

ECHE Advisement Interviews

(Students admitted Fall 2012 and later)

Preparing for Your Advisement Interview

1. Review this Advisement Packet to familiarize yourself with opportunities for academic program enhancement (concentrations, minors, BS/Masters) and beyond-the-classroom experiences (co-op, research, study abroad).
2. Complete the Professional Development Plan form, bring a copy to advisement, and be prepared to discuss your answers with your advisor.
3. Print a copy of your current résumé and bring it to your Advisement Interview.
4. Prepare a list of the courses you plan to take in the next 2 semesters and bring it to advisement. The best way to do this is to print and mark up a copy of the Undergraduate Curriculum Flowchart, indicating courses completed, in progress, and planned for at least the next two semesters.

Purpose

The advisement interview is an ongoing student/advisor discussion that will help you:

- re-assess your personal aspirations and career interests;
- set long-term professional development goals; and
- develop a “Professional Development Plan” outlining coursework and beyond-the-classroom experiences that will help you achieve your career goals.

A Professional Development Plan, developed with our advice, will help you achieve one of the following milestones:

- Advance professionally in the chemical process industries or in their chosen career field.
- Earn advanced degrees in chemical engineering (or a related technical discipline), medicine, law, or business.
- Attain leadership positions in today’s rapidly changing, increasingly technological, global society.

If you are able to achieve one or more of these milestones within six years of graduation, then the B.S.E. degree program in Chemical Engineering will have fulfilled its Program Educational Objective as required for ABET accreditation.

Advisement Interview Questions

Your advisor will ask you the following questions during your advisement interview. You should be prepared to discuss these questions by answering them, in writing, on the Professional Development Plan form.

- What are your professional or career goals after graduation?
- Are you doing anything (in addition to coursework) to help you prepare for the next step in your career? Have you considered opportunities for academic program enhancement (concentrations, minors, BS/Masters) and beyond-the-classroom experiences (co-op, research, study abroad) that can help you achieve your career goals?
- What are the next steps in your “Professional Development Plan”? How can we help you take these next steps? What are your action items?
- What courses have you completed, and in what courses are you currently enrolled? What courses will you take the next two semesters? When do you plan to graduate?

Advisement Follow-up

If you have an interest in any academic program enhancements (concentrations, minors, BS with Distinction, etc.) or beyond-the-classroom experiences (co-op, internships, research experiences, study abroad), please tell your advisor so that we may contact you again for follow-up action.

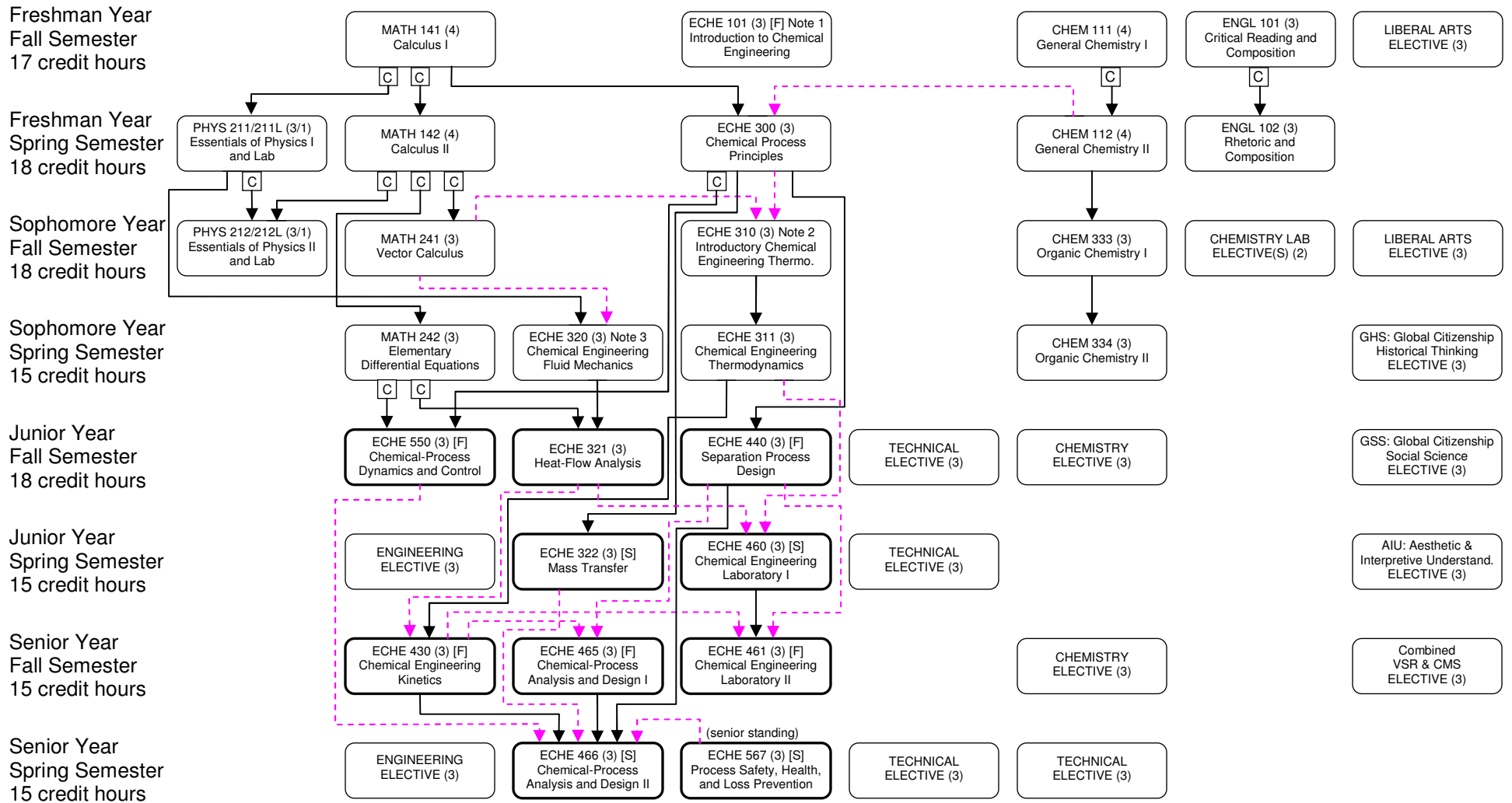
ECHE Advisement Information (Students admitted Fall 2012 and later)

Contents

1. ECHE Curriculum Flowsheet (students admitted Fall 2012 or later)
2. ECHE Curriculum Guidesheet (students admitted Fall 2012 or later)
3. Liberal Arts and Fine Arts Requirements (students admitted Fall 2012 or later)
4. ECHE Elective Course List (Engineering, Technical, and Chemistry Electives)
5. Syllabus for ECHE 202: Preparation for the Chemical Engineering Workplace
6. Optional Concentrations within the ECHE Curriculum
7. B.S.E. with Distinction
8. Co-op Options: ECHE Curriculum Course Tables
9. Chemical Engineering Undergraduate Student Options
 - a. Beyond-the-Classroom Experiences: web links for more information on co-op employment, internship employment, REU and research opportunities, and study abroad programs
 - b. Academic Program Enhancement: web links to Undergraduate Bulletin pages for the Co-op for Credit course, ECHE program concentrations, minors in related fields, B.S.E with Distinction, Accelerated BS/Masters, and Senior Privilege

Department of Chemical Engineering

Bachelor of Science in Engineering Curriculum & Flowchart of Prerequisites



Note 1. ECHE 101 or ENCP 101
 Note 2. ECHE 310 or ENCP 290
 Note 3. ECHE 320 or ENCP 360

Legend:

- Prerequisite
- C → Prerequisite (Grade of C or better)
- - - → Prerequisite or corequisite
- UPPER DIVISION COURSES
- [F]: Offered Fall only
[S]: Offered Spring only

