CIVIL AND ENVIRONMENTAL ENGINEERING (CEE)

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

CEE 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

CEE 601 Construction Engineering and Project Management (3 Credits)
Engineering & Comp Sci
Double-numbered with CEE 401
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 605 Construction Estimating and Scheduling (3 Credits)
Engineering & Comp Sci
Double-numbered with CEE 405
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 609 Environmental Data Science (3 Credits)
Engineering & Comp Sci
Cross-listed with EAR 609
Introduction to data science methods for environmental analysis in the R and Python programming languages. Reproducible scientific computing; open geospatial data sources; common structures of environmental data; space/time applications of supervised machine learning; and high throughput computing.

CEE 613 Physical Hydrology (3 Credits)
Engineering & Comp Sci
Cross-listed with EAR 613
Double-numbered with CEE 413, EAR 413
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 615 Timber Design (3 Credits)
Engineering & Comp Sci
Double-numbered with CEE 415
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.
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/)

CEE 629 Reliability of Civil Systems (3 Credits)
Engineering & Comp Sci
Probability-based risk assessment. Probability modeling of load and resistance processes. Probability distribution and cumulative density functions. Extreme value problems. First and second order reliability analyses of series and parallel civil engineering systems.

CEE 630 Environmental Organic Chemistry (3 Credits)
Engineering & Comp Sci
Double-numbered with CEE 430
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.

CEE 631 Classical and Matrix Structural Analysis (3 Credits)
Engineering & Comp Sci
Analysis of cables and arches using classical method. Linear and nonlinear analyses of trusses and frames using matrix method. Modeling and analysis of special structures.

CEE 632 Structural Dynamics and Earthquake Engineering (3 Credits)
Engineering & Comp Sci
Dynamic response of single- and multi-degree-of-freedom structures. Time domain and frequency domain analyses. Linear and nonlinear systems. Applications to earthquake engineering. Blast loading and soil-structure interaction effects.

CEE 633 Finite Element Analysis (3 Credits)
Engineering & Comp Sci
Fundamentals and techniques of modern finite analytical methods, including the finite element and finite difference methods. Application to elasticity, plate, shell seepage, torsion, and fracture mechanics problems.

CEE 634 Stability Analysis of Structural Systems (3 Credits)
Engineering & Comp Sci
Stability analysis of bars, arches, plates and shells. Stability criteria. Analytical and numerical solutions to stability problems. Effects of geometrical imperfections and material nonlinearity. Design considerations for stability.

CEE 635 Adv Reinforced Concrt Des (3 Credits)
Engineering & Comp Sci
Relation of straight line and ultimate theories to the analysis and design of reinforced an prestressed concrete structures.

CEE 636 Plstc Des/Steel Strctures (3 Credits)
Engineering & Comp Sci
Design of steel structures using plasticity theory. Concept of plastic hinge and collapse mechanism. Lower and upper bound theorems. Equilibrium and mechanism methods for the analysis and design of continuous beams and frames.

CEE 637 Adv Soil Mech Fndtns I (3 Credits)
Engineering & Comp Sci
Physiochemical studies of soils land soil behavior. Stress distribution in soil masses. Immediate and time-dependent compression of soils. Settlement analysis. Seepage through foundations and earth structures.

CEE 638 Adv Soil Mech&Foundtns II (3 Credits)
Engineering & Comp Sci
Shear strength of soils. Bearing capacity and slope stability analyses. Earth pressures and analysis of retaining structures. Soil dynamics.

CEE 639 Sustainable Development and Infrastructure Management (3 Credits)
Engineering & Comp Sci
Cross-listed with ECS 636
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.

CEE 641 Seepage & Earth Dam Desgn (3 Credits)
Engineering & Comp Sci
Types of earth dams. Method of construction. Case histories. Stability of dams. Seepage-flow nets. Effective stress analysis. Darcy's law. Estimation of flow. Design of filters. Instrumentation. Design of dams for earthquake forces.
Advisory recommendation Prereq: CEE 337

CEE 642 Treatment Processes in Environmental Engineering (3 Credits)
Engineering & Comp Sci
Double-numbered with CEE 442
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.
Shared Competencies: Critical and Creative Thinking (https://coursecatalog.syracuse.edu/shared-competencies/critical-and-creative-thinking/)

CEE 643 Transportation Engineering (3 Credits)
Engineering & Comp Sci
Double-numbered with CEE 443
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.

CEE 648 Building Environmental Modeling and Simulations (3 Credits)
Engineering & Comp Sci
Cross-listed with MAE 658
Building environmental analysis; contaminant source and sink models; single-zone, multizone, and computational fluid dynamics models.
Advisory recommendation Prereq: MAE 341 and MAE 355

CEE 649 Building Materials and Envelope (3 Credits)
Engineering & Comp Sci
Cross-listed with MAE 659
Understanding of heat, air and moisture transfer effects on building envelope/enclosure through linking material properties, assembly design and hygorthermal performance with structural and mechanical considerations. Introduction to advanced computational tools for building enclosures.

CEE 650 Environmental Risk Assessment & Toxicology (3 Credits)
Engineering & Comp Sci
Cross-listed with BEN 650, CEN 650
Double-numbered with BEN 450, CEN 450, CEE 450
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 651 Physical-Chemical Process (3 Credits)
Engineering & Comp Sci
Principles used in the analysis and design of physical-chemical water/waste-treatment processes.

CEE 652 Biologicl Waste Treatment (3 Credits)
Engineering & Comp Sci
Theories and Advanced design concepts for aerobic, anoxic and anaerobic system applications.

CEE 653 Applied Aquatic Chemistry (3 Credits)
Engineering & Comp Sci
Principles of aquatic chemistry applied to the solution of environmental engineering problems. Includes acid-base, carbonate, precipitation-dissolution, coordination, and oxidation-reduction chemistry.
Advisory recommendation Prereq: CEE 471 or CEE 671

CEE 657 Biogeochemistry (3 Credits)
Engineering & Comp Sci
Double-numbered with CEE 457
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.
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 659 Advanced Hydrology (3 Credits)
Engineering & Comp Sci
Development of advanced theories of hydrologic action: precipitation frequencies, precipitation-runoff relations, magnitude and frequency of maxima and minima; interpretation and application of these theories.

CEE 660 Seminar Civil Engineering (0 Credits)
Engineering & Comp Sci
Research report presentations by students and visiting specialists in civil engineering and associated sciences and professions. Required each semester of all M.C.E. candidates.
Repeatable

CEE 662 Chem/Soil & Natural Srfcs (3 Credits)
Engineering & Comp Sci
General principles. Chemical properties of soils, nature of surfaces, soil formation, soil minerals, and mechanisms regulating solute chemistry in soil solutions.

CEE 663 Introduction to Sustainable Engineering (3 Credits)
Engineering & Comp Sci
Double-numbered with CEE 463
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 665 Modern Urban Infrastructure (3 Credits)
Engineering & Comp Sci
Double-numbered with CEE 465
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 666 Design of Concrete Bridges (3 Credits)
Engineering & Comp Sci
Analysis and design of highway concrete bridges. Bridge economics, aesthetics, construction, load distribution, and design using load resistance factor design (LRFD). Analysis of stresses and deformations, and the relation to AASHTO-LRFD Design Specifications.

CEE 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

CEE 671 Environmental Chemistry and Analysis (3 Credits)
Engineering & Comp Sci
Cross-listed with CEN 661
Double-numbered with CEE 471, CEN 461
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.
Shared Competencies: Scientific Inquiry and Research Skills (https://coursecatalog.syracuse.edu/shared-competencies/scientific-inquiry-and-research-skills/)

CEE 672 Applied Env Microbiology (3 Credits)
Engineering & Comp Sci
Cross-listed with CEN 672
Double-numbered with CEE 472, CEN 472
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 673 Transp Procss/Env Engrng (3 Credits)
Engineering & Comp Sci
Double-numbered with CEE 473
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.
Advisory recommendation Prereq: CEE 327 or MAE 341, CEE 341

CEE 676 Multiscale Material Modeling and Simulations (3 Credits)
Engineering & Comp Sci
Advanced computational and theoretical tools to model and simulate the behavior of materials from the fundamental building blocks to the continuous functional form at multiple scale levels.

CEE 677 Design of Structural Systems (3 Credits)
Engineering & Comp Sci
Planning, analysis, and design of structural systems, e.g. buildings and bridges. Structure economics, aesthetics, construction, analysis, and design will be presented. Reference will be made to the AASHTO-LRFD Specifications, and the International Building Codes.

CEE 678 Rehabilitation of Civil Infrastructure (3 Credits)
Engineering & Comp Sci
Double-numbered with CEE 478
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.
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 687 Environmental Geostatistics (3 Credits)
Engineering & Comp Sci
Cross-listed with GEO 687
Statistical analysis of spatial patterns in environmental data. Exploratory data analysis; estimation, modeling, and interpretation of variograms; prediction using driging. Applications in engineering, geography, earth science and ecology. Use of geostatistical software.

CEE 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

CEE 737 Applied Soil Mechanics (3 Credits)
Engineering & Comp Sci
Shallow and deep foundations, buried structures, and earth structures.
Advisory recommendation Prereq: CEE 638

CEE 739 Soil Stabilization (3 Credits)
Engineering & Comp Sci
Principles and practice of stabilization techniques for soil and rock material: chemical, mechanical electrosmosis, chemical and cement grouting, de-watering, heating, and dynamic consolidation.
Advisory recommendation Prereq: CEE 637

CEE 740 Soil Dynamics (3 Credits)
Engineering & Comp Sci
Earthquakes: magnitude, intensity, design acceleration history, response spectra, soil behavior under dynamic loads, wave propagation, shear modulus and damping dynamic analysis, design of retaining walls, shallow foundations and deep foundation for earthquakes.
Advisory recommendation Prereq: CEE 637

CEE 764 Industrial Hygiene Eng (3 Credits)
Engineering & Comp Sci
Environmental hazards to human health. Toxic properties of industrial dusts, gaseous contaminants, and ionizing radiations. Theories and principles of maximum permissible doses. Control techniques.

CEE 789 Special Investigtns/CEE (3 Credits)
Engineering & Comp Sci
Special investigations and research in civil engineering designed to meet the needs of individual students.
Repeatable

CEE 995 Master's Exit Paper (0 Credits)
Engineering & Comp Sci
Written paper on a topic in civil or environmental engineering, supervised by a faculty advisor and submitted in accordance with current departmental guidelines.

CEE 996 Master's Project (3 Credits)
Engineering & Comp Sci
Investigation of a civil engineering or environmental engineering or science problem. A written report is required in accordance with current departmental guidelines. Required of all students electing the non-thesis option for a master's degree.
Repeatable

CEE 997 Masters Thesis (0-6 Credits)
Engineering & Comp Sci
Research thesis on some phases of engineering to be selected by student and approved by department chair.
Repeatable

CEE 999 Dissertation (0-15 Credits)
Engineering & Comp Sci
Research Studies directed to the dissertation under supervision of member of Graduate School faculty.
Repeatable