

Handbook for New Students

2009-2010



Ralph E. Martin Department of Chemical Engineering

3202 Bell Engineering Center

Fayetteville, AR 72701

Welcome to the Ralph E. Martin Department of Chemical Engineering

Welcome to the University of Arkansas and the Ralph E. Martin Department of Chemical Engineering. You are joining a distinguished group of U of A Chemical Engineering alumni who are CEOs of Fortune 500 companies, entrepreneurs, consultants, professors and technical experts. Chemical Engineering is a tough curriculum, but the rewards upon graduation are significant.

The faculty and staff are here to help make your transition from high school to college as smooth as possible. As students or parents of students, please do not hesitate to contact us for any reason. Please accept my personal invitation to come by and talk about academic matters, career planning, or even the Razorbacks.

Ed Clausen, PhD, PE
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Ray C. Adam Endowed Chair in Chemical Engineering
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The Ralph E. Martin Department of Chemical Engineering . . .

- Has an ABET-accredited program designed to prepare students for careers in industry, graduate school, professional schools (medicine, dentistry, law, pharmacy) and government
- Has a faculty with an open-door policy that is eager to help students regardless of their problems, or to just chat
- Currently has 14 faculty, about 150 undergraduates and about 25 graduate students
- Has research activities in biological systems and food science, biomaterials, biomolecular separations, chemical hazards, chemical separations and critical fluid technology, environmental fate and transport, space and planetary surfaces, material science for microelectronics, membrane systems, mixing in chemical processes and petroleum processing. A brief description of these opportunities and the faculty heading the research efforts may be found at <http://www.cheg.uark.edu/research.asp>.
- Typically enrolls 50-60 new undergraduate students each year (students enter chemical engineering as freshmen, transfer students or from the Freshman Engineering Program)
- Had annual starting salaries for B.S. chemical engineers of almost \$72,000 in 2008 and, even with the recession, of about \$63,000 in 2009
- Stresses co-ops, internships and research experience as ways for students to see if Chemical Engineering is for them, and to better prepare them for permanent employment
- Is fortunate to have a solid group of employers that strongly desire U of A chemical engineering graduates
- Stresses a friendly atmosphere among faculty, staff and students

What Do Chemical Engineers Do?

- Chemical Engineers are involved in . . .
 - energy production
 - production of chemicals, plastics, pharmaceuticals and fertilizers
 - refining of minerals and ores
 - protection of the environment

- Chemical engineers may work in . . .
 - research
 - development
 - design
 - construction
 - plant operation
 - sales
 - technical service
 - economics and planning
 - mathematical modeling
 - management of plants and companies

- . . . but may also work in . . .
 - medicine
 - law, especially patent law
 - safety
 - personnel
 - purchasing
 - insurance—risk evaluation
 - utility industry
 - investments
 - consulting
 - computing

Who is a Typical Chemical Engineer?

- Many future chemical engineers have a strong interest in math, science and problem solving while in high school.
- Some chemical engineers really like chemistry, and some just barely tolerate chemistry.
- Many chemical engineers are interested in solving some of the world's really big problems such as cleaning up the environment, feeding the world or finding an inexpensive and sustainable energy source.
- Some Chemical Engineering students want to attend medical school, dental school, pharmacy school or graduate school. The Ralph E. Martin Department of Chemical Engineering has a 90% acceptance rate to medical school.
- Some future chemical engineers see the Chemical Engineering curriculum as a challenge (it is!), and want to see if they are up to the challenge.
- Some future chemical engineers have friends or relatives that are engineers, and some have no previous connection to chemical engineering.

Placement of Graduates . . .

- Although the market for chemical engineers has always been cyclic, the placement of our graduates has traditionally been 100%. A few of our 2009 graduates have not yet been placed.
- The average annual starting salary for B.S. chemical engineers was almost \$72,000 in 2008 and, even with the recession, was about \$63,000 in 2009
- The faculty are dedicated toward helping students find jobs as co-ops, interns or as permanent employees. Careers, internships/co-ops and job placement are major topics in the sophomore level course CHEG 2221, Professional Practice Seminar, and Dr. Clausen works with students and graduates in assisting them in finding employment.

Permanent Employment, Classes of 2007, 2008 and 2009

Opportunity	Number of Students		
	2007	2008	2009
Albemarle	1	1	2
Almatis	1	2	
Baker Atlas			1
Baker-Hughes	1		
Bio-Tech Pharmacal			1
Cargill		1	1
CBI	1	1	
Domtar			1
Dow Chemical	2	2	1
Eagle Picher			1
Eastman Chemical	2	2	2
ExxonMobil	1		
Gallo Wineries	1		
General Electric	1		
Georgia Pacific	1		3
Green Bay Packaging	1		
Halliburton			1
INEOS Bio (formerly BRI)	1		2
Kennametals	1		
L'Oreal			1
Metal Forms	1		
Pro-sys	1		
Southwestern Energy	1		
Southwest Waterproofing		1	
Space Photonics		1	
Syntroleum	1		
UOP	2		
Professional Schools			
Graduate School		4	3
Medical School	1	2	5

Optometry School	1		
Veterinary School	1		
Military		1	
Teachers Across America			1

Freshman Engineering or Chemical Engineering . . .

