

# Department of Civil Engineering

## 2015-2016 Academic Year Program Fact Sheet



### Overview

Santa Clara University is the oldest institution of higher education in the state of California and has offered engineering programs since 1912. The ABET-accredited Civil Engineering Program provides students with a comprehensive background in both theory and application. Students are required to complete coursework in all of the main civil engineering disciplines (structural, geotechnical, water resources, environmental, and transportation engineering) as well as in key complimentary academic areas that provide the breadth of knowledge needed for professional practice and licensure. Students can pursue either a general civil engineering degree program or, through the selection of technical electives, focus on a specialty area within civil engineering. The University's location in the heart of Silicon Valley provides SCU civil engineering students with unique opportunities for intern/co-op positions, part-time student employment, post-graduate employment, and post-graduate study. In keeping with the University's Jesuit tradition, the undergraduate engineering programs incorporate a strong humanities-based core curriculum. The Civil Engineering program graduates between 35 and 50 students each year. Historically, 35 percent of the program's graduates have been female and 30 percent have been Asian/Pacific Islander, Hispanic, African American or Native American. The University student:faculty ratio is 16:1 and the average undergraduate engineering course enrollment is 26 students.

### Undergraduate Engineering Program & Curricular Components

- degree programs designed to be completed in four years
- lecture courses taught by faculty (no graduate student instructors); individual, assigned faculty advisors for all students
- a required senior year capstone design project
- optional five-year BS/MS program
- optional formal co-op program administered through the University's Career Services Center
- optional study abroad experience for one academic term (typically fall quarter of the junior year)
- active student organizations (ASCE/AGC, SHPE, EWB, SWE, NSBE, Tau Beta Pi)

### Civil Engineering Faculty

The Civil Engineering Department has seven full-time faculty members. The full-time faculty is augmented by several continuing term faculty members and working professionals to provide for instruction in all key areas of civil engineering. Research conducted by the Civil Engineering faculty has resulted in significant technical contributions in wastewater treatment, solid waste containment, earthquake-resistant engineering design, light frame steel construction, climate modeling, transportation planning, and other closely related areas.

### Civil Engineering Laboratory Facilities

- Simulation & Design Laboratory: for conducting numerical simulations of practical engineering systems in all areas of civil engineering
- Structural and Strength of Materials Laboratory: for the small- and full-scale testing of structural systems and elements
- Environmental Laboratory: for quantifying levels of impurities in water and air and evaluating pilot-scale treatment systems
- Soil Mechanics Laboratory: for determining the critical properties of soils used in civil engineering-related applications
- Fluid Mechanics and Hydraulics Laboratory: for characterizing devices and systems used to convey and control the flow of water
- Concrete Testing Laboratory: for the preparation and evaluation of conventional and innovative concrete test specimen
- Surveying and Traffic Laboratory: for maintaining the instrumentation used for student surveying exercises and field traffic studies
  - Geology Laboratories: equipped with extensive rock and mineral samples, as well as topographic, geologic, and soil maps.
  - Structural Laboratory Annex: is a high-bay test facility equipped with a closed-loop hydraulic system, modern data acquisition and control system: Annex has capability to test unique building components

### Civil Engineering and Related University Computing Resources

- 32 Windows-based workstations with high resolution flat panel displays in the Department's Analysis & Design Laboratory together with network-integrated high speed laser printing and large format inkjet plotting devices
- 100 Windows, 24 Linux, and 24 Mac-based workstations in the School of Engineering Design Center (all with large flat panel displays)
- over 300 high speed, networked Windows and Apple/Mac-based computers in University general use computer laboratories
- software holdings in the Civil Engineering Modeling and Analysis Laboratory and the Engineering Design Center include a wide variety of commercial packages used for the planning, analysis, design, and management of civil engineering systems
- a fully networked campus (major University buildings and residence halls) with network connections and centralized printing facilities
- multimedia-equipped classrooms in the Engineering Center with strong Media Services support

### Additional Information / Web-based Links

- SCU Civil Engineering Home Page: [www.scu.edu/engineering/ce](http://www.scu.edu/engineering/ce)
- SCU Bulletin - Online Version: [www.scu.edu/bulletin/undergraduate/](http://www.scu.edu/bulletin/undergraduate/)
- SCU Admissions Information: [www.scu.edu/admissions](http://www.scu.edu/admissions)
- American Society for Engineering Education Pre-college Information: [www.egfi-k12.org/](http://www.egfi-k12.org/)



## Department of Civil Engineering

**Sample GENERAL CIVIL ENGINEERING Program of Studies for Students  
Entering the University as Freshmen During the 2015/2016 Academic Year**