Chemical Engineering Guidesheet | Fall 2012

CAROLINA CORE

AIU | Aesth. & Interpretive Understanding

--	--

ARP | Analytical Reasoning & Prob. Solving

MATH 141**

Prereq: Math placement test; or a C or better in MATH 115

MATH 142**

Prereq: C or better in MATH 141

CMW | Communication - Writing

ENGL 101**

ENGL 102**

GHS | Global Citizenship Historical Thinking

--	--

GSS | Global Citizenship Social Science

--	--

SCI | Scientific Literacy

PHYS 211 & L**

Prereq: C or better in MATH 141

PHYS 212 & L

Prereq: C or better in PHYS 211 & MATH 142

GFL | Global Citizenship Foreign Language

test score: _____

Overlay Courses

2 courses may fulfilled General Education requirements

1 course must stand alone

A -- CMS: Spoken Component

B -- INF: Information Literacy

C -- VSR: Values, Ethics, Social Responsibility

OTHER GENERAL EDUCATION

MATH 241**

Prereq: C or better in MATH 142

MATH 242**

Prereq: C or better in MATH 142

CHEM 111**

Prereq: MATH 111 or 115

CHEM 112

Prereq: C or better in CHEM 111 or CHEM 141

CHEM 333

Prereq: CHEM 111 or CHEM 142

CHEM 334

Prereq: CHEM 333

Liberal Arts Elective stand-alone overlay course

Liberal Arts Elective

Liberal Arts Elective must be 300 or higher level

LOWER DIVISION ENGINEERING

ECHE 101/ENCP 101

ECHE 300

Prereq: MATH 141; Pre or Coreq: CHEM 112

ECHE 310/ENCP 290

Pre or Coreq: ECHE 300, MATH 241

ECHE 311

Prereq: ECHE 310 or ENCP 290

ECHE 320/ENCP 360

Prereq: PHYS 211, Pre or Coreq: MATH 241

**** must be a C or higher**

Chemical Engineering Guidesheet | Fall 2012

UPPER DIVISION ENGINEERING

ECHE 321	
Prereq: ECHE 320 or ENCP 360, C or better in MATH 242	
ECHE 322	
Prereq: ECHE 300	
ECHE 430	
Prereq: ECHE 311; Pre or coreq: ECHE 321	
ECHE 440	
Prereq: ECHE 300	
ECHE 460	
Coreq: ECHE 311 and 321	
ECHE 461	
Prereq: ECHE 460; Coreq: ECHE 430 and 440	
ECHE 465	
Prereq: ECHE 430 and 440	
ECHE 466	
Prereq: ECHE 430, 440, 465; Pre or coreq: ECHE 322, 550, 567	
550	
Prereq: C or better in ECHE 300 and MATH 242	
ECHE 567	
Prereq: Senior standing	

ENGINEERING ELECTIVES

Chosen from:	
BMEN 211, 260, 271, 290, 342, 345, 354, 361, 390, 589;	
ENCP 200 (or ECIV 200 or EMCH 200), 210 (or ECIV 210 or EMCH 310), 260 (or ECIV 220 or EMCH 260), 330, (or EMCH 330), 540, 481, 499, 540;	
ECHE 389, 456, 498, 499, 520, 571, 572, 573, 574, 589;	
ECIV 320, 325, 327, 330, 350, 362, 426, 500 and above;	
ELCT 220, 221, 222, 321, 331, 332, 350, 353, 361, 362, 371, 500 and above;	
EMCH 111, 201, 308, 367, 371, 441, 500 and above.	

CHEMISTRY ELECTIVES

Chosen from:	
CHEM 118, 318, 321, 340, 511, 533, 541, 542, 545, 550, 555, 556, 621, 622, 623, 624, 633, 644	

CHEMISTRY LAB ELECTIVES

Chosen from:	
CHEM 321L, 331L (or 333L), 332L (or 334L), 540L, 541L, 542L, 550L, 591L, 592L, 621L	

TECHNICAL ELECTIVES

All courses listed as Engineering electives, Chemistry electives, and Chemistry lab electives, as well as:	
BIOL 101, 101L, 102, 102L, 250, 250L, 260, 270, 270L, 301, 301L, 302, 302L, 303, 415, 460, 502, 541, 541L, 570, 571L, 572, 575; CSCE 145, 146, 207, 211;	
GEOL 510, 560, 570, 571, 575; MATH 374, 500 and above;	
MSCI 390, 521, 537, 582; PHYS 307, 500 and above;	
STAT 500 and above except 541 and 591.	

Liberal Arts Requirements

All University of South Carolina students* must fulfill the University's general education requirements, known as the Carolina Core†. The B.S.E. curriculum in Chemical Engineering has additional liberal arts requirements beyond those specified by the Carolina Core. These requirements and their integration with the Carolina Core are described below.

1. ENGL 101 and 102 are required and must be completed with a grade of "C" or better. These courses fulfill the CMW and INF requirements of the Carolina Core. Note: students with transfer, AP or IB credit for ENGL 102 must take an approved Carolina Core INF course at the University of South Carolina.
2. The B.S.E. curriculum in Chemical Engineering requires six additional liberal arts courses (18 credit hours). Within this set of courses, approved Carolina Core courses should be selected to fulfill the Core's AIU, CMS, GHS, GSS, and VSR requirements. Additional liberal arts courses (beyond those chosen to fulfill Core requirements) must be selected from the approved list of liberal arts electives (see below).
3. At least one of the six liberal arts courses must be at the 300-level or above and in the same field of study as one of the other five courses.
4. Foreign Language: the Carolina Core GFL requirement may be satisfied by a score of "2" or more on a foreign language placement test or completion of approved Carolina Core GFL courses.

LIST OF APPROVED LIBERAL ARTS COURSES

All approved Carolina Core courses for AIU, CMS, GFL, GHS, GSS, and VSR

AERO 401, 402 (POC Cadets only)
AFAM 201, 202, 335
ANTH 101, 102, 205, (*) except 399, 501
ARTE 101
ARTH 105, 106, (*) except 399, 498, 499, 599
ARMY 406, 407 (Army cadets only)
CPLT Any course; (**)
DANC 101
ECON 221, 222 or 224, (*) except 399, 421, 499, 524, 595
ENGL Any course above 102; (**) except 460 through 467
Foreign languages 121, (*) except intensive reading courses or courses about teaching
GEOG 103, 121, 200, (*) except 399, 595
HIST Any course
LASP 301, 311, 312, 315, 322, 331, 351, 398, 425, 451, 454, 455
LING 300, 340, 405, 422, 505, 540, 541, 542, 543, 545, 567, 600
MUSC 110, 140, 145, any music history course at or above 300 level
NAVY 303 (Midshipmen only)
PHIL 102, (*)
PSYC 101, 103, (*) except 570 to 599
POLI Any course except 379, 399
RELG Any course
SOCY 101, (*) except 399
THEA 200, 561, 562
WGST 111, 112, 113, 300, 301, 304, 305, 307, 308, 310, 351, 352, 358, 430, 454, 525, 554, 555

(*) courses at the 300 level or above, with exceptions noted

(**) courses numbered 270 and above count as 300-level, with exceptions noted

* Students enrolling for the first time at any USC campus in Fall 2012 or subsequent semesters.

† See www.sc.edu/carolinacore for definitions of component abbreviations, the list of approved Carolina Core courses, and other details.

Chemical Engineering Elective Courses (Students admitted Fall 2012 or later)

Engineering Electives (6 hours)

ENCP 200 (or ECIV 200 or EMCH 200), 201 (or EMCH 201), 210 (or ECIV 210 or EMCH 310), 260 (or ECIV 220 or EMCH 260), 330 (or EMCH 330), 460, 481, 499, 540; BMEN 211, 260, 271, 290, 300 and above, except 301 and 303; CSCE 211, 212, 240, 313, 317, 374; ECHE 202 (in combination with two credit hours of ECHE 499 for co-op students), 372, 389, 456, 497, 499, 520, 571, 572, 573, 574, and 589; ELCT 220, 221, 222, 300 and above; ECIV 300 and above, except 360; EMCH 300 and above, except 354 and 360.