The Freshman Engineering Program was developed to help incoming freshmen decide on engineering majors, develop and practice good study habits and, in general, prepare the incoming students for the rigors of college and the university program. All freshmen entering the College of Engineering, with the exception of selected Chemical Engineering majors, must enroll in the Freshman Engineering Program.

As an alternative, students may choose to directly enter Chemical Engineering as incoming freshmen if they are well prepared in chemistry as determined by a passing score on the Chemistry Placement Exam or by credit for CHEM 1103, University Chemistry I. If a student later decides that Chemical Engineering is not the right choice, the faculty will help you to choose a major that best fits your career goals.

Freshman Engineering

- Uncertain about engineering major
- Not well prepared in Chemistry (Placement Exam Score of <70%)
- Needs help with study habits

or

Chemical Engineering

- Believes that Chemical Engineering is for them
- AP credit for University Chemistry I
- Placement Exam score of 70% or better

Chemistry Placement Exam . . .

A one hour Chemistry Placement Examination is being offered in each Orientation Session this summer. The purpose of this exam is to place students in either CHEM 1103, University Chemistry I, or CHEM 1123, University Chemistry II, and CHEM 1121L, University Chemistry II Lab. Students placed in CHEM 1123/1121L are given credit for CHEM 1103/1101L and CHEM 1123/1121L upon satisfactorily completing CHEM 1123/CHEM 1121L with a C or above. This exam is of particular importance to Chemical Engineering students because earning a passing score (70%) demonstrates that a student is ready to enter the Chemical Engineering program. The exam may only be taken once. Students scoring a 4C or better on the Chemistry AP Examination receive credit for CHEM 1103/1101L and CHEM 1123/1121L.

The Chemistry Placement Exam is scheduled for 8:15 am in the Chemistry Building, Room 105, on Day One of each new student orientation session.

Session	Session Date	Population Served	Chemistry Placement Date, Time
1	June 8-9	Honors Students	June 8, 8:15 am
2	June 9-10	Honors Students (except AFLS, ARCH, EDUC)	June 9, 8:15 am
3	June 10-11	All Students	June 10, 8:15 am
4	June 11-12	All Students	June 11, 8:15 am
5	June 15-16	All Students	June 15, 8:15 am
6	June 16-17	All Students (except ARCH)	June 16, 8:15 am
7	June 17-18	All Students (except ARCH)	June 17, 8:15 am
8	June 18-19	All Students	June 18, 8:15 am
9	June 22-23	All Students	June 22, 8:15 am
10	June 23-24	All Students (except ARCH)	June 23, 8:15 am
11	June 24-25	All Students (except ARCH)	June 24, 8:15 am
12	June 25-26	All Students	June 25, 8:15 am
13	June 29-30	All Students	June 29, 8:15 am
14	August 10-11	All Students Registration opens July 1st	August 10, 8:15 am

The placement exam covers the following areas that are taught in a good high school chemistry course:

- Symbols, formulas, formula weights
- The mole concept
- Chemical stoichiometry, calculations based on a given equation
- Atomic size, ionization energy, electronegativity, etc. trends
- Molarity
- Nomenclature
- Subshell configurations
- Lewis electron dot representations
- Shapes of molecules and ions
- Balancing equations
- Acid-base equations

For more information on the content of the placement exam, see the sample exam on the next page. For more information on the offering of the exam, contact:

- University of Arkansas Chemistry Department
 - Dr. Bill Durham (bdurham@uark.edu)
 - Dr. Heather Jorgensen (hjorgen@uark.edu)

Chemistry Placement Test Review Questions—Summer 2009

1. Write the chemical formula for sulfurous acid.
2. What are the names of each of the following polyatomic ions?
 - $\text{C}_2\text{O}_4^{2-}$
 - SO_4^{2-}
 - SO_3^{2-}
 - NH_4^+
 - ClO_4^-
3. Which of the following substances would be classified as a mixture?
 - a canister of N_2O_4 gas
 - a beaker of liquid ethanol ($\text{CH}_3\text{CH}_2\text{OH}$)
 - a sample of pewter (an alloy)
 - a sample of N_2 gas
4. What is the strongest acid and what is the strongest base?
5. An ion with a 2+ charge has 10 electrons and 12 neutrons. What is the ion?
6. If calcium bromide and potassium sulfate are mixed, will a precipitate form?
7. Balance the follow equation.
$$\text{NaNO}_3(\text{s}) + \text{H}_2\text{SO}_4(\text{l}) \rightarrow \text{Na}_2\text{SO}_4(\text{s}) + \text{HNO}_3(\text{g})$$
8. In Problem 7, how many ml of a 1.225 M solution of sodium nitrate are required to produce 5.630 grams of sodium sulfate?
9. Which of the following forms of chlorine has the HIGHEST oxidation number?
 - HCl
 - Cl_2
 - HClO
 - HClO_4
 - HClO_3
10. Draw the Lewis dot structure for NO_2^+ .

