

Civil Engineering, B.S.

Program Educational Objectives: Graduates of the Civil Engineering program will (1) establish a Civil Engineering career in industry, government, or academia and achieve professional licensure as appropriate; (2) demonstrate excellence and innovation in engineering problem solving and design in a global and societal context; (3) commit to lifelong learning and professional development to stay current in technology and contemporary issues; and (4) take on increasing levels of responsibility and leadership in technical and/or managerial roles. (Program educational objectives are those aspects of engineering that help shape the curriculum; achievement of these objectives is a shared responsibility between the student and UCI.)

The curriculum provides the opportunity to obtain a firm foundation in engineering science and to develop the techniques of analysis and design, which are basic for the successful practitioner. Emphasis is placed on developing problem-solving skills.

High School Students: See School Admissions (<http://catalogue.uci.edu/thehenrysamuelischoolofengineering/#undergraduatestudytext>) information.

Transfer Students: Preference will be given to junior-level applicants with the highest grades overall, and who have satisfactorily completed the following **required** courses: two years of approved calculus, one year of calculus-based physics with laboratories (mechanics, electricity and magnetism), completion of lower-division writing, one year of general chemistry (with laboratory), and one course in introductory programming. For course equivalency specific to each college, see <https://assist.org>.

Students are encouraged to complete as many of the lower-division degree requirements as possible prior to transfer. Students who enroll at UCI in need of completing lower-division coursework may find that it will take longer than two years to complete their degrees. For further information, contact The Henry Samueli School of Engineering at 949-824-4334.

All students must meet the University Requirements (<http://catalogue.uci.edu/informationforadmittedstudents/requirementsforabachelorsdegree/>).

All students must meet the School Requirements (<http://catalogue.uci.edu/thehenrysamuelischoolofengineering/#schoolrequirements>).

Major Requirements

Mathematics and Basic Science Courses:

CHEM 1A	General Chemistry
or	
ENGR 1A	General Chemistry for Engineers
CHEM 1B	General Chemistry
ENGRCEE 11	Methods II: Probability and Statistics
MATH 2A- 2B	Single-Variable Calculus and Single-Variable Calculus
MATH 2D	Multivariable Calculus
MATH 3A	Introduction to Linear Algebra
MATH 3D	Elementary Differential Equations
MATH 2E	Multivariable Calculus
PHYSICS 7C	Classical Physics
PHYSICS 7LC	Classical Physics Laboratory
PHYSICS 7D	Classical Physics
PHYSICS 7LD	Classical Physics Laboratory

One basic science elective selected from any Biological Science or Earth Systems Science course with approved GE II designation.

Lower-Division Technical Elective:

Select one course from two of the sections:

Section A:

ENGR 7A- 7B	Introduction to Engineering I and Introduction to Engineering II *
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Section B:

CHEM 1LE	Accelerated General Chemistry Lab
CHEM 1C- 1LC	General Chemistry and General Chemistry Laboratory

Section C:

EECS 70A	Network Analysis I
ENGR 54	Principles of Materials Science and Engineering

ENGRMAE 80	Dynamics
ENGRMAE 91	Introduction to Thermodynamics
Engineering Topics Courses:	
ENGRCEE 20	Introduction to Computational Problem Solving
ENGRCEE 21	Computational Problem Solving
ENGRCEE 30	Statics
ENGRCEE 81A	Civil Engineering Practicum I
ENGRCEE 81B	Civil Engineering Practicum II
ENGRCEE 110	Methods III: Modeling, Economics, and Management
ENGRCEE 111	Methods IV: Systems Analysis and Decision-Making
ENGRCEE 121	Transportation Systems I: Analysis and Design
ENGRCEE 130	Soil Mechanics
ENGRCEE 130L	Soil Mechanics Laboratory
ENGRCEE 150	Mechanics of Materials
ENGRCEE 150L	Mechanics of Materials Laboratory
ENGRCEE 151A	Structural Analysis
ENGRCEE 151C	Reinforced Concrete Design
ENGRCEE 160	Environmental Processes
ENGRCEE 170	Introduction to Fluid Mechanics
ENGRCEE 171	Water Resources Engineering
ENGRCEE 181A- 181B- 181C	Senior Design Practicum I and Senior Design Practicum II and Senior Design Practicum III
Engineering Professional Topics Courses:	
ENGRCEE 40	Fundamentals of Economic Analysis for Scientists and Engineers
or	
ECON 20A- 20B	Basic Economics I and Basic Economics II
ENGR 190W	Communications in the Professional World
ENGRCEE 60	Contemporary and Emerging Environmental Challenges
or UPPP 8	Introduction to Environmental Analysis and Design
Specialization Electives:	
Students must select one of the areas of specialization and complete the associated requirements, as shown below. Students select, with the approval of a faculty advisor, any additional engineering topics courses needed to satisfy school and departmental requirements.	
Specialization in General Civil Engineering:	
Requires four courses, at least one course each from three of the following four options:	
(1) Select one:	
ENGRCEE 122	Transportation Systems II: Operations and Control
ENGRCEE 123	Transportation Systems III: Planning and Forecasting
(2) Select one:	
ENGRCEE 149	Introduction to Earthquake Engineering
ENGRCEE 151B	Structural Timber Design
ENGRCEE 152	Computer Methods in Structural Analysis and Design
ENGRCEE 155	Structural Steel Design
ENGRCEE 156	Foundation Design
(3) Select one:	
ENGRCEE 163	Wastewater Treatment Process Design
ENGRCEE 164	Carbon and Energy Footprint Analysis
ENGRCEE 165	Physical-Chemical Treatment Processes
ENGRCEE 169	Environmental Microbiology for Engineers
(4) Select one:	
ENGRCEE 172	Groundwater Hydrology
ENGRCEE 173	Watershed Modeling

