CEE 671, CEN 661
An introduction to chemical principles in natural and engineered environmental systems. Thermodynamics and kinetics of reactions; acid-base chemistry; environmental organic chemistry; treatment process design applications. Includes selected laboratory exercises. Additional work is required of graduate students.
MAT 296 and CHE 106 and CHE 107
Shared Competencies: Scientific Inquiry and Research Skills (https://coursecatalog.syracuse.edu/shared-competencies/scientific-inquiry-and-research-skills/)

CEE 472 Applied Env Microbiology (3 Credits)
Engineering & Comp Sci
Cross-listed with CEN 472
Double-numbered with CEE 672, CEN 672
General Principles and application of environmental microbiology and microbial processes. Role of microbes in water pollution control, environmental health, and element cycling in the environment. Additional work is required of graduate students.
Shared Competencies: Scientific Inquiry and Research Skills (https://coursecatalog.syracuse.edu/shared-competencies/scientific-inquiry-and-research-skills/)

CEE 473 Transp Procss/Env Engrng (3 Credits)
Engineering & Comp Sci
Double-numbered with CEE 673
Fundamentals and applications of mass and heat transport in environmental engineering. Molecular and turbulent diffusion, advection, dispersion, settling, and surface transfer in air and water. Quantitative applications in treatment systems and the natural environment. Additional work is required of graduate students.
Prereq: (CEE 327 OR MAE 341) and CEE 341

CEE 475 Civil and Environmental Engineering Design (4 Credits)
Engineering & Comp Sci
Capstone design experience. Fundamental principles in various areas of civil and environmental engineering applied to open-ended design projects. Economics, safety, reliability, environmental, sustainability, ethical and social considerations.
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/); Communication Skills (https://coursecatalog.syracuse.edu/shared-competencies/communication-skills/); Scientific Inquiry and Research Skills (https://coursecatalog.syracuse.edu/shared-competencies/scientific-inquiry-and-research-skills/)

CEE 478 Rehabilitation of Civil Infrastructure (3 Credits)
Engineering & Comp Sci
Double-numbered with CEE 678
Deterioration of construction materials. Evaluation, non-destructive testing, and rehabilitation of existing structures. Properties and applications of repair materials. Seismic retrofit of bridges. Analysis and design of structural members retrofitted with carbon fiber reinforced polymer composites.
Prereq: CEE 332 and (CEE 325 or ECS 325)
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/); Scientific Inquiry and Research Skills (https://coursecatalog.syracuse.edu/shared-competencies/scientific-inquiry-and-research-skills/)

CEE 480 International Course (1-12 Credits)
Engineering & Comp Sci
Offered through SUAbroad by educational institution outside the United States. Student registers for the course at the foreign institution and is graded according to that institution's practice. SUAbroad works with the S.U. academic department to assign the appropriate course level, title, and grade for the student's transcript.
Repeatable

CEE 490 Independent Study (1-6 Credits)
Engineering & Comp Sci
In-depth exploration of a problem or problems. Individual independent study upon a plan submitted by the student. Admission by consent of supervising instructor or instructors and the department.
Repeatable

CEE 499 Honors Capstone Project (1-3 Credits)
Engineering & Comp Sci
Completion of an Honors Capstone Project under the supervision of a faculty member.
Repeatable 3 times for 3 credits maximum

CEE 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 6 times for 6 credits maximum

CEE 501 FE Exam Preparation (1 Credit)
Engineering & Comp Sci
Discussion of content, administration, and implementation of the Fundamentals of Engineering (FE) Exam, a comprehensive review of FE-type problems, and a targeted review of specific topics on the FE Exam.

CEE 520 Building Information Modeling (3 Credits)
Engineering & Comp Sci
Generating three-dimensional architectural/structural models. Dimensioning and Annotating. Modeling various components of a building, including floors, roofs, structure, ceilings, stairs, ramps, railings. Generating schedules, views and detailing views.