	FALL	WINTER	SPRING	
<b>FROSH</b>	MATH 11 - CALC I CHEM 11 - CHEM I (5) CRIT THINK WRITING I CENG 7 - GRAPH COMM ENGR 1 - INTRO ENGR (2)	MATH 12 - CALC II PHYS 31 - PHYSICS I (5) CRIT THINK WRITING II CULTURES & IDEAS I	MATH 13 - CALC III PHYS 32 - PHYSICS II (5) CENG 10 - SURVEYING CULTURES & IDEAS II	<b>FROSH</b>
<b>SOPH</b>	MATH 14 - CALC IV PHYS 33 - PHYSICS III (5) CENG 15 - COMP APL CENG (3) CENG 41 - STATICS	AMTH 106 - DIFF EQNS CENG 20 - GEOLOGY CENG 44A - STR MATLS UNIV CORE REQUIREMENT	CENG 44B - STR MATLS (2) CENG 115 - MATERIALS (5) CENG 132 - STRUCT ANAL ELEN 50 - CIRCUITS (5)	<b>SOPH</b>
<b>JUNIOR</b>	CENG 121A - GEOTECH I CENG 145 - TRANS ENG DES CENG 148 - STRUCT SYS (5) UNIV CORE REQUIREMENT	AMTH 112 - RISK IN CIV ENGR CENG 121B - GEOTECH II (2) CENG 125 - MUNICIPAL ENG CENG 141 - FLUIDS/HYDR (5) CENG TECH ELECTIVE	CENG 128 - ENGR ECON (3) CENG 140 - WATER RES (5) CENG 143 - ENVIRON ENG CENG TECH ELECTIVE	<b>JUNIOR</b>
<b>SENIOR</b>	CENG 192A - CENG PRACT (2) ENGL 181 - APP ENG COMM (2) CENG TECH ELECTIVE UNIV CORE REQUIREMENT UNIV CORE REQUIREMENT	ENGL 182A - APP ENG COM (1) CENG 192C - ADV CAD (2) CENG 193 - PROJECT DES I REQUIRED FLEX COURSE UNIV CORE REQUIREMENT	ENGL 182B - APP ENG COMM (1) CENG 194 - PROECT DES II (1) REQUIRED FLEX COURSE REQUIRED FLEX COURSE UNIV CORE REQUIREMENT	<b>SENIOR</b>

**FLEX COURSES include a CENG technical elective, a computer applications course\*, and a free elective.**

Courses are normally worth 4 quarter units of academic credit unless indicated otherwise and may include an associated laboratory. Detailed course descriptions can be found in the on-line University Bulletin ([www.scu.edu/bulletin/undergraduate/](http://www.scu.edu/bulletin/undergraduate/)). Civil engineering majors must complete four CENG technical electives as part of their academic programs. At least two technical elective courses shall be selected from the Design Category shown below. Students should work with their academic advisor to select the electives that both address their professional goals and help prepare them for their senior design capstone project. The Civil Engineering Department has developed several optional upper division track programs for students who are interested in one particular area of civil engineering. These sample curricular tracks provide insight into how the technical electives should be scheduled to optimize exposure to one particular sub-discipline. \*Either CENG 160 or CENG 192D *must be taken as a required computer applications course; the other may then be taken as a separate technical elective.*

**CATEGORY I: CENG DESIGN-FOCUSED TECHNICAL ELECTIVES:**

CENG 119 - DES SUSTAIN CONSTRUCT	CENG 136 - ADVANCED CONCRETE DES	CENG 144 - ENVIRON SYSTEMS DES
CENG 133 - TIMBER DES	CENG 137 - EARTHQUAKE ENGR DES	CENG 146 - COLD FORMED STEEL DES
CENG 134 - STRUCTURAL STEEL DES	CENG 138 - GEOTECHNICAL ENGR DES	CENG 150 - TRAFFIC ENGR DES
CENG 135 - REINFORCED CONCRETE DES	CENG 142 - WATER RESOURCES DES	

**CATEGORY II: CENG ANALYSIS-FOCUSED TECHNICAL ELECTIVES:**

CENG 118 - CONSTRUCTION ENG (3)	CENG 149 - CIVIL SYSTEMS ENGR	CENG 184 - CONSTRUCTION ADMIN (3)
CENG 123 - ENVIRON REACTION ENG	CENG 151 - SPEC TOPICS TRANS ENG	CENG 186 - CONSTRUCTION PLANNING
CENG 124 - WATER LAW & POLICY	CENG 160 - GIS IN WATER RESOURCES (3)*	CENG 187 - CONSTRUCTION OPERATIONS
CENG 139 - GROUNDWATER HYDROL (3)	CENG 161 - SUSTANABLE WATER RES	CENG 192D - INTRO TO BIM (3)*
	CENG 162 - COMP WATER RESOURCES (3)	

University CORE Curriculum requirements for engineering students are detailed in the University Bulletin and the CORE Curriculum Guide. The University implemented a new Core Curriculum in the fall of 2009. This Core Curriculum requires that all engineering students complete (a) a set of courses that satisfy designated topic area requirements, (b) a three-course approved Pathway cluster, and (c) coursework that also satisfies five additional learning outcomes. Engineering students can use select courses to satisfy multiple CORE requirements.