

Academic Advising Handbook

Department of Chemical & Petroleum Engineering

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Academic Advising Handbook

Department of Chemical & Petroleum Engineering
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I. SUMMARY

Academic Advising is an integral part of your development as a chemical or petroleum engineer. We feel that it is an important part of our responsibility to assist you in meeting your academic and professional goals. This advising manual provides much of the information that you will need to get the most out of your academic advising sessions. Please review it often as it provides answers to many of the questions typically asked by students.

The development of your academic Plan of Study is done under the guidance of advisors in partnership with you. For this to be successful, you should be open with your advisors about your capabilities, goals and problems.

Our department has an Academic Support Officer who will work with you to understand KU's requirements, as well as each requirement for your intended major. Ideally, you should meet with our Academic Support Officer as you begin the major. She will help you plan your academic program to graduate in Chemical or Petroleum Engineering within the time frame that you select, and insure that you do not take unnecessary courses. Our Academic Support officer is a good resource for information about major requirements, KU requirements, and outside offices such as Study Abroad or Career Services. You may also meet with the Academic Support Officer to declare an emphasis, or for assistance with any forms you might need.

In addition, every student in Chemical and Petroleum Engineering is assigned a faculty advisor. The name of your faculty advisor is sent to each student in an email, and is also available at the C&PE front desk. Each advisor knows the curriculum, is familiar with the elective courses. Your faculty advisor is an excellent resource for discussing the contents of your courses, possible internships, and questions specific to Engineering as a discipline.

Our goal is for you to have the same faculty advisor throughout your study with us. Assuming that you stay in our program, that your advisor stays in our program, and that you are satisfied with the advice, we intend for you to keep that advisor. You may ask to change advisors. You may request this through the Academic Support Officer. We do try to keep the advising load balanced among all advisors. Occasionally, we will not be able to honor a specific request, but we almost always can move an advisee to a new advisor.

You must see your faculty advisor twice per year during the University advising period. Your advisors are also available throughout the academic year to consult with you on academic, professional and, when qualified, personal matters.

You are responsible for scheduling an appointment with your faculty advisor during the University Advising Period. Your advisor will email you instructions prior to the advising period. The School of Engineering places an enrollment hold on **every student** to be sure that all students receive advising—until you are advised, you will be unable to enroll.

“You are responsible for scheduling an appointment with your faculty advisor during the University Advising Period. Your advisor will email you instructions prior to the advising period.”

Prior to enrollment advising, you will be notified about how to schedule your appointment with your Advisor. At least 30 minutes will be required for this session. For your appointment, you should already know what courses you need to take for the upcoming semester. The Academic Support Officer can help you with this prior to your faculty appointment if you need assistance. You will need to arrive for your faculty advising appointment with a **recent copy of your DPR** and your completed **Enrollment Advising Form**. Your advisor will already have your folder, and will also make a record of your meeting in the KYou portal for future reference.

Once you and your faculty advisor have discussed your progress, reviewed your Plan of Study, and signed your enrollment form, you will turn in the form at the front desk. Our Academic Support Officer will release the ‘Advising Hold’ electronically within one day **during the official advising period**. **After the advising period is over, the advising hold is only released once per week, at most**. Once your hold is released you will be free to enroll online from any internet accessible computer. We advise you to enroll in the courses agreed to between you and your advisor, but we recognize that you are responsible for your plan of study.

We encourage you to seek advice, as you need it, throughout the year. We are here to help you meet your academic goals.

When you need to add or drop courses, you should see an advisor. Please do not wait to the last minute of an Add/Drop Period to see your advisor. She or he may not be available at that instant.

Academic Support Officer

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Faculty Advisors

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III. MISSION STATEMENTS

A. *Chemical Engineering Program*

1. **Mission Statement**

The overall program mission for the B.S. degree in chemical or petroleum engineering is to provide a modern chemical or petroleum engineering education with proper balance between theory and practice. Graduates are prepared for professional practice in industry or government and for post-undergraduate training in chemical or petroleum engineering, medicine, etc. In addition to scientific and engineering training, students receive training in educational skills and in the humanities and social sciences.

2. **Program Statement**

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

3. **Program Outcomes (Goals)**

- Students must develop the ability to apply basic and engineering sciences to identify, formulate, and solve chemical engineering problems.
- Students must display an ability to integrate and apply knowledge to solve complex problems, including the design of experiments and processes, interpretation of data/results and modification of the design based upon interpretation of data/results.
- Students must be able to develop responsible solutions to the professional and ethical situations in which they may find themselves in practice.
- Students must be able to evaluate the potential risks, i.e. consequences and probabilities of engineering solutions which may affect society and the environment.
- Students must demonstrate proficiency in the use of computer software such as spreadsheets, mathematics packages, word processors, and graphics in solution of engineering problems.
- Students must develop effective oral, written, and interpersonal communication skills.
- Students must learn how to work and interact effectively in groups/teams which have diverse personalities, cultures, and backgrounds.
- Students must demonstrate the ability to learn independently and be introduced to the necessity for life-long learning.

- Students must demonstrate thorough grounding in chemistry and a working knowledge of advanced chemistry selected as appropriate to the goals of the program (AIChE Program Criteria).
- Students must demonstrate a working knowledge of chemical engineering principles including material and energy balances applied to chemical processes; thermodynamics of physical and chemical equilibria; heat, mass, and momentum transfer; chemical reaction engineering; continuous stage-wise operations; process dynamics and control; process design; safety and environmental aspects and appropriate modern experimental and computing techniques.