CEE 529 Risk Anlys in Civ Engin (3 Credits)
Engineering & Comp Sci
Probability, statistics, and decision theory applied to a variety of civil-engineering disciplines, such as structural design and analysis, geotechnical, water quality, water resources, and transportation.
Prereq: MAT 397

CEE 535 Strctrl Steel Design (3 Credits)
Engineering & Comp Sci
Design of structures using load- and resistance-factor design concept. Limit states design of columns, beams, beam-columns, frames, connections, plate girders, and composite sections. Computer applications to design.
Prereq: CEE 331
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/); Civic and Global Responsibility (https://coursecatalog.syracuse.edu/shared-competencies/civic-and-global-responsibility/); Scientific Inquiry and Research Skills (https://coursecatalog.syracuse.edu/shared-competencies/scientific-inquiry-and-research-skills/)

CEE 536 Prestrssd Concrete Design (3 Credits)
Engineering & Comp Sci
Analysis and design of prestressed concrete members for flexure, shear, torsion, and compression. Basic concept of prestressing. Stress computation and prestress loss estimation. Deflection and crack control.
Prereq: CEE 331
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/)

CEE 538 Dynamics of Structures (3 Credits)
Engineering & Comp Sci
Response of single and multiple degree of freedom systems to dynamic loadings (harmonic, blast, wind, earthquake); design of buildings, bridges, and pipelines for dynamic loading (with particular emphasis on earthquakes); building and bridge codes.
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/); Civic and Global Responsibility (https://coursecatalog.syracuse.edu/shared-competencies/civic-and-global-responsibility/); Scientific Inquiry and Research Skills (https://coursecatalog.syracuse.edu/shared-competencies/scientific-inquiry-and-research-skills/)

CEE 545 Pavement Design (3 Credits)
Engineering & Comp Sci
Pavement types and stress analysis, traffic assessment, subgrade and pavement materials evaluation, design of flexible and rigid pavements for highways and airports, pavement distress and rehabilitation, introduction to pavement management systems and SuperPave mix design.
Prereq: CEE 338 Coreq: CEE 443

CEE 548 Engineering Economics and Technology Valuation (3 Credits)
Engineering & Comp Sci
Cross-listed with MAE 548
Value-based assessment and management of engineering/technology projects: equivalence; discounted cash flow; taxes/depreciation; financial statements. Risk-adjusted valuation: risk/uncertainty in staged projects; Monte Carlo simulations; decision trees; real options; project portfolio management.
Prereq: MAT 296
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/)

CEE 549 Designing with Geofoam (3 Credits)
Engineering & Comp Sci
Introduction to geofoam production, physical properties, evaluation of engineering parameters, specification and quality assurance, analyses and design of selected applications, comparison with conventional methods, field monitoring, and case histories.
Prereq: CEE 338

CEE 551 Energy Conversion (3 Credits)
Engineering & Comp Sci
Cross-listed with MAE 551
Energy demand and resources. Fundamentals of combustion. Power plants, refrigeration systems. Turbines and engines. Advanced systems. Direct energy conversion. Alternate energy sources. Energy storage. Costs and environmental impact.

CEE 552 Building Environmental Measurements and Controls (3 Credits)
Engineering & Comp Sci
Cross-listed with MAE 552
Fundamentals of building ventilating methods for measuring and controlling indoor environmental conditioning, thermal comfort, and indoor air quality.
Prereq: MAE 341 and MAE 355

CEE 553 HVAC Systems Analysis and Design (3 Credits)
Engineering & Comp Sci
Cross-listed with MAE 553
Fundamentals of moist air properties, basic air conditioning processes, heat transfer in building structures, heating and cooling load calculations, and air distribution systems.
Prereq: MAE 251
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/)

CEE 554 Principles of Environmental Toxicology (3 Credits)
Engineering & Comp Sci
Factors that make chemicals environmental hazards and techniques used in their evaluation. Topics include chemical, physiological, and molecular aspects of toxicology; transport and fate of chemicals in the environment; and current legislation.
Prereq: (BIO 121 and 122 and 123) or (CHE 106 and 107 and 275) or (CHE 109 and 129)

CEE 555 Hazardous Waste Mgmt (3 Credits)
Engineering & Comp Sci
Regulations that address management of hazardous wastes. Practices and technologies commonly used in meeting regulations. Investigative and diagnostic techniques.

