



Discover UCI Preview Week  
Welcome to Civil & Environmental Engineering

UCI Samueli  
School of Engineering

## Welcome to CEE @ UCI



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Civil & Environmental Engineering  
Why?

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### Why Civil and Environmental Engineering?

“No one is interested in an engineer’s tale, but everyone needs a civil engineer. Humanity can live without airplanes and missiles, cars and computers. But a shelter within which to sleep and harbor one’s children, a cistern or well for drinking water, a road to travel in the harshest weather, a bridge to cross a river, a sanitary means to dispose of waste — these necessities bestow upon the civil engineer a universal passport.”

Melissa Fischer “The Advocacy” 2019



## Civil & Environmental Systems Problem Identification, Design Solutions

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- A company needs to accommodate a number of employees. Given floor area ratios, a **multistory building** may be required. What type and capacity must the footings, columns and beams, and other elements have to accommodate loads?
- A city has increasing population and employment. What modes, capacity, and performance characteristics must the **transportation system** exhibit to accommodate predicted travel demands?
- A **water distribution system** is to be designed for a city. What characteristics must the reservoir and other infrastructure components have to accommodate the predicted demand?




\*

## Civil & Environmental Engineering Advising 101. Toolbox

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- **What was in your Toolbox 4 years ago?**
  - \* What tools were you been able to add?
  - \* How comfortable are you with your level of understanding?
- **Learn how to learn...**
  - \* What can you add to your toolbox? What knowledge and skills can you improve?
- **Basic Knowledge:**
  - \* Math, Science, and computational skills are fundamental to engineering, but so are...
- **Attitudes & Behaviors:**
  - \* Creativity and Innovation; Global Perspective;
  - \* Teamwork and Leadership; Ethical Reasoning;
  - \* Entrepreneurial Thinking
- **What will you need in your Toolbox 4 years from now?**





## Is CEE a Good Career Choice?

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The college majors most and least likely to lead to underemployment

% saying they are underemployed in a recent PayScale survey, by undergraduate major

**Most underemployed majors**


CRIMINAL JUSTICE	65
BUSINESS MANAGEMENT & ADMINISTRATION	60
HEALTH CARE ADMINISTRATION	58
GENERAL STUDIES	55
SOCIOLOGY	52
ENGLISH LANGUAGE & LITERATURE	50
GRAPHIC DESIGN	48
LIBERAL ARTS	45
EDUCATION	42
PSYCHOLOGY	40

**Least underemployed majors**

CIVIL & ENVIRONMENTAL ENGINEERING	25
AEROSPACE ENGINEERING	22
COMPUTER ENGINEERING	20
CHEMICAL ENGINEERING	18
LAW	15
PHYSICS	12
MECHANICAL ENGINEERING	10
ELECTRICAL ENGINEERING	8
GEOLOGY	6
MATHEMATICS	4

**\* underemployed:**  
Not having enough paid work or not doing work that makes full use of your skills and abilities (different from unemployment in that you are working but not at your full capability)

WASHINGTONPOST.COM/WONKBLOG Source: PayScale



## Is CEE a Good Career Choice?


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**Fastest Growing STEM Jobs:**

Civil Engineering is 12th

Rank	Job	2014-2018		2018-2028 Projections		Index
		Growth Rate	Change in Number of Workers	Growth Rate	Change in Number of Workers	
1	Applications Software Developers	31.6 %	216,690	25.6 %	241,500	100.00
2	Information Security Analysts	34.8 %	27,880	31.6 %	35,500	98.16
3	Statisticians	48.0 %	12,950	30.7 %	13,600	94.48
4	Operations Research Analysts	19.8 %	17,250	25.6 %	28,100	93.87
5	Computer User Support Specialists	11.9 %	67,160	10.6 %	70,900	91.41
6	Computer Systems	11.3 %	59,650	8.8 %	56,000	87.73
7	Industrial Engineers	18.0 %	42,560	8.3 %	23,800	87.42
8	Computer and Information Research Scientists	24.2 %	5,860	16.5 %	5,200	85.89
9	Systems Software Developers	6.0 %	22,930	10.1 %	42,600	85.28
10	Architects (Except Landscape and Naval)	17.4 %	15,460	8.4 %	11,200	83.13
10	Medical Scientists (Except Epidemiologists)	19.4 %	19,580	8.1 %	10,600	83.13
12	Civil Engineers	16.2 %	42,570	6.3 %	20,500	82.82