B. *Petroleum Engineering Program*

1. Mission Statement

The overall program mission for the B.S. degree in chemical or petroleum engineering is to provide a modern chemical or petroleum engineering education with proper balance between theory and practice. Graduates are prepared for professional practice in industry or government and for post-undergraduate training in chemical or petroleum engineering, medicine, etc. In addition to scientific and engineering training, students receive training in educational skills and in the humanities and social sciences.

2. Program Statement

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

Program Objectives

- Graduates must have demonstrated thorough grounding in geology including structural and sedimentary geology, chemistry, mathematics and physics; thorough grounding in the basic engineering sciences including statistics and dynamics, circuits, strength of materials, thermodynamics, material and energy balances, heat transfer, and fluid mechanics; working knowledge of reservoir engineering, production and well completion engineering, modern drilling practices, well logging, economic analysis, water flooding and reservoir simulation, and appropriate modern experimental and computing techniques.
- Graduates must be able to function on multi-disciplinary teams and communicate effectively through active listening and verbal, written, and graphic expression.
- Graduates must understand the importance of professional responsibility and high ethical standards; must have a knowledge of contemporary issues; must possess a broad education necessary to understand the impact of engineering solutions in a global/societal context; and must have a recognition of the need for and an ability to engage in life-long learning.

3. Program Outcomes (Goals)

- Students must develop the ability to apply basic and engineering sciences to identify, formulate, and solve petroleum engineering problems.

- Students must display an ability to integrate and apply knowledge to solve complex problems, including the design of experiments and processes, interpretation of data/results and modification of the design based upon interpretation of data/results.
- Students must be able to develop responsible solutions to the professional and ethical situations in which they may find themselves in practice.
- Students must be able to evaluate the potential risks, i.e. consequences and probabilities of engineering solutions which may affect society and the environment.
- Students must demonstrate proficiency in the use of computer software such as spreadsheets, mathematics packages, word processors, and graphics in solution of engineering problems.
- Students must develop effective oral, written, and interpersonal communication skills.
- Students must learn how to work and interact effectively in groups/teams which have diverse personalities, cultures, and backgrounds.
- Students must demonstrate the ability to learn independently and be introduced to the necessity for life-long learning.
- Students must demonstrate competency in mathematics through differential equations, probability, and statistics; fluid mechanics; strength of materials; and thermodynamics.
- Students must demonstrate competency in petroleum engineering including design and analysis of well systems, procedures for drilling and completing wells, characterization and evaluation of subsurface geological formations, design and analysis of systems for producing, injecting and handling fluids; application of reservoir engineering principles and practices for optimizing resource development and management; use of project economics and resource valuation methods for design and decision making under conditions of risk and uncertainty.

IV. GENERAL ADVISING TOPICS

A. *Responsibilities*

1. **Advisee**

You are responsible for your course of study and the fulfillment of the graduation requirements. Before you can enroll, the University requires you to acknowledge that you are responsible.

It is your responsibility to keep your academic plan up to date. The Academic Support Officer can assist you with this. Review your plan regarding current enrollment for upcoming semesters.

2. **Advisor**

Your advisors are responsible for being available to meet your needs. They are there to provide advice on courses, course sequences, electives and planning. Advisors should schedule sufficient time to address your questions and, when necessary, provide insight into other aspects of your professional development. Your advisors can help you develop insight into your capabilities, goals and desires and to provide assistance to you in meeting these subject to your capabilities. However, she or he is only an advisor.

B. *Folder*

The Department keeps an academic folder for each student. Contained therein are:

- A record of enrollment advising appointments, initialed by you and your advisor
- A record that documents notes, agreements, acknowledgements and drops made by you if you consulted with your advisor when you dropped courses
- A suggested semester by semester sequence of courses
- Your Plan of Study

The record of courses should be kept current as you progress through the curriculum. While it should be consistent with the DPR, there may be differences due to your individualized course of study. Differences, however, should be reconciled prior to the Application for Degree is filed.

C. *Timing*

You must see your faculty advisor twice per year during the University advising periods. These two periods roughly coincide with the first two weeks after Fall Break in October and the first two weeks after Spring Break. **Prior to enrollment advising**, you will be notified about how to schedule your appointment with your Advisor.

We require that you meet with your faculty advisor so that she or he can review your academic progress, discuss your performance during the current semester, plan future semesters and assist in your selection for specific courses for the coming semester and, potentially, summer session. **You should know prior to your appointment what courses you should enroll in**, using your Plan of Study. You will fine-tune your schedule with your faculty advisor. If you need assistance getting prepared for faculty advising, contact the Academic Support Officer.

Advising is not complete until your faculty advisor signs your advising form and you bring the department your signed advising form. We will make a copy of the form for you, and file the original in your academic folder.

Appendix H of this Handbook is our enrollment form. A copy of this form, with classes already filled out, should be brought to your faculty advising time. This form will be signed by you and your faculty advisor and becomes a record of your advising session. The School of Engineering has imposed an 'Advising Hold' on your enrollment. You will not be able to enroll until this hold is released by the Academic Support Officer. When you turn in your form at the front office, staff will record that you have been advised, typically by copying your enrollment form.

The Academic Support Officer will then release the hold within one day after you return your form *during the faculty advising period*. Release may take longer outside this time frame.

At a time convenient to you, you sign on to the enrollment website and enroll. While you may enroll in any course you wish, subject to prerequisites, you should enroll in the courses on your enrollment form.

D. Planning

Planning the course of study is an important part of the advising process. For most students, the following guide for planning has been found to be helpful.

Advising for Enrollment

First Semester program
Second Semester Freshman
First Semester Sophomore
Second Semester Sophomore
Fall Semester Junior

Plan Through

(with Academic Support Officer) full Plan of Study
Second Semester Sophomore
First Semester Junior
Second Semester Junior
To Graduation

You and your advisor should review your plan during each advising period, verify that adherence to the plan will result in graduation and modify the plan as necessary.