11. Write the electron configuration for Se. How many valence electrons does Se have?
12. What is the molecular geometry of NO_3^- ?
13. Balance the reaction $\text{MnO}_2(\text{s}) + \text{I}^-(\text{aq}) \rightarrow \text{Mn}^{2+}(\text{aq}) + \text{I}_2(\text{s})$ under basic conditions.
What is the stoichiometric coefficient for Mn^{2+} in the balanced equation?
14. If one regular Tums tablet contains 500 mg of $\text{CaCO}_3(\text{s})$, how many ml of 1.00 M stomach acid (as HCl) could it neutralize? The molar mass (molecular weight) for CaCO_3 is 100.1 g/mol.
15. What is the formal charge on N in the most stable resonance form of CNO^- ?

Advanced Placement (AP)/College Level Examination Program (CLEP) Credit . . .

The table on page 49 of the U of A catalog of studies (accessible at http://catalogofstudies.uark.edu/documents/07_COS.pdf) may be used in determining AP credit for university classes. The table on page 45 of the same document may be used in determining CLEP credit for university credit.

The Chemical Engineering Curriculum . . .

- The educational objective of the Chemical Engineering undergraduate program is to provide students with a foundation in mathematics and the basic sciences, the humanities and social sciences, engineering sciences, engineering design methods, and specific chemical engineering skills, and to thereby prepare them, in a global context, to face the challenges of today's complex and difficult problems.
- Chemical engineering skills include mass and energy balances, single and multi-component thermodynamics, basic fluid mechanics, heat and mass transfer operations, process economics, process design, process safety, process control, and laboratory practice. Chemical engineering principles are applied to biological processes in several courses in the undergraduate curriculum including Fundamentals of Chemical Engineering, Chemical Process Safety, and Chemical Engineering elective courses as well as undergraduate research opportunities. No specific background in biology is required for this work. The list of upper level chemistry electives includes courses in biochemistry which provides students the opportunity to supplement their background in biochemistry if desired.
- Students take Chemical Engineering courses in their first year, which helps to introduce the chemical engineering profession to students early in their academic careers, as well as adding sophistication and rigor to the program. The program culminates in a capstone design course sequence in the senior year which prepares students to enter a working environment.

Suggested Chemical Engineering Curriculum for Students Entering as Freshmen or as Transfers to the U of A

Fall Semester Year 1

4 MATH 2554 Calculus I
3 CHEM 1123 University Chemistry II
1 CHEM 1121L University Chemistry II Lab
3 ENGL 1013 Composition I
3 CHEG 1113 Introduction to Chemical Engineering I
3 HIST 2003 History/American People to 1877 (HIST 2013 or PLSC 2003 may be substituted)

17 Semester hours

Spring Semester Year 1

4 MATH 2564 Calculus II
3 CHEG 1123 Introduction to Chemical Engineering II
3 ENGL 1023 Composition II
2 CHEG 1212L Chemical Engineering Lab I
3 Humanities/social science core elective

15 Semester hours

Fall Semester Year 2

4 MATH 2574 Calculus III
3 CHEM 3603 Organic Chemistry I
1 CHEM 3601L Organic Chemistry I Lab
4 PHYS 2054 University Physics I
1 CHEG 2221 Professional Practice Seminar
3 CHEG 2313 Thermodynamics of Single Component Systems

16 Semester hours

Spring Semester Year 2

4 MATH 3404 Differential Equations
3 CHEM 3613 Organic Chemistry II
1 CHEM 3611L Organic Chemistry II Lab
4 PHYS 2074 University Physics II
3 CHEG 2133 Fluid Mechanics
3 CHEG 3323 Thermodynamics of Multi-component Systems

18 Semester hours

Fall Semester Year 3

4 CHEM Elective

3 MEEG 2003 Statics

3 CHEG 3143 Heat Transport

2 CHEG 3232L Chemical Engineering Lab II

3 CHEG 3253 Chemical Engineering Computer Methods

3 Humanities/social science core elective

18 Semester hours

Spring Semester Year 3

4 CHEM Elective

3 MEEG 3013 Mechanics of Materials

3 CHEG 3333 Chemical Engineering Reactor Design

3 CHEG 3153 Non-equilibrium Mass Transfer

3 ECON 2143 Basic Economics (ECON 2013, Principles of Macroeconomics, may be substituted)

0 ENGL 2003 Advanced Composition or Exemption

16 Semester hours

Fall Semester Year 4

3 CHEG 4163 Equilibrium Stage Mass Transfer

3 CHEG 4413 Chemical Engineering Design I

3 CHEG 4813 Chemical Process Safety

3 Technical elective

3 Humanities/social science core elective

15 Semester hours

Spring Semester Year 4

2 CHEG 4332L Chemical Engineering Lab III

3 CHEG 4443 Chemical Engineering Design II

3 ELEG 3903 Electric Circuits and Machines

3 CHEG 4423 Automatic Process Control

3 Technical elective

3 Humanities/social science core elective

17 Semester hours

Suggested Chemical Engineering Curriculum for Students Entering as the Program from Freshman Engineering

Fall Semester Year 1

4 MATH 2554 Calculus I
3 CHEM 1103 University Chemistry I
3 ENGL 1013 Composition I
4 PHYS 2054 University Physics I
0 PHYS 2050L University Physics Lab I
1 GNEG 1111 Introduction to Engineering I

15 Semester hours

Spring Semester Year 1

4 MATH 2564 Calculus II
3 CHEM 1123 University Chemistry II
1 CHEM 1121L University Chemistry II Lab
3 ENGL 1023T Technical Composition II
1 GNEG 1121 Introduction to Engineering I
3 HIST 2003 Hist./American People to 1877 (HIST 2013 or PLSC 2003 may be substituted)

