

Handbook for New Students

2017-2018



Ralph E. Martin Department of Chemical Engineering

3202 Bell Engineering Center

Fayetteville, AR 72701

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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. As a new Chemical Engineering student, you are joining a distinguished group of U of A Chemical Engineers 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.

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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 15 faculty, about 310 undergraduates and about 45 graduate students
- Has research activities in biological systems, biomaterials, biomedical engineering, biomolecular separations, chemical hazards, chemical separations, sustainability, material science for microelectronics, membrane systems, water treatment and petroleum processing. A brief description of these opportunities and the faculty heading the research efforts may be found at <http://chemical-engineering.uark.edu/research/index.php>.
- Typically enrolls 80-100 new undergraduate students each year (students enter chemical engineering as freshmen, transfer students or from the Freshman Engineering Program)
- Has average annual starting salaries for B.S. chemical engineers of just under \$70,000
- 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

For more information on Chemical Engineering as a profession, visit <http://www.careercornerstone.org/chemeng/profiles/chemengprofiles.htm> or <http://www.whynotchemeng.com/>.

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, but still use it as a tool.
- Many chemical engineers are interested in solving some of the world's really big problems such as cleaning up the environment, having a sustainable water supply, 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 very close to 100%. Many of our students are placed well before graduation. However, we have recently seen a downturn in jobs in energy and chemicals, which makes career preparation by participating in co-ops and internships very important.
- The average annual starting salary for B.S. chemical engineers was just under \$70,000 in 2015-2017.
- 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 Fall AIChE student chapter meetings, and our Department works one-on-one with students and graduates in assisting them in finding co-op, internship and permanent employment.
- Some of our graduates choose to further their education in graduate school or attend professional schools such as medical school, pharmacy school, dental school or law school. Research opportunities with our faculty or through NSF-sponsored REUs are ways to make you more competitive for these opportunities.

Permanent Employment, Classes of 2011-2017

Opportunity	Number of Students						
	2011	2012	2013	2014	2015	2016	2017
3M						1	
ABB						1	
Albemarle	5	2	2		1		
Alcoa						1	
Almatis				1		1	
Apogee Trading				1			
AR Dept Environ Quality						1	
Ashland Hercules				1			
Baker-Hughes				2			
Black & Veatch							1
BNSF Railway							2
BP				1			
Burns & McDonnell						1	
CBI	1	2		1	3		
Chemtreat						1	
Chevron						1	
Conoco Phillips				1	1		
Cross Oil			1				
CTS					1		
Dayco				1			
Delek Refining					1		
Domtar	1			1	1	1	1
Dow Chemical	3	2	1	2	2		1
Eagle Picher			1				
Eastman Chemical	2	5	4	3	3	6	1
Engineered Polymer Solutions (ESA)				1			
EPIC							1
Ergon Refineries				1			
Exterran					1		

Flint Hills Resources						1	
Ford, Bacon					1		
FM Global			1	2	1	1	1
FutureFuel					1	1	1
GE Water Systems		1					
Georgia Pacific				5	1	3	2
Halliburton	3						
Holly Frontier Refining		1					
Honeywell					1		
INEOS Bio				1			
Innovative IDM						1	
International Paper			1				
Invista						1	
Kinder Morgan						1	
Koch Industries					1		
KPT							1
L'Oreal			1				
LyondellBasell		1		2		1	
Maverick Technologies		2	2		1	1	
Merck	1						
Nalco					2	1	1
PepsiCo	1						1
Peterson Chem Tech							1
Porocel			2		1		
Process Dynamics			1		1		1
Quorum Business Sol				1		1	
Riceland							1
Roddy Engineering			1				
SI Group							1
Solares							1
Solenis							1
Southwestern Energy	1		1	1			
Spartan Engineering		1					
Stark Manufacturing						1	
Trinity Consultants	1		1	2	1	1	
U.S. Air Force							1

Valspar	1						
Wilbros		1					
Zeeco			1	1		4	1
Self-employed		1			1		
Professional Schools							
Business School				1	1		2
Dental School		1					
Graduate School	6	2	6	9	3	4	16
Law School			1		1		
Medical School		2	2	2		1	1
Pharmacy School	1		1	2			
Military	1				1		

Freshman 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 must enroll in the Freshman Engineering Program. However, some advanced placement freshmen may elect to concurrently enter Chemical Engineering if they meet the chemistry and math prerequisites. Depending on academic standing, transfer students may be directed to Freshman Engineering if participation in the program enhances progress toward their degrees, or they may enter Chemical Engineering without Freshman Engineering.