Planning is intended to be a flexible guide to assist you in evaluating your progress toward graduation.

You and your advisor must take the time each advising period to review the plan. Failure to do so could result in delays in graduation.

Preparation of your Plan of Study is to be done for all classes. When you are unsure of what electives you might take in the future, you still must plan when you will take them. They can generically be shown as KU Core, Chem Elect (Chemistry Elective), Engr (Engineering Elective). By so doing, you will have reserved a course slot in that future semester for an elective. We recommend that the advisor actually fill out the planning form in the advising packet subject to your counsel.

E. 'Sixty-Hour' Guideline

The faculty have developed the chemical & petroleum engineering curricula with the proviso that students following these are well-prepared in the prerequisites, do not have substantial commuting time (i.e., are resident in Lawrence), do not have part-time job and/or do not have substantial extracurricular responsibilities.

For those who must or want to work at a part-time job, for those with extracurricular time responsibilities and/or for those with substantial commuting times, we recommend the following 60-hour guideline (with needed adjustments depending on some special situations noted below):

The number of productive hours per week for a student is 60. Subtract from this the number of hours per week required for the job, extracurricular activity and/or commuting. Take the remainder and divide by 3.

This gives the absolute **maximum** number of hours for enrollment. For example, if a student must work 20 hours per week, the **maximum** number of hours for enrollment should be $(60-20)/3 = 13$ credit hours.

This formula **over-estimates**, however, the maximum number of hours when any of the following apply:

1. The foundation in the prerequisite material is weak, e.g. a D in an earlier class such as Mass Transfer when enrolling in Design I;
2. A substantial number of hours to enroll in are junior/senior level, e.g. Fall Junior Year with 8 hours of junior-level chemical engineering courses;
3. A large percentage of the hours to be enrolled in are engineering courses, e.g. Spring Junior Year with 10 hours of chemical engineering courses;
4. The number of contact hours is larger than the number of credit hours, e.g. C&PE 626 with 9 contact hours for 3 credit hours;
5. Commuting time to the part-time job is substantial, e.g. from Lawrence to Johnson County; or,
6. Preparation time for work is extraordinary, e.g. a part-time job where the dress code is not student casual.

With respect to items 1 through 3, students should consider using a divisor of 4 instead of 3. This is in recognition that the number of extra hours required outside of the classroom increases with weak preparation or higher-level courses. With respect to items 4 through 6, students should consider subtracting these extra hours from 60 as well as the number of hours required for work or outside activities.

With the recommended cap on the maximum hours, the plan of study will, in all likelihood, span five academic years rather than the normal four years. While some students may be able to handle more commitments than others, the faculty experience indicates that, for most students, ignoring this guideline will result in lower grades and a weaker foundation in the prerequisite material for subsequent courses. This may result in decreased opportunities upon graduation.

Your advisor will assist in modifying your plan of study to meet your individual needs.

F. Advising Session

You and your advisors will develop an individualized approach to your interaction. The general sequence of an advising session is:

- Review current academic progress and previous semester grades
- Review and modify your plan of study
- Discuss courses for the coming semester
- Address any questions, concerns and problems.

You will be contacted each semester via email regarding the advising process. You must sign up in advance. This session usually requires at least ½ hour. Please plan for this.

G. Add/Drop Periods

The University has set three different periods during the course of a semester for adding and dropping courses. These roughly correspond to one third of the semester each. You should look at the University Calendar found on the KU website to find out the beginning/ending dates for each period in any given semester.

The University has specific rules for adding courses. Please consult the KU website.

Dropping courses can be done any time during the first sixty days of the semester. However, the restrictions and implications change as the semester progresses.

During the first Drop Period (See the University Registrar Calendar for the exact date in any given semester), you may drop a class without the course appearing on your transcript. (We encourage consultation with your advisor.)

During the second Drop Period which lasts through the sixtieth day, you may drop a class with your advisor's agreement. However, the instructor of record must assign a W (Withdraw) grade. The W will appear on your transcript as part of your permanent record, but it does not contribute to your GPA (Grade Point Average).

After the first 60 days of the semester, you may no longer drop a course.

On-line drop and add procedures are fluid as the University develops this system. You may actually be able to drop or add a class without seeing your advisor. We encourage you to see him or her, however. Your advisor will review your plan and assess the impact on your Plan of Study. The online system may have a 'Drop Hold' added that will need release before you can officially drop a course.

H. Prerequisites

The Chemical and Petroleum Engineering course sequences are tightly woven. **You are responsible for being aware of and adhering to all pre-requisites, which can be checked online via the KU Course Catalog (<http://catalog.ku.edu>)** Each course depends upon you learning the knowledge and skills in the prerequisite courses. Should you fall behind developing this foundation, we advise you stop and re-take the course. However,

you must understand that this will likely result in an additional year of study. You may not take a chemical or petroleum engineering course without having successfully completed the prerequisite requirements.

I. Success in Chemical Engineering and Material & Energy Balances

If you earn a D in C&PE 211 (Material & Energy Balances) and then do not retake the course, the likelihood that you will graduate in Chemical Engineering is very small. Therefore, the faculty strongly recommend you retake C&PE 211 if you earn a D and want to graduate in Chemical Engineering.

V. CURRICULUM

A. General Requirements

1. Requirements for the Bachelor of Science Degree

The requirements for graduation are spelled out in the Undergraduate Catalog of the university. The Undergraduate Catalog is the official document of record and takes precedence over this handbook.

The Department of Chemical and Petroleum Engineering imposes these additional requirements:

- ChE students must earn a combined GPA of 2.0 in C&PE 211 and C&PE 221 to progress to junior year courses. PetE students must earn a combined GPA of 2.0 in C&PE 217 and C&PE 327 to progress to junior year courses. The best grade earned will be used to calculate this GPA.
- A student must attain a cumulative grade-point average of at least 2.0 in 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.