Chemistry Electives (6 hours)

CHEM 321, 511, 533, 541, 542, 545, 550, 555, 556, 621, 622, 623, 624, 633, 644.

Chemistry Lab Electives (2 hours)

CHEM 321L, 331L (or 333L), 332L (or 334L), 541L, 542L, 550L, 591, 592, 621L.

Technical Electives (12 hours)

Includes all courses listed as Engineering Electives, Chemistry Electives, and Chemistry Lab Electives as well as ENCP 102 (or EMCH 111), MATH 374, 500 and above; STAT 500 and above, except 541 and 591; BIOL 101, 101L, 102, 102L, 120, 120L, 200 and above; GEOL any course; MSCI any course; PHYS 300 and above; CSCE 145, 146, 206, 210, 215, 350.

ECHE-202: Preparation for the Chemical Engineering Workplace

Required Text

Myers-Briggs Type Indicator (MBTI) - (\$15.00)

Required Readings (TBA)

Readings will be provided during class or posted on Blackboard. Students will be provided with electronic and/or copies of relevant readings.

Course Description: (1 credit: 1, 75 minute lecture per week for 10 weeks)

This course will help students identify their interests and actively explore careers in chemical engineering. Students will identify why experiential education and skill development are critical components of career preparation. This course will provide practical tools for workplace preparation and performance.

Course Learning Outcomes

I. Develop students self awareness

As a result of this course, students will:

- a. be able to identify their work related interests
- b. be able to identify their work related values
- c. be able to identify their personality preferences

II. Educate students about the world of work and current workplace trends

As a result of this course, students will:

- a. be able to identify significant events in the history of work;
- b. be able to identify current trends shaping the global marketplace;
- c. develop a greater understanding of select occupations;
- d. be able to identify the competencies necessary to be competitive in today's workplace; and
- e. be able to research and report on specific chemical industries.

III. Educate students about experiential education

As a result of this course, students will:

- a. be able to define experiential education;
- b. be able to articulate and reflect on the value of experiential education;
- c. be able to identify experiential education opportunities; and
- d. educate their peers on the diversity of experiential education opportunities available.

IV. Develop tools and competencies relevant to the world of work

As a result of this course, students will:

- a. participate in networking activities with employers;
- b. develop oral presentation skills;
- c. develop appropriate writing skills related to job searching activities;
- d. develop skills in teamwork and leadership through group projects; and
- e. recognize competencies necessary in today's workplace.

Topics

1. Student self awareness towards interests, values and personality preferences. (2 week)
2. History, current trends, and opportunities in the chemical industries. (2 weeks)
3. Value and opportunities in experiential education. (3 weeks)
4. Tools and competencies relevant to the world of work. (3 weeks)

Academic Integrity & Responsibility

The University of South Carolina expects high standards in all areas from its students. The University, as well as faculty, staff, alumni, and students, believe strongly in the Honor Code. This Code requires acceptance of certain responsibilities and agreement by all students to abide by the spirit of the Honor Code upon entering the University of South Carolina. In order that you may better understand the required responsibilities, the general University community codes are outlined below.

1. It shall be the responsibility of every faculty member, student, administrator and staff member of the University community to uphold and maintain the academic standards and integrity of the University of South Carolina.
2. Any member of the University community, who has reasonable grounds to believe that an infraction of the code of Student Academic Responsibility has occurred, has an obligation to report the alleged violation.

Violation of any of the following standards subjects the student to disciplinary action: bribery, cheating, lying and plagiarism.

Your enrollment in this class signified your willingness to accept these responsibilities and uphold the Honor Code of the University of South Carolina. For further explanation of the Code of Academic Student Responsibility, please refer to the Carolina Community Student Policy Manual

Attendance Policy

This class is treated like a work situation. Just as attendance is required for employment, it is required for class. *The University attendance policy* specifies that students may only 1 class meetings (10% of class time) without penalty. The 2nd absence will result in a grade penalty of one letter grade. The 3rd absence will result in a deduction of 2 letter grades. Quizzes, homework, and participation points cannot be made up except in the case of extreme illness or loss.

Late arrival to class interrupts both your instructor and fellow students. Deductions will be made in your class attendance if you are persistently or excessively tardy to class (more than several minutes). Attendance will be taken each day; **remember that you are expected to contact your instructor in advance any time you will miss class.**

General Expectations

1. Attendance & Timeliness
2. Participation & Engagement
3. Academic Integrity
4. Respect for instructors and fellow students
5. Regular use of Blackboard
6. Complete all assignments, group work, activities and readings with respect to due date(s)
7. All electronic devices should be turned OFF during class
8. Bring required reading material to each class meeting

Syllabus Clause and Contract

This syllabus may be revised and adapted throughout the semester to better serve the needs of the class. The instructor may assign additional reading and/or assignments as needed. Additionally, the decision to remain in this class upon receipt of the syllabus serves as the students' acceptance of this syllabus as a binding contract, meaning they agree with the terms set forth and the expectations of them as members of this class.

Class Format and Grading

Classes will be a combination of lecture, discussion, and activities. Homework (75%) and project (25%) will be assigned and completed outside of class. These will make up the final grade. No exams will be given.

Grading Scale

- A = 90-100
- B+ = 85-89
- B = 80-84
- C+ = 75-79
- C = 70-74
- D+ = 65-69
- D = 60-64
- F < 60

Optional Concentrations

The chemical engineering curriculum provides a thorough grounding in the basic sciences of chemistry and physics. It also provides the engineering application of these basic sciences to the design, analysis, and control of chemical and physical processes, including the hazards associated with these processes. This is accomplished through a series of required courses and a variety of technical, engineering and chemistry electives. These program electives allow the student to obtain concentrated knowledge in a specialty area of chemical engineering.

Students may opt to pursue any of the following concentrations.

Concentration in Biomolecular Engineering

Students may choose to select program electives to satisfy the requirements for an optional concentration in Biomolecular Engineering. A student must complete both BIOL 102 and BMEN 392. A student must complete a six hour cell and molecular biology sequence (CHEM 555 and CHEM 556) or (CHEM 550 and BIOL 302). The student must complete two courses (6 credit hours) from the following list of electives: BMEN 546, BMEN 572, BMEN 271, BMEN 389, BMEN 589.

Concentration in Interdisciplinary Engineering

Students may choose to select program electives to satisfy the requirements for an optional concentration in Interdisciplinary Engineering. A student must complete five courses (15 credit hours) from the following list of electives: EMCH 200 (or ECIV 200 or ENCP 200), EMCH 260, EMCH 310, MATH 526, STAT 509, CSCE 206 or ECHE 456, ELCT 220 or ELCT 221, ECHE 372 or EMCH 371, CHEM 621.

Concentration in Materials

Students may choose to select program electives to satisfy the requirements for an optional concentration in Materials. A student must complete five courses (15 credit hours) with two courses (6 credit hours) from ECHE 571, ECHE 572, or ECHE 372. The student must also complete three courses (9 credit hours) from one of three options: (EMCH 200, EMCH 260, and EMCH 310) or (ELCT 220 or ELCT 221, ELCT 363, and ELCT 563 or ELCT 581) or (CHEM 511, CHEM 633, and CHEM 644).

Concentration in Energy

Students may choose to select program electives to satisfy the requirements for an optional concentration in Energy. A student must complete five courses (15 credits), which must include ECHE 573 and ECHE 372, ECHE 571 or ECHE 572. The student must also complete three courses (9 credit hours) from the following list of electives: ECHE 574, ELCT 510, ELCT 563, EMCH 551, EMCH 552, EMCH 553, EMCH 576, EMCH 592, EMCH 594.

B.S.E. with Distinction

The B.S.E. with Distinction is available to students majoring in chemical engineering who wish to participate in significant research and/or design activities in chemical engineering with a faculty mentor.

