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.

Educational Objective

The objective of the program is to prepare graduates for professional practice in industry, government, or post-undergraduate training in petroleum engineering and other related disciplines.

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. They 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 (http://engr.ku.edu/sites/engr.drupal.ku.edu/files/docs/pdfs/Majors_and_Curriculum_Guide_2014_Online.pdf) 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 and ACT scores (or equivalent SAT scores) are required.

Minimum Academic Standards for Admission

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

- Must be admissible (http://admissions.ku.edu/apply/requirements/usfreshmen) to the University of Kansas by assured admissions or individual review AND
- Have a 3.0+ GPA AND
- Have a mathematics ACT score of 22 (or math SAT score of 540).

Important: Simply meeting these requirements won’t guarantee admission to a School of Engineering degree program. Students who perform beyond these minimums will have a better probability of being admitted to their selected major.

Minimum Academic Standards for Direct Admission into Degree Program for incoming Freshmen

Students with a 26+ Math ACT (600+ Math SAT) or meet eligibility requirements for MATH 125 (Calculus I) (http://catalog.ku.edu/liberal-arts-sciences/math/#undergraduatetext) may be admitted directly into their chosen major, with the exception of those seeking admission into an EECS program. Electrical Engineering, Computer Science, Computer Engineering, and Interdisciplinary Computing students must have a 28+ Math ACT (640+ Math SAT) or eligibility for MATH 125 for direct admission.

First-Year General Engineering Program

Students with a 22-25 Math ACT (540-580 Math SAT) or meet eligibility requirements for Math 104 (Pre-Calculus) (http://catalog.ku.edu/liberal-arts-sciences/math/#undergraduatetext) are admitted to the School of Engineering First-Year Experience non-degree program for undergraduate students.

First-year Engineering students have one academic year (two semesters and one summer) to transition into a degree program. Admission to a degree program is possible after one of the following is met:

- Complete 12+ credit hours at KU, earn a “B” or higher in Math 104 (Pre-Calculus), earn a “C” or higher in all science and engineering courses, and earn a KU GPA of 2.5+ OR
- Earn a “C” or better in MATH 125 (Calculus I), earn a “C” or better in all science and engineering courses, and earn a KU GPA of 2.5+

Exploring Engineering

Students not admitted directly to the School of Engineering or their major but who are admissible to the university may be admitted to the College of Liberal Arts and Sciences as an Undecided student. They can later re-apply to the School of Engineering during the semester they are completing the admission requirements for transfer students.

Transfer Admission Standards

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 have a cumulative college transferable grade-point average of 2.5+ to be
considered. In addition, students must have grades of "C" or better in those courses in math (must include MATH 125 Calculus I or equivalent), science, and engineering applicable to the engineering degree.

Students interested in the Information Technology program are admitted as juniors. They must have completed 60 hours of pre-requisite courses including foundational courses in math, science, and computer science and have a 2.5+ cumulative GPA or better. The Information Technology program resides at the Edwards Campus in Overland Park, KS. Click here (http://edwardscampus.ku.edu/overview-bachelors-information-technology) for more information.

Current KU Students admitted to other academic units may apply to the School of Engineering by completing a Change of School form (http://engineering.ku.edu/forms). This must be turned in to the School of Engineering Dean's Office by the appropriate deadlines indicated below.

### 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

<table>
<thead>
<tr>
<th>Semester</th>
<th>Applicants</th>
<th>Deadline</th>
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<tbody>
<tr>
<td>September 15</td>
<td>Priority deadline for current KU students to apply for spring admission to Engineering.</td>
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<tr>
<td>November 1</td>
<td>Final deadline for scholarship consideration for incoming freshmen planning to enter in fall or summer semesters.</td>
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<tr>
<td>December 1</td>
<td>Final deadline to apply for the Self Engineering Leadership Fellows Program for incoming freshmen</td>
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<tr>
<td>February 1</td>
<td>Final deadline for scholarship consideration for transfer students planning to enter in fall or summer semesters. Applications available for the Engineering Learning Community</td>
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### General Education Requirements

The KU Core is the university-wide curriculum that all incoming undergraduate students will complete as part of their degree requirements. It comprises three general education goals and three advanced education goals. Associated with each goal are one or more learning outcomes:

- GE 1.1, Goal 1, Outcome 1, Critical Thinking;
- GE 1.2, Goal 1, Outcome 2, Quantitative Literacy;
- GE 2.1, Goal 2, Outcome 1, Written Communication;
- GE 2.2, Goal 2, Outcome 2, Oral Communication;
- GE 3H, Goal 3, Outcome 1, Arts & Humanities;
- GE 3N Goal 3, Outcome 2, Natural Sciences;
- GE 3S Goal 3, Outcome 3, Social Sciences;
- AE 4.1, Goal 4, Outcome 1, Diversity;
- AE 4.2 Goal 4, Outcome 2 Culture;
- AE 5.1, Goal 5, Outcome 1, Social Responsibility & Ethics (course);
- AE 5.2, Goal 5, Outcome 2, Social Responsibility & Ethics (practice);
- AE 6.1, Goal 6, Outcome 1 and 2, Integration & Creativity.

Details of the KU Core can be found at kucore.ku.edu. Some required courses in the Petroleum Engineering curriculum satisfy a KU Core goal and/or outcome. For these courses, the goal/outcome code is given in parentheses after the course on the pages below. Where required courses do NOT specially satisfy KU Core goals (GE 2.2, GE 3H, GE 3S, AE 4.1, AE 4.2, AE 5) students must choose from a list of several courses to satisfy each of the required goals.