The School of Engineering imposes the following additional requirements.

- A student must attain a cumulative grade-point average of at least 2.0 in the courses applied toward the degree. A student must also have a KU cumulative grade-point average of 2.0 whether or not all courses are being applied to the degree.
- A student also must attain a cumulative grade-point average of at least 2.0 in all courses taken in the School of Engineering, including courses not applied toward a degree.
- A student entering with advanced standing must attain a cumulative grade-point average of at least 2.0 in the resident courses applied toward the degree and at least a 2.0 in all courses taken in the School of Engineering.
- A student must be officially enrolled in the School of Engineering while completing the last 30 hours of credit toward the degree.

2. Courses of Study

The coursework required for the Bachelor of Science options in Chemical Engineering and Petroleum Engineering is included in the curriculum guide in the Appendix.

There are two principal programs: Chemical Engineering and Petroleum Engineering. Within Chemical Engineering, there are five options: General, Biomedical, Premedical, Environmental and Petroleum. These options provide suggested electives. In addition, Chemical Engineering has a Co-op Program. Any of the five options can be coupled with the Co-op Program.

The suggested courses for each semester are indicated. Although there is some flexibility when elective courses are taken, most CPE courses are offered only in the semester indicated.

3. Mathematics

A minimum of fifteen (15) hours of mathematics through differential equations is required.

You have two options in meeting mathematics requirements.

The first consists of MATH 121 - Calculus I (5), MATH 122 - Calculus II (5), MATH 223 - Vector Calculus (3), MATH 290 - Elementary Linear Algebra (2) and MATH 320 or MATH 220- Elementary Differential Equations (3). This is Math Option A on the advising forms.

The second option consists of MATH 121 - Calculus I (5), MATH 122 - Calculus II (5), MATH 220 - Applied Differential Equations (3), and MATH 290 - Elementary Linear Algebra (2). This is Math Option B on the advising forms. If you choose this option and are a chemical engineer, you are required to take an additional 3 credit hours in mathematics, science, engineering, humanities or social sciences (MSEHS elective). This elective is specified in the Chemical Engineering Biomedical, Premedical and Petroleum options. If you choose this option and are a petroleum engineer, you are required to take an additional 3 credit hours in mathematics.

Your selection of your mathematics option is up to you. MATH Option A covers linear algebra and multivariable calculus and is chosen by students who want to continue develop mathematical skills from the traditional classical viewpoint. Math Option B has an engineering applications approach and is, therefore, narrower in breadth than the MATH Option A.

While the Chemical Engineering – Biomedical, Chemical Engineering - Premedical and Chemical Engineering – Petroleum curricula show the Math Option B, this is not a requirement. You may select the other but the number of hours for graduation increases by three (3).

Transfer students may have fulfilled the course requirements but may be short on hours. In this case, an additional mathematics course must be taken. MATH 526, Probability and Statistics (3 credits) is often used for this purpose. MATH 465, Probability and Statistics for Engineers, is also recommended. Other mathematics courses numbered 500 and above are acceptable.

Substitution of basic science courses to meet the minimum mathematics requirement is not permitted.

Students may qualify for retroactive credit in mathematics by completing the second course in a sequence with a grade of "C" or better. Students passing MATH 122 or MATH 142 with an A, B, or C may receive credit for MATH 121 by contacting the Mathematics Department.

MATH 115 and MATH 116 count as the equivalent of MATH 121.

4. Basic Sciences

A minimum of 18 hours of basic sciences including calculus based physics and chemistry through qualitative analysis (CHEM 175) is required. If you are short credit hours because physics or chemistry taken at another institution does not have the same number of hours as at KU, you may make up the required credit hours with any natural science class or excess Advanced Chemistry hours.

If you have taken non-calculus based physics courses such as PHSX 114 and 115, you may complete the physics requirements by enrolling in PHSX 201 for 1.0 credit hour. For this 1.0 credit hour, you must complete the lecture part of the course. You need not complete the laboratory part.

5. General Education - The KU Core

Students whose start date is Fall 2013 or later must complete all requirements in the KU Core to graduate. For an in depth guide to these requirements, visit their website at kucore.ku.edu. Many of the courses in your major count towards the KU Core and require you to complete no additional coursework. Others will be fulfilled by choosing coursework from the list of courses provided.

Goal 2, Learning Outcome One, of the KU Core requires six hours of university coursework during the first two years, at least three hours of which require inquiry-based writing. You must enroll in the appropriate English course in your first semester at KU and maintain continuous enrollment in appropriate English courses, whether these are Applied English Center courses or regular English courses, until you have completed the core requirement. If you are exempt from ENGL 101 this will satisfy the first of your Goal 2 Learning Outcome 1 courses without any actual credits received. You do not need to make up these credits for C&PE, but be aware that other majors **may** require you to take additional hours to make up this difference. You may not enroll in C&PE laboratory courses (C&PE 616, C&PE 618, C&PE 619 or C&PE 629) until you have completed your Goal 2 Learning Outcome 1 coursework.

If you are an international student, as soon as you are released by the AEC, you must enroll in ENGL 101. Credits for English Composition at a foreign institution are not accepted for the required English courses in any engineering curriculum.

Goal 3 of the KU core addresses Humanities, Natural Sciences, and Social Sciences. You will satisfy your Natural Science requirement with C&PE coursework. You will choose an elective from the Humanities and Social Science lists to complete those requirements.

Goal 4 of the KU Core addresses diversity and global awareness. You will choose an elective from the Goal 4 Learning Outcomes 1 and 2 lists to complete those requirements.

