

CIVIL ENGINEERING DEGREE PROGRAM

acceptable courses maintained by
department office)

4. SCOPE OF PROPOSED CHANGE:

- a. Does this proposal impact other colleges/schools? Yes No
If yes, then how would you do so?
- b. Do you anticipate a net change in the number of students in your college? Yes No
If yes, how many more (or fewer) students do you expect?
- c. Do you anticipate a net increase (or decrease) in the number of students from outside of your college taking classes in your college? Yes No
If yes, please indicate the number of students and/or class seats involved.
- d. Do you anticipate a net increase (or decrease) in the number of students from your college taking courses in other colleges? Yes No
 - Students no longer required to take a Math/Science/Engineering elective. While some students may still choose to take these courses we anticipate enrollment of Civil Engineering students in the following courses may be reduced: BIO 311D, CH 320M, CH 328M, CH 353, E M 311M, E M 339, GEO 316P, M 427L, M 340L, M 361, M 362K, M 364K, M 372, M 372K, M 374, M E 339, M E 349, M E 374F, PHY 335. We do not anticipate a decrease in enrollment in GEO 303, GEO 401, or BIO 311C since it is still a requirement that Civil Engineering student take one of these course to fulfill their Science elective requirement.

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? 260

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

Person communicated with: Dr. Janice Fischer – Director of Undergraduate Biology; Dr. Dave Thirumalai – Department of Chemistry Chair; Dr. Noel Clemens – Department of Engineering Mechanics Chair; Dr. Charles Kerans – Department of Geological Sciences Chair; Dr. Thomas Chen – Department of Mathematics Chair; Dr. Richard Neptune – Department of Mechanical Engineering Chair; Dr. Jack Ritchie – Department of Physics

Date of communication: May 18, 2017

Response: No objections received.

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

NO

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?

YES

Note: THECB Semester Credit Hour Change Form required, download from URL:

<http://www.thecb.state.tx.us/reports/DocFetch.cfm?DocID=2419&format=doc>

If yes, explain: Yes, with the increased number of hours in 171P to 371P and the removal of a Math/Science/Engineering elective the net will decrease by 1.

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5. COLLEGE/SCHOOL APPROVAL PROCESS

Department approval date: April 14 th , 2017	Approved by whom: CAEE Faculty & Chair
College approval date: May 24, 2017	Approved by whom: CSE Degrees & Courses Committee
Dean approval date: Sept. 18, 2017	Approved by whom: CSE Faculty; Sharon L. Wood, Dean

PROPOSED NEW CATALOG TEXT:⁴

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.

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 18 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, 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.

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:

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- Exhibit character and decision-making skills embodying professionalism and ethical behavior
- Apply knowledge, strong reasoning, and quantitative skills to design and implement creative and sustainable solutions
- Engage in lifelong learning to meet evolving engineering challenges facing society
- Exhibit strong communication, critical thinking, interpersonal, and 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/its.

Curriculum

Course requirements include courses within the Cockrell School of Engineering 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 may also be counted toward the core curriculum; these courses are identified below.

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. Courses that may be used to fulfill flag requirements are identified in the *Course Schedule*.

Requirements		Hours
Civil Engineering Courses		
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
C E 321	Transportation Systems [^]	3
C E 324P	Properties and Behavior of Engineering Materials [^]	3
C E 329	Structural Analysis [^]	3
C E 333T	Engineering Communication (writing flag; ethics and leadership flag)	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 4371P	Engineering Professionalism (ethics and leadership flag)	4 ³
Architectural Engineering		
ARE 323K	Project Management and Economics [^]	3

[^] Base Level course

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Chemistry		
CH 301	Principles of Chemistry I (part I science and technology)	3
CH 302	Principles of Chemistry II (part I science and technology)	3
Engineering Mechanics		
E M 306	Statics	3
E M 319	Mechanics of Solids	3
Mathematics		
M 408C	Differential and Integral Calculus (mathematics; quantitative reasoning flag)	4
M 408D	Sequences, Series, and Multivariable Calculus	4
M 427J	Differential Equations with Linear Algebra (quantitative reasoning flag)	4
or M 427K	Advanced Calculus for Applications I	
Mechanical Engineering		
M E 210	Engineering Design Graphics	2
Physics		
PHY 103M	Laboratory for Physics 303K	1
PHY 103N	Laboratory for Physics 303L	1
PHY 303K	Engineering Physics I (part II science and technology)	3
PHY 303L	Engineering Physics II	3
Other Required Courses		
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 Technical electives		1845
Level II elective (independent inquiry flag)		3
Remaining Core Curriculum		
RHE 306	Rhetoric and Writing (English Composition)	3
E 316L	British Literature (humanities; in E 316L, 316M, 316N, and 316P some sections carry a global cultures or cultural diversity flag)	3
or E 316M	American Literature	
or E 316N	World Literature	
or E 316P	Masterworks of Literature	
American and Texas government (some sections carry a cultural diversity flag)		6
American history (some sections carry a cultural diversity flag)		6
Social and behavioral science (some sections carry a global cultures and/or cultural diversity flag)		3

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Visual and performing arts (some sections carry a global cultures and/or cultural diversity flag)	3
UGS 302 First-Year Signature Course (in UGS 302 all sections carry writing flag; in UGS 303 some sections carry a writing flag)	3
or UGS 303 First-Year Signature Course	
Total Hours	1254

~~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 technical~~ level I technical electives in civil engineering are listed in areas of specialization. The ~~45~~ 18 semester hours of ~~level I technical~~ level I technical 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.