[smartasset.com/checking-account/fastest-growing-stem-jobs-in-the-us-2020](https://smartasset.com/checking-account/fastest-growing-stem-jobs-in-the-us-2020)



# Civil: Occupational Outlook 2019

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OCCUPATIONAL OUTLOOK HANDBOOK

## Civil Engineers

<https://www.bls.gov/ooh/architecture-and-engineering/civil-engineers.htm>

Summary
What They Do
Work Environment
How to Become One
Pay
Job Outlook
State & Area Data
Similar Occupations
More Info

Quick Facts: Civil Engineers	
2019 Median Pay	\$87,060 per year \$41.86 per hour
Typical Entry-Level Education	Bachelor's degree
Work Experience in a Related Occupation	None
On-the-job Training	None
Number of Jobs, 2019	329,200
Job Outlook, 2019-29	2% (Slower than average)
Employment Change, 2019-29	5,500


**What Civil Engineers Do**  
Civil engineers design, build, and supervise infrastructure projects and systems.


**Work Environment**  
Civil engineers generally work in a variety of locations and conditions. It is common for them to split their time between working in an office and working outdoors at construction sites so that they can monitor operations or solve problems onsite. Most work full time.

**How to Become a Civil Engineer**  
Civil engineers need a bachelor's degree in civil engineering, in one of its specialties, or in civil engineering technology. They typically need a graduate degree and licensure for promotion to senior positions. Although licensure requirements vary by state, civil engineers usually must be licensed if they provide services directly to the public.

**Pay** The median annual wage for civil engineers was \$87,060 in May 2019.

**Job Outlook**  
Employment of civil engineers is projected to grow 2 percent from 2019 to 2029, slower than the average for all occupations. As infrastructure continues to age, civil engineers will be needed to manage projects to rebuild, repair, and upgrade bridges, roads, levees, dams, airports, buildings, and structures of all types.





# Environmental: Occupational Outlook 2019

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OCCUPATIONAL OUTLOOK HANDBOOK

## Environmental Engineers

[bls.gov/ooh/architecture-and-engineering/environmental-engineers.htm](https://www.bls.gov/ooh/architecture-and-engineering/environmental-engineers.htm)

Summary
What They Do
Work Environment
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Pay
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Quick Facts: Environmental Engineers	
2019 Median Pay	\$88,860 per year \$42.72 per hour
Typical Entry-Level Education	Bachelor's degree
Work Experience in a Related Occupation	None
On-the-job Training	None
Number of Jobs, 2019	55,800
Job Outlook, 2019-29	3% (As fast as average)
Employment Change, 2019-29	1,700


**What Environmental Engineers Do**  
Environmental engineers use the principles of engineering, soil science, biology, and chemistry to develop solutions to environmental problems.

**Work Environment**  
Environmental engineers work in a variety of settings because of the nature of the tasks they do. When they are working with other engineers and urban and regional planners, environmental engineers are likely to be in offices. When they are carrying out solutions through construction projects, they are likely to be at construction sites.

**How to Become an Environmental Engineer**  
Environmental engineers must have a bachelor's degree in environmental engineering or a related field, such as civil, chemical, or general engineering. Employers also value practical experience. Therefore, cooperative engineering programs, which provide college credit for structured job experience, are valuable as well.