Without any exemptions or transferred credit, these general education requirements will total 18 hours. The list of courses that meet these requirements changes often. Find the most current lists of qualifying courses through the course search function in the KYou portal.

6. Engineering Electives

Twelve hours of engineering science/design electives are required for a Bachelor of Science in Chemical Engineering.

At least 5 elective hours must be taken from engineering areas outside the department. A minimum three (3) hours must be taken within the Department except for the Environmental Option, in which all four electives are CE environmental courses. A maximum of six (6) hours may be taken from chemical and petroleum engineering. Electives in all cases must be selected from the approved list in this handbook. See Subsection C.

Introductory courses in all departments are not acceptable as engineering electives.

7. Maximum Enrollment

You may not enroll in more than 19 credit hours per semester (nine credit hours during the summer session) except with approval of your advisor and the Associate Dean.

8. Credit/No Credit Grading

Credit/no credit grading is not allowed for courses required for your major. Typically, this includes courses used to fulfill Goals 2.1, 3H, 3S, 4.1, and 4.2.

9. C&PE Substitution Policies

Substitutions are permitted by petition. The petition must provide justification for the substitution. Your faculty advisor, the Department and the Associate Dean of the School of Engineering must approve your petition. You can find this form at [http://www.engr.ku.edu/forms/pdfs/Course_Substitution_Petition\(Spring2011\).pdf](http://www.engr.ku.edu/forms/pdfs/Course_Substitution_Petition(Spring2011).pdf)

You should not assume approval until the petition has gone through the entire process. Petitions for substitutions should be made in the freshman-junior years where changes are still possible rather than in the senior year where it is more difficult to make adjustments.

10. Transfer Students and C&PE 111, 117 and 127

If you are a transfer student, either from within KU, from another university or from a community college, you are not required to take these courses. Instead you will take an elective course or courses that will fulfill the engineering hour requirements for the courses.

In the case of a student transferring from another engineering department, you may transfer another introductory course for CPE 111 (chemical engineers) or CPE 117 and CPE 127 (petroleum engineers). Other introductory courses include ENGR 108, AE 245, and EECS 101.

B. Placement

KU accepts several kinds of non-traditional earned credit including Advanced Placement, International Baccalaureate, military courses and the College Level Examination Program. Retroactive credit is also offered in foreign-language classes, and ACT/SAT scores may exempt you from certain requirements. Additional information may be found on KU's Admissions website: www.admissions.ku.edu/credit/earned.shtml.

1. Goal 2 Learning Outcome One

Initial enrollment in English should be based on the following criteria:

- If you are **not** in the Honors Program:

ACT English Score	SAT English Score	Enroll in
34-36	650-800	Enroll in ENGL 105 (Freshman Honors English); exempt from ENGL 101
31-33	600-650	Enroll in ENGL 102 (or English 105, if you pass the Honors Placement Exam); exempt from ENGL 101
30 or less	600 and below	Enroll in ENGL 101

- If you are in the Honors Program:

ACT English Score	SAT English Score	Enroll in
31-36	600-800	Enroll in ENGL 105 (Freshman Honors English); Exempt from ENGL 101,
27-30	500-600	Enroll in ENGL 102 (students wanting to take ENGL 105 may do so if the Honors Placement Exam is passed); Exempt from ENGL 101

2. Mathematics

The Department of Mathematics closely monitors initial enrollment in math courses. If you enroll in a course without meeting the criteria, your math enrollment will be canceled.

- If you have a mathematics ACT score of 28 or above (SAT above 640), you are eligible to enroll in MATH 121 - Calculus I.
- If you have a mathematics ACT score between 22 and 27 (SAT between 540 and 630), you must enroll in MATH 104 – Pre-calculus.
- If you have a Mathematics ACT Score below 22 (SAT below 530), you must enroll in MATH 002.

If you want to take a math course at a higher level than one for which they are eligible, you should contact the Mathematics Department to request a placement test.

3. Chemistry

Students who receive a score of 5 on the Advanced Chemistry Placement Examination need not take CHEM 170 and 175 and will receive 10 hours of credit for CHEM 130/135. CHEM 130/135 is an acceptable substitute for CHEM 170/175. Those who receive a score of 3 or 4 will, after Department of Chemistry review and permission, be given credit for CHEM 130. Upon passing a special examination, credit for CHEM 135 may also be given.

C. Engineering Electives

At least three hours of engineering elective must be taken within your field of study except for the Chemical Engineering Environmental Option. No more than six hours may be within C&PE Department except as noted below.

You should select engineering electives based on your interests. Oftentimes, these electives are only offered once per year or once every three semesters. Therefore, you must plan in advance so that you are able to enroll in the elective of interest.

1. Acceptable Electives

Petroleum engineering junior and senior level courses C&PE 217, 517, 527, 528, 618, 619, 627, 628, and 629 may be taken by students pursuing chemical engineering degrees as engineering electives, if the prerequisites are met. The six-hour maximum discussed under Engineering Electives (Section V, Subsection A, Item 7) does not hold in this case—Petroleum classes can be counted as “inside” or “outside” C&PE for Chemical Engineering majors.

Chemical engineering junior and senior level courses C&PE 523, 524, 613, 615, 616, 623, 624 may be taken by petroleum engineering students as engineering electives if the prerequisites are met. The six-hour maximum discussed under Engineering Electives (Section V, Subsection A, Item 7) does not hold in this case—Chemical Engineering classes can be counted as “inside” or “outside” C&PE for Petroleum Engineering majors.

Some cross disciplinary courses may be counted as either inside or outside C&PE electives. Some examples include: C&PE 601 (Nanotechnology), 655, 656, and 752. Please see your advisor for clarification.

