

Bachelor of Science in Petroleum Engineering

B.S. in Petroleum Engineering Program

Petroleum engineering is the branch of engineering concerned with the drilling, recovery, production, and distribution of petroleum and natural gas. It includes knowledge of the properties of fluids and rocks in surface and subsurface environments as well as methods of exploiting the economic production of oil and gas from petroleum reservoirs. A major subdivision at KU is reservoir engineering, or the development of processes to improve production from oil and gas reservoirs. Reservoir engineers use sophisticated mathematical techniques and computer technology to obtain optimum production. Through such techniques, petroleum engineers continue to extract oil and gas from reservoirs that only a few years ago would have been considered uneconomical. This branch of engineering is somewhat different from the other in that production is far removed from physical observation.

The curriculum develops fundamental concepts that describe the properties of fluids and rocks in surface and subsurface environments. These are integrated with courses covering fluid flow in reservoirs along with drilling and production equipment to develop a broad understanding of how fundamental concepts are used to solve technical problems. The development of engineering design concepts begins with the application of fundamental principles and concepts to solve engineering problems in these courses and culminates in a series of senior-level design courses that require comprehensive integration of technical knowledge as well as consideration of economic, environmental, safety, and societal concerns. This experience is essential in the preparation of graduates for entry-level positions.

Professional Opportunities

Petroleum engineers search the world for reservoirs containing oil and natural gas. Once these resources are discovered, petroleum engineers work to understand the geologic formation and properties of the rock containing the reservoir, determine the drilling methods to be used, and monitor drilling and production operations. Petroleum engineers design equipment and processes to achieve the maximum profitable recovery of oil and gas. Petroleum engineers typically work for major oil companies, independent oil exploration, and production and service companies.

Undergraduate Admission to the School of Engineering

Admission to the KU School of Engineering and its degree programs is selective. Students may be admitted to an engineering or computer science degree program (<https://enr.ku.edu/admission-requirements/>) as freshmen (first-year) students, but all admissions, for both in-state and out-of-state students, are selective. Applications are judged on several factors, such as high school record, scores on national tests, academic record at college or university level, and trend of grades and more. High school transcripts are required.

Freshman Admission Standards to the School of Engineering

To be considered for admission to the School of Engineering, beginning freshmen (first-year) students must meet or exceed the following minimum standards:

- Must be admissible (<https://admissions.ku.edu/major-specific-requirements/>) to the University of Kansas by assured admissions or individual review, **AND**
- Have a 3.0+ high school GPA, **AND**
- Demonstrate mathematics preparedness by:
 - Obtaining a mathematics ACT score of 22+ (or math SAT score of 540+), OR
 - Achieving a B or better in college algebra or a more advanced mathematics course, OR
 - Achieving a C or better in a high school calculus course; OR
 - Earning credit via IB or AP credit for the above-mentioned courses in accordance with KU placement credit requirements; OR
 - Achieving at minimum a qualifying score for MATH 104 on the ALEKS mathematics placement exam.

Pre-Engineering

Students not admitted directly to the School of Engineering and their department but who are admissible to the university may be admitted to the College of Liberal Arts and Sciences as a pre-engineering student. They can later re-apply to the School of Engineering during the semester they are completing the admission requirements for current students at KU.

Transfer Student Admission Standards to the School of Engineering

Applications from all transfer students, whether from other institutions or from other academic schools at the University of Kansas, are evaluated on a case-by-case basis. Transfer students must:

- Be admissible (<http://admissions.ku.edu/apply/requirements/ustransfer/>) to KU, **AND**
- Earn a cumulative college transferable grade-point average of 2.5+, **AND**
- Earn a grade of C or better in MATH 125 (Calculus I, or its direct equivalent), **AND**
- Earn grades of C or better in math, science, and engineering courses applicable to the engineering degree.

Students must also complete their last 30 hours of credit at KU (<http://policy.ku.edu/governance/FSRR/#art4sect5>). For more information on transfer credits, see KU Undergraduate Admissions (<https://admissions.ku.edu/i-am/transfer/>).

Current Student Admission Standards to the School of Engineering

Students who are currently enrolled at KU, need to meet the following:

- Earn a 2.5+ KU GPA, **AND**
- Earn a grade of C or better in MATH 125 (Calculus I, or its direct equivalent), **AND**

- Earn a grade of C or better in all math, science, and engineering courses.

Current KU Students admitted to other academic units may apply to the School of Engineering by completing a Change of School form (<https://inowformsprivate.ku.edu/imagenowforms/fs/?form=OUR%20Change%20of%20School%20Form>). Per University Registrar deadlines for processing, Change of School applications each semester are processed up until the 20th day of classes. If received and processed after the 20th day of classes, students will be active in the new program the following semester.

