

CIVIL & ENVIRONMENTAL ENGINEERING
Required Core Courses – EFFECTIVE FALL 2016

Required Core Courses

Courses core to the CEE Graduate Program are specific to one of the five areas of specialization within Civil and Environmental Engineering: Environmental, Geotechnical, Structural, Transportation, and Water Resources. Students must complete the core courses in their respective area of specialization as part of their program of study in the CEE Graduate Program. The courses may be taken on the UCD campus, or their equivalent from another accredited academic institution, in accordance with residence and transfer credit policies of the university

Environmental Engineering (8-10 units)

- a) Core Courses (8 units): Students must choose either a “Water track” or an “Air track”
- Students pursuing the Water track must complete ECI 243A (4 units) and ECI 243B (4 units) - Water and Waste Treatment
 - Students pursuing the Air track must complete ECI 242 Air Quality (4 units) and ECI 247 Aerosols (4 units)
- b) Elective Courses: In addition to the above required core courses for the Water or Air track, students in the Environmental Engineering track are encouraged to complete as an elective two quarters of Environmental and Water Resources Engineering Seminar: ECI 296 (2 units)

Geotechnical Engineering (11-12 units)

- a) Core Courses (11-12 units); Students pursuing the Geotechnical Engineering track must complete the following core course:
- ECI 281A – Advanced Soil Mechanics (4 units)
- and an additional two core courses from the following list:
- ECI 259 - Asphalt and Asphalt Mixes (4 units)
 - ECI 280A - Nonlinear Finite Elements for Elastic-Plastic Problems (4 units)
 - ECI 280B - Nonlinear Dynamic Finite Elements (4 units)
 - ECI 281B - Advanced Soil Mechanics (4 units)
 - ECI 282 - Pavement Design and Rehabilitation (4 units)
 - ECI 283 - Physico-Chemical Aspects of Soil Behavior (3 units)
 - ECI 284 - Theoretical Geomechanics (4 units)
 - ECI 286 - Advanced Foundation Design (4 units)
 - ECI 287 -Geotechnical Earthquake Engineering (4 units)
 - ECI 288 - Earth and Rockfill Dams (4 units)
- b) Elective Courses: Students interested in geotechnical engineering practice are encouraged to take ECI 281B - Advanced Soil Mechanics (4 units)

Structural Engineering and Structural Mechanics (12-16 units)

- a) Core Courses (12-16 units): Students pursuing the Structural Engineering or Structural Mechanics track are encouraged to complete all four, but must complete a minimum of three of the following core courses:
- ECI 201 - Introduction to Theory of Elasticity (4 units)
 - ECI 211 - Advanced Matrix Structural Analysis (4 units)
 - ECI 212A - The Finite Element Method in Structural Mechanics (4 units)
 - ECI 213 - Analysis of Structures Subjected to Dynamic Loads (4 units)

Transportation Engineering (17-18 units)

- a) Core Courses (17-18 units): Students pursuing the Transportation Engineering track must complete the following core courses:
- ECI 251 – Transportation Demand Analysis (4 units)
 - ECI 256 – Urban Traffic Management and Control (4 units)
 - An economics course such as ECN 100, ECN 145, ECI 268, ARE 275, ARE/ESP 175, ARE 176, or a course similar in spirit as approved by the Transportation Engineering Area Advisor (econometrics courses are normally not considered similar in spirit: they are statistics-oriented, and can have relatively little economics content per se). (3-4 units)
 - TTP 281 – ITS weekly seminar series: must be taken each quarter for at least the first two years. Can be waived due to a conflict with another course, after confirmation with the Transportation Engineering Area Advisor. (6 units)

Water Resources Engineering (8 units)

- a) Core Courses (8 units): Students pursuing the Water Resources Engineering track must complete two core courses from the following list:
- ECI 240 - Water Quality (4 units)
 - ECI 272A - Advanced Hydrogeology (4 units)
 - ECI 276 - Watershed Hydrology (4 units)
 - ECI 277A - Computational River Mechanics (4 units)
 - ECI 279 - Advanced Mechanics of Fluids (4 units)

Required Background Courses for Students Without an Engineering Degree

Students without a BS in Engineering who are admitted to the CEE graduate program are required to complete the following courses or equivalents. The engineering nature of prior degrees may be certified by the Graduate Advisor, with appeal to the Graduate Program Committee based on the course content of prior degrees.

Select four courses from the following six categories:

ENG 103 Fluid Mechanics 4 units

ENG 104 Mechanics of Materials 4 units

ENG 105* Thermodynamics 4 units

(* or Chem 110C or Chem 107A or Chem 107B)

ECI 141 Engineering Hydraulics 3 units

ECI 115 Computer Methods 4 units

ECI 114 Probabilistic Systems Analysis 4 units

Including at least two of the following three classes:

ENG 103

ENG 104

ENG 105

In addition to the above courses, students must complete at least an additional 6 upper division engineering course units (minimum of 2 courses) approved by the students Major Professor or Graduate Adviser.

In consultation with their Major Professor, students must prepare a list of the courses that they are taking to satisfy the above requirements including a brief written explanation of any equivalent courses. Some or all of these course requirements may be satisfied by equivalent courses. Equivalent status of courses is determined on a case-by-case basis by the Graduate Adviser, in consultation with the student's Major Professor and the Chairperson, upon a written request by the student. If a student would like to count a course taken at another institution to fill one or more of these requirements, they must provide to their Major Professor and the Graduate Adviser a syllabus of the course taken, and evidence that they received a satisfactory grade in the course. None of the courses taken to fulfill the above requirements may be used for credit toward an advanced degree in Engineering, and all must be taken for a letter grade.