15 Semester hours

Fall Semester Year 2

4 MATH 2574 Calculus III
3 CHEM 3603 Organic Chemistry I
1 CHEM 3601L Organic Chemistry I Lab
4 PHYS 2074 University Physics II
3 CHEG 1113 Introduction to Chemical Engineering I
3 Humanities/social science core elective

18 Semester hours

Spring Semester Year 2

4 MATH 3404 Differential Equations
3 CHEM 3613 Organic Chemistry II
1 CHEM 3611L Organic Chemistry II Lab
3 CHEG 1123 Introduction to Chemical Engineering II
2 CHEG 1212L Chemical Engineering Lab I

3 CHEG 2133 Fluid Mechanics

3 ECON 2143 Basic Economics (ECON 2013, Principles of Macroeconomics, may be substituted)

19 Semester hours

Fall Semester Year 3

4 CHEM Elective

3 MEEG 2003 Statics

1 CHEG 2221 Professional Practice Seminar

3 CHEG 2313 Thermodynamics of Single Component Systems

6 Humanities/social science core electives

17 Semester hours

Spring Semester Year 3

4 CHEM Elective

3 MEEG 3013 Mechanics of Materials

3 CHEG 3143 Heat Transport

2 CHEG 3232L Chemical Engineering Lab II

3 CHEG 3323 Thermodynamics of Multi-component Systems

3 CHEG 3333 Chemical Engineering Reactor Design

0 ENGL 2003 Advanced Composition or Exemption

18 Semester hours

Summer Semester Year 3

3 CHEG 3153 Non-equilibrium Mass Transfer

3 Semester hours

Fall Semester Year 4

3 CHEG 3253 Chemical Engineering Computer Methods

3 CHEG 4163 Equilibrium Stage Mass Transfer

3 CHEG 4413 Chemical Engineering Design I

3 CHEG 4813 Chemical Process Safety

3 Technical elective

15 Semester hours

Spring Semester Year 4

2 CHEG 4332L Chemical Engineering Lab III
3 CHEG 4443 Chemical Engineering Design II
3 ELEG 3903 Electric Circuits and Machines
3 CHEG 4423 Automatic Process Control
3 Technical elective
3 Humanities/ social science core elective
17 Semester hours

Undergraduate Research Opportunities . . .

- Opportunities are available for undergraduate Chemical Engineering majors to participate in research through the Honors Program, REUs or by just arranging to work with an individual faculty member. The Chemical Engineering Department has research activities in biological systems and food science, biomaterials, biomolecular separations, chemical hazards, chemical separations and critical fluid technology, environmental fate and transport, space and planetary surfaces, material science for microelectronics, membrane systems, mixing in chemical processes and petroleum processing. A brief description of these opportunities and the faculty heading the research efforts may be found at <http://www.cheg.uark.edu/research.asp>.
- SURF and Honors Undergraduate Research Fellowships allow students to be paid while doing research with a faculty member. Honors students are eligible for these fellowships after they have completed six hours of Honors courses.
- Many students participate in research activities as undergraduates, and some participate as early as their freshman year.
- Summer REU (Research Experience for Undergraduates) opportunities are available at universities throughout the U.S. Check out these opportunities at http://www.nsf.gov/crssprgm/reu/reu_search.cfm.
- A student can get involved with research by just talking to a faculty member about his/her research program.
- About 25% of our students participated in research this year, either through REUs or with faculty mentors

Chemical Engineering Undergraduate Students Participating in Research—2008-2009 School Year

Faculty Member/ Opportunity	Number of Students
NSF-Sponsored REUs	4
Faculty-Sponsored Research Mentor	
Babcock	1
Beitle	1
C. Hestekin	3
J. Hestekin	10
King	2
Roper	4
Servoss	4
Spicer	2
Non-ChE faculty	4

The Honors Program in Chemical Engineering . . .

- offers special advantages (undergraduate research fellowships, study abroad opportunities, priority registration) to high-ability students who thrive on achievement and are interested in an in-depth academic program leading to a graduate or professional degree
- requires a high school gpa of 3.5 and an ACT score of 28 for admission of freshmen, and a 3.25 gpa on transfer courses for admission of transfer students
- requires 12 hours of Honors courses (six in Chemical Engineering, and six outside of Chemical Engineering), a university gpa of 3.5 and an Honors thesis for graduation with Honors

For more information on the Honors Program in Chemical Engineering, go to the Department website at www.cheg.uark.edu. Click on Student Resources, and then click on Honors Program Guidance Document.

Co-ops/Internships . . .

- The number one selection criterion for employees hiring chemical engineers is engineering-related work experience, not grades.
- Significant work experience in chemical engineering can be obtained through a co-op or summer internship. A co-op alternates semesters of work and school, while an internship is most often a summer job.
- Many company representatives hire undergraduate students through the Fall and Spring Engineering Expos (career fairs). The faculty will also help you find a job.
- Co-ops and internships typically occur in Arkansas, Texas, Louisiana and Missouri, but can be as far away as California.
- Most co-ops/interns are hired to work after the students' sophomore and junior years.
- Co-ops and internships pay well (up to \$20 per hour, sometimes with an additional housing allowance), give work experience in chemical engineering, and give the student an opportunity to work away from home.
- About one third of our students participated in co-ops or internships with companies that also hire our graduates. Over 60% of our 2009 graduates participated in co-op or internship activities.