Already Applied to KU, But Not Engineering?

Don't worry. It's not too late to change your mind if you've already applied to KU and selected a major outside the School of Engineering. If you think one of the 12 engineering or computer science majors is a better fit for your talents, you can still change your requested major — preferably before May 1 — and be considered for admission to the School of Engineering and all the benefits that go with it.

To update your application, visit Undergraduate Admissions (<http://admissions.ku.edu/update-your-application/>) and click on "Change application term, major, mailing address, and/or email address."

Please contact a member of our recruitment team (studyengineering@ku.edu), 785-864-3881, if you have any difficulty.

Application Deadlines For New Freshman and Transfer Applicants

November 1	Priority scholarship deadline for incoming freshmen.
December 1	Deadline to apply for the Self Engineering Leadership Fellows Program for incoming freshmen.
May 1	Enrollment Deposit due.
Last Friday in October	Deadline to submit Change of School applications for fall semester admission.
Last Friday in March	Deadline to submit Change of School applications for spring semester admission.

Bachelor of Science in Petroleum Engineering Degree Requirements

1. In order to progress to a junior year course (any C&PE course labeled 500 and above), a student must have earned a C# or better in the following courses: MATH 125, MATH 126, MATH 127, MATH 220, MATH 290; CHEM 130, CHEM 135 (CHEM 170/175 acceptable alternatives); EPHX 210 (PHSX 211 acceptable alternative), and PHSX 212. Honors versions of the listed courses would also be subject to the rule.

and C&PE 327 to progress to C&PE 511, C&PE 527, C&PE 528, C&PE 618, or C&PE 619.

3. A student in Petroleum Engineering must complete and earn a cumulative 1.8 grade-point average in C&PE 511, C&PE 527, C&PE 528, and C&PE 618 to progress to C&PE 625, C&PE 627, C&PE 617, or C&PE 628.

Code	Title	Hours
Core 34 General Education		
Select courses to meet Core 34 General Education requirements.		27
Mathematics Courses		
MATH 125 or MATH 145	Calculus I (Core 34: Math and Statistics (SGE)) ⁰³⁰ Calculus I, Honors	4
MATH 126 or MATH 146	Calculus II Calculus II, Honors	4
MATH 127 or MATH 147	Calculus III Calculus III, Honors	4
MATH 220 or MATH 221	Applied Differential Equations Applied Differential Equations, Honors	3
MATH 290 or MATH 291	Elementary Linear Algebra Elementary Linear Algebra, Honors	2
Basic Sciences		
CHEM 130 or CHEM 170 or CHEM 190 & CHEM 191	General Chemistry I Chemistry for the Chemical Sciences I Foundations of Chemistry I, Honors and Foundations of Chemistry I Laboratory, Honors	5
CHEM 135 or CHEM 175 or CHEM 195 & CHEM 196	General Chemistry II Chemistry for the Chemical Sciences II Foundations of Chemistry II, Honors and Foundations of Chemistry II Laboratory, Honors	5
EPHX 210 or PHSX 211 or PHSX 213	General Physics I for Engineers (Core 34: Natural and Physical Sciences (SGE)) ⁰⁴⁰ General Physics I General Physics I Honors	3
PHSX 216 or PHSX 213 or PHSX 114	General Physics I Laboratory (Core 34: Natural and Physical Sciences (SGE)) ⁰⁴⁰ General Physics I Honors College Physics I	1
PHSX 212 or PHSX 214	General Physics II General Physics II Honors	3
PHSX 236 or PHSX 214	General Physics II Laboratory General Physics II Honors	1
Petroleum Engineering Courses		
C&PE 127	Introduction to Petroleum Engineering Profession	1
C&PE 211	Material and Energy Balances	3
C&PE 325	Numerical Methods and Statistics for Engineers	3
C&PE 327	Reservoir Engineering	3
C&PE 511	Momentum Transfer	3
C&PE 519	Drilling Fluids Laboratory	1
C&PE 527	Reservoir Engineering II	3
C&PE 528	Well Logging	3
C&PE 640	Natural Gas Engineering	3
C&PE 617	Drilling and Well Completion	3
C&PE 618	Improved Oil Recovery	3

C&PE 619	Petroleum Engineering Laboratory	3
C&PE 624	Process Safety and Sustainability	3
C&PE 625	Unconventional Reservoirs	3
C&PE 641	AI and Machine Learning for Energy and Dynamic Systems	3
C&PE 642	New Energy Ventures	3
C&PE 627	Petroleum Production	3

Capstone Course

C&PE 628	Petroleum Engineering Design	3
----------	------------------------------	---

Engineering & Advanced Science Courses

ME 211	Statics and Introduction to Mechanics	3
GEOL 101 & GEOL 103	The Way The Earth Works and Geology Fundamentals Laboratory	5
GEOL 332	Sedimentology for Petroleum Engineers	4
GEOL 535	Petroleum and Subsurface Geology	4

Total Hours		128
--------------------	--	------------

Credit for Honors Courses: Honors versions of listed courses can also be used to satisfy degree requirements.

