

## DOCUMENTS OF THE GENERAL FACULTY

**PROPOSED CHANGES TO THE BACHELOR OF SCIENCE IN CIVIL ENGINEERING  
DEGREE PROGRAM IN THE COCKRELL SCHOOL OF ENGINEERING CHAPTER IN THE  
UNDERGRADUATE CATALOG, 2016-2018**

Dean Sharon L. Wood in the Cockrell School of Engineering has filed with the secretary of the Faculty Council the following changes to the *Undergraduate Catalog, 2016-2018*. The secretary has classified this proposal as legislation of *exclusive* interest to only one college or school.

The Committee on Undergraduate Degree Program Review recommended approval of the changes on January 6, 2016, and forwarded the proposal to the Office of the General Faculty. The Faculty Council has the authority to approve this legislation on behalf of the General Faculty. The authority to grant final approval on this legislation resides with UT System.

If no objection is filed with the Office of the General Faculty by the date specified below, the legislation will be held to have been approved by the Faculty Council. If an objection is filed within the prescribed period, the legislation will be presented to the Faculty Council at its next meeting. The objection, with reasons, must be signed by a member of the Faculty Council.

To be counted, a protest must be received in the Office of the General Faculty by January 20, 2016.



Hillary Hart, Secretary  
General Faculty and Faculty Council



**If 4 a, b, c, or d was answered with yes, please answer the following questions. If the proposal has potential budgetary impacts for another college/school, such as requiring new sections or a non-negligible increase in the number of seats offered, at least one contact must be at the college-level.**

How many students do you expect to be impacted?

Impacted schools must be contacted and their response(s) included:

Person communicated with:

Date of communication:

Response: Pending

- e. Does this proposal involve changes to the core curriculum or other basic education requirements (42-hour core, signature courses, flags)? If yes, explain:

**If yes, undergraduate studies must be informed of the proposed changes and their response included:**

Person communicated with:

Date of communication:

Response:

- f. Will this proposal change the number of hours required for degree completion? If yes, explain:

## 5. COLLEGE/SCHOOL APPROVAL PROCESS

Department approval date: March 11, 2015

College approval date: March 27, 2015

Dean approval date: April 29, 2015

## PROPOSED NEW CATALOG TEXT:

### BACHELOR OF SCIENCE IN CIVIL ENGINEERING

Civil engineers design, construct, operate and maintain the physical fabric of society. In doing so, civil engineers work toward continuous improvement of the human condition and natural environment, tackling many of the grand challenges that face humankind today. Much of the work of civil engineers is highly visible, such as roadways, bridges, airports, levees, buildings, bike paths, and city parks, while other parts are rarely seen but equally vital to the health of communities, such as the water and wastewater treatment, distribution, and collection systems or the energy infrastructure. Civil engineers keep human beings safe by designing resilient infrastructure that does not fail in extraordinary events, but that is also socially, economically, and environmentally sustainable.

~~Engineering is the application of scientific principles and technical knowledge to real world problems. Civil engineering is the segment of the engineering profession that strives to provide for the basic needs of humanity. The civil engineer is involved with the physical environment through the planning, design, construction, and operation of building and housing systems, transportation systems, and systems for the protection and use of air and water resources.~~

The civil engineering student has the opportunity to obtain a broad background in mathematics and the physical sciences and their applications to all areas of civil engineering. This flexible curriculum allows the student to elect eighteen semester hours of approved technical coursework to emphasize the areas of civil engineering of most interest to the student. In addition, courses in the humanities and social sciences are included.

To excel as a civil engineer, a student should have an aptitude for mathematics and science, an interest in the practical application of technical knowledge to societal problems, the motivation to study and prepare for engineering practice, and the desire to be a professional, and a desire to work with others to better the lives of humankind. Civil engineering graduates of the University may seek a wide variety of positions in planning, design, and construction with government agencies, industry, and private consulting firms. Those who plan to pursue graduate work in engineering, or in other professions such as business, medicine, law, or journalism, have an excellent base on which to build.