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

AP credit for some of the more common AP classes is shown in the table below. A more detailed list of AP classes and corresponding credit is shown in the U of A catalog, accessible at

<http://catalog.uark.edu/undergradcatalog/academicregulations/advancedstandinprograms/#advancedplacementtext>. Similar tables in the catalog of studies may be used in determining CLEP or IBE credit.

AP Exam	U of A Course	Minimum Score
Calculus AB	MATH 2554	3C
	MATH 2554	4C
	MATH 2554H	5C
Calculus BC	MATH 2554 & MATH 2564	3C
	MATH 2554 & MATH 2564	4C
	MATH 2554H & MATH 2564H	5C
Chemistry	CHEM 1103/1101L & CHEM 1123/1121L	4C
	CHEM 1103/1101L & CHEM 1123H/1121M	5C
Physics 1	PHYS 2013/2011L	3C
Physics 1 & Calculus AB or BC score of 3	PHYS 2054	3Cq, 4C
	PHYS 2054H	5C
Physics B	PHYS 2013/2011L & PHYS 2033/2031L	3C
Physics B & Calculus AB or BC score of 3	PHYS 2054 & PHYS 2033/2031L	3Cq, 4C
	PHYS 2054H & PHYS 2033/2031L	5C
Physics C Mechanics	PHYS 2054	3Cq, 4C
Physics C, E & M	PHYS 2074	3Cq, 4C
Psychology	PSYC 2003	3C
Literature and Composition	ENGL 1213	4C
	ENGL 1213H	5C
Language and Composition	ENGL 1013	3E
	ENGL 1013	4C
	ENGL 1013H	5C
Government and	PLSC 2003	3C, 4C

Politics: U.S.	PLSC 2003H	5C
European History	HIST 1123	4C
U.S. History	HIST 2003 or HIST 2013	4C
	HIST 2003 & HIST 2013	5C
World History	HIST 1113 or HIST 1123	4C
	HIST 1113 & HIST 1123	5C

The Chemical Engineering Curriculum . . .

The educational objectives of our chemical engineering program are to prepare students for career and professional accomplishments after graduation including:

- Successfully practice as an engineer or in some other professional pursuit, including traditional or emerging fields of chemical engineering.
- Enter and successfully participate in a graduate or professional program that continues their career development.

The program prepares graduates to achieve these educational objectives through the development of skills as outlined in our educational outcomes and taught in our curriculum.

In support of the department's Educational Objective, the curriculum includes a foundation in mathematics and the basic sciences, the humanities and social sciences, engineering sciences, engineering design methods, and specific chemical engineering skills such as 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. The undergraduate curriculum recognizes the importance of biology and biochemistry by applying chemical engineering principles to these systems within the context of required chemical engineering coursework and potential research experiences available to undergraduate students.

Students take several Chemical Engineering courses in their first year in the program (sophomore year, after Freshman Engineering), which helps to introduce the chemical engineering profession to students early in their academic careers, as well as preparing students for industrial co-ops and internships. 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

The following table shows the suggested four-year Chemical Engineering curriculum, and the diagram following the table shows the same curriculum in advising form format. Please realize that students make their way through the

curriculum at different rates; an academic advisor will help you determine the pace that is best for you.

Fall—Year 1

MATH 2554, Calculus I
 CHEM 1103, University Chemistry I
 ENGL 1013, Composition I
 PHYS 2054, University Physics I
GNEG 1111, Introduction to Engineering I
 15 hours

Fall—Year 2

MATH 2574, Calculus III
 CHEM 3603, Organic Chemistry I
 CHEM 3601L, Organic Chemistry I Lab
 CHEG 2113, Intro to Chemical Engineering
 Humanities/Social Science Elective, 3 hours
HIST 2003, HIST 2013 or PLSC 2003
 17 hours

Fall—Year 3

CHEM 3813, Intro to Biochemistry or
 CHEM 4813H, Honors Biochemistry I
 Design
 CHEG 3144, Heat and Mass Transfer
 CHEG 3323, Thermodynamics of
 Multicomp. Systems
 ECON 2143, Basic Economics (ECON 2013
 may be substituted)
Humanities/Social Science Elective, 3 hours
 16 hours