### Plan of Study

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

#### Freshman

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours Spring</th>
<th>Hours</th>
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<tbody>
<tr>
<td>C&amp;PE 117</td>
<td>1 C&amp;PE 127</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 130 or 170 (KU Core GE 3N)</td>
<td>5 CHEM 135 or 175 (KU Core GE 3N)</td>
<td>5</td>
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<tr>
<td>MATH 125</td>
<td>4 MATH 126</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 101 (KU Core GE 2.1)</td>
<td>3 ENGL 102 (KU Core GE 2.1)</td>
<td>3</td>
</tr>
<tr>
<td>KU Core GE 3S</td>
<td>3 GEOL 101</td>
<td>3</td>
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<td><strong>16</strong></td>
<td></td>
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</table>

#### Sophomore

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours Spring</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>C&amp;PE 217</td>
<td>2 C&amp;PE 327</td>
<td>4</td>
</tr>
<tr>
<td>C&amp;PE 219</td>
<td>1 C&amp;PE 325</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>3 ME 312</td>
<td>3</td>
</tr>
<tr>
<td>MATH 290</td>
<td>2 MATH 127</td>
<td>4</td>
</tr>
<tr>
<td>PHSX 210 (KU Core GE1.1)</td>
<td>3 PHSX 212</td>
<td>3</td>
</tr>
<tr>
<td>PHSX 216</td>
<td>1 PHSX 236</td>
<td>1</td>
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Bachelor of Science in Petroleum Engineering Degree Requirements

A student must have an average GPA for the highest grade earned in ME 312 (or C&PE 221) and C&PE 327 of at least 2.0 to be eligible for the junior year courses: C&PE 527 and 528.

A student must attain a cumulative grade-point average of at least 2.0 in required C&PE courses taken at KU through the junior year before being admitted to senior-level courses.

A student must attain a cumulative grade-point average of at least 2.0 in C&PE courses taken at KU for graduation with a B.S. degree in chemical or petroleum engineering.

A total of 133 hours is required, as follows:

Petroleum Engineering Science (25)

- C&PE 117 Energy in the Modern World 1
- C&PE 127 Introduction to Petroleum Engineering Profession 1
- C&PE 217 Introduction to Petroleum Drilling Engineering 2
- C&PE 219 Drilling Fluids Laboratory 1
- C&PE 325 Numerical Methods and Statistics for Engineers 3
- ME 312 Basic Engineering Thermodynamics 3
- C&PE 327 Reservoir Engineering 4
- C&PE 511 Momentum Transfer 3
- C&PE 521 Heat Transfer 3
- C&PE 527 Reservoir Engineering II 4

Design and Integrating Courses (24)

- C&PE 522 Economic Appraisal of Chemical and Petroleum Projects (* may satisfy KU Core AE5, see kucore.ku.edu) 2
- C&PE 528 Well Logging 3
- C&PE 617 Drilling and Well Completion (* may satisfy KU Core AE5, see kucore.ku.edu) 3
- C&PE 618 Secondary Recovery 4
- C&PE 619 Petroleum Engineering Laboratory I 3
- C&PE 625 Unconventional Reservoirs 3
- C&PE 627 Petroleum Production 3
- C&PE 628 Petroleum Engineering Design (KU Core AE 6) 3

Engineering Science Electives (12)

- ME 211 Statics and Introduction to Mechanics 3
- Basic Science or Engineering Elective 3
- Engineering Elective 6

Basic Sciences (31)

- CHEM 170 Chemistry for the Chemical Sciences I (KU Core GE 3N) 5
- or CHEM 130 General Chemistry I 5
- CHEM 175 Chemistry for the Chemical Sciences II 5
- or CHEM 135 General Chemistry II 5
- PHSX 210 General Physics I for Engineers (KU Core GE 1.1) 3
- PHSX 216 General Physics I Laboratory 1
- PHSX 212 General Physics II 3
- PHSX 236 General Physics II Laboratory 1
- GEOL 101 & GEOL 103 The Way The Earth Works and Geology Fundamentals Laboratory 5
- GEOL 331 Sedimentology and Stratigraphy (GEOL 591 topic must be equivalent) 4
- or GEOL 591 Topics in Geology: _____ 4
- GEOL 535 Petroleum and Subsurface Geology 4

Mathematics Courses (17)

- MATH 125 Calculus I 4
- MATH 126 Calculus II 4
- MATH 127 Calculus III 4
- MATH 290 Elementary Linear Algebra 2
- MATH 220 Applied Differential Equations 3

General Education Component (24)

Students with an initial term of Fall 2014 or later must meet the minimum requirements of the KU Core. Learn more about KU Core requirements at http://kucore.ku.edu.

- ENGL 101 Composition (KU Core GE 2.1) 3
- ENGL 102 Critical Reading and Writing (KU Core GE 2.1) 3
- ENGL 203 Topics in Reading and Writing: _____ (Topic: Technical Writing for Engineers (Goal 3H)) 3
- COMS 130 Speaker-Audience Communication (KU Core GE 2.2) 3
- KU Core GE 3S (Social Science) 3
- KU Core AE 4.1 (Human Diversity) 3
- KU Core AE 4.2 (Global Awareness) 3
- KU Core GE 5.1 (Ethics ) 3
Credit for ROTC Courses

Only ROTC courses qualifying as engineering electives and humanities/socail sciences may be used.

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, in the Commencement Program, and on the University transcript.