### **Program Student Outcomes**

Graduates of the civil engineering program should attain the following outcomes:

- An ability to apply knowledge of mathematics, science, and engineering
- An ability to design and conduct experiments, as well as to analyze and interpret data
- An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- An ability to function on multidisciplinary teams
- An ability to identify, formulate, and solve engineering problems
- An understanding of professional and ethical responsibility
- An ability to communicate effectively
- The broad education necessary to understand what impact engineering solutions have in global, economic, environmental, and societal contexts
- Recognition of the need for and an ability to engage in lifelong learning
- Knowledge of contemporary issues
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

### **Program Educational Objectives**

Graduates of the civil engineering program should solve civil engineering problems within a greater societal context. They should:

- Exhibit character and decision-making skills embodying professionalism and ethical behavior  
~~Act professionally and ethically~~
- Apply knowledge, strong reasoning, and quantitative skills to design and implement creative and sustainable solutions
- Engage in lifelong learning ~~in order to meet~~ evolving engineering ~~the challenges facing society~~  
~~the profession~~
- Exhibit strong communication, critical thinking, interpersonal, and ~~resource~~-management skills as leaders and contributors in the civil engineering profession

### **Portable Computing Devices**

Students entering Civil Engineering are required to have a laptop at their disposal. Laptops do not need to be brought to campus on a daily basis, but individual courses may require that a laptop be brought to class or lab sessions. For a list of minimum system requirements see: [www.cae.utexas.edu/students/itss](http://www.cae.utexas.edu/students/itss).

### **Curriculum**

Course requirements include courses within the Cockrell School of Engineering ~~are divided into three categories: basic sequence courses, major sequence courses, and other required courses.~~ In addition, each student must complete the University's core curriculum. In some cases, a course required for the Bachelor of Science in Civil Engineering as part of the basic sequence may also be counted toward the core curriculum; these courses are identified below. ~~To ensure that courses used to fulfill the social and behavioral sciences and visual and performing arts requirements of the core curriculum also meet ABET criteria, students should follow the guidance given in ABET Criteria.~~

In the process of fulfilling engineering degree requirements, students must also complete coursework to satisfy the following flag requirements: one independent inquiry flag, one quantitative reasoning flag, one ethics and leadership flag, one global cultures flag, one cultural diversity in the US flag, and two writing flags. The independent inquiry flag, the quantitative reasoning flag, the ethics and leadership flag and one writing flag are carried by courses specifically required for the degree; these courses are identified below.

Students are advised to fulfill the second writing flag requirement with a course that meets another requirement of the core curriculum, such as the first-year signature course. Courses that may be used to fulfill flag requirements are identified in the *Course Schedule*.

Enrollment in major sequence courses is restricted to students who have received credit for all of the basic sequence courses and have been admitted to the major sequence. Requirements for admission to a major sequence are given in Admission to a Major Sequence. Enrollment in other required courses is not restricted by completion of the basic sequence.

<b>Requirements</b>		<b>Hours</b>
<b>Basic Sequence Courses</b>		
<b>Chemistry</b>		
CH 301	Principles of Chemistry I (part II science and technology)	<u>3</u>
CH 302	Principles of Chemistry II	<u>3</u>
<b>Civil Engineering Courses</b>		
C E 301	Civil Engineering Systems	3
C E 311K	Introduction to Computer Methods	3
C E 311S	Probability and Statistics for Civil Engineers	3
C E 319F	Elementary Mechanics of Fluids	3
<u>C E 321</u>	<u>Transportation Systems</u>	<u>3</u>
<u>C E 324P</u>	<u>Properties and Behavior of Engineering Materials</u>	<u>3</u>
<u>C E 329</u>	<u>Structural Analysis</u>	<u>3</u>
<u>C E 333T</u>	<u>Engineering Communication (writing flag)</u>	<u>3</u>
<u>C E 341</u>	<u>Introduction to Environmental Engineering</u>	<u>3</u>
<u>C E 356</u>	<u>Elements of Hydraulic Engineering</u>	<u>3</u>
<u>C E 357</u>	<u>Geotechnical Engineering</u>	<u>3</u>
<u>C E 171P</u>	<u>Engineering Professionalism (ethics and leadership flag)</u>	<u>1</u>
<b>Architectural Engineering</b>		
<u>ARE 323K</u>	<u>Project Management and Economics</u>	<u>3</u>
<b>Chemistry</b>		
<u>CH 301</u>	<u>Principles of Chemistry I (part II science and technology)</u>	<u>3</u>
<u>CH 302</u>	<u>Principles of Chemistry II</u>	<u>3</u>
<b>Engineering Mechanics</b>		
E M 306	Statics	3
E M 319	Mechanics of Solids	3
<b>Mathematics</b>		
M 408C	Differential and Integral Calculus (mathematics; quantitative reasoning flag)	4
M 408D	Sequences, Series, and Multivariable Calculus	4
<u>M 427J or</u> <u>M 427K</u>	<u>Differential Equations with Linear Algebra (quantitative reasoning flag)</u>	<u>4</u>
<b>Mechanical Engineering</b>		