Other courses which have engineering science or design content that are offered by departments in the School of Engineering may be taken by a C&PE student if the prerequisites of the course are met or by permission of the instructor and are not restricted to majors in the field. These courses may not substantially in whole or part reproduce topics covered in our program. They must broaden your knowledge and/or skill while meeting the engineering science and design requirements.

2. Unacceptable Electives

Some engineering courses that are offered by other departments replicate our required courses. If the required courses have been or will be taken, those courses offered by other departments may not be used as engineering electives. Examples follow.

- **ME 312** Engineering Thermodynamics (3 credits) duplicates a significant amount C&PE 221 Basic Engineering Thermodynamics and *may not be used* as an engineering elective.
- **ME 512** Introduction to Thermal Engineering (3 credits) is a combination of ME 312 and ME 612 and *may not be used* as an engineering elective.
- **ME 510** and **ME 612** duplicate a significant amount of C&PE 511 and C&PE 521 coursework, respectively, and therefore *may not be used* allowed as electives.
- **CMGT 357** Introduction to Engineering Economics duplicates a significant amount of material covered in C&PE 522 and *may not be used* as an engineering elective.

Some courses offered by the School of Engineering do not contain any engineering science or design content. These may not be used as engineering electives. They may be used for 'Other' or MSEHS elective hours, when needed. Examples of these courses are:

- **ENGR 504** Technical Writing is credit for writing for the Kansas Engineer It *may not be used* as an engineering elective.
- **ENGR 514** Technical/Science Communications to Non-technical Populations (3 credits) *may not be used* as an engineering elective.
- **ENGR 515** Verbal Communications in Engineering *may not be used* as an engineering elective.
- **CE 625** Applied Probability and Statistics *may not be used* as an engineering elective.
- **CE 240** Surveying *may not be used* as an engineering elective.

Programming courses such as JAVA and C++ are not considered to be broadening and are not acceptable engineering electives. They may be considered for the MSEHS Elective.

D. Chemical Engineering Advanced Chemistry Electives

A minimum of 15 hours of advanced chemistry is required. Advanced chemistry courses deal with changes in composition, structure and properties of matter at an advanced level. We require CHEM 330 (3), CHEM 331 (2) and CHEM 530 (3) and CHEM 535 (4).

You have flexibility in choosing the remaining three (3) hours. These may be upper level chemistry including BIOL 600, Biochemistry, or may come from the Natural Sciences including physics, biology and geology. For some of the options, this elective is specified. These must be designated by the College and Liberal Sciences as N in the Undergraduate Catalog. In addition, you have a menu of courses from other departments which qualify as advanced chemistry. These are listed below.

1. Chemistry

You may select any chemistry course at 400 level or higher excluding seminars or other courses not having >90% science content.

2. Engineering Courses Acceptable for Advanced Chemistry

C&PE	765	Corrosion Engineering (3)
C&PE	657	Polymer Science & Technology (3)
CE	570/770	Concepts of Environmental Chemistry (2)
CE	571/771	Environmental Chemical Analysis (1)
CE	774	Chemical Principles of Environmental Processes (3)

3. Engineering Courses with Partial Credit for Advanced Chemistry

C&PE	721	Chemical. Engineering Thermodynamics (2 of 3 credit hours)
C&PE	722	Kinetics and Catalysis (2 of 3 credit hours)
ME	306	Science of Materials (2 of 3 acceptable)

4. Other Engineering Courses

The following courses may be acceptable as an Advanced Chemistry Elective. A letter from the instructor is required. That letter must describe the chemistry content of the work and indicate the number of hours that can be used as advanced chemistry.

C&PE	651	Undergraduate Problems
C&PE	661	Undergraduate Honors Research
C&PE	715	Topics in Chemical and Petroleum Engineering
CE	490	Special Problems

5. Natural Sciences

Higher level natural science courses as listed below are acceptable advanced chemistry electives. Seminars may not be taken for Advanced Chemistry credit. In special cases, lower level natural science courses are acceptable electives. These are indicated below.

- **Biology** – You may use any biology course designated as N in the timetable. This includes BIOL 100, 101 and 102, and 150.
- **Microbiology** – You may use any microbiology course designated as N in the timetable. This includes MCRB 110.
- **Geology** – You may use any geology course designated as N. This includes GEOL 101 and 105.
- **Physics** – You may use any physics course at 300 level or higher designated as N. This includes PHSX 313.
- **CE 573/773** – Biological Principles of Environmental Engineering Processes (2 of 3 credit hours).

VI. FOUR-YEAR SCHOLARSHIPS IN CHEMICAL AND PETROLEUM ENGINEERING

A. *General Requirements*

Chemical and Petroleum Engineering scholarships are awarded to entering freshmen with outstanding academic records. They are renewable for up to eight academic (fall/spring) semesters until graduation with a B.S. Degree in Chemical or Petroleum Engineering. The requirements for scholarship retention are:

- You must be continuously enrolled at the University of Kansas for the fall and spring semesters of each academic year. Such enrollment must be in a program leading to the B.S. Degree in either Chemical or Petroleum Engineering.
- You must maintain a cumulative Grade Point Average (GPA) of 3.2 or better. Both your overall GPA and your GPA in engineering courses must meet this criterion. These GPA's are computed for courses completed at the University of Kansas, only.
- You must complete at least twelve (12) credit hours in a semester. Credit hours taken at a college or university other than the University of Kansas can be counted toward this total but the grade points earned are not included when evaluating whether the GPA criterion above has been met. These courses must count toward the degree as specified in the curriculum guide and DPR. Departmental courses as specified on the schedule below must be part of this total.