Prerequisite

A minimum GPA of 3.50 in major courses, 3.50 in all engineering courses, and 3.50 overall at the time the student applies to enter the departmental undergraduate research track.

Requirements

The student should apply to enter the departmental undergraduate research track and choose the members of the thesis committee as early as possible but in all cases at least one year before submitting and defending the thesis. The thesis committee will consist of a thesis advisor, who must be a tenure-track faculty member in chemical engineering, and two other tenure-track or research faculty members in chemical engineering or in any other department.

By the end of the semester in which the student is admitted into the research track, a short description of the research must be agreed upon by the thesis committee and the student, and filed in the college office. Projects involving research and/or design are acceptable. The design projects or research projects for ECHE 465, 466, 567, or other courses are not acceptable as the thesis. The student must also choose three credit hours of engineering or technical elective courses related to the thesis topic. The course(s) must be approved by the thesis committee and completed by the student at least one semester before the thesis is submitted and defended.

Before submitting and defending the thesis, the student must have completed three credit hours of ECHE 499 Special Problems under the thesis advisor, preferably one credit hour per semester. During the semester in which the thesis is submitted and defended the student must also complete three credit hours of ECHE 497 Thesis Preparation, one credit hour under each of the three members of the thesis committee. At least two months before submitting and defending the thesis, the student must present a progress report to the thesis committee orally and in writing.

By the end of his/her last semester, the student must have presented the research at a national meeting of a professional society (such as AIChE, ACS, ECS, etc.), at Discovery Day at USC, or at a comparable venue. The student must also submit a written thesis describing the research and defend it orally before the thesis committee. The defense must be announced at least one week in advance and be open to the general public.

Students who successfully fulfill all of these requirements with a GPA of at least 3.50 in the three hours of ECHE 497, 3.50 in all major courses, 3.50 in all engineering courses, and 3.50 overall, will be awarded their degree with "Distinction in Chemical Engineering" upon graduation.

ChE UNDERGRADUATE PROGRAM - COOP OPTION A (2 Sessions)

<p>FALL 1</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>ECHE 101¹</td><td>Intro. to Chem. Engr.</td><td style="text-align: right;">3</td></tr> <tr><td>CHEM 111</td><td>General Chemistry</td><td style="text-align: right;">4</td></tr> <tr><td>MATH 141</td><td>Calculus I</td><td style="text-align: right;">4</td></tr> <tr><td>ENGL 101</td><td>Composition</td><td style="text-align: right;">3</td></tr> <tr><td>HIST</td><td>History Elective</td><td style="text-align: right;">3</td></tr> <tr><td></td><td></td><td style="text-align: right; border-top: 1px solid black;">17</td></tr> </table>	ECHE 101 ¹	Intro. to Chem. Engr.	3	CHEM 111	General Chemistry	4	MATH 141	Calculus I	4	ENGL 101	Composition	3	HIST	History Elective	3			17	<p>SPRING 1</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>ECHE 300</td><td>Chem. Process Principles</td><td style="text-align: right;">3</td></tr> <tr><td>CHEM 112</td><td>General Chemistry</td><td style="text-align: right;">4</td></tr> <tr><td>MATH 142</td><td>Calculus II</td><td style="text-align: right;">4</td></tr> <tr><td>PHYS 211</td><td>Essentials of Physics I</td><td style="text-align: right;">3</td></tr> <tr><td>PHYS 211L</td><td>Essential of Physics I Lab</td><td style="text-align: right;">1</td></tr> <tr><td>ENGL 102</td><td>Composition and Literature</td><td style="text-align: right;">3</td></tr> <tr><td></td><td></td><td style="text-align: right; border-top: 1px solid black;">18</td></tr> </table>	ECHE 300	Chem. Process Principles	3	CHEM 112	General Chemistry	4	MATH 142	Calculus II	4	PHYS 211	Essentials of Physics I	3	PHYS 211L	Essential of Physics I Lab	1	ENGL 102	Composition and Literature	3			18
ECHE 101 ¹	Intro. to Chem. Engr.	3																																						
CHEM 111	General Chemistry	4																																						
MATH 141	Calculus I	4																																						
ENGL 101	Composition	3																																						
HIST	History Elective	3																																						
		17																																						
ECHE 300	Chem. Process Principles	3																																						
CHEM 112	General Chemistry	4																																						
MATH 142	Calculus II	4																																						
PHYS 211	Essentials of Physics I	3																																						
PHYS 211L	Essential of Physics I Lab	1																																						
ENGL 102	Composition and Literature	3																																						
		18																																						
<p>SUMMER 1 - 1</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>MATH 241</td><td>Vector Calculus</td><td style="text-align: right;">3</td></tr> <tr><td>Liberal Arts</td><td>Liberal Arts Elective</td><td style="text-align: right;">3</td></tr> <tr><td></td><td></td><td style="text-align: right; border-top: 1px solid black;">6</td></tr> </table>	MATH 241	Vector Calculus	3	Liberal Arts	Liberal Arts Elective	3			6	<p>SUMMER 1 - 2</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>MATH 242</td><td>Differential Equations</td><td style="text-align: right;">3</td></tr> <tr><td>Liberal Arts</td><td>Liberal Arts Elective</td><td style="text-align: right;">3</td></tr> <tr><td></td><td></td><td style="text-align: right; border-top: 1px solid black;">6</td></tr> </table>	MATH 242	Differential Equations	3	Liberal Arts	Liberal Arts Elective	3			6																					
MATH 241	Vector Calculus	3																																						
Liberal Arts	Liberal Arts Elective	3																																						
		6																																						
MATH 242	Differential Equations	3																																						
Liberal Arts	Liberal Arts Elective	3																																						
		6																																						