Fall—Year 4

CHEG 4163, Separation Processes
 CHEG 4413, Chem Engr Design I
 CHEG 4813, Chemical Process Safety
 Advanced Science Elective, 3 hours
Technical elective, 3 hours
 15 hours

Spring—Year 1

MATH 2564, Calculus II
 CHEM 1123, University Chemistry II
 CHEM 1121L, University Chemistry II Lab
 ENGL 1023, Composition II
 PHYS 2074, University Physics II
GNEG 1121, Introduction to Engineering II
 16 hours

Spring—Year 2

MATH 2584, Differential Equations
 CHEM 3613, Organic Chemistry II
 CHEM 3611L, Organic Chemistry II Lab
 CHEG 2133, Fluid Mechanics
 CHEG 2313, Thermodynamics of Single Comp
Humanities/Social Science Elective, 3 hours
 17 hours

Spring—Year 3

CHEG 3713, Materials Technology
 CHEG 3333, Chemical Engr Reactor
 CHEG 3253, Computer Methods
 CHEG 3233, CHEG Lab I (Junior Lab)
 Humanities/Social Science Elective, 3 hours
Technical Elective, 3 hours
 18 hours

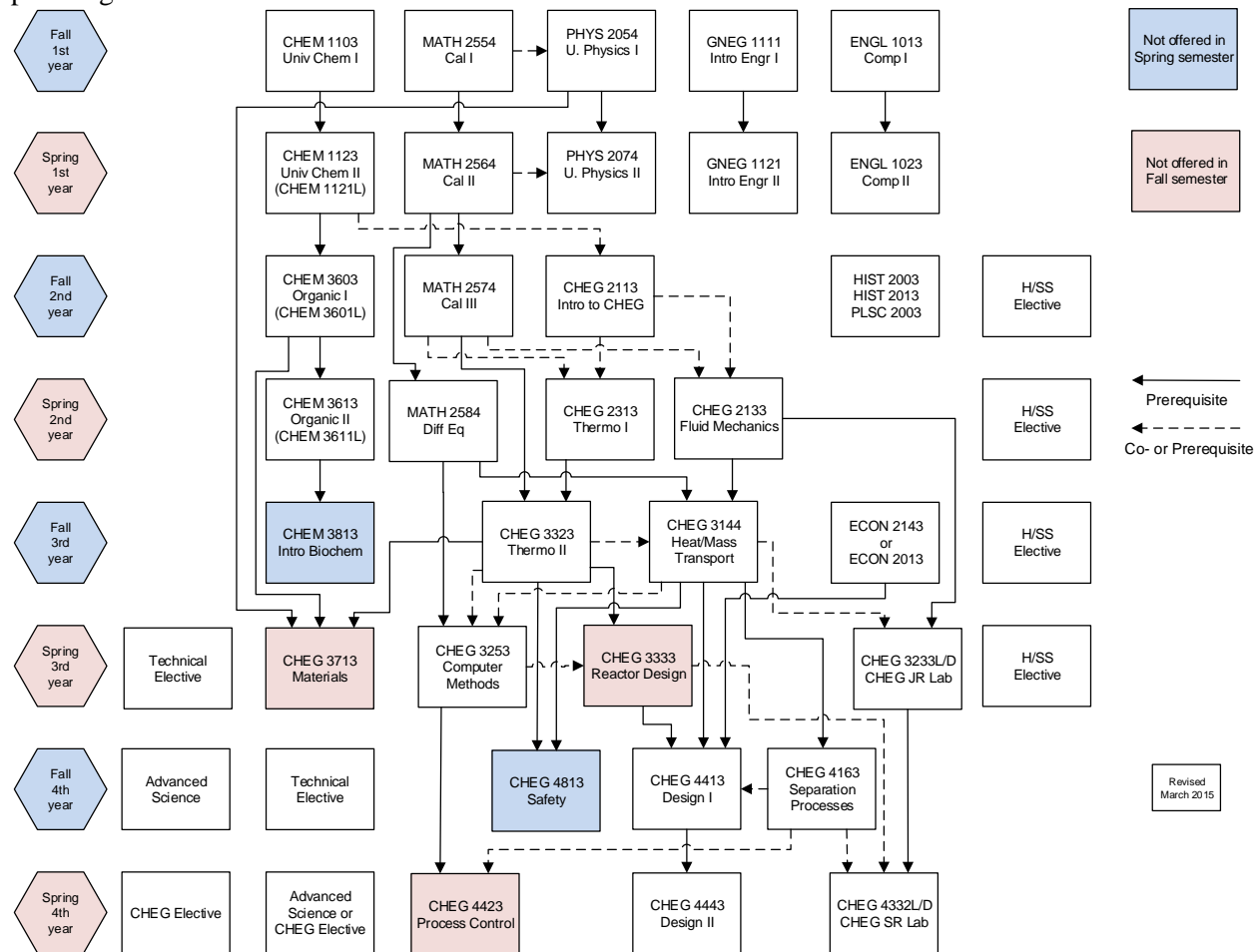
Spring—Year 4

CHEG 4332, CHEG Lab II (Senior Lab)
 CHEG 4423, Auto Process Control
 CHEG 4443, Chem Engr Design II
 CHEG elective, 3 hours
Advanced Science or Technical elective, 3 hours
 14 hours

University of Arkansas
Ralph E. Martin Department of Chemical Engineering
Fall 2015 (128 hour) plan

Name: _____ **ID:** _____ **Semester:** _____

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



History/HSS Electives (18 hr)

1. HIST 2003, 2013 or PLSC 2003
2. Hum: _____
3. Fine Arts: _____
4. Soc Sci 1: ECON 2143 or ECON 2013
- hr)**
5. Soc Sci 2: _____
6. Soc Sci 3: _____

Technical Elective (6 hr)

1. _____
2. _____

Advanced Science/CHEG Electives (9

1. _____ (AS)
2. _____ (AS/CHEG)
3. _____ (CHEG)

Undergraduate Research Opportunities . . .

- Opportunities are available for undergraduate Chemical Engineering majors to participate in research through the Honors Program, Research Experience for Undergraduates (REUs) or by arranging to work with an individual faculty member. The Chemical Engineering Department has research activities in biological systems, biomaterials, biomedical engineering, biomolecular separations, chemical hazards, chemical separations, sustainability, material science for microelectronics, membrane systems, water treatment and petroleum processing. A brief description of these opportunities and the faculty heading the research efforts may be found on the departmental website, at <http://chemical-engineering.uark.edu/research/index.php>.