Chemical Engineering Undergraduate Students Participating in Co-ops and Internships—2008-2009 School Year

Company Sponsoring Co-op/Internship	Number of Students
Albemarle	5
Almatix	1
American Airlines	1
Ashland Chemical	2
Bio-Tech Pharmacal	1
CP Kelco	4
Domtar	1
Dow Chemical	3
Eagle Picher	1
Eastman Chemical	10
Entergy	1
FutureFuel	1
Graphic Packaging	1
Green Bay Packaging	3
Hercules	1
INEOS Bio	2
Oxy	1
Paul Mueller Company	1
Process Dynamics	2
S & R Compression	1
Stancil	1
SW Energy	1
Umicore	1
Valspar	2

Study Abroad . . .

- Students may augment their academic experiences by studying abroad for a summer or semester
- Many study abroad opportunities are available through the U of A Office of Study Abroad and International Exchange (see <http://studyabroad.uark.edu/>). The Ralph E. Martin Department of Chemical Engineering participates in a program that will allow students to take Chemical Engineering courses at the University of Newcastle in Australia. Information on this program can also be obtained from the Office of Study Abroad and International Exchange.
- Funds are available for Study Abroad through the Honors Program and the Office of Study Abroad and International Exchange. Students may apply existing U of A scholarships to study at the University of Newcastle.

AICHE Student Chapter . . .

- Is a very active student professional organization which helps students learn more about the profession through alumni speakers and plant trips, and also hosts social activities for the students
- Has 5-7 speakers per semester in which alumni from companies such as Dow Chemical, Eastman Chemical, Domtar, the Fayetteville Diagnostic Clinic, ExxonMobil and Process Engineering talk about their companies and their jobs
- Hosts an annual bus trip where students visit a plant that employs chemical engineers
- Has several social events (picnics, faculty chili cook-off, intramural sports) each year

AICHE Council . . .

- Is a subgroup of the AIChE Student Chapter which formally brings student concerns to the faculty, and is a student “sounding board” for new ideas or policies in the department
- Is made up of two elected representatives from each class (freshman through senior) plus the AIChE officers, and meets monthly over pizza to discuss matters of importance to the students and the department
- Selects finalists for the Outstanding High School Mentor Awards, awards that are given annually to individuals that have made a difference in the lives of students prior to entering college

Alpha Chi Sigma . . .

- Is a professional fraternity of chemists and chemistry-related scientists and engineers
- The three objects of Alpha Chi Sigma are to
 - bind its members with a tie of true and lasting friendship
 - strive for the advancement of chemistry both as a science and as a profession
 - aid its members by every honorable means in the attainment of their ambitions as chemists throughout their mortal lives
- Membership at the university comes through taking chemistry classes, and is by invitation

Departmental Scholarships . . .

Funded by gifts from generous donors, the College of Engineering and the Department of Chemical Engineering offer a range of scholarships targeted toward engineering degree-seeking students. In general, scholarships are not given to students just entering the program, or to students who already have a significant amount of financial aid. To learn more about what engineering scholarships you might be eligible to receive and application deadlines, email Assistant Dean Thomas Carter at tic@uark.edu or stop by the Scholarships office in Bell 3189. Applications for Engineering (and Chemical Engineering) scholarships are available at <http://www.engr.uark.edu/Scholarships&FinancialAid.htm>. Only one application is required for both College of Engineering and Chemical Engineering scholarships.

For more information on University of Arkansas scholarships and other forms of financial aid, visit the University Financial Aid office at <http://www.uark.edu/admin/fininfo/index.htm>.

Advising . . .

If you are entering the Freshman Engineering program prior to Chemical Engineering, advising and registration will be in Freshman Engineering. If you are directly entering the Chemical Engineering Department, either as an entering freshman or a transfer student, advising for this summer and all subsequent semesters occurs through one-on-one meetings with Dr. Ed Clausen, the Associate Department Head, who will serve as your academic advisor. The worksheets on the following pages aid in the advising process, and are available on the Department website at www.cheg.uark.edu. Click on Student Resources, and then click on Undergraduate Advising Forms. To use the forms, simply "X" out the courses you have had or for which you have received credit, and circle the courses you wish to take. Detailed advising information is available in the Undergraduate Advising Manual at the same website. Click on Student Resources, and then click on Undergraduate Advising Manual.