One, three hour course, from the approved list of Math/Science/Engineering Electives may be substituted for a technical elective. This course does not count towards the 3 different area breadth requirement. The current approved list is available in the departmental undergraduate office.

~~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~~ Technical 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 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 364, *Design of Wastewater and Water Treatment Facilities* (carries an independent inquiry flag)

Civil Engineering 369L, *Air Pollution Engineering*

Civil Engineering 369R, *Indoor Air Quality*

Civil Engineering 370K, *Environmental Sampling and Analysis*

Geotechnical Engineering

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

Civil Engineering 375, *Earth Slopes and Retaining Structures*

Structural Engineering

Architectural Engineering 345K, *Masonry Engineering*

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Architectural Engineering 362L, *Structural Design in Wood*
 Civil Engineering 331, *Reinforced Concrete Design*
 Civil Engineering 335, *Elements of Steel Design*
Civil Engineering 362M, *Advanced Reinforced Concrete Design* (carries an independent inquiry flag)
Civil Engineering 362N, *Advanced Steel Design* (carries an independent inquiry flag)
 Civil Engineering 363, *Advanced Structural Analysis*

Transportation Engineering
Civil Engineering 367G, *Design and Evaluation of Ground-Based Transportation Systems* (carries an independent inquiry flag)
 Civil Engineering 367P, *Pavement Design and Performance*
 Civil Engineering 367T, *Traffic Engineering Water Resources Engineering*
Civil Engineering 367R, *Optimization Techniques for Transportation Engineers*
 Civil Engineering 358, *Introductory Ocean Engineering*
Civil Engineering 365K, *Hydraulic Engineering Design* (carries an independent inquiry flag)
 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

First Year			
First Term	Hours	Second Term	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 performing arts (may be taken in any semester)	3
	16		16
Second Year			
First Term	Hours	Second Term	Hours

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C E 311K	3 C E 311S	3
E M 306	3 E M 319	3
M 427J or 427K	4 C E 319F	3
PHY 303L	3 C E 333T	3
PHY 103N	1 American history	3
American history	3	
	17	15

Third Year

First Term	Hours	Second Term	Hours
C E 324P	3	E M 311M or M E 320	3
Base level course	3	Base level course	3
Base level course	3	Base level course	3
Base level course	3	Base level course	3
E 316L, 316M, 316N, or 316P	3	Social and behavioral sciences or visual and performing arts (may be taken in any semester)	3
	15		15

Fourth Year

First Term	Hours	Second Term	Hours
Level II <u>Technical</u> elective	3	C E 4371P	3 <u>3</u>
Level II <u>Technical</u> elective	3	Level II <u>Technical</u> elective	3
Level II <u>Technical</u> elective	3	Level II <u>Technical</u> elective	3
Approved science elective	3	Level II <u>Technical</u> elective	3
American and Texas government	3	American government	3
		Approved math, science, or engineering science elective	3
	15		15 <u>16</u>

Total credit hours: ~~125~~124

¹ See <https://facultycouncil.utexas.edu/degree-program-changes> for detailed explanations.

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² Submit required Texas Higher Education Coordinating Board forms to the provost's office (lydia.cornell@austin.utexas.edu); downloadable from URL <https://facultycouncil.utexas.edu/theeb-forms>

³ **EXCLUSIVE:** of *exclusive* application and of primary interest only to a single college or school ("no protest" period is *seven calendar days*); **GENERAL:** of *general* interest to more than one college or school (but not for submission to the General Faculty) ("no protest" period is *fourteen calendar days*); *major* legislation must be submitted to the General Faculty for adoption ("no protest" period is *fourteen calendar days*).

⁴ The proposed text should be based on the text of the current catalog available at: <http://catalog.utexas.edu/undergraduate/>

Strike through and replace (with underlines) only the specific language to be changed. Do NOT use track changes, and do not include hyperlinks in the catalog copy. Submit form electronically to the Office of the General Faculty and Faculty Council at fc@austin.utexas.edu. For questions on completing this section, please contact Victoria Cervantes, vc@austin.utexas.edu, 471-5934 or Brenda Schumann, brenda.schumann@austin.utexas.edu, 475-

7654 .