<p>FALL 2</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>ECHE 310²</td><td>Intro. Chem. Engr. Thermo.</td><td style="text-align: right;">3</td></tr> <tr><td>ECHE 320³</td><td>Chem. Engr. Fluid Mech.</td><td style="text-align: right;">3</td></tr> <tr><td>CHEM 333</td><td>Organic Chemistry I</td><td style="text-align: right;">3</td></tr> <tr><td>PHYS 212</td><td>Essentials of Physics II</td><td style="text-align: right;">3</td></tr> <tr><td>PHYS 212 L</td><td>Essentials of Physics II Lab</td><td style="text-align: right;">1</td></tr> <tr><td>Fine Arts</td><td>Fine Arts Elective</td><td style="text-align: right;">3</td></tr> <tr><td></td><td></td><td style="text-align: right; border-top: 1px solid black;">16</td></tr> </table>	ECHE 310 ²	Intro. Chem. Engr. Thermo.	3	ECHE 320 ³	Chem. Engr. Fluid Mech.	3	CHEM 333	Organic Chemistry I	3	PHYS 212	Essentials of Physics II	3	PHYS 212 L	Essentials of Physics II Lab	1	Fine Arts	Fine Arts Elective	3			16	<p>SPRING 2</p> <p style="text-align: center;">COOP SESSION #1</p>																		
ECHE 310 ²	Intro. Chem. Engr. Thermo.	3																																						
ECHE 320 ³	Chem. Engr. Fluid Mech.	3																																						
CHEM 333	Organic Chemistry I	3																																						
PHYS 212	Essentials of Physics II	3																																						
PHYS 212 L	Essentials of Physics II Lab	1																																						
Fine Arts	Fine Arts Elective	3																																						
		16																																						
<p>SUMMER 2 - 1,2</p>	<p>COOP SESSION #2</p>																																							
<p>FALL 3</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>ECHE 311</td><td>Chem. Engr. Thermo.</td><td style="text-align: right;">3</td></tr> <tr><td>ECHE 321</td><td>Heat-Flow Analysis</td><td style="text-align: right;">3</td></tr> <tr><td>ECHE 550</td><td>Chem. Proc. Dyn. & Contr.</td><td style="text-align: right;">3</td></tr> <tr><td>CHEM 334</td><td>Organic Chemistry II</td><td style="text-align: right;">3</td></tr> <tr><td>Liberal Arts</td><td>Liberal Arts Elective</td><td style="text-align: right;">3</td></tr> <tr><td></td><td></td><td style="text-align: right; border-top: 1px solid black;">15</td></tr> </table>	ECHE 311	Chem. Engr. Thermo.	3	ECHE 321	Heat-Flow Analysis	3	ECHE 550	Chem. Proc. Dyn. & Contr.	3	CHEM 334	Organic Chemistry II	3	Liberal Arts	Liberal Arts Elective	3			15	<p>SPRING 3</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>ECHE 322</td><td>Mass Transfer</td><td style="text-align: right;">3</td></tr> <tr><td>ECHE 460</td><td>Chem. Engr. Lab I</td><td style="text-align: right;">3</td></tr> <tr><td>CHEM</td><td>Chemistry Elective</td><td style="text-align: right;">3</td></tr> <tr><td>Engineering</td><td>Engineering Elective</td><td style="text-align: right;">3</td></tr> <tr><td>Technical</td><td>Technical Elective</td><td style="text-align: right;">3</td></tr> <tr><td></td><td></td><td style="text-align: right; border-top: 1px solid black;">15</td></tr> </table>	ECHE 322	Mass Transfer	3	ECHE 460	Chem. Engr. Lab I	3	CHEM	Chemistry Elective	3	Engineering	Engineering Elective	3	Technical	Technical Elective	3			15			
ECHE 311	Chem. Engr. Thermo.	3																																						
ECHE 321	Heat-Flow Analysis	3																																						
ECHE 550	Chem. Proc. Dyn. & Contr.	3																																						
CHEM 334	Organic Chemistry II	3																																						
Liberal Arts	Liberal Arts Elective	3																																						
		15																																						
ECHE 322	Mass Transfer	3																																						
ECHE 460	Chem. Engr. Lab I	3																																						
CHEM	Chemistry Elective	3																																						
Engineering	Engineering Elective	3																																						
Technical	Technical Elective	3																																						
		15																																						
<p>SUMMER 3 - 1</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>CHEM</td><td>Chemistry Elective</td><td style="text-align: right;">3</td></tr> <tr><td>CHEM</td><td>Chemistry Lab Elective(s)</td><td style="text-align: right;">2</td></tr> <tr><td></td><td></td><td style="text-align: right; border-top: 1px solid black;">5</td></tr> </table>	CHEM	Chemistry Elective	3	CHEM	Chemistry Lab Elective(s)	2			5	<p>SUMMER 3 - 2</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>Technical</td><td>Technical Elective</td><td style="text-align: right;">3</td></tr> <tr><td></td><td></td><td style="text-align: right; border-top: 1px solid black;">3</td></tr> </table>	Technical	Technical Elective	3			3																								
CHEM	Chemistry Elective	3																																						
CHEM	Chemistry Lab Elective(s)	2																																						
		5																																						
Technical	Technical Elective	3																																						
		3																																						
<p>FALL 4</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>ECHE 430</td><td>Chem. Engr. Kinetics</td><td style="text-align: right;">3</td></tr> <tr><td>ECHE 440</td><td>Separation Process Des.</td><td style="text-align: right;">3</td></tr> <tr><td>ECHE 461</td><td>Chem. Engr. Lab II</td><td style="text-align: right;">3</td></tr> <tr><td>ECHE 465</td><td>Chem. Proc. Anal. & Des. I</td><td style="text-align: right;">3</td></tr> <tr><td>Liberal Arts</td><td>Liberal Arts Elective</td><td style="text-align: right;">3</td></tr> <tr><td></td><td></td><td style="text-align: right; border-top: 1px solid black;">15</td></tr> </table>	ECHE 430	Chem. Engr. Kinetics	3	ECHE 440	Separation Process Des.	3	ECHE 461	Chem. Engr. Lab II	3	ECHE 465	Chem. Proc. Anal. & Des. I	3	Liberal Arts	Liberal Arts Elective	3			15	<p>SPRING 4</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>ECHE 466</td><td>Chem. Proc. Anal. & Des. II</td><td style="text-align: right;">3</td></tr> <tr><td>ECHE 567</td><td>Safety, Health & Loss Prev.</td><td style="text-align: right;">3</td></tr> <tr><td>Engineering</td><td>Engineering Elective</td><td style="text-align: right;">3</td></tr> <tr><td>Technical</td><td>Technical Elective</td><td style="text-align: right;">3</td></tr> <tr><td>Technical</td><td>Technical Elective</td><td style="text-align: right;">3</td></tr> <tr><td></td><td></td><td style="text-align: right; border-top: 1px solid black;">15</td></tr> </table>	ECHE 466	Chem. Proc. Anal. & Des. II	3	ECHE 567	Safety, Health & Loss Prev.	3	Engineering	Engineering Elective	3	Technical	Technical Elective	3	Technical	Technical Elective	3			15			
ECHE 430	Chem. Engr. Kinetics	3																																						
ECHE 440	Separation Process Des.	3																																						
ECHE 461	Chem. Engr. Lab II	3																																						
ECHE 465	Chem. Proc. Anal. & Des. I	3																																						
Liberal Arts	Liberal Arts Elective	3																																						
		15																																						
ECHE 466	Chem. Proc. Anal. & Des. II	3																																						
ECHE 567	Safety, Health & Loss Prev.	3																																						
Engineering	Engineering Elective	3																																						
Technical	Technical Elective	3																																						
Technical	Technical Elective	3																																						
		15																																						