M E 210	Engineering Design Graphics	2
<b>Physics</b>		
PHY 103M	Laboratory for Physics 303K	1
PHY 103N	Laboratory for Physics 303L	1
PHY 303K	Engineering Physics I (part I science and technology; quantitative reasoning flag)	3
PHY 303L	Engineering Physics II (part I science and technology; quantitative reasoning flag)	3
<b>Rhetoric and Writing</b>		
RHE 306	Rhetoric and Writing (English composition)	3
UGS 302	First-Year Signature Course (some sections carry writing flag)	3
or UGS 303	First-Year Signature Course	
<b>Major Sequence Courses</b>		
ARE 323K	Project Management and Economics	3
C E 324P	Properties and Behavior of Engineering Materials	3
C E 321	Transportation Systems	3
C E 329	Structural Analysis	3
C E 341	Introduction to Environmental Engineering	3
C E 356	Elements of Hydraulic Engineering	3
C E 357	Geotechnical Engineering	3
C E 333T	Engineering Communication (writing flag)	3
C E 171P	Engineering Professionalism (ethics and leadership flag)	1
Level I electives		15
Level II elective		3
<b>Other Required Courses</b>		
M 427K	Advanced Calculus for Applications I (quantitative reasoning flag)	4
E M 311M	Dynamics	3
or M E 320	Applied Thermodynamics	
Approved science elective		3
Approved mathematics, science, or engineering science elective		3
Level I electives		15
Level II elective		3
<b>Remaining Core Curriculum Courses</b>		
RHE 306	Rhetoric and Writing (English composition)	3
E 316L	British Literature (humanities) (some sections carry a global cultures flag)	3
or E 316M	American Literature (humanities) (some sections carry a cultural diversity flag)	
or E 316N	World Literature (humanities) (some sections carry a global cultures flag)	
or E 316P	Masterworks of Literature (humanities)	
American and Texas government	(some sections carry a global cultures and/or cultural	6

<u>diversity flag)</u>	
American history ( <u>some sections carry a cultural diversity flag</u> )	6
Social and behavioral science ( <u>some sections carry a global cultures and/or cultural diversity flag</u> )	3
Visual and performing arts ( <u>some sections carry a global cultures and/or cultural diversity flag</u> )	3
UGS 302 <u>First-Year Signature Course (some-all sections carry writing flag)</u>	3
or UGS 303 <u>First-Year Signature Course (some sections carry a writing flag)</u>	
Total Hours	125

### **Level I and Level II Technical Electives**

The civil engineering curriculum does not require the student to declare a specific technical area option. However, for the guidance of students with particular interests, level I electives in civil engineering are listed in areas of specialization. The fifteen semester hours of level I electives must be chosen from the following civil engineering and architectural engineering courses; in special cases, with the written permission of the department chair, this requirement may be relaxed, provided the student demonstrates in advance that the courses to be substituted for civil engineering or architectural engineering courses are part of a consistent educational plan. To provide a broad general background, at least one technical elective from each of three different areas of specialization must be included in each student's program.

Each student must take at least one technical area option level II elective. Level II electives may be substituted for technical area option level I electives, but the requirement of at least one technical elective from each of three different areas of specialization still applies.

The following lists reflect current course offerings and are subject to change by the faculty. Current lists are available in the departmental undergraduate office.

### **Level I Electives**

#### *Construction Engineering and Project Management*

#### Architectural Engineering 335, Materials and Methods of Building Construction

Architectural Engineering 358, Cost Estimating in Building Construction

Architectural Engineering 366, Contracts, Liability, and Ethics (carries an ethics and leadership flag)

Architectural Engineering 376, Building Information Modeling for Capital Projects

#### *Infrastructure ~~Construction~~ Materials Engineering*

Civil Engineering 351, Concrete Materials

Civil Engineering 366K, Design of Bituminous Mixtures

#### *Environmental Engineering*

Civil Engineering 342, Water and Wastewater Treatment Engineering

Civil Engineering 346, Solid Waste Engineering and Management

Civil Engineering 369L, Air Pollution Engineering

Civil Engineering 369R, Indoor Air Quality

Civil Engineering 370K, Environmental Sampling and Analysis

#### *Geotechnical Engineering*

Civil Engineering 375, Earth Slopes and Retaining Structures

#### *Structural Engineering*

Architectural Engineering 345K, Masonry

Engineering Architectural Engineering 362L,

*Structural Design in Wood* Civil Engineering 331,  
*Reinforced Concrete Design*  
 Civil Engineering 335, *Elements of Steel Design*  
 Civil Engineering 363, *Advanced Structural Analysis*  
*Transportation Engineering*  
 Civil Engineering 367P, *Pavement Design and Performance*  
 Civil Engineering 367T, *Traffic Engineering*

*Water Resources Engineering*  
 Civil Engineering 358, *Introductory Ocean Engineering*  
 Civil Engineering 374K, *Hydrology*  
 Civil Engineering 374L, *Groundwater Hydraulics*

### **Level II Electives (Design)**

*Environmental Engineering*  
 Civil Engineering 364, *Design of Wastewater and Water Treatment Facilities* (carries an independent inquiry flag)

*Geotechnical Engineering*  
 Civil Engineering 360K, *Foundation Engineering* (carries an independent inquiry flag)

*Structural Engineering*  
 Civil Engineering 362M, *Advanced Reinforced Concrete Design* (carries an independent inquiry flag)  
 Civil Engineering 362N, *Advanced Steel Design* (carries an independent inquiry flag)

*Transportation Engineering*  
 Civil Engineering 367G, *Design and Evaluation of Ground-Based Transportation Systems* (carries an independent inquiry flag)

*Water Resources Engineering*  
 Civil Engineering 365K, *Hydraulic Engineering Design* (carries an independent inquiry flag)

### **Suggested Arrangement of Courses**

		<b>First Year</b>			
	<b>First Term</b>	Hours		<b>Second Term</b>	Hours
C E 301		3	CH 302		3
CH 301		3	M E 210		2
M 408C		4	M 408D		4
RHE 306		3	PHY 303K		3
UGS 302 or 303		3	PHY 103M		1
			Social and behavioral sciences or visual and		3
		16			16
		<b>Second Year</b>			
	<b>First Term</b>	Hours		<b>Second Term</b>	Hours
C E 311K		3	C E 311S		3
E M 306		3	E M 319		3
<u>M 427J</u> or M 427K		4	C E 319F		3
PHY 303L		3	C E 333T		3
PHY 103N		1	American history		3
American history		3			



		17			15
			<b>Third Year</b>		
	<b>First Term</b>	Hours		<b>Second Term</b>	Hours
	C E 324P	3	<u>E M 311M or M E</u>		<u>3</u>
	Base level course	3	Base level course		3
	Base level course	3	Base level course		3
	Base level course	3	Base level course		3
			Social and behavioral sciences or visual and		
		15			15
			<b>Fourth Year</b>		
	<b>First Term</b>	Hours		<b>Second Term</b>	Hours
	Level I elective	3	C E 171P		1
	Level I elective	3	Level I elective		3
	Level I elective	3	Level I elective		3
	Approved science elective	3	Level II elective		3
	American and Texas government	3	American government		3
			Approved math, science, or engineering		3
		15			16
	Total credit hours: 125				