- 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 *at the U of A*. Information on these opportunities may be found on the Honors College website, <http://honorscollege.uark.edu/current-students/research-grants/index.php>.
- Many students participate in research activities as undergraduates, and some participate as early as their freshman year. Freshman Engineering (FEP) has programs that allow high achieving students to participate in research or entrepreneurial activities as freshmen.
- Summer REU opportunities are available at universities throughout the U.S. Check out these opportunities on the departmental website, at <http://chemical-engineering.uark.edu/academics/undergraduate-program/summer-research-programs.php>.
- A student can get involved with research by just starting a dialog with a faculty member about his/her research program.
- About 20% of our students participate in research each school year, either through REUs or with faculty mentors.

Chemical Engineering Undergraduate Students Participating in Research

Faculty Member/ Opportunity	Number of Students					
	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
NSF-Sponsored REUs	5	1	3	8	6	5
Faculty-Sponsored Research Mentor						
Ackerson				1		
Babcock						
Beitle	5	2	1	5	5	4
Greenlee					2	12
Havens				1		
C. Hestekin	2	2	1	1	4	4
J. Hestekin	8	5	10	10	1	2
King	3					
Roper	7	3	3	3	6	4
Servoss	8	8	5	8	7	4
Spicer			2	2	2	6
Thoma					1	4
Wickramasinghe	2	3		1	1	3
Non-ChE faculty	3	7	10	10	9	15

The Honors Program in Chemical Engineering . . .

- Offers special advantages (special Honors programs, 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 3.50 and an ACT score of 28 for admission of freshmen, and a 3.50 gpa on transfer courses for admission of transfer students
- Requires 12 hours of Honors courses (at least six in Chemical Engineering), a university gpa of 3.50 and an Honors thesis for graduation with Honors

To apply to the Honors program, go to
<http://honorscollege.uark.edu/apply/index.php>.

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. Although the difference between a co-op and an internship is a bit muddled, a co-op generally 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 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 \$35 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.
- Each year about one third of our students participate in co-ops or internships with companies that also hire our graduates. A large majority of our graduates participate in co-op or internship activities sometime during their stay at the U of A.