B. *Required Course Schedule for Four-Year Chemical Engineering Scholarship Recipients*

1. **Freshman**

C&PE 111 - Fall

C&PE 121 - Spring after freshman year (or EECS 137/138)

2. **Sophomore**

C&PE 211 - Summer after freshman year or Fall of sophomore year

C&PE 221 – Spring of sophomore year

C. *Review, Continuance and Discontinuance*

The Scholarship Committee reviews student progress each semester. If you do not meet the requirements, the scholarship can be discontinued. If through initial enrollment or the add/drop process in the first 4 weeks of the semester, a student's enrollment drops below the 12 credits identified above, the scholarship may be terminated immediately. This may require the student to repay the scholarship amount to the University. However, a one semester probationary period is normally provided prior to loss of the scholarship if:

- Any semester GPA (either overall or engineering) is less than 3.2.

- The cumulative GPA after two or more semesters (either overall or engineering) falls below 3.2.

The Scholarship Committee will review your progress on scholarship probation after the one semester probationary period. If the condition causing the probation has been corrected, you will be removed from probation. If not, the scholarship will normally be discontinued unless there are mitigating circumstances. In no case will the probation be continued more than two contiguous semesters.

For freshmen, this scholarship will be awarded for at least two semesters unless:

- The first semester GPA is less than 2.5 in courses that count toward the degree, or
- Fewer than 12 credit hours that count toward the degree have been completed in the first semester.
- Enrollment in the second semester is less than 12 credit hours that count toward the degree.

Any student whose scholarship has been discontinued may apply for reinstatement at a later date. The Scholarship Committee will act upon a written request for reinstatement.

VII. HONORS

A. *Departmental Honors*

You can earn Departmental Honors in Chemical & Petroleum Engineering by meeting the following criteria:

- Completion of the B.S. degree program in Chemical & Petroleum Engineering with an overall GPA of 3.5 in courses taken at KU
- Completion of C&PE 661, Undergraduate Honors Research, for a minimum of three (3) credit hours with a grade of A or B

You may not enroll in C&PE 661 before the junior year in the C&PE program. You are allowed to enroll in C&PE 661 if your overall GPA and engineering GPA in courses taken at KU is 3.5 or higher. Enrollment in C&PE 661 constitutes acceptance as a candidate into the Departmental Honors Program.

Students awarded Departmental Honors will be recognized in the Commencement Program and on the University transcript.

B. *College of Liberal Arts and Sciences Honors*

You are invited to join the College of Liberal Arts and Sciences Honors Program if:

- You have an ACT composite score of 31 (SAT 1340); or,
- You are a National Merit Finalist; or,
- You are a Summerfield Scholar; or,
- You are a Watkins-Berger Scholar; or,
- You have a strong academic record.

If you want to take honors courses, you should contact the Honors Program at Nunemaker Center, 1506 Engel Road. The Undergraduate Catalog contains additional information regarding requirements.

C. *Graduation with Distinction*

If you are in the top 10% of the graduating class as measured by the cumulative KU GPA and you have taken at least 64 hours in residence at KU, you are qualified to graduate with distinction. You are qualified for graduation with highest distinction if you are in the top 1/3 of those graduating with distinction.

The list is compiled once per year and includes August, December and May graduates.

VIII. OTHER TOPICS

A. Co-op Program

1. Overview

The Department of Chemical & Petroleum Engineering's Co-op (Cooperative Education) Program is an excellent opportunity for you to obtain industrial experience and perspective while pursuing a degree in chemical engineering.

This opportunity is open to all students in the chemical engineering curriculum at any point during their academic study beyond the first semester of the sophomore year. Typically, however, students enter the program after completing C&PE 211, Material & Energy Balances. The number of Co-op positions open during any year depends upon the number of opportunities offered by recruiting companies.

The program is based on cooperative experience in education and industry. The typical Co-op program would have you working for a company for three separate time periods during the study of chemical engineering. The assignments may be at a variety of locations. During these periods, you are away from the KU campus, typically for a semester or semester plus summer. You are on professional assignment with the company but remain a full-time student at KU. During the assignment, the company provides industrial experience and professional pay consistent with your academic background. Assuming continued success, you continue with the company on subsequent Co-op assignments.

2. Academic Requirements

In order to remain a full-time student, you would enroll in one (1) hour of ENGR 300 under the supervision of the Co-op adviser during each Co-op period. ENGR 300 does not count as an engineering elective. Therefore, if you were to be away from campus for three separate Co-op time periods, three (3) hours of ENGR 300 are required, in addition to all other requirements for graduation.

A typical Co-op curriculum is found in the Appendix. However, the program is very flexible and may be tailored to meet your needs, the industrial assignments and your goals. Should you opt for a Co-op assignment, you should note that the Co-op program requires, typically, at least one additional year for graduation. The Co-op Advisor and your assigned Advisor are very experienced in tailoring the program to meet your needs. Please feel free to consult with both.

3. Application Process

The application process is the same as that for summer internship and permanent employment. You need to file a resume with the Engineering Career Services using their procedures. This allows you to interview with companies who visit during the fall Career Fair and during the fall interview period. As opportunities are limited and the time is early in the fall semester, you must prepare for interviewing as soon as you arrive back on campus after the summer break. If you do not file a resume with Career Services, you will not be eligible to interview with potential Co-op employers and will miss the opportunity. The Co-op interview typically lasts 20-30 minutes. A plant visit may also be required.

4. Advising Requirements

Once a Co-op assignment is offered, you must modify your Plan of Study to reflect admittance into the Co-op program. However, we encourage you to talk with the Co-op adviser early in the process. Changing to the Co-op advisor is not required but is recommended once the student is in the program.