CEE 558 Solid Wastes: Collection and Disposal (3 Credits)
Engineering & Comp Sci
Composition of refuse. Quantities produced by individuals and industries. Collection equipment, methods, and associated costs. Disposal problems and solutions, such as landfills, incineration, and composting.

CEE 562 Air Resources (3 Credits)
Engineering & Comp Sci
Cross-listed with CEN 562
Occurrence, nature and properties, major sources and quantities of contaminants. Ambient air concentration levels, community distribution patterns, and control of air pollution.
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/); Civic and Global Responsibility (https://coursecatalog.syracuse.edu/shared-competencies/civic-and-global-responsibility/); Scientific Inquiry and Research Skills (https://coursecatalog.syracuse.edu/shared-competencies/scientific-inquiry-and-research-skills/)

CEE 570 Water&Wastewtr Trtmnt Des (3 Credits)
Engineering & Comp Sci
Design of water and wastewater treatment plants; design capacity, process size and configuration, and overall treatment system performance for specific use needs and regulatory requirements. Groups prepare designs and cost estimates with written and oral reports. Repeatable
Prereq: CEE 327 and CEE 342

CEE 571 Water Quality Modeling (3 Credits)
Engineering & Comp Sci
Conceptual and mathematical models of water quality in surface waters. Application of mass and energy balances to aquatic systems. Numerical methods for solution of governing equations. Students will build simple models and use existing water quality modeling software.
Prereq: MAT 296 and CEE 341
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/); Civic and Global Responsibility (https://coursecatalog.syracuse.edu/shared-competencies/civic-and-global-responsibility/); Scientific Inquiry and Research Skills (https://coursecatalog.syracuse.edu/shared-competencies/scientific-inquiry-and-research-skills/)

CEE 573 Water, Sanitation, and Sustainability in Low-Resource Settings (3 Credits)
Engineering & Comp Sci
Overview of water and sanitation technologies and systems, including design and operational principles, commonly found in low-resource settings around the world. Emphasis on sustainable design considering environmental, economic, and social dimensions, with inclusion of stakeholder perspectives.

CEE 577 Urban Stormwater Management (3 Credits)
Engineering & Comp Sci
Theory and practice of urban stormwater management systems. Selecting and sizing stormwater quality and quantity control devices and systems. Sustainability aspects of urban stormwater design and regulatory compliance requirements. ENVISION rating system. Final design project.
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/); Civic and Global Responsibility (https://coursecatalog.syracuse.edu/shared-competencies/civic-and-global-responsibility/); Scientific Inquiry and Research Skills (https://coursecatalog.syracuse.edu/shared-competencies/scientific-inquiry-and-research-skills/)

CEE 581 Lean Construction Principles and Methods (3 Credits)
Engineering & Comp Sci
Principles and methods of lean construction. History and evolution of lean production and lean construction paradigms. Production control and contracting. Applications to construction processes and operations to improve project performance.
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/); Scientific Inquiry and Research Skills (https://coursecatalog.syracuse.edu/shared-competencies/scientific-inquiry-and-research-skills/)

CEE 582 Construction Productivity (3 Credits)
Engineering & Comp Sci
Discussion of construction productivity measurement techniques, productivity improvement methods, and how to measure productivity loss. Examine factors that affect construction productivity such as human behavior, overtime, shift work, overmanning, change orders, and weather.
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/); Communication Skills (https://coursecatalog.syracuse.edu/shared-competencies/communication-skills/); Scientific Inquiry and Research Skills (https://coursecatalog.syracuse.edu/shared-competencies/scientific-inquiry-and-research-skills/)

CEE 584 Designing W/Geosynthetics (3 Credits)
Engineering & Comp Sci
Engineering properties of geosynthetics (geotextiles, geogrids, geonets, geomembranes, and geocomposites). Design of filters using geotextiles, retaining structures using geosynthetics, design of liquid impoundment, and solid waste containment facilities.
Prereq: CEE 337
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/); Communication Skills (https://coursecatalog.syracuse.edu/shared-competencies/communication-skills/); Scientific Inquiry and Research Skills (https://coursecatalog.syracuse.edu/shared-competencies/scientific-inquiry-and-research-skills/)

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