ChE UNDERGRADUATE PROGRAM - COOP OPTION B (3 Sessions)

<p>FALL 1</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>ECHE 101¹</td><td>Intro. to Chem. Engr.</td><td style="text-align: right;">3</td></tr> <tr><td>CHEM 111</td><td>General Chemistry</td><td style="text-align: right;">4</td></tr> <tr><td>MATH 141</td><td>Calculus I</td><td style="text-align: right;">4</td></tr> <tr><td>ENGL 101</td><td>Composition</td><td style="text-align: right;">3</td></tr> <tr><td>HIST</td><td>History Elective</td><td style="text-align: right;">3</td></tr> <tr><td></td><td></td><td style="text-align: right; border-top: 1px solid black;">17</td></tr> </table>	ECHE 101 ¹	Intro. to Chem. Engr.	3	CHEM 111	General Chemistry	4	MATH 141	Calculus I	4	ENGL 101	Composition	3	HIST	History Elective	3			17	<p>SPRING 1</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>ECHE 300</td><td>Chem. Process Principles</td><td style="text-align: right;">3</td></tr> <tr><td>CHEM 112</td><td>General Chemistry</td><td style="text-align: right;">4</td></tr> <tr><td>MATH 142</td><td>Calculus II</td><td style="text-align: right;">4</td></tr> <tr><td>PHYS 211</td><td>Essentials of Physics I</td><td style="text-align: right;">3</td></tr> <tr><td>PHYS 211L</td><td>Essential of Physics I Lab</td><td style="text-align: right;">1</td></tr> <tr><td>ENGL 102</td><td>Composition and Literature</td><td style="text-align: right;">3</td></tr> <tr><td></td><td></td><td style="text-align: right; border-top: 1px solid black;">18</td></tr> </table>	ECHE 300	Chem. Process Principles	3	CHEM 112	General Chemistry	4	MATH 142	Calculus II	4	PHYS 211	Essentials of Physics I	3	PHYS 211L	Essential of Physics I Lab	1	ENGL 102	Composition and Literature	3			18
ECHE 101 ¹	Intro. to Chem. Engr.	3																																						
CHEM 111	General Chemistry	4																																						
MATH 141	Calculus I	4																																						
ENGL 101	Composition	3																																						
HIST	History Elective	3																																						
		17																																						
ECHE 300	Chem. Process Principles	3																																						
CHEM 112	General Chemistry	4																																						
MATH 142	Calculus II	4																																						
PHYS 211	Essentials of Physics I	3																																						
PHYS 211L	Essential of Physics I Lab	1																																						
ENGL 102	Composition and Literature	3																																						
		18																																						
SUMMER 1 - 1,2	COOP SESSION #1																																							
<p>FALL 2</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>ECHE 310²</td><td>Intro. Chem. Engr. Thermo.</td><td style="text-align: right;">3</td></tr> <tr><td>ECHE 320³</td><td>Chem. Engr. Fluid Mech.</td><td style="text-align: right;">3</td></tr> <tr><td>PHYS 212</td><td>Essentials of Physics II</td><td style="text-align: right;">3</td></tr> <tr><td>PHYS 212 L</td><td>Essentials of Physics II Lab</td><td style="text-align: right;">1</td></tr> <tr><td>MATH 241</td><td>Vector Calculus</td><td style="text-align: right;">3</td></tr> <tr><td>Fine Arts</td><td>Fine Arts Elective</td><td style="text-align: right;">3</td></tr> <tr><td></td><td></td><td style="text-align: right; border-top: 1px solid black;">16</td></tr> </table>	ECHE 310 ²	Intro. Chem. Engr. Thermo.	3	ECHE 320 ³	Chem. Engr. Fluid Mech.	3	PHYS 212	Essentials of Physics II	3	PHYS 212 L	Essentials of Physics II Lab	1	MATH 241	Vector Calculus	3	Fine Arts	Fine Arts Elective	3			16	<p>SPRING 2</p> <p style="text-align: center;">COOP SESSION #2</p>																		
ECHE 310 ²	Intro. Chem. Engr. Thermo.	3																																						
ECHE 320 ³	Chem. Engr. Fluid Mech.	3																																						
PHYS 212	Essentials of Physics II	3																																						
PHYS 212 L	Essentials of Physics II Lab	1																																						
MATH 241	Vector Calculus	3																																						
Fine Arts	Fine Arts Elective	3																																						
		16																																						
<p>SUMMER 2 - 1</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>CHEM 333</td><td>Organic Chemistry I</td><td style="text-align: right;">3</td></tr> <tr><td>MATH 242</td><td>Differential Equations</td><td style="text-align: right;">3</td></tr> <tr><td></td><td></td><td style="text-align: right; border-top: 1px solid black;">6</td></tr> </table>	CHEM 333	Organic Chemistry I	3	MATH 242	Differential Equations	3			6	<p>SUMMER 2 - 2</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>CHEM 334</td><td>Organic Chemistry II</td><td style="text-align: right;">3</td></tr> <tr><td>Liberal Arts</td><td>Liberal Arts Elective</td><td style="text-align: right;">3</td></tr> <tr><td></td><td></td><td style="text-align: right; border-top: 1px solid black;">6</td></tr> </table>	CHEM 334	Organic Chemistry II	3	Liberal Arts	Liberal Arts Elective	3			6																					
CHEM 333	Organic Chemistry I	3																																						
MATH 242	Differential Equations	3																																						
		6																																						
CHEM 334	Organic Chemistry II	3																																						
Liberal Arts	Liberal Arts Elective	3																																						
		6																																						
<p>FALL 3</p> <p style="text-align: center;">COOP SESSION #3</p>	<p>SPRING 3</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>ECHE 311</td><td>Chem. Engr. Thermo.</td><td style="text-align: right;">3</td></tr> <tr><td>ECHE 321</td><td>Heat-Flow Analysis</td><td style="text-align: right;">3</td></tr> <tr><td>ECHE 322</td><td>Mass Transfer</td><td style="text-align: right;">3</td></tr> <tr><td>Technical</td><td>Technical Elective</td><td style="text-align: right;">3</td></tr> <tr><td>Liberal Arts</td><td>Liberal Arts Elective</td><td style="text-align: right;">3</td></tr> <tr><td></td><td></td><td style="text-align: right; border-top: 1px solid black;">15</td></tr> </table>	ECHE 311	Chem. Engr. Thermo.	3	ECHE 321	Heat-Flow Analysis	3	ECHE 322	Mass Transfer	3	Technical	Technical Elective	3	Liberal Arts	Liberal Arts Elective	3			15																					
ECHE 311	Chem. Engr. Thermo.	3																																						
ECHE 321	Heat-Flow Analysis	3																																						
ECHE 322	Mass Transfer	3																																						
Technical	Technical Elective	3																																						
Liberal Arts	Liberal Arts Elective	3																																						
		15																																						
<p>SUMMER 3 - 1</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>CHEM</td><td>Chemistry Elective</td><td style="text-align: right;">3</td></tr> <tr><td>CHEM</td><td>Chemistry Lab Elective(s)</td><td style="text-align: right;">2</td></tr> <tr><td></td><td></td><td style="text-align: right; border-top: 1px solid black;">5</td></tr> </table>	CHEM	Chemistry Elective	3	CHEM	Chemistry Lab Elective(s)	2			5	<p>SUMMER 3 - 2</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>Technical</td><td>Technical Elective</td><td style="text-align: right;">3</td></tr> <tr><td></td><td></td><td style="text-align: right; border-top: 1px solid black;">3</td></tr> </table>	Technical	Technical Elective	3			3																								
CHEM	Chemistry Elective	3																																						
CHEM	Chemistry Lab Elective(s)	2																																						
		5																																						
Technical	Technical Elective	3																																						
		3																																						
<p>FALL 4</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>ECHE 430</td><td>Chem. Engr. Kinetics</td><td style="text-align: right;">3</td></tr> <tr><td>ECHE 440</td><td>Separation Process Des.</td><td style="text-align: right;">3</td></tr> <tr><td>ECHE 465</td><td>Chem. Proc. Anal. & Des. I</td><td style="text-align: right;">3</td></tr> <tr><td>ECHE 550</td><td>Chem. Proc. Dyn. & Contr.</td><td style="text-align: right;">3</td></tr> <tr><td>Liberal Arts</td><td>Liberal Arts Elective</td><td style="text-align: right;">3</td></tr> <tr><td></td><td></td><td style="text-align: right; border-top: 1px solid black;">15</td></tr> </table>	ECHE 430	Chem. Engr. Kinetics	3	ECHE 440	Separation Process Des.	3	ECHE 465	Chem. Proc. Anal. & Des. I	3	ECHE 550	Chem. Proc. Dyn. & Contr.	3	Liberal Arts	Liberal Arts Elective	3			15	<p>SPRING 4</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>ECHE 466</td><td>Chem. Proc. Anal. & Des. II</td><td style="text-align: right;">3</td></tr> <tr><td>ECHE 567</td><td>Safety, Health & Loss Prev.</td><td style="text-align: right;">3</td></tr> <tr><td>ECHE 460</td><td>Chem. Engr. Lab I</td><td style="text-align: right;">3</td></tr> <tr><td>Engineering</td><td>Engineering Elective</td><td style="text-align: right;">3</td></tr> <tr><td>Liberal Arts</td><td>Liberal Arts Elective</td><td style="text-align: right;">3</td></tr> <tr><td></td><td></td><td style="text-align: right; border-top: 1px solid black;">15</td></tr> </table>	ECHE 466	Chem. Proc. Anal. & Des. II	3	ECHE 567	Safety, Health & Loss Prev.	3	ECHE 460	Chem. Engr. Lab I	3	Engineering	Engineering Elective	3	Liberal Arts	Liberal Arts Elective	3			15			
ECHE 430	Chem. Engr. Kinetics	3																																						
ECHE 440	Separation Process Des.	3																																						
ECHE 465	Chem. Proc. Anal. & Des. I	3																																						
ECHE 550	Chem. Proc. Dyn. & Contr.	3																																						
Liberal Arts	Liberal Arts Elective	3																																						
		15																																						
ECHE 466	Chem. Proc. Anal. & Des. II	3																																						
ECHE 567	Safety, Health & Loss Prev.	3																																						
ECHE 460	Chem. Engr. Lab I	3																																						
Engineering	Engineering Elective	3																																						
Liberal Arts	Liberal Arts Elective	3																																						
		15																																						
<p>FALL 5</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td>ECHE 461</td><td>Chem. Engr. Lab II</td><td style="text-align: right;">3</td></tr> <tr><td>Engineering</td><td>Engineering Elective</td><td style="text-align: right;">3</td></tr> <tr><td>CHEM</td><td>Chemistry Elective</td><td style="text-align: right;">3</td></tr> <tr><td>Technical</td><td>Technical Elective</td><td style="text-align: right;">3</td></tr> <tr><td>Technical</td><td>Technical Elective</td><td style="text-align: right;">3</td></tr> <tr><td></td><td></td><td style="text-align: right; border-top: 1px solid black;">15</td></tr> </table>	ECHE 461	Chem. Engr. Lab II	3	Engineering	Engineering Elective	3	CHEM	Chemistry Elective	3	Technical	Technical Elective	3	Technical	Technical Elective	3			15																						
ECHE 461	Chem. Engr. Lab II	3																																						
Engineering	Engineering Elective	3																																						
CHEM	Chemistry Elective	3																																						
Technical	Technical Elective	3																																						
Technical	Technical Elective	3																																						
		15																																						

