

DOCUMENTS OF THE GENERAL FACULTY

**PROPOSED CHANGES TO THE BACHELOR OF SCIENCE IN PETROLEUM 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: July 24, 2015

College approval date: August 20, 2015 for all items

Dean approval date: September 25, 2015 for all items

PROPOSED NEW CATALOG TEXT:

BACHELOR OF SCIENCE IN PETROLEUM ENGINEERING

Energy is a key component to people's everyday lives. Petroleum engineers are able to address and solve important technology challenges that will lead to energy security and societal prosperity, so the position is in high demand. This challenging and rewarding field of engineering requires creative application of a wide spectrum of knowledge, including, but not limited to mathematics, physics, geology, and chemistry. Worldwide energy demand is growing, and experts agree that oil and gas will continue to play an important role in the world's energy supply. The decision making for complex projects falls to a great extent upon petroleum engineers, providing them with a high degree of responsibility. In addition, since hydrocarbon reserves are found in such diverse areas as Asia, South America, and Europe, petroleum engineers will have opportunities for exciting assignments all over the globe.

Petroleum engineers play a variety of roles within the energy business. They design and monitor the drilling of exploratory and development wells used to locate and produce the oil and gas from the subsurface. They work with technologies that can describe the characteristics of rocks deep beneath the surface and detect the type of fluids contained in those rocks. They install and maintain the equipment that lifts fluids from subsurface reservoirs to the surface, and they design surface collection and treatment facilities to prepare produced hydrocarbons for delivery to a refinery or pipeline. Hydraulic fracturing of shale gas and tight oil is the responsibility of a petroleum engineer, as is the development and implementation of enhanced oil recovery methods that capture stranded or bypassed hydrocarbons from old oilfields. In addition to these traditional petroleum engineering career choices, there are other emerging careers for petroleum engineering graduates in pollution clean-up, underground waste disposal (including the subsurface injection of carbon dioxide to reduce atmospheric greenhouse gases), and hydrology.

The objective of the petroleum engineering program is to graduate practical, qualified engineers who can successfully pursue careers in the oil and gas production and services industries or similar areas. Graduates of the program are expected to understand the fundamental principles of science and engineering behind the technology of petroleum engineering to keep their education current and to give them the capability of self-instruction after graduation. They should be prepared to serve society by using the ideals of ethical behavior, professionalism, and environmentally responsible stewardship of natural resources.

The technical curriculum contains the following elements:

- A combination of college-level mathematics and basic sciences (some with experimental work) that includes mathematics through differential equations, probability and statistics, physics, chemistry, and geology
- Engineering topics that develop a working knowledge of fluid mechanics, strength of materials, transport phenomena, material properties, phase behavior, and thermodynamics
- Petroleum engineering topics that develop competence in (1) design and analysis of well systems and procedures for drilling and completing wells; (2) characterization and evaluation of subsurface geological formations and their resources using geoscientific and engineering methods; (3) design and analysis of systems for producing, injecting, and handling fluids; (4) application of reservoir engineering principles and practices to optimize resource development and management; and (5) use of project economics and resource valuation methods for design and decision making under conditions of risk and uncertainty
- A major capstone design experience that prepares students for engineering practice, based on the knowledge and skills acquired in earlier coursework and incorporating engineering standards and realistic constraints

Portable Computing Devices

Students entering Petroleum Engineering are required to have access to a portable computing device capable of running programs suitable for use in the classroom and on the university wireless network. The use of this device will be necessary in many required courses, and individual instructors may require the device be brought to class or lab sessions. For a list of minimum system requirements see: <http://www.pge.utexas.edu/portabledevicereqs>.

Curriculum

~~Course requirements are divided into three categories: basic sequence courses, major sequence courses, 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 that fulfills one of the following requirements may also be counted toward core curriculum or flag requirements; 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 course with a 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 both writing flags are carried by courses specifically required for the degree; these courses are identified below. 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.~~

Courses used to fulfill technical and nontechnical elective requirements must be approved by the petroleum and geosystems engineering undergraduate adviser before the student enrolls in them.