**Pay** The median annual wage for environmental engineers was \$88,860 in May 2019.

**Job Outlook**  
Employment of environmental engineers is projected to grow 3 percent from 2019 to 2029, about as fast as the average for all occupations. State and local governments' concerns regarding water availability and quality should lead to efforts to increase the efficiency of water use.





## Civil & Environmental Engineering Why Should You Choose CEE @ UCI ?

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Whether its civil or environmental engineering, **most** university programs offer a similar curriculum:

- 2 years of math and 2 years of science
- Fundamental engineering science and skills courses
- A junior core of advanced courses and labs in the many sub-areas of each field

**UCI's** programs offer **unique** opportunities:

- Specializations
- Senior Design
- UCI CEE Affiliates
- Undergraduate Research Opportunities



## BS in Civil Engineering Specializations

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### Structural Engineering:

Requires **CEE155**, and three courses from CEE149, CEE151B, CEE152, CEE156, MAE157.



Structures

### Transportation Systems Engineering:

Requires **CEE122** and **CEE123**, and two courses from CEE124, CEE125, Engr189, EECS70.



Transportation

### Environmental Hydrology & Water Resources:

Requires four courses from CEE163, 164, 165, 169, CEE172, 173, 176, or 178.



Water





## BS in Environmental Engineering Engineering Elective Topics

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- **Water Supply and Resources:**

Choose from: CEE171, CEE172, CEE173, CEE176, and CEE178



- **Environmental Processes:**

Choose from: CEE163, CEE165, CEE167, and CEE169



- **Atmospheric Systems & Air Poll Control:**

Choose from: MAE110, MAE115, MAE164, and ESS 112



## Civil and Environmental Engineering Senior Capstone Design Sequence

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- **CEE181A Fall Quarter:**


Interdisciplinary student teams work with The Irvine Company to plan the land use and the associated civil infrastructure of a sub-area in the City of Irvine



- **CEE181B-C Winter/Spring Quarters:**


Specialized student teams work with an Industrial Affiliate to design a specific infrastructure element (such as a bridge, a building, a roadway or transit system, or a water supply or control system)








## Civil & Environmental Engineering Participating Firms in Senior Design


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## Civil and Environmental Engineering UCI CEE Affiliates

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**UCI Civil and Environmental Engineering (CEE) Affiliates:**

- provide an effective means to offer support and guidance to the department, its programs, and its students;
- act as an interface between the professional civil and environmental engineering community in Southern California, particularly Orange County, and the university;
- include senior executives representing leading civil and environmental engineering firms and public agencies, as well as individual members.





## Civil & Environmental Engineering Undergraduate Research Opportunities

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### Undergraduate Research Opportunities in the HSSOE:

- Our **Freshman Experiential Learning Program** provides design/build/test experience to undergraduates from their first year on campus. Multidisciplinary teams experience real-world product development through planning, research, design, manufacturing, and evaluation. The program, the first in the UC system, offers UCI students a distinct competitive advantage.
- All undergraduates are encouraged to participate in UCI's **Undergraduate Research Opportunities Program (UROP)** which guides students through all phases of the research process, providing them with the necessary skills to succeed in their future careers.
- To date, **two-thirds** of HSSOE undergraduate students have participated in faculty-led research projects.



## Civil & Environmental Engineering Student Organizations

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### Student Organizations



American Public Works Association (APWA)



American Academy of Environmental Engineers and Scientists (AAEES)



American Society of Civil Engineers (ASCE)



Chi Epsilon (Civil Engineering Honor Society)



Earthquake Engineering Research Institute



Engineers Without Borders (EWB)



Institute for Transportation Engineers (ITE)





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**Civil & Environmental Engineering  
Questions?**

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## Any Questions ?



Professor Michael G. McNally ([mmcnally@uci.edu](mailto:mmcnally@uci.edu))  
 Fall Office Hours: **Thursdays** 2-3:30 pm  
<https://uci.zoom.us/j/97315048733>