Chemical Engineering Undergraduate Students Participating in Co-ops and Internships

Company Sponsoring Co-op/Internship	Number of Students					
	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Abbott Labs			1			
Aera Energy, LLC			1	1		
Air Products		1				
Albemarle	2	6	3	3	3	1
Almatis	1	1				
Apex Tool Group				1		
Arkansas Dept of Health						1
Ashland Hercules	5	4	3	4	3	2
Bakaert						1
Baru Brewery			1			
Biotech Pharmacal						1
Black & Veatch						1
Borco						1
Boston Scientific						1
BNSF Railway						1
BP	1	1				
Brewer Science					1	1
Buckman USA				1	1	1
Calumet				1		
CASI						1
CBI						1
CenArk Construction					1	
CE Water Mgmt					1	
CH2M Hill	1					
Chesapeake Energy			1			
Chevron				1		
Chirocloud, LLC			1			
Clorox					1	1
Cornerstone Automation					1	

Cross Oil	3	4	5	5	2	
Dayco		3	3	2	1	1
Denbury Blade			1	1		
Domtar	3	5	2	4	4	2
Dow Chemical	1	4	6	5	3	2
Drill Chemical Drilling Solutions			1			
Eagle Picher	1			1	1	
Eastman Chemical	7	5	9	5	8	5
El Dorado Chemical					1	
Eli Lilly						1
Engineering Institute			1			
Envirotech						1
EPC Gas Processing						1
Ergon Refining	2	2	2	1	1	1
Experitec	1			1		
Evonik						1
Fiber Glass Systems	1					
Flint Hills Resources						1
FutureFuel	1				1	1
GCC			1			
GE Healthcare			1			
Georgia Pacific	1	3		6	2	3
Green Bay Packaging	6	5	3	1	4	5
Halliburton					2	1
Helena Chemical						1
Hercules					1	
Hershey					2	2
Holly Frontier		1	1			
Huber Specialty Hydrates						1
INEOS Bio					1	
Ingersol Rand						1
International Paper		1				
Invista				1		

IRST	1					
Johnson & Johnson		1				
Kimberly Clark			1	1		
Kinder Morgan				1	1	
Kohler Co.	1					
Kraft Foods					1	
Kroff Process Tech					1	1
LANL						1
Lawrence Livermore Lab		1				
Lion Oil		1				
Lockheed Martin					1	
L'Oreal	1				1	6
LyondellBasell	3	5	6	6	7	9
Martin Partnership			3	1	2	4
Maverick Technologies	1	2	4	4	1	
McClelland Consulting Engr	1					
MME	1					
Motiva					1	
M & S Engineering						1
Multi-Craft Contractors				1	1	1
Nalco			2	1	3	3
NanoMech	1	1				
NASA		1				
Nestlé Gerber	1					
Northwest Medical			1			
Novation						1
NREL				1		
NRHS				1		
Owen Construction					1	
Pal-Harmany					1	
Petroleum Co. of Trinidad	1					
Phoenix Engineering					1	

Press Energy						1
Process Dynamics	8	5	2	2	1	4
Pryor Chemical					1	
Regard Resources				1		
Roddy Engineering		2	1			
SBDI					1	
Schreiber Foods				1		
SFI		1				
SI Group					1	
Simmons Foods					1	
Smuckers					1	
Solae (DuPont)			1	1		1
Solenis					1	2
Southwestern Energy	1	3				
Superior Industries		2	2	1	2	2
TAMKO Bldg Prod			1			
Technip			1			
Technologia Industrial			1	1	1	
Terra Renewal Services		1				
Tesseract Struc Inno					1	1
Tidewater					1	
Toth and Associates	1					
Tyson Foods					1	2
UAMS						1
Unilever				1		
Union Power Station		1				
USAA					1	
U.S. Army Corps of Engineers	1					
USA Truck						1
U.S. Bureau of Reclamation				1		
U.S. Dept of the Interior	1					

U.S. EPA				1		
U.S. Fish & Wildlife			1			
U.S. Government						1
U.S. Navy					1	
Valspar	1	1	2			
Woodbridge Foam					1	
WWT						1
Zeeco	1			1	1	

Study Abroad . . .