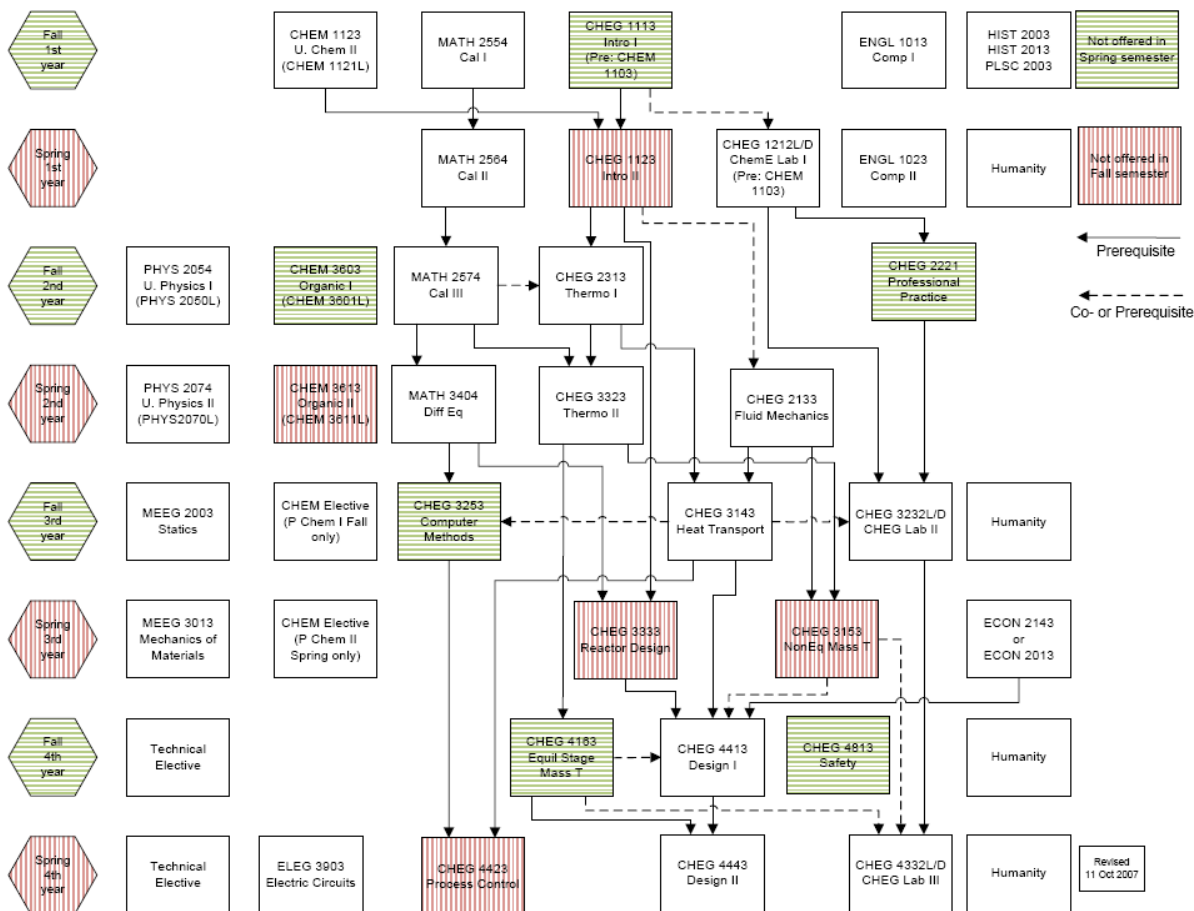
Advising Form for Transfer Students, Current Chemical Engineers

University of Arkansas

Ralph E. Martin Department of Chemical Engineering

Name: _____ Date: _____ Semester: _____

"X" out the courses you have passed, or are taking; circle the classes you are planning to take



HSS Electives (18 hr)

1. HIST 2003, 2013 or PLSC 2003
2. Hum 1: _____
3. Hum 2: _____
4. Soc Sci 1: ECON 2143 or ECON 2013
5. Soc Sci 2: _____
6. Soc Sci 3: _____

Technical Electives (6 hr)

1. _____
2. _____

Upper Level Chem/Physics (8 hr)