Requirements

Hours

Basic Sequence Courses

Chemistry		
CH 301	Principles of Chemistry I (part II science and technology)	3
CH 302	Principles of Chemistry II	3
Petroleum and Geosystems Engineering		
PGE 301	Engineering, Energy, and the Environment	3
PGE 310	Formulation and Solution of Geosystems Engineering Problems	3
PGE 322K	Transport Phenomena in Geosystems	3
PGE 323K	Reservoir Engineering I: Primary Recovery	3
PGE 323L	Reservoir Engineering II: Secondary and Tertiary Recovery	3
PGE 326	Thermodynamics and Phase Behavior	3
PGE 333T	Engineering Communication (writing flag and ethics and leadership flag)	3
PGE 334	Reservoir Geomechanics	3
PGE 337	Introduction to Geostatistics	3
PGE 362	Production Technology and Design	3
PGE 365	Resource Economics and Valuation	3
PGE 368	Fundamentals of Well Logging	3
PGE 373L	Geosystems Engineering Design and Analysis	3
PGE 424	Petrophysics	4
PGE 427	Properties of Petroleum Fluids	4
PGE 430	Drilling and Well Completions	4
Chemistry		
CH 301	Principles of Chemistry I (part II science and technology)	3
CH 302	Principles of Chemistry II	3
Engineering Mechanics		
E M 306	Statics	3
E M 319	Mechanics of Solids	3
Geological Sciences		
GEO 303	Introduction to Geology	3
GEO 316P	Sedimentary Rocks	3
Mathematics		
M 408C	Differential and Integral Calculus (mathematics; quantitative reasoning flag)	4
M 408D	Sequences, Series, and Multivariable Calculus	4
M 427KJ or M427K	Advanced Calculus for Applications I Differential Equations with Linear Algebra (quantitative reasoning flag)	4
Petroleum and Geosystems Engineering		
PGE 301	Engineering, Energy, and the Environment	3
PGE 310	Formulation and Solution of Geosystems Engineering Problems	3
PGE 427	Properties of Petroleum Fluids	4
PGE 322K	Transport Phenomena in Geosystems	3
PGE 326	Thermodynamics and Phase Behavior	3
PGE 333T	Engineering Communication (writing flag and ethics and leadership flag)	3
Physics		
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
Rhetoric and Writing		
RHE 306	Rhetoric and Writing (English composition)	3
UGS 302	First Year Signature Course	3
or UGS 303	First Year Signature Course	
Major Sequence Courses		
Petroleum and Geosystems Engineering		
PGE 323K	Reservoir Engineering I: Primary Recovery	3
PGE 323L	Reservoir Engineering II: Secondary and Tertiary Recovery	3
PGE 424	Petrophysics	4
PGE 430	Drilling and Well Completions	4
PGE 334	Reservoir Geomechanics	3
PGE 337	Introduction to Geostatistics	3
PGE 362	Production Technology and Design	3
PGE 365	Resource Economics and Valuation	3
PGE 368	Fundamentals of Well Logging	3
PGE 373L	Geosystems Engineering Design and Analysis	3
Approved technical area electives		12
Remaining Core Curriculum Courses		
E 316L	British Literature (humanities) (<u>some sections carry a global cultures flag</u>)	3
or E 316M	American Literature (<u>some sections carry a cultural diversity flag</u>)	
or E 316N	World Literature (<u>some sections carry a global cultures flag</u>)	
or E 316P	Masterworks of Literature	
American and Texas government (<u>some sections carry a global cultures and/or cultural diversity flag</u>)		6
American history (<u>some sections carry a cultural diversity flag</u>)		6
Visual and performing arts (<u>some sections carry a global cultures and/or cultural diversity flag</u>)		3
Social and behavioral sciences (<u>some sections carry a global cultures and/or cultural diversity flag</u>)		3
<u>UGS 302</u>	<u>First-Year Signature Course (all sections carry a writing flag)</u>	<u>3</u>
or UGS 303	<u>First-Year Signature Course (some sections carry a writing flag)</u>	
Total Hours		128

Suggested Arrangement of Courses

		First Year			
	First Term	Hours	Second Term	Hours	
CH 301		3	CH 302	3	
GEO 303		3	M 408D	4	
M 408C		4	PHY 303K	3	
RHE 306		3	PHY 103M	1	
UGS 302 or 303		3	PGE 301	3	
			Social and behavioral sciences or visual and performing arts	3	
		16		17	

		Second Year			
First Term	Hours		Second Term		Hours
E M 306	3	E M 319			3
PHY 303L	3	PGE 322K			3
PHY 103N	1	PGE 333T			3
<u>M 427J or K</u>	4	GEO 316P			3
PGE 310	3	PGE 427			4
PGE 326	3				
	17				16
		Third Year			
First Term	Hours		Second Term		Hours
PGE 323K	3	PGE 323L			3
PGE 424	4	PGE 362			3
PGE 430	4	PGE 368			3
Social and behavioral sciences or visual and performing arts	3	American history			3
American government	3	Approved technical area elective			3
	17				15
		Fourth Year			
First Term	Hours		Second Term		Hours
PGE 334	3	E 316L, 316M, 316N, or 316P			3
PGE 337	3	PGE 373L			3
PGE 365	3	American history			3
Approved technical area elective	3	Approved technical area electives			6
American government	3				
	15				15
Total credit hours: 128					