5. Advantages/Disadvantages

The principal advantage of the Co-op program is that you will gain industrial perspective during your course of study. This experience helps to provide perspective while studying the course material required for graduation. A secondary advantage is that you are paid a professional salary while on assignment. You should note that the host company is able to evaluate the engineering and interpersonal skills during the Co-op assignments which may increase the probability that a permanent job offer is made after graduation.

The principal disadvantage is that at least one additional year is required to complete the chemical engineering degree. This additional year results in additional investment in tuition, living costs and lost post-graduation professional salary (for the one additional year required for the Co-op program). A summer internship does provide similar experience to the Co-op experience, but the internship assignments are also limited.

B. Premedical Program

1. Required Classes

Within the BSChE program, the Department offers a Premedical option. This option was developed in conjunction with the Pre-Medical program at KU. The requirements within chemical engineering are the same. The notable difference is the emphasis on biology.

BIOL 150 and 152 partially count toward the Advanced Chemistry requirement in Chemical Engineering. They are required for admission to medical school. The completion of these two biology courses and the corresponding laboratories fulfills the required biology for admission into medical school. In addition, CHEM 335 and 336 are required beyond the single semester of organic chemistry required in chemical engineering.

PSYC 104 and SOC 104 are required for the MCAT. These two courses also satisfy KU Core Goals 3S and 3H, respectively. Biol 600 [Biochemistry] is required.

2. Recommended Classes

We strongly recommend that students take additional biology before they take the MCAT. In order of importance, these recommended courses are:

Biol 350 [Genetics]

Biol 646 [Physiology]

Biol 416 [Cell Structure & Function] (recommended for medical school but can be taken after the MCAT)

3. Length of Study

The course of study (Appendix C) is a sample program which shows what is required to graduate in four years, take some of the recommended biology and be prepared for medical school. Note that summer school is required, assuming no transfer credit from high school. However, this limits your experience and perspective of medicine and engineering. You may want to consider a five-year plan of study, also given in Appendix C. This plan of study offers the following advantages:

Using four summers to get medically-related work experience, e.g.

- volunteer at emergency room or low income clinic or county health department;
- shadow a doctor;
- work in a hospital laboratory / take patient samples;
- perform medically related undergraduate research projects;
- become certified as an emergency medical technician (EMT) or nursing assistant (CNA);
- work on a medical mission in the US or other nation.

Working as an engineering summer intern in a non-medical field may also be useful to ascertain your ultimate level of interest in pursuing a medical career.

C. Professional Registration

Registration is a process that ultimately identifies an individual as an engineer who has achieved professional excellence and is recognized among his/her peers. It is the legal certification of the ability to practice engineering in the public arena. Professional registration is now becoming a requisite for such things as expert testimony, federal and state reporting, engineering design certification and professional consulting. Consequently, we encourage students to begin the process of seeking professional registration while completing your undergraduate degree.

Professional registration requires passing the Fundamentals of Engineering Examination, four years' experience as a practicing engineer and, subsequently, passing the Principles and Practice of Engineering Examination.

Juniors are eligible to take the examination in the Spring Semester. Seniors may take it Fall or Spring. Students are encouraged to take the Fundamentals of Engineering Examination during their junior or senior year at KU while the material covered in the examination is still fresh.

Students who are planning to take the Fundamentals of Engineering Examination will find courses in Statics (CE 201), Strength of Materials (CE 310) and Electrical Circuits, Devices and Systems (EECS 319) to be valuable engineering electives.

D. Academic Minors

The School of Engineering does not have specific academic minors. However, students may earn minor degrees based on the requirements of the School (Business or the College of Liberal Arts and Sciences, for example.)

If a student believes that he/she has or will earn a minor, an application is filed through the School of Engineering. The student must have a 'Minor Advisor'. She or he must sign this application form. The form is returned to the School of Engineering. This will be forwarded to the appropriate School for evaluation. If the College officials agree, the student will be awarded a minor upon graduation along with the B.S. Degree.

Minor Degrees are intended to be in an area beyond your normal field of study. Chemical engineering students will not be awarded Minor Degrees in chemistry because this is closely allied with chemical engineering and not viewed as an extension of the student's major field of study.

To obtain a minor, the student must typically take at least 18 credit hours, 12 of which must be 300 level courses or above. The student must have at least a 2.0 GPA in the minor. If the department or program in the College of Liberal Arts and Sciences has additional requirements for their minor, you must meet those requirements, as well. To declare your minor, contact the relevant department directly.

Chemical and Petroleum Engineering

Enrollment Form for _____
Semester, Year

Name _____ KUID _____ Major: Chemical Petroleum
(circle one)

Degree Program: BS MS PhD Curriculum Option: general biomed petro enviro pre-med
(circle one) (BS ChE only) (circle one)

Dept.	Course #	Course Title	Credit Hrs	Meeting time & location
Total hours advised:				

Alternate Course Selection

Dept.	Course #	In place of which course above?	Credit Hrs	Meeting time & location

In consultation with an advisor, I have chosen these courses based on my program of study. I understand that I am responsible for selection of these courses and for knowing degree requirements for my major.

Student Signature _____ Date: _____

Advisor Signature _____ Date: _____

Policies to be aware of:

- ChE students **must** have a 2.0 GPA in CPE 211 and CPE 221 to progress to Junior CPE courses.
- ChE students **and** PetE students must have a 2.0 CPE GPA to progress to Senior CPE courses

Advisor checklist:

- Confirmed and completed top section
- Signed and dated by all parties
- Checked online DPR for errors/questions
- Passed or enrolled in **all pre-requisites**
- Chosen electives count toward degree
- Flagged CPE 211/221 restriction (if applicable)
- Flagged CPE GPA restriction (if applicable)
- Entered in online advising tool

_____ Prepared with

Dawn

Notes:
