CE 111 Introduction to Civil Engineering (1) (CR/NC)
Broad overview of the field of civil engineering, including professional societies and their student chapters, professional licensing and registration, professional codes of ethics, the elements of engineering design, and the scope of analysis and design activities undertaken by private- and public-sector civil design professionals. Credit/No Credit grading only. 1 lecture.

CE 112 Design Principles in Civil Engineering (2)
The civil and environmental engineering design process. Illustration and quantification of design alternatives. Practice in creating and evaluating typical designs drawn from different specialty areas of the field. 2 lectures. Prerequisite: MATH 141.

CE 113 Computer Aided Drafting in Civil Engineering (2)
Computer-aided drawing (CAD) and related software to display and quantify engineering designs. Elements of engineering design drawings. Related topics in information technology. 2 laboratories. Corequisite: CE 112, or prerequisite: ENVE 111.

CE 200 Special Problems for Undergraduates (1–2) (CR/NC)
Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Credit/No Credit grading only. Prerequisite: Consent of department chair.

CE 201 Mechanics of Materials (6)
Stresses, strains, and deformations associated with torsion, axial, shear, moment, and pressure vessel loadings. Combined loads and principle representations of the states of stress and strain at a point. Basic failure criteria. Introduction to stability including buckling of columns. Equivalent in content to CE 204 and CE 207. 6 lectures. Prerequisite: ME 211.

CE 204 Mechanics of Materials I (3)
Stresses, strains, and deformations associated with axial, torsional, and flexural loading of bars, shafts, and beams. Analysis of elementary and indeterminate mechanical and structural systems. 3 lectures. Prerequisite: ME 211.

CE 207 Mechanics of Materials II (3)
Combined stress states including torsion, axial, shear, moment, and pressure vessel loadings. Principle stress/strain states. Basic failure criteria. Analysis of beam forces, moments, deflections, and rotations. Introduction to stability concepts including column buckling. 3 lectures. Prerequisite: CE 204.

CE 240 Additional Engineering Laboratory (1-2) (CR/NC)
Special assignments undertaken by students who need or wish to acquire abilities supplementary to their standard pattern of courses. Assignments must be primarily of shop or laboratory nature. Work done with minimum faculty supervision. Total credit limited to 6 units. Credit/No Credit grading only. 1-2 laboratories.

CE 251 Numerical Methods in Engineering (4)
Concepts from numerical analysis and basic programming theory introduced in the context of engineering applications. Topics include the application of programming constructs, finite precision calculations, vectors, matrices, eigenvalues/vectors, linear systems, linear programming, basic nonlinear systems, differential equations, plotting, statistics, least squares, and approximations. 3 lectures, 1 laboratory. Prerequisite: CE 113 and MATH 244. Corequisite: CE 207.

CE 259 Civil Engineering Materials (2)
Experimental determination of mechanical properties of concrete, asphalt, and soils as required for engineering applications. Experimental verification of assumptions made in mechanics of materials procedures. Use of strain measuring devices. Preparation of technical reports. 2 laboratories. Prerequisite: CE 204.

CE 270 Selected Topics (1–4)
Directed group study of selected topics. The Schedule of Classes will list title selected. Total credit limited to 8 units. 1 to 4 lectures. Prerequisite: Open to undergraduate students and consent of instructor.

CE 321 Fundamentals of Transportation Engineering (3)
The characteristics and functions of highway, air, rail, transit and other modes of urban and intercity transportation. Fundamentals of transportation design, operations, and planning. Evaluation of costs, benefits, and environmental considerations. 3 lectures. Prerequisite: PHYS 141; CE 259 or graduate standing. Formerly CE 221. Change effective Spring 2012.

CE 322 Fundamentals of Transportation Engineering Laboratory (2)
Application of principles of transportation planning, operations, and design. Emphasis on urban transportation planning and operations, and the design of urban and intercity highway and rail facilities. Experimental determination of the physical and mechanical properties of pavement materials through laboratory and field testing. Analysis of data and preparation of testing reports. 2 laboratories. Prerequisite or concurrent: CE 321. Formerly CE 222.

CE 336 Water Resources Engineering (4)
Hydraulics of pile flow. Open channel flow, groundwater, and hydrology. 4 lectures. Prerequisite: ME 341 or ENVE 264.

CE 337 Hydraulics Laboratory (1)
Application of basic fluid dynamic principles to various mechanical systems. Exposure to experimental problems and techniques with guided laboratory projects related to civil engineering discipline. 1 laboratory. Prerequisite: ME 341 or ENVE 264. Corequisite: CE 336.

CE 351 Structural Analysis (4)
Analysis for member forces and deflections of determinate and indeterminate structures, including trusses, beams, and frames. General theorems, influence diagrams, and energy methods. 3 lectures, 1 laboratory. Prerequisite: CE 251 and either CE 201 or CE 207.

CE 355 Reinforced Concrete Design (4)
Analytical and design principles of reinforced concrete in designing civil engineering systems. Origin of code requirements. Fundamentals of proportioning. Details of elements and structural systems. 3 lectures, 1 laboratory. Prerequisite: CE 259, CE 351.

CE 356 Structural Steel Design (4)
Design and behavior of the elements of steel structures. Design and analysis of bolted, welded and eccentric connections. Proportioning of members and connections. Introduction to plastic design, end plate connection, composite construction, shear connections and design of composite beams. 3 lectures, 1 laboratory. Prerequisite: CE 351.

CE 381 Geotechnical Engineering (4)
Engineering geology, elementary mass-volume relations, clay-water interaction, soil classification, soil compaction, geostatic stress distributions, 1-D and 2-D steady-state flow, shear strength under drained and undrained conditions. 4 lectures. Prerequisite: CE 207 and ME 341 or ENVE 264. Concurrent: CE 382 (CE majors only). Change effective Winter 2012.

CE 382 Geotechnical Engineering Laboratory (1)
Use of standard laboratory test methods to determine physical, mechanical, and hydraulic properties of soil. 1 laboratory. Corequisite: CE 381.

CE 400 Special Problems for Advanced Undergraduates (1–2)
Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Consent of department chair.

CE 401 Advanced Mechanics of Materials (4)
Introduction to linear elasticity as a means for development of reduced order theories such as torsion, beams, columns, and plates from the general three-dimensional continuum. Energy methods as well as the application and limitation of these theories. 4 lectures. Prerequisite: CE 351 or ME 328.

CE 404 Applied Finite Element Analysis (4)
Finite element based solutions to engineering problems with an emphasis on elastostatic problems in structural mechanics. The power and pitfalls associated with the finite element method highlighted through practical modeling assignments. Introduces the use of commercial finite element codes. 3 lectures, 1 laboratory. Prerequisite: ME 329 or CE 351 or BMED 410. Crosslisted as BMED/CE/ME 404.

CE 405 Concrete Materials (4)
Supplementary cementitious materials and chemical admixtures and their incorporation into concrete mix design. Design and testing of concrete for durability and other specialized properties. 3 lectures, 1 laboratory. Prerequisite: CE 259.
CE 407 Structural Dynamics (4)
Effect of vibration and transient loads on structural elements. Dynamics load factors, support motion, damping and natural frequencies of multidimensional structural systems. Modal analysis. 3 lectures, 1 laboratory. Prerequisite: CE 351, ME 212.

CE 421 Traffic Engineering (4)
Principles of traffic circulation on highway systems and other modes. Traffic control. Traffic data collection and analysis. Capacity analysis. Traffic modeling. New technologies. 3 lectures, 1 laboratory. Prerequisite: CE 321 or consent of instructor.

CE 422 Highway Geometrics and Design (4)
Alignment location and safe geometric design of highways. Earthwork and drainage related to highway. Theory and practice in design of alignments, highway cross-sections, intersections, interchanges, and freeways in urban and rural areas. Application of advanced computer software to highway geometrics. 2 lectures, 2 laboratories. Prerequisite: CE 321 or consent of instructor.

CE 423 Intelligent Transportation Systems (4)
Specification and operation of Intelligent Transportation Systems (ITS). Traffic surveillance and control systems including applications to freeways, urban streets, rural highways, and public transportation. Standards include the National Architecture for ITS. 3 lectures, 1 laboratory. Prerequisite: CE 321, graduate standing, or consent of instructor.

CE 424 Public Transportation (4)
Interdisciplinary aspects of public transportation problems, systems-team design approach to solutions. History and present state of public transportation; role of public transportation in urban environment; legislative, political, social, and economic aspects of public transportation systems. Methodology and procedures for transit planning. Review of transit studies. 3 lectures, 1 laboratory. Prerequisite: CE 321 or consent of instructor.

CE 431 Coastal Hydraulics I (4)
Waves and their characteristics, types of waves, wave water theories, orbital velocities, refraction of waves, wave diffraction, wave reflection, application of linear theory to wave forces on cylindrical structures, submerged pipelines and vertical flat barriers (sea walls), wave uprush, rubble mound breakwaters. 4 lectures. Prerequisite: ME 341 or ENVE 264.

CE 432 Coastal Hydraulics II (4)
Reformed breaker height determination, wave runup analysis using a reformed breaker height. Wave setback analysis. Pile height determination. Criteria for types of breaking waves. Revetment analysis, rip-rap revetment design, wave forces on pilings. 4 lectures. Prerequisite: CE 431.

CE 433 Open Channel Hydraulics (4)
Analysis and characteristics of flow in open channels; critical flows; uniform flow; gradually varied flow; channel design problems, channel transitions and controls. Rapidly varied flow; hydraulic jump and energy dissipators. Unsteady flows, waves and wave propagation, flood routing. Applications of numerical methods in hydraulic engineering. 4 lectures. Prerequisite: CE 336.

CE 434 Groundwater Hydraulics and Hydrology (4)

CE 435 Engineering Hydrology (4)
Analysis of hydrologic cycle components such as precipitation, infiltration and evaporation. Rainfall-runoff analysis to determine peak flows and runoff hydrographs. Hydrologic river and reservoir routings and their applications for floodplain management. Application of frequency analysis methods to determine design rainfalls and design flows. 4 lectures. Prerequisite: CE 336.

CE 440 Hydraulic Systems Engineering (4)
Water and wastewater flows. Design of water distribution systems, trans-mission and storage reservoirs, wastewater collection systems, and storm water systems. Pumps and pump systems, flow measurements. Water sources for municipal supply. 3 lectures, 1 laboratory. Prerequisite: CE 336.

CE 454 Structural Design (4)
Design of reinforced concrete, steel and timber structures. Loading standards, code design methods, connection design. Comprehensive design projects. 2 lectures, 2 laboratories. Prerequisite: CE 351, CE 355, CE 356.

CE 455 Design of Timber Structures (4)
Analysis and design of timber structures with emphasis on construction methodology, and material behavior. Topics include: physical and mechanical properties of structural lumber and glulams; lateral load paths; diaphragms; connections; shear wall design; and combined load design. 3 lectures, 1 laboratory. Prerequisite: CE 355 or CE 356.

CE 456 Seismic Principles for Civil and Environmental Engineers (4)
Basic principles in seismic analysis and design of civil and environmental systems. Seismological aspects of earthquakes. Simple concepts in structural dynamics. Simplified code-based analysis and design. 4 lectures. Prerequisite: CE 207. Not open to students with credit in CE 557.

CE 457 Bridge Engineering (4)

CE 458 Fiber Reinforced Polymer (FRP) Design (4)
Properties and mechanical characteristics of Fiber Reinforced Polymer (FRP) composite materials; applications in civil engineering structures as primary or secondary reinforcement; and design techniques based on newly developed ACI 440 design guidelines and worldwide experience in FRP design. 3 lectures, 1 laboratory. Prerequisite: CE 351 and CE 355. Concurrent: CE 356. Not open to students with credit in CE 558. Change effective Spring 2012.

CE 459 FRP Strengthening of Reinforced Concrete Structures (4)
Flexural and shear strengthening reinforced and prestressed concrete members using fiber reinforced polymer composite plates and laminates; seismic repair and rehabilitation of columns, slabs, beams and structures. Focus on design philosophy and design methodology, based on the current understanding of FRP-strengthening techniques. 3 lectures, 1 laboratory. Prerequisite: CE 355. Not open to students with credit in CE 556. Change effective Winter 2012.

CE 461, 462 Senior Project I, II (2) (2)
Completion of a 120-hour integrated civil research, analysis, and/or design project that is representative of those encountered in professional practice. Prerequisite: Senior standing and consent of the supervising faculty member.

CE 464 Professional Practice (3)
Examination of the non-technical issues that are dealt with on a regular basis by the design professional, including professional ethics, marketing and business development, professional engagement, personnel and project management, risk management, professional liability insurance, and dispute resolution. 3 seminars. Prerequisite: Senior standing.

CE 466 Senior Design I (3)
Work on multi-disciplinary teams to complete an integrated civil design project. Focus of formal instruction on selected topics in geotechnical, structural, transportation, and water resources engineering design. Topics, related to interpersonal communication, teamwork, leadership, ethics, and professional practice, addressed to promote understanding of the non-technical issues and skills that must be mastered to become a successful design professional. 2 lectures, 1 laboratory. Prerequisite: CE 321, CE 322, CE 336, CE 337, CE 355, CE 356, CE 381, CE 382, senior standing, and consent of instructor.

CE 467 Senior Design II (3)
Continuation of CE 466. Continuation of work on multi-disciplinary teams to complete an integrated civil design project. Focus of formal instruction on technical and non-technical issues. Summarization of team project results in formal written reports and oral presentations. 2 lectures, 1 laboratory. Prerequisite: CE 466.

CE 468, 469 Community Engineering Senior Design I, II (3) (3)
Two-part series. Student teams work in cooperation with a local community organization to complete an integrated civil design project. Projects representative of those encountered in professional practice. Focus on professional as well as design issues. Volunteer service required. 2 lectures, 1 laboratory. Prerequisite: CE 321, CE 322, CE 336, CE 337, CE 355, CE 356, CE 381, CE 382, senior standing, and consent of instructor.

CE 470 Selected Advanced Topics (1–4)
Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. The Schedule of Classes will list title selected. Total credit limited to 8 units. 1 to 4 lectures. Prerequisite: Consent of instructor.
CE 527 Sustainable Mobility (4)
Presentation and analysis of concepts and designs for sustainable mobility from a
global-to-local, interdisciplinary perspective, including pedestrians, bicyclists,
and public transportation. Addresses economy, environment, and equity (social
issues) through lectures, panels, excursions and a planning/design project in San
Luis Obispo County. 3 lectures, 1 laboratory. Prerequisite: Graduate standing or
consent of instructor. CE 321 or CRP 435 or consent of instructor.
Change effective Spring 2012.

CE 528 Transportation Economics and Analysis (4)
Principles of engineering systems analysis and applications to transportation
using examples from different modes. Identification of transportation benefits,
costs, user and non-user impacts, transportation cost models, pricing, and
optimization. 3 lectures, 1 laboratory. Prerequisite: CE 321, graduate standing,
or consent of instructor. Change effective Winter 2013.

CE 529 Modeling and Simulation in Transportation (4)
Theory and operation of transportation systems, the systems approach,
simulation techniques. Use of available software packages. Simulation model
development, calibration and use. 2 lectures, 2 laboratories. Prerequisite: CE
321, graduate standing, or consent of instructor.

CE 533 Advanced Water Resources Engineering (4)
Matrix and simulation methods in hydrology, statistical studies in hydrology and
their applications to civil engineering problems. Generalized hydrologic
characteristics. Hydrologic simulation, computer applications, urban and small
watershed hydrology, macroscopic and microscopic approach. Storm water
management models. Hydrologic design. 4 lectures. Prerequisite: CE 336, or
graduate standing or consent of instructor. Change effective Winter 2012.

CE 535 Water Resources Systems Planning and Analysis (4)
Water resources planning, development, system analysis and optimization.
Dynamic programming, multi-objective water resource systems. 4 lectures.
Prerequisite: CE 336, graduate standing or consent of instructor. Change
effective Winter 2012.

CE 536 Computer Applications in Water Resources with Geographic
Information Systems (GIS) (4)
Modeling, design and analysis of water, wastewater, stormwater systems.
Integration of water resource systems with Geographic Information Systems
(GIS). 3 lectures, 1 laboratory. Prerequisite: CE 336, and CE 440 graduate
standing or consent of instructor. Change Effective Winter 2012.

CE 537 Groundwater Contamination (4)
Sources and types of groundwater contamination, contamination transport
mechanisms. Sorption and other chemical reactions. Numerical modeling of
contaminant transport. Nonaqueous phase liquids. Groundwater remediation and
design. 4 lectures. Prerequisite: CE 113; corequisite: CE 336 and ENVE 331.

CE 538 Urban Water Systems (4)
Integration of water delivery, wastewater collection, drainage systems, and
associated treatment components in urbanizing areas. Relationships between
surface and groundwater elements of water sources and disposal. Use of current
design models to quantify the benefits of non-traditional options. 4 lectures.
Prerequisite: CE 440, graduate standing or consent of instructor. Change
effective Winter 2012.

CE 539 Environmental Hydraulics (4)
Application of fluid mechanics principles to environmental flows. Emphasis on
advection, dispersion, stratification and mixing effects, stratified flows,
turbulent jets and plumes, wastewater and thermal diffusers, cooling ponds and
channels, control of environmental problems. 4 lectures. Prerequisite: CE 336,
graduate standing or consent of instructor. Change effective Winter 2012.

CE 552 Analysis and Seismic Design of Reinforced Concrete (4)
Emphasis placed on reinforced concrete behavior and seismic design. Topics include
moment curvature analysis and plastic hinge modeling, strut and tie, design of
structural walls, design of concrete moment frames and seismic detailing. 4
lectures. Prerequisite: CE 454; Recommended: concurrent: CE 557. Formerly
CE 452.

CE 555 Advanced Civil Engineering Materials Laboratory (2)
Fundamental properties of new and advanced materials. Experimental
techniques. Fracture characteristics and composite response of cement matrix
composites. New materials and products to advanced applications such as
automation. 2 laboratories. Prerequisite: CE 259 or graduate standing.

CE 556 Advanced Fiber Reinforced Polymer (FRP) Strengthening of
Reinforced Concrete Structures (4)
Flexural and shear strengthening reinforced and pre-stressed concrete members
using FRP composite laminates and plates; seismic repair and rehabilitation of
columns, beams, slabs and whole structures. Design philosophies based on
the current ACI-440 and the most up to date research in FRP composites. Durability,
fire protection and blast mitigation of structures utilizing FRP laminates. 3
lectures, 1 laboratory. Prerequisite: CE 355. Not open to students with credit in
CE 459.

CE 557 Seismic Analysis and Design for Civil Engineers (4)
Extension of the basic principles of structural dynamics to analysis of civil
structures (buildings, bridges, tanks, etc.) to earthquake loading. Code based
(Uniform Building Code and AASHTO) earthquake resistant design of civil
structures. 3 lectures, 1 laboratory. Prerequisite: CE 407. Not open to students
with credit in CE 450, Change effective Spring 2012.

CE 558 Advanced Fiber Reinforced Polymer (FRP) Design (4)
Properties and mechanical characteristics of FRP composites and design methodologies
based on the current understanding and usage of FRP composites. Applications
of composite rebars in civil engineering structures as primary reinforcement.
Design and analysis of reinforced concrete structures utilizing FRP rebars
based on the ACI 440 design guidelines. 3 lectures, 1 laboratory. Prerequisite:
CE 355. Not open to students with credit in CE 458.

CE 559 Prestressed Concrete Design (4)
Advanced analysis, design and behavior of prestressed and precast concrete
elements and structures. Origin of code requirements. Detailed design of
prestressed concrete components of civil engineering systems for buildings and
highway construction. Creep and shrinkage of concrete and relaxation of steel
applied to prestressing losses. 4 lectures. Prerequisite: CE 355 or graduate
standing.

CE 570 Selected Advanced Topics (1–4)
Directed group study of selected topics for advanced students. Open to graduate
students. The Schedule of Classes will list title selected. Total credit limited to 8
units. 1–4 seminars. Prerequisite: Graduate standing or consent of instructor.

CE 571 Selected Advanced Laboratory (1–4)
Directed group laboratory study of selected topics for advanced students. Open
to undergraduate and graduate students. The Schedule of Classes will list title
selected. Total credit limited to 8 units. 1–4 laboratories. Prerequisite: Graduate
standing or consent of instructor.

CE 573 Public Works Administration (3)
Management and engineering of infrastructure and related systems in public
jurisdictions. Utility systems, streets and highways, illumination, distribution
systems, etc. Personnel management, financing, public relations, and contract
management. 3 seminars. Prerequisite: Graduate standing or consent of
instructor.

CE 574 Computer Applications in Civil Engineering (3)
Overview of computer application, hardware and software alternatives, use of
selected application programs, CAD, microcomputers, management and
application of resources. 1 lecture, 2 laboratories. Prerequisite: Graduate
standing or consent of instructor.

CE 581 Advanced Geotechnical Engineering (4)
Advanced topics in saturated flow, unsaturated flow, and consolidation. Stress-
strain-deformation response of soils under both drained and undrained loading.
Conventional and advanced laboratory strength testing. 3 lectures, 1 laboratory.
Prerequisite: CE 481 or graduate standing.

CE 582 Geotechnical In Situ Testing (4)
Standard penetration, cone penetration, and flat-plate dilatometer testing.
Equipment operation and maintenance. Interpretation of SPT/CPT/DMT
sounding data. Stratigraphic analysis. CPT/DMT-based analysis and design of
shallow and deep foundations. 2 lectures, 2 laboratories. Prerequisite: CE 481 or
graduate standing.

CE 583 Geotechnical Earthquake Engineering (4)
Introduction to engineering seismology and ground motion evaluation. Dynamic
behavior of soils. Seismic site response analysis. Soil liquefaction evaluation
methods and mitigation techniques. Seismic stability of slopes and retaining
walls. Computer-aided analysis. 4 lectures. Prerequisite: CE 481 and CE 407 or
graduate standing.
CE 584 Lateral Support Systems (4)
Classical and modern earth pressure theories. Lateral earth pressure calculations for general subsurface conditions. Analysis and design of reinforced concrete cantilever walls, sheetpile walls, soldier-pile walls, tie-back walls, and mechanically-stabilized earth. Computer-aided analysis and design. 4 lectures. Prerequisite: CE 481 or graduate standing.

CE 585 Slope Stability Analysis (4)

CE 586 Analysis and Design of Deep Foundations (4)
Bearing capacity and settlement analysis of drilled shafts and driven piles. Analysis and design of single piles and pile groups for vertical, lateral, and combined loading. Construction procedures, field inspection, and load-testing. Computer-aided analysis and design. 4 lectures. Prerequisite: CE 481 or graduate standing.

CE 587 Geoenvironmental Engineering (4)
Principles for containment applications. Engineering properties of soils and geosynthetics and their interaction with contaminants and wastes; analysis of geosynthetics used in containment facilities; liners; covers; leachate and gas collection systems; contaminant transport; and monitoring systems. 4 lectures. Prerequisite: CE 381.

CE 588 Ground Improvement (4)
Ground improvement applications investigated for modification of geomechanical and hydraulic properties of soils. Engineering properties of soft ground and high water content materials; mechanical, chemical, and thermal stabilization investigated for foundation and environmental remediation applications. 4 lectures. Prerequisite: CE 381, CE 382, and CE 481.

CE 589 Geosynthetics Engineering (4)
Geosynthetics applications within civil engineering. Design content for geotechnical, geoenvironmental, and transportation applications. Manufacturing processes, material properties, interaction with soils, and service conditions. 4 lectures. Prerequisite: CE 381.

CE 591 Graduate Seminar I (1)
Current research activities and analysis/design philosophies in civil and environmental engineering practice. 1 seminar. Prerequisite: Graduate standing.

CE 592 Graduate Seminar II (1)
Current research activities and analysis/design philosophies in civil and environmental engineering practice. Development of oral and written presentation skills. 1 seminar. Prerequisite: CE 591 and graduate standing.

CE 593 Cooperative Education Experience (2) (CR/NC)
Advanced study analysis and part-time work experience in student’s career field; current innovations, practices, and problems in administration, supervision, and organization of business, industry, and government. Must have demonstrated ability to do independent work and research in career field. Credit/No Credit grading only. Prerequisite: Graduate standing and consent of instructor.

CE 594 Cooperative Education Experience (6) (CR/NC)
Advanced study analysis and full-time work experience in student’s career field; current innovations, practices, and problems in administration, supervision, and organization of business, industry, and government. Must have demonstrated ability to do independent work and research in career field. Credit/No Credit grading only. Prerequisite: Graduate standing and consent of instructor.

CE 595 Cooperative Education Experience (12) (CR/NC)
Advanced study analysis and full-time work experience in student’s career field; current innovations, practices, and problems in administration, supervision, and organization of business, industry, and government. Must have demonstrated ability to do independent work and research in career field. A fully-developed formal report and evaluation by work supervisor required. Credit/No Credit grading only. Prerequisite: Graduate standing and consent of instructor.

CE 599 Design Project (Thesis) (1-9)
Each individual or group will be assigned a project for solution under faculty supervision as a requirement for the master's degree, culminating in a written report/thesis. Prerequisite: Graduate standing.