- Students may augment their academic experiences by studying abroad for a summer or semester. This has become more popular in recent years.
- 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, and the College of Engineering has study abroad programs in Belize, India, Spain and Italy. Information on these and other programs can also be obtained from the Office of Study Abroad and International Exchange.
- Funds are available for Study Abroad through the Honors Program (go to <http://honorscollege.uark.edu/current-students/study-abroad-grants/index.php>) and the Office of Study Abroad and International Exchange (go to <http://studyabroad.uark.edu/students/scholarships.php>). Students may apply existing U of A scholarships to study at the University of Newcastle.

AIChE Student Chapter . . .

- Is an 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 and Process Engineering talk about their companies and their jobs
- Helps you prepare for the Career Fair
- Has several social events (picnics, faculty chili cook-off, intramural sports) each year
- If you would like to be informed of AIChE meetings and other activities, contact Dr. Jeremy Herman at jjh004@uark.edu.

Omega Chi Epsilon . . .

- Is a national Chemical Engineering Honor Society for junior and seniors that academically rank near the top of their classes
- Performs special service projects that aid the department, college, university or community
- If you would like to learn more, contact Dr. Shannon Servoss at sservoss@uark.edu

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
- If you are interested in learning more about the organization, contact Dr. Christa Hestekin at chesteki@uark.edu

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 University-wide Current Student, Engineering and Chemical Engineering scholarships are available at <http://scholarships.uark.edu/>. This 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://finaid.uark.edu>.

If you are a minority Chemical Engineering student, ask about special scholarships available from the American Chemical Society.

Advising . . .

Advising and registration for Freshman Engineering students will be in Freshman Engineering. When you enter Chemical Engineering, the Associate Department Head, Dr. Ed Clausen, will serve as your academic advisor. Advising occurs through one-on-one meetings with Dr. Clausen. Do not hesitate to contact Dr. Clausen (eclause@uark.edu) if you have advising questions or questions about chemical engineering as a major or profession.

What Do I Take This Fall?

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

MATH 2554, Calculus I
 CHEM 1103, University Chemistry I
 ENGL 1013, Composition I
 PHYS 2054, University Physics I
GNEG 1111, Introduction to Engineering I
 15 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 1284, Precalculus, to MATH 2584, Differential Equations, depending upon an individual’s ACT, AP, CLEP and Math Placement scores).
- Most students will take CHEM 1103, University Chemistry I, but some will have AP credit for both CHEM 1103 and CHEM 1123/1121L, University Chemistry II with lab. If you have credit for these courses, you might want to look at CHEG 2113, Introduction to Chemical Engineering, but only if you are pretty sure you want to be a chemical engineer. Most entering freshmen are not ready for CHEM 3603/3601L, Organic Chemistry I. If you wish to take Organic Chemistry as a freshman, consult your advisor.
- 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) humanities/fine arts/social science electives (a list of approved courses may be found at <http://catalog.uark.edu/undergradcatalog/academicregulations/universitycore/>).
- 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.
- Transfer students may or may not wish to take the Freshman Engineering (FEP) classes (GNEG 1111, GNEG 1121, GNEG 1103), depending on their progress in math and chemistry. Consult a chemical engineering advisor or FEP advisor to see what is best for you.

CHEG 2113, Introduction to Chemical Engineering

Your first Chemical Engineering class will be CHEG 2113, Introduction to Chemical Engineering, taught by Dr. Clausen, either taken in the freshman year by advanced students or taken in the sophomore by a majority of the chemical engineering students. The course is an introduction to the chemical engineering profession (the profession, careers, the Chemical Process Industry and current events in the industry, equipment, communication, ethics), 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*, 8th ed, Prentice Hall, 2012, and covers the following topics:

- The Chemical Engineering Profession
- Chemical Engineering and Society
- Ethics
- Making Oral Presentations
- Dimensions, Units and Their Conversion
- Moles, Density and Concentration
- Choosing a Basis
- Temperature
- Pressure
- The Chemical Reaction Equation and Stoichiometry
- Introduction to Material Balances
- A General Strategy for Solving Material Balance Problems
- Solving Material Balance Problems for Single Units Without Chemical Reaction
- Material Balances for Processes Involving Reaction
- Heats of Reaction
- Material Balances for Reaction Processes, including Heats of Reaction
- Material Balance Problems Involving Multiple Units
- Recycle, Bypass, Purge and the Industrial Application of Material Balances