Civil Engineering Major Degree Plan

The four-year program leading to the Bachelor of Science degree in Civil Engineering is listed below. During the first two years, students are in a pre-engineering program. Students must successfully complete the pre-engineering program or, in the case of transfer students, substantially equivalent coursework at another institution before they are accepted into the professional program. Transfer students may apply for permission to take upper-division courses in cases where postponement of these courses will prolong the student's time to graduate.

Students in the Civil Engineering program must establish proficiency in at least four areas of Civil Engineering. Proficiency is established through a combination of material covered in required courses, as well as by establishing depth through the selection of technical electives. Proficiency must be established in four of the following areas: Environmental Engineering, Fluid Mechanics/ Hydraulics, Geotechnical, Structures, Transportation, or Water Resources. The courses must be selected from the approved Technical Elective courses.

Undergraduate Course Requirements for Civil Engineering (128 credits)[1]

Pre-engineering Program: Freshman and Sophomore

Freshman Year (32 credits)

Fall Semester (16 credits)

MATH 1210 (QL)[2] Calculus I 4
CHEM 1210[2] Principles of Chemistry I 4
CHEM 1215[2] Chemical Principles Laboratory I 1
CEE 1880[2] Civil and Environmental Engineering Orientation and Computer Applications 1
CEE 2240[2] Engineering Surveying 3
University Studies Breadth course 3

Spring Semester (16 credits)

MATH 1220 (QL)[2] Calculus II 4
ETE 2270[2] Computer Engineering Drafting 2
BIOL 1010 (BLS) Biology and the Citizen 3
PHYS 2210 (QI) General Physics—Science and Engineering I 4
University Studies Breadth course 3

Sophomore Year (30-31 credits)

Fall Semester (15-16 credits)

GEO 1110 (BPS)[2] The Dynamic Earth: Physical Geology (4 cr) **or**
GEOG 1000 (BPS) Physical Geography (3 cr) ..... 3 or 4
MATH 2210 (QI)[2] Multivariable Calculus 3
ENGR 2010[2] Engineering Mechanics Statics 2
ENGL 2010 (CL2)[2] Intermediate Writing: Research Writing in a Persuasive Mode 3
CEE 2870[2] Sophomore Seminar 1
University Studies Breadth course 3

Spring Semester (15 credits)

ENGR 2030[2] Engineering Mechanics Dynamics 3
ENGR 2140[2] Strength of Materials 2
ENGR 2450[2] Numerical Methods for Engineers 3
MATH 2250 (QI)[2] Linear Algebra and Differential Equations 4
Engineering Science Elective 3

[1] Passing the Fundamentals of Engineering Exam is required for graduation. The exam is offered in October and April. Application must be made 120 days in advance. The exam is usually taken during fall semester of the junior or senior year.

[2] These courses are required for admission to the Professional Engineering Program (PEP).

Professional Engineering Program: Junior and Senior

Junior Year (33 credits)

Fall Semester (17 credits)

CEE 3010 Mechanics of Materials 2
CEE 3030 Uncertainty in Engineering Analysis 2
CEE 3500 Civil and Environmental Engineering Fluid Mechanics 3
CEE 3610[3] Environmental Management 3
CEE 3870 (CI)[3] Professional/Technical Writing in Civil and Environmental Engineering 2
CEE 4200 Engineering Economics 2
Engineering Science Elective 3

Spring Semester (16 credits)

CEE 3020 Structural Analysis 2
CEE 3510 Civil and Environmental Engineering Hydraulics 3
CEE 3880 Civil Engineering Design I 1
CEE Group A course[4] 3
CEE Group A course[4] 4
University Studies Breadth course 3

[3] CEE 3610 and 3870 must be taken concurrently.

Senior Year (33-35 credits)

Fall Semester (17 credits)

CEE 4870 (CI) Civil Engineering Design II 2
CEE Senior Design elective course[5] 3
CEE Technical Elective course[5] 3
CEE Technical Elective course[5] 3
CEE Technical Elective Group B course[5] 3
University Studies Depth Social Sciences (DSS) course 3

Spring Semester (16-18 credits)

CEE 4880 (CI) Civil Engineering Design III 2
CEE Group A course[4] 3
CEE Group A course[4] 3-4
CEE Group A course[4] 3
CEE Technical Elective course[5] 3
University Studies Depth Humanities and Creative Arts (DHA) course 2-3

[4] Students must complete *all five* of the following Group A Courses. The order in which they are taken will dictate the choice of technical elective courses (as they are prerequisites for various technical elective courses).

Engineering Science Electives (6 credits minimum)

Students in the Civil Engineering program must complete two engineering science electives chosen from the three courses below. The addition of two engineering science courses in place of one technical elective is required of all students entering the Civil Engineering Professional Program August 2007 and beyond.

ETE 2210 Electrical Engineering for Nonmajors (F,Sp,Su) 4
MAE 2160 Material Science (F,Sp) 3
MAE 2300 Thermodynamics I (Sp,Su) 3

Group A Courses

CEE 3080 Design of Reinforced Concrete Structures (Sp) 3
CEE 3210 Introduction to Transportation Engineering (Sp) 3
CEE 3430 Engineering Hydrology (Sp) 3
CEE 3640 Water and Wastewater Engineering (Sp) (4 cr) **or**
CEE 3780 Solid and Hazardous Waste Management (F) (3 cr) **or**
CEE 5860 Air Quality Management (F) (3 cr) ..... 3 or 4
CEE 4300 Engineering Soil Mechanics (Sp) 4

[5] Civil Engineering students are required to complete a Senior Design elective course concurrent with CEE 4870. In addition, they must complete four Technical Elective Courses (one of which must be selected from Group B), for a total of 12 credits. Following is a list of Technical Elective Courses and Senior Design Elective Courses.