ChE UNDERGRADUATE PROGRAM - COOP OPTION C (3 Sessions)

<p>FALL 1</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 15%;">ECHE 101¹</td><td style="width: 65%;">Intro. to Chem. Engr.</td><td style="width: 20%; text-align: right;">3</td></tr> <tr><td>CHEM 111</td><td>General Chemistry</td><td style="text-align: right;">4</td></tr> <tr><td>MATH 141</td><td>Calculus I</td><td style="text-align: right;">4</td></tr> <tr><td>ENGL 101</td><td>Composition</td><td style="text-align: right;">3</td></tr> <tr><td>HIST</td><td>History Elective</td><td style="text-align: right;">3</td></tr> <tr><td colspan="2"></td><td style="text-align: right; border-top: 1px solid black;">17</td></tr> </table>	ECHE 101 ¹	Intro. to Chem. Engr.	3	CHEM 111	General Chemistry	4	MATH 141	Calculus I	4	ENGL 101	Composition	3	HIST	History Elective	3			17	<p>SPRING 1</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 15%;">ECHE 300</td><td style="width: 65%;">Chem. Process Principles</td><td style="width: 20%; text-align: right;">3</td></tr> <tr><td>CHEM 112</td><td>General Chemistry</td><td style="text-align: right;">4</td></tr> <tr><td>MATH 142</td><td>Calculus II</td><td style="text-align: right;">4</td></tr> <tr><td>PHYS 211</td><td>Essentials of Physics I</td><td style="text-align: right;">3</td></tr> <tr><td>PHYS 211L</td><td>Essential of Physics I Lab</td><td style="text-align: right;">1</td></tr> <tr><td>ENGL 102</td><td>Composition and Literature</td><td style="text-align: right;">3</td></tr> <tr><td colspan="2"></td><td style="text-align: right; border-top: 1px solid black;">18</td></tr> </table>	ECHE 300	Chem. Process Principles	3	CHEM 112	General Chemistry	4	MATH 142	Calculus II	4	PHYS 211	Essentials of Physics I	3	PHYS 211L	Essential of Physics I Lab	1	ENGL 102	Composition and Literature	3			18
ECHE 101 ¹	Intro. to Chem. Engr.	3																																						
CHEM 111	General Chemistry	4																																						
MATH 141	Calculus I	4																																						
ENGL 101	Composition	3																																						
HIST	History Elective	3																																						
		17																																						
ECHE 300	Chem. Process Principles	3																																						
CHEM 112	General Chemistry	4																																						
MATH 142	Calculus II	4																																						
PHYS 211	Essentials of Physics I	3																																						
PHYS 211L	Essential of Physics I Lab	1																																						
ENGL 102	Composition and Literature	3																																						
		18																																						
<p>SUMMER 1 - 1</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 15%;">MATH 241</td><td style="width: 65%;">Vector Calculus</td><td style="width: 20%; text-align: right;">3</td></tr> <tr><td>Liberal Arts</td><td>Liberal Arts Elective</td><td style="text-align: right;">3</td></tr> <tr><td colspan="2"></td><td style="text-align: right; border-top: 1px solid black;">6</td></tr> </table>	MATH 241	Vector Calculus	3	Liberal Arts	Liberal Arts Elective	3			6	<p>SUMMER 1 - 2</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 15%;">MATH 242</td><td style="width: 65%;">Differential Equations</td><td style="width: 20%; text-align: right;">3</td></tr> <tr><td>Liberal Arts</td><td>Liberal Arts Elective</td><td style="text-align: right;">3</td></tr> <tr><td colspan="2"></td><td style="text-align: right; border-top: 1px solid black;">6</td></tr> </table>	MATH 242	Differential Equations	3	Liberal Arts	Liberal Arts Elective	3			6																					
MATH 241	Vector Calculus	3																																						
Liberal Arts	Liberal Arts Elective	3																																						
		6																																						
MATH 242	Differential Equations	3																																						
Liberal Arts	Liberal Arts Elective	3																																						
		6																																						
<p>FALL 2</p> <p style="text-align: center; margin-top: 20px;">COOP SESSION #1</p>	<p>SPRING 2</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 15%;">ECHE 310²</td><td style="width: 65%;">Intro. Chem. Engr. Thermo.</td><td style="width: 20%; text-align: right;">3</td></tr> <tr><td>ECHE 320³</td><td>Chem. Engr. Fluid Mech.</td><td style="text-align: right;">3</td></tr> <tr><td>CHEM 333</td><td>Organic Chemistry I</td><td style="text-align: right;">3</td></tr> <tr><td>PHYS 212</td><td>Essentials of Physics II</td><td style="text-align: right;">3</td></tr> <tr><td>PHYS 212 L</td><td>Essentials of Physics II Lab</td><td style="text-align: right;">1</td></tr> <tr><td>Fine Arts</td><td>Fine Arts Elective</td><td style="text-align: right;">3</td></tr> <tr><td colspan="2"></td><td style="text-align: right; border-top: 1px solid black;">16</td></tr> </table>	ECHE 310 ²	Intro. Chem. Engr. Thermo.	3	ECHE 320 ³	Chem. Engr. Fluid Mech.	3	CHEM 333	Organic Chemistry I	3	PHYS 212	Essentials of Physics II	3	PHYS 212 L	Essentials of Physics II Lab	1	Fine Arts	Fine Arts Elective	3			16																		
ECHE 310 ²	Intro. Chem. Engr. Thermo.	3																																						
ECHE 320 ³	Chem. Engr. Fluid Mech.	3																																						
CHEM 333	Organic Chemistry I	3																																						
PHYS 212	Essentials of Physics II	3																																						
PHYS 212 L	Essentials of Physics II Lab	1																																						
Fine Arts	Fine Arts Elective	3																																						
		16																																						
SUMMER 2 - 1,2	COOP SESSION #2																																							
<p>FALL 3</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 15%;">ECHE 311</td><td style="width: 65%;">Chem. Engr. Thermo.</td><td style="width: 20%; text-align: right;">3</td></tr> <tr><td>ECHE 321</td><td>Heat-Flow Analysis</td><td style="text-align: right;">3</td></tr> <tr><td>ECHE 550</td><td>Chem. Proc. Dyn. & Contr.</td><td style="text-align: right;">3</td></tr> <tr><td>CHEM 334</td><td>Organic Chemistry II</td><td style="text-align: right;">3</td></tr> <tr><td>Liberal Arts</td><td>Liberal Arts Elective</td><td style="text-align: right;">3</td></tr> <tr><td colspan="2"></td><td style="text-align: right; border-top: 1px solid black;">15</td></tr> </table>	ECHE 311	Chem. Engr. Thermo.	3	ECHE 321	Heat-Flow Analysis	3	ECHE 550	Chem. Proc. Dyn. & Contr.	3	CHEM 334	Organic Chemistry II	3	Liberal Arts	Liberal Arts Elective	3			15	<p>SPRING 3</p> <p style="text-align: center; margin-top: 20px;">COOP SESSION #3</p>																					
ECHE 311	Chem. Engr. Thermo.	3																																						
ECHE 321	Heat-Flow Analysis	3																																						
ECHE 550	Chem. Proc. Dyn. & Contr.	3																																						
CHEM 334	Organic Chemistry II	3																																						
Liberal Arts	Liberal Arts Elective	3																																						
		15																																						
<p>SUMMER 3 - 1</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 15%;">CHEM</td><td style="width: 65%;">Chemistry Elective</td><td style="width: 20%; text-align: right;">3</td></tr> <tr><td>CHEM</td><td>Chemistry Lab Elective(s)</td><td style="text-align: right;">2</td></tr> <tr><td colspan="2"></td><td style="text-align: right; border-top: 1px solid black;">5</td></tr> </table>	CHEM	Chemistry Elective	3	CHEM	Chemistry Lab Elective(s)	2			5	<p>SUMMER 3 - 2</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 15%;">Technical</td><td style="width: 65%;">Technical Elective</td><td style="width: 20%; text-align: right;">3</td></tr> <tr><td colspan="2"></td><td style="text-align: right; border-top: 1px solid black;">3</td></tr> </table>	Technical	Technical Elective	3			3																								
CHEM	Chemistry Elective	3																																						
CHEM	Chemistry Lab Elective(s)	2																																						
		5																																						
Technical	Technical Elective	3																																						
		3																																						
<p>FALL 4</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 15%;">ECHE 430</td><td style="width: 65%;">Chem. Engr. Kinetics</td><td style="width: 20%; text-align: right;">3</td></tr> <tr><td>ECHE 440</td><td>Separation Process Des.</td><td style="text-align: right;">3</td></tr> <tr><td>ECHE 465</td><td>Chem. Proc. Anal. & Des. I</td><td style="text-align: right;">3</td></tr> <tr><td>Technical</td><td>Technical Elective</td><td style="text-align: right;">3</td></tr> <tr><td>Liberal Arts</td><td>Liberal Arts Elective</td><td style="text-align: right;">3</td></tr> <tr><td colspan="2"></td><td style="text-align: right; border-top: 1px solid black;">15</td></tr> </table>	ECHE 430	Chem. Engr. Kinetics	3	ECHE 440	Separation Process Des.	3	ECHE 465	Chem. Proc. Anal. & Des. I	3	Technical	Technical Elective	3	Liberal Arts	Liberal Arts Elective	3			15	<p>SPRING 4</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 15%;">ECHE 322</td><td style="width: 65%;">Mass Transfer</td><td style="width: 20%; text-align: right;">3</td></tr> <tr><td>ECHE 460</td><td>Chem. Engr. Lab I</td><td style="text-align: right;">3</td></tr> <tr><td>ECHE 466</td><td>Chem. Proc. Anal. & Des. II</td><td style="text-align: right;">3</td></tr> <tr><td>ECHE 567</td><td>Safety, Health & Loss Prev.</td><td style="text-align: right;">3</td></tr> <tr><td>Technical</td><td>Technical Elective</td><td style="text-align: right;">3</td></tr> <tr><td colspan="2"></td><td style="text-align: right; border-top: 1px solid black;">15</td></tr> </table>	ECHE 322	Mass Transfer	3	ECHE 460	Chem. Engr. Lab I	3	ECHE 466	Chem. Proc. Anal. & Des. II	3	ECHE 567	Safety, Health & Loss Prev.	3	Technical	Technical Elective	3			15			
ECHE 430	Chem. Engr. Kinetics	3																																						
ECHE 440	Separation Process Des.	3																																						
ECHE 465	Chem. Proc. Anal. & Des. I	3																																						
Technical	Technical Elective	3																																						
Liberal Arts	Liberal Arts Elective	3																																						
		15																																						
ECHE 322	Mass Transfer	3																																						
ECHE 460	Chem. Engr. Lab I	3																																						
ECHE 466	Chem. Proc. Anal. & Des. II	3																																						
ECHE 567	Safety, Health & Loss Prev.	3																																						
Technical	Technical Elective	3																																						
		15																																						
<p>FALL 5</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 15%;">ECHE 461</td><td style="width: 65%;">Chem. Engr. Lab II</td><td style="width: 20%; text-align: right;">3</td></tr> <tr><td>Engineering</td><td>Engineering Elective</td><td style="text-align: right;">3</td></tr> <tr><td>Engineering</td><td>Engineering Elective</td><td style="text-align: right;">3</td></tr> <tr><td>Technical</td><td>Technical Elective</td><td style="text-align: right;">3</td></tr> <tr><td>CHEM</td><td>Chemistry Elective</td><td style="text-align: right;">3</td></tr> <tr><td colspan="2"></td><td style="text-align: right; border-top: 1px solid black;">15</td></tr> </table>	ECHE 461	Chem. Engr. Lab II	3	Engineering	Engineering Elective	3	Engineering	Engineering Elective	3	Technical	Technical Elective	3	CHEM	Chemistry Elective	3			15																						
ECHE 461	Chem. Engr. Lab II	3																																						
Engineering	Engineering Elective	3																																						
Engineering	Engineering Elective	3																																						
Technical	Technical Elective	3																																						
CHEM	Chemistry Elective	3																																						
		15																																						