1. _____
2. _____
3. _____

← Prerequisite
 ← Co- or Prerequisite

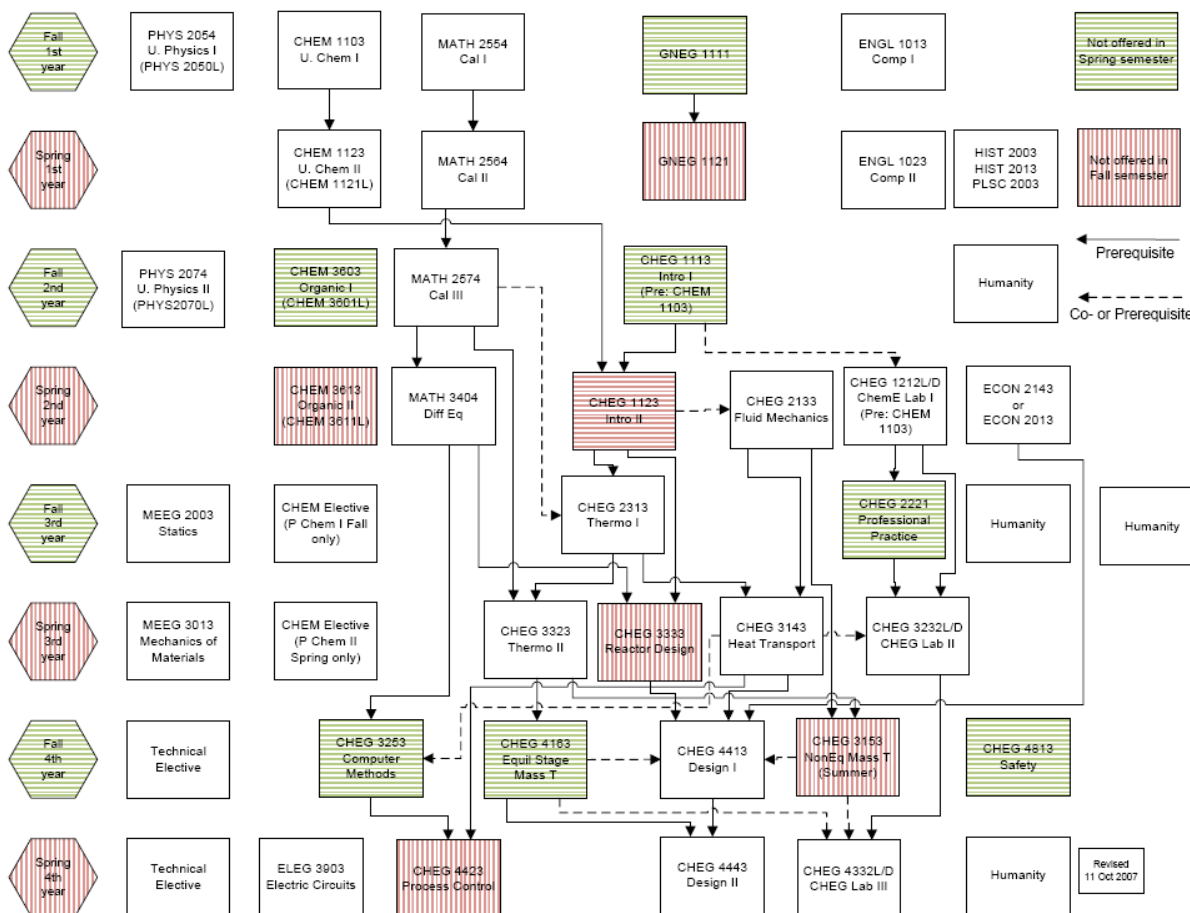
Revised
 11 Oct 2007

Advising Form for Students Entering from Freshman Engineering

University of Arkansas Ralph E. Martin Department of Chemical Engineering

Name: _____ Date: _____ Semester: _____

"X" out the courses you have passed, or are taking; circle the classes you are planning to take



HSS Electives (18 hr)

1. HIST 2003, 2013 or PLSC 2003
2. Hum 1: _____
3. Hum 2: _____
4. Soc Sci 1: ECON 2143 or ECON 2013
5. Soc Sci 2: _____
6. Soc Sci 3: _____

Technical Electives (6 hr)

1. _____
2. _____

Upper Level Chem/Physics (8 hr)