Civil Engineering Major Degree Plan

Technical Elective Courses (15 credits minimum required)
Students in the Civil Engineering program must complete a senior design elective (see list below). They must also establish proficiency in *at least four* areas of Civil Engineering by taking a *minimum of two courses* in each area. Proficiency in **Environmental Engineering** is established by taking BIOL 1010; CEE 3610; and CEE 3640, 3780, or 5860. Proficiency in **Structures** is established by taking ENGR 2010, 2140; and CEE 3010, 3020, 3080. Proficiency in **Fluid Mechanics and Hydraulics** is established by taking ENGR 2030; and CEE 3430, 3500, 3510. Students will also demonstrate proficiency in *one of* Geotechnical Engineering, Transportation Engineering, or Water Resources Engineering by taking a Group B course (see list below).

Proficiency in **Geotechnical Engineering** is established by taking ENGR 2030; GEO 1110 (recommended) or GEOG 1000; CEE 4300; and *either* CEE 5350 or 5380. Proficiency in **Transportation Engineering** is established by taking CEE 3210; and *one of* CEE 5190, 5220, 5230, or 5240. Proficiency in **Water Resources Engineering** is established by taking CEE 3430; and *one of* CEE 5450, 5460, or 5470.

The sum of the Group B class, the Senior Design Elective, and other technical electives from the approved list must be at least 15 credits.

CEE 3670 Transport Phenomena in Bio-Environmental Systems (Sp) . 3
CEE 3780 Solid and Hazardous Waste Management (F) 3
CEE 4930 Independent Study: Principles of Irrigation Engineering (should take CEE 3430 and 3500 prior to this course) 3
CEE 4930 Independent Study: Irrigation Conveyance and Control Systems 3
CEE 5010 Matrix Analysis/Finite Element (F) 3
CEE 5050 Design of Wood and Masonry Structures (Sp) 3
CEE 5070 Structural Steel Design (F) 3
CEE 5080 Numerical Methods in Elasticity (F) 3
CEE 5100 Infrastructure Evaluation and Renewal (Sp) 3
CEE 5190 Geographic Information Systems for Civil Engineers (Sp) . . . 3
CEE 5220 Traffic Engineering (Sp) 3
CEE 5230 Geometric Design of Highways (Sp) 3
CEE 5240 Urban and Regional Transportation Planning (F) 3
CEE 5350 Foundation Analysis and Design (F) 3
CEE 5380 Earthquake Engineering (Sp) 3
CEE 5430 Groundwater Engineering (F) 3
CEE 5450 Hydrologic Modeling (Sp) 3
CEE 5460 Water Resources Engineering (F) 3
CEE 5470 Sedimentation Engineering (Sp) 3
CEE 5500 Open Channel Hydraulics with an Emphasis on Gradually Varied Flow (F) 3
CEE 5540 Hydraulic Structures Design (F) 3
CEE 5550 Hydraulics of Closed Conduits (Sp) 3
CEE 5690 Natural Systems Engineering (F) 3
CEE 5720 Natural Systems Modeling (Sp) 3
CEE 5860 Air Quality Management (F) 3
CEE 5870 Hazardous Waste Incineration (Sp) 2
CEE 5880 Remediation Engineering (F) 3
CEE 5900 Cooperative Practice (F,Sp,Su) 3
ETE 2210[6] Electrical Engineering for Nonmajors (F,Sp,Su) 4
MAE 2160[6] Material Science (F,Sp) 3
MAE 2300[6] Thermodynamics I (Sp,Su) 3

[6] If a student takes *all three* Engineering Science classes, the third one counts as a technical elective.

Senior Design Elective Courses (3 credits required)
CEE 3780 Solid and Hazardous Waste Management (F) 3
CEE 5070 Structural Steel Design (F) 3
CEE 5230 Geometric Design of Highways (Sp) 3
CEE 5350 Foundation Analysis and Design (F) 3
CEE 5460 Water Resources Engineering (F) 3
CEE 5470 Sedimentation Engineering (Sp) 3
CEE 5500 Open Channel Hydraulics with an Emphasis on Gradually Varied Flow (F) 3
CEE 5540 Hydraulic Structures Design (F) 3

Group B Elective Courses (3 credits required)
CEE 5190 Geographic Information Systems for Civil Engineers (Sp) . . . 3
CEE 5220 Traffic Engineering (Sp) 3
CEE 5230 Geometric Design of Highways (Sp) 3
CEE 5240 Urban and Regional Transportation Planning (F) 3
CEE 5350 Foundation Analysis and Design (F) 3
CEE 5380 Earthquake Engineering (Sp) 3
CEE 5450 Hydrologic Modeling (Sp) 3
CEE 5460 Water Resources Engineering (F) 3
CEE 5470 Sedimentation Engineering (Sp) 3