Credit for ROTC Courses: Only ROTC courses qualifying as engineering electives and humanities/social sciences may be used.

Plan of Study

Recommended enrollments are as follows, but may vary according to existing credits:

Freshman

Fall	Hours Spring	Hours
C&PE 127	1 CHEM 135 or 175	5
CHEM 130 or 170	5 MATH 126	4
MATH 125 (Core 34: Math and Statistics (SGE)) ^{030***}	4 GEOL 101	3
Core 34: English (SGE) ⁰¹⁰	3 GEOL 103	2
Core 34: Communications (SGE) ⁰²⁰	3 Core 34: English (SGE) ⁰¹⁰	3
16		17

Sophomore

Fall	Hours Spring	Hours
C&PE 211	3 C&PE 325	3
C&PE 327	3 C&PE 527	3
MATH 220 or 221	3 C&PE 528	3
MATH 290 or 291	2 MATH 127 or 147	4
EPHX 210 or PHSX 211 (Core 34: Natural and Physical Sciences (SGE)) ^{040***}	3 PHSX 212	3
PHSX 216 (Core 34: Natural and Physical Sciences (SGE)) ^{040***}	1 PHSX 236	1
15		17

Junior

Fall	Hours Spring	Hours
C&PE 511	3 C&PE 619	3
ME 211	3 C&PE 618	3

GEOL 332	4 C&PE 625	3
C&PE 642	3 C&PE 519	1
Core 34: Social and Behavior Science (SGE) ⁰⁵⁰	3 Core 34: Arts and Humanities (SGE) ⁰⁶⁰	3
	Core 34: Social and Behavioral Science (SGE) ⁰⁵⁰	3
16		16

Senior

Fall	Hours Spring	Hours
C&PE 627	3 C&PE 617	3
C&PE 640	3 C&PE 628 (Capstone)	3
GEOL 535	4 C&PE 624	3
Core 34: Arts and Humanities (SGE) ⁰⁶⁰	3 C&PE 641	3
Core 34: US Culture- Inst Des (SGE) ⁰⁷⁰	3 Core 34: Global Culture- Inst Des (SGE) ⁰⁷⁰	3
16		15

Total Hours 128

Notes:

* - This course is a Required major course and is also part of Core 34: Systemwide General Education. If this course is not taken to fulfill the Core 34:SGE requirement, it must be taken in place of elective hours.

** - This course is a Recommended Core 34: Systemwide General Education course. This specific course is not required but is recommended by the program's faculty.

*** - This course is a Required Core 34: Systemwide General Education course. This program is approved by the Kansas Board of Regents to require this specific Core 34: Systemwide General Education course. If a student did not take this course it must be taken in addition to other degree requirements.

At the completion of this program, students will be able to:

- Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- An ability to communicate effectively with a range of audiences.
- Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- Acquire and apply new knowledge as needed, using appropriate strategies.

Departmental Honors

Students wishing to receive Departmental Honors in Chemical and Petroleum Engineering must apply to the Department in writing by September 1st for a December graduation or February 1st for a May graduation. The criteria for Departmental Honors are:

1. A cumulative 3.5 GPA in courses taken at KU
2. A cumulative 3.5 GPA in engineering courses taken at KU
3. Completion of an experience or an achievement that is deemed worthy of Departmental Honors. Examples of achievements include (not limited to):
 - a. Completion of 3 hours of C&PE 661 (Honors research) or equivalent with an A or B
 - b. Completion of Senior Thesis
 - c. Co-author on a publication – may require research advisor verification
 - d. Presentation at a National Conference – may require research advisor verification
 - e. Receiving an award for scholarly work – may require research advisor verification

The application must include:

- Completed application form
- Approximately 200-500 word statement of the achievement or experience that is worthy of Departmental Honors.

A departmental committee will review all applications and make the final decision on the awarding of Departmental Honors. Some applications may require verification from the research advisor. Students awarded Departmental Honors will be recognized at the end of the year banquet.