ENGRCEE 176	Hydrology
ENGRCEE 178	Fluid Mechanics of Open Channels

Specialization in Environmental Hydrology and Water Resources:

Select four of the following:

ENGRCEE 163	Wastewater Treatment Process Design
ENGRCEE 164	Carbon and Energy Footprint Analysis
ENGRCEE 165	Physical-Chemical Treatment Processes
ENGRCEE 169	Environmental Microbiology for Engineers
ENGRCEE 172	Groundwater Hydrology
ENGRCEE 173	Watershed Modeling
ENGRCEE 176	Hydrology
ENGRCEE 178	Fluid Mechanics of Open Channels

Specialization in Structural Engineering:

ENGRCEE 155	Structural Steel Design
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Select three of the following:

ENGRCEE 149	Introduction to Earthquake Engineering
ENGRCEE 151B	Structural Timber Design
ENGRCEE 152	Computer Methods in Structural Analysis and Design
ENGRCEE 156	Foundation Design
ENGRMAE 155	Composite Materials and Structures
ENGRMAE 157	Lightweight Structures

Specialization in Transportation Systems Engineering:

ENGRCEE 122	Transportation Systems II: Operations and Control
ENGRCEE 123	Transportation Systems III: Planning and Forecasting

Select two of the following:

EECS 70A	Network Analysis I (EECS 70A may not be used in this Specialization if used for a Lower-Division Technical Elective.)
ENGRCEE 124	Transportation Systems IV: Freeway Operations and Control
ENGRCEE 125	Transportation and the Environment
ENGRMAE 170	Introduction to Control Systems
ENGRMAE 171	Digital Control Systems

* ENGR 7A-ENGR 7B is available only to lower-division students in Fall and Winter quarters. Both ENGR 7A-ENGR 7B must be taken to be counted as one Lower-Division Technical Elective.

In addition, students must aggregate a minimum of 22 design units. Design unit values are indicated at the end of each course description. The faculty advisors and the Student Affairs Office can provide necessary guidance for satisfying the design requirements.

(The nominal Civil Engineering program will require 185 units of courses depending on specialization to satisfy all university and major requirements. Because each student comes to UCI with a different level of preparation, the actual number of units will vary.)

At most an aggregate total of 6 units of 199 or H199 courses may be used to satisfy degree requirements.

The sample program of study chart shown is typical for the accredited major in Civil Engineering. Students should keep in mind that this program is based upon a rigid set of prerequisites, beginning with adequate preparation in high school mathematics, physics, and chemistry. Therefore, the course sequence should not be changed except for the most compelling reasons. Students must have their programs approved by their faculty advisor. Civil Engineering majors are encouraged to consult with academic counselors as needed, and students who are academically at risk are mandated to see a counselor as frequently as deemed necessary by the advising staff.

Sample Program of Study — Civil Engineering

Freshman		
Fall	Winter	Spring
MATH 2A	MATH 2B	MATH 2D
CHEM 1A or ENGR 1A	PHYSICS 7C	PHYSICS 7D
Lower-Division Technical Elective	PHYSICS 7LC	PHYSICS 7LD
General Education	CHEM 1B	ENGRCEE 81A
	General Education	Basic Science Elective

Sophomore		
Fall	Winter	Spring
MATH 3A	MATH 3D	MATH 2E
ENGRCEE 20	ENGRCEE 11	ENGRCEE 21
ENGRCEE 30	ENGRCEE 81B	Lower-Division Technical Elective
General Education	General Education	General Education
Junior		
Fall	Winter	Spring
ENGRCEE 121	ENGRCEE 130	ENGRCEE 110
ENGRCEE 150	ENGRCEE 130L	ENGRCEE 151C
ENGRCEE 150L	ENGRCEE 151A	ENGRCEE 160
ENGRCEE 170	ENGRCEE 171	General Education
ENGR 190W		

* Note: ENGR 7A-ENGR 7B is available only to lower-division students in Fall and Winter quarters. Both ENGR 7A-ENGR 7B must be taken to be counted as one Lower-Division Technical Elective.

The following sample plans of study are provided for the senior year only; the first three years are common to all specializations.

Senior-Year Sample Programs of Study — Civil Engineering

Senior: General Civil Engineering Specialization

Senior		
Fall	Winter	Spring
ENGRCEE 181A	ENGRCEE 181B	ENGRCEE 181C
Spec. Elective	ENGRCEE 111	Spec. Elective
General Education	Spec. Elective	Spec. Elective
General Education	General Education	General Education

Senior: Environmental Hydrology and Water Resources Specialization

Senior		
Fall	Winter	Spring
ENGRCEE 181A	ENGRCEE 181B	ENGRCEE 181C
Spec. Elective	ENGRCEE 111	Spec. Elective
General Education	Spec. Elective	Spec. Elective
General Education	General Education	General Education

Senior: Structural Engineering Specialization

Senior		
Fall	Winter	Spring
ENGRCEE 181A	ENGRCEE 181B	ENGRCEE 181C
ENGRCEE 155	ENGRCEE 111	Spec. Elective
Spec. Elective	Spec. Elective	General Education
General Education	General Education	General Education

Senior: Transportation Systems Engineering

Senior		
Fall	Winter	Spring
ENGRCEE 181A	ENGRCEE 181B	ENGRCEE 181C
Spec. Elective	ENGRCEE 111	ENGRCEE 123
General Education	ENGRCEE 122	Spec. Elective
General Education	General Education	General Education