1. _____
2. _____
3. _____

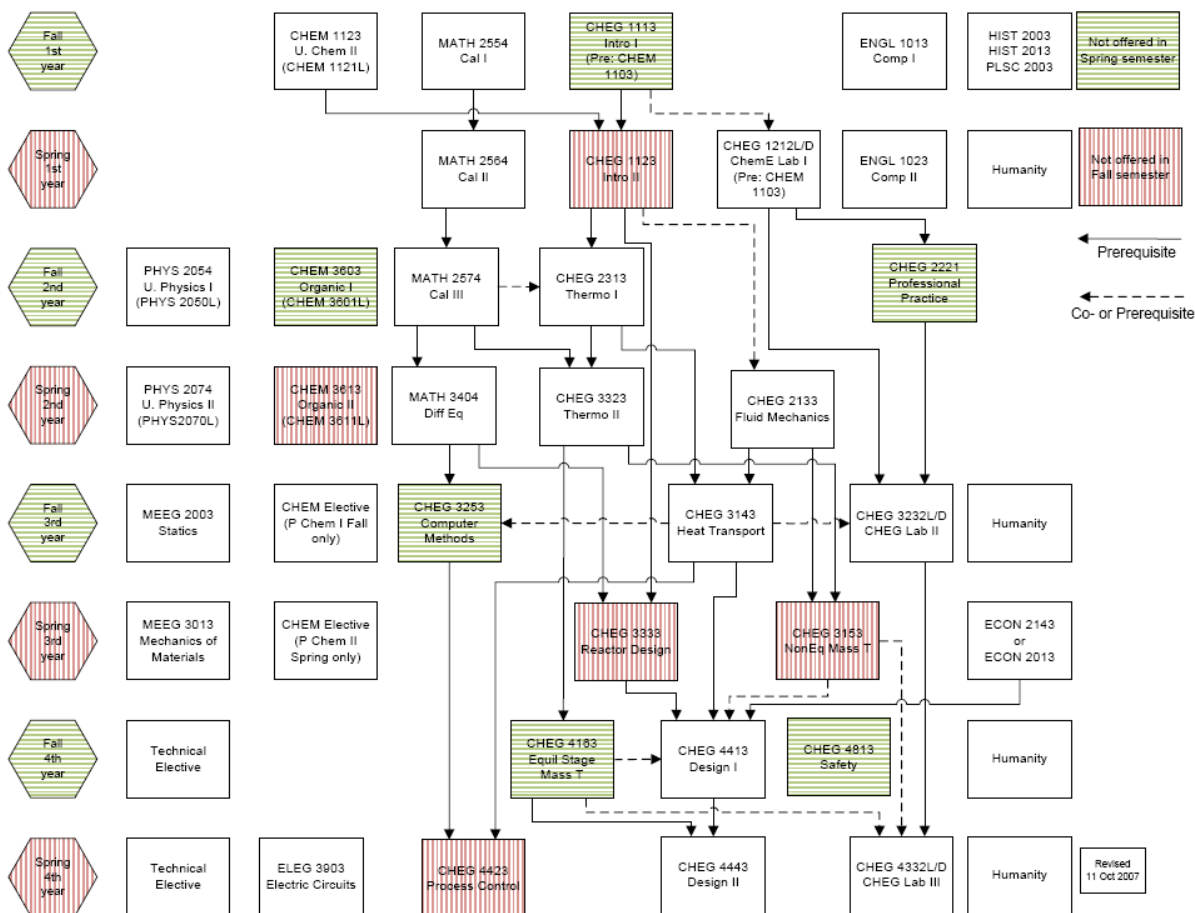
Revised 11 Oct 2007

Advising Form for New Freshmen

University of Arkansas Ralph E. Martin Department of Chemical Engineering

Name: _____ Date: _____ Semester: _____

"X" out the courses you have passed, or are taking; circle the classes you are planning to take



AP/CLEP Courses

AP Course	Score	Credited UA Course(s)

HSS Electives

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. HIST 2003, HIST 2013, PLSC 2003 2. Hum 1: _____ 3. Hum 2: _____ | <ol style="list-style-type: none"> 4. Soc Sci 1: ECON 2143 or ECON 2013 5. Soc Sci 2: _____ 6. Soc Sci 3: _____ |
|--|--|

What Do I Take This Fall?

The “average” chemical engineering student will take the following courses in the first semester of the Freshman year:

- 4 MATH 2554 Calculus I
 - 3 CHEM 1123 University Chemistry II
 - 1 CHEM 1121L University Chemistry II Lab
 - 3 ENGL 1013 Composition I
 - 3 CHEG 1113 Introduction to Chemical Engineering I
 - 3 HIST 2003 History/American People to 1877 (HIST 2013 or PLSC 2003 may be substituted)
- 17 Semester hours**

However, there is no such thing as an “average” student, and a schedule must be constructed for each student, depending upon his/her individual needs.

- Most students will take a math class (most typically ranging from MATH 1285, pre-calculus, to MATH 3404, Differential Equations, depending upon an individual’s ACT, AP and CLEP scores).
- Most students will take CHEM 1123/1121L, University Chemistry II and Laboratory. If a student is not ready for CHEM 1123/1121L, he/she should enroll in the Freshman Engineering Program. If a student has credit for CHEM 1123/1121L, he/she should probably take PHYS 2054, University Physics I. Most entering freshmen are not ready for CHEM 3603/3601L, Organic Chemistry I.
- Many students will take ENGL 1013 or ENGL 1023. If a student has credit for ENGL 1013 and 1023, other potential courses (normally taken later in the curriculum) include lower level humanities/social science electives (a list of approved courses may be found at <http://www.engr.uark.edu/545.php>) or ECON 2143/2013.
- If a student is exempt from ENGL 1013 and 1023 because his/her ACT English score is ≥ 30 , the student does not get credit for these courses (in the absence of AP or CLEP credit), but the student may take six hours of any non-remedial courses in place of ENGL 1013/1023.

- AP results will not generally be available during early summer registration. Much of the schedule building will thus have to be based on educated guesses (How well do you think you did on a particular AP test?), which will be revised as needed later.

CHEG 1113, Introduction to Chemical Engineering I

Your first Chemical Engineering class will be CHEG 1113, Introduction to Chemical Engineering I, taught by Dr. Clausen. The course is an introduction to the chemical engineering profession (careers, the Chemical Process Industry, equipment, largely through examples), but also covers technical topics including material balances, which are the first step in designing a process or piece of equipment. The course is taught from D.M. Himmelblau and J.B. Riggs, *Basic Principles and Calculations in Chemical Engineering*, 7th ed, Prentice Hall, 2004, and covers the following topics:

Chapter 1—Dimensions, Units and Their Conversion

Chapter 2—Moles, Density and Concentration

Chapter 3—Choosing a Basis

Exam 1

Chapter 4—Temperature

Chapter 5—Pressure

Chapter 9—The Chemical Reaction Equation and Stoichiometry

Exam 2

Chapter 6—Introduction to Material Balances

Chapter 7—A General Strategy for Solving Material Balance Problems

Chapter 8—Solving Material Balance Problems for Single Units Without
Chemical Reaction

Chapter 10—Material Balances for Processes Involving Reaction

Exam 3

Chapter 11—Material Balance Problems Involving Multiple Units

Chapter 12—Recycle, Bypass, Purge and the Industrial Application of
Material Balances

Exam 4

Introduction to Process Simulators for Solving Material Balance Problems

Final Exam, Comprehensive

CHEG 1113 is followed in the first year by CHEG 1123, Introduction to Chemical Engineering II (also taught by Dr. Clausen) and CHEG 1212L, Chemical Engineering Laboratory I (taught by Dr. Babcock). Thus, the beginning student gets a good flavor about the chemical engineering profession from the start.