ChE UNDERGRADUATE PROGRAM - COOP OPTION D (3 Sessions)

<p>FALL 1</p> <p>ECHE 101¹ Intro. to Chem. Engr. 3 CHEM 111 General Chemistry 4 MATH 141 Calculus I 4 ENGL 101 Composition 3 HIST History Elective 3 <u>17</u></p>	<p>SPRING 1</p> <p>ECHE 300 Chem. Process Principles 3 CHEM 112 General Chemistry 4 MATH 142 Calculus II 4 PHYS 211 Essentials of Physics I 3 PHYS 211L Essential of Physics I Lab 1 ENGL 102 Composition and Literature 3 <u>18</u></p>
<p>SUMMER 1 - 1</p> <p>MATH 241 Vector Calculus 3 Liberal Arts Liberal Arts Elective 3 <u>6</u></p>	<p>SUMMER 1 - 2</p> <p>MATH 242 Differential Equations 3 Liberal Arts Liberal Arts Elective 3 <u>6</u></p>
<p>FALL 2</p> <p>ECHE 310² Intro. Chem. Engr. Thermo. 3 ECHE 320³ Chem. Engr. Fluid Mech. 3 CHEM 333 Organic Chemistry I 3 PHYS 212 Essentials of Physics II 3 PHYS 212 L Essentials of Physics II Lab 1 Fine Arts Fine Arts Elective 3 <u>16</u></p>	<p>SPRING 2</p> <p style="text-align: center;">COOP SESSION #1</p>
<p>SUMMER 2 - 1</p> <p>CHEM Chemistry Elective 3 CHEM Chemistry Lab Elective(s) 2 <u>5</u></p>	<p>SUMMER 2 - 2</p> <p>CHEM 334 Organic Chemistry II 3 <u>3</u></p>
<p>FALL 3</p> <p style="text-align: center;">COOP SESSION #2</p>	<p>SPRING 3</p> <p>ECHE 311 Chem. Engr. Thermo. 3 ECHE 321 Heat-Flow Analysis 3 ECHE 322 Mass Transfer 3 Engineering Engineering Elective 3 Liberal Arts Liberal Arts Elective 3 <u>15</u></p>
<p>SUMMER 3 - 1,2</p>	<p style="text-align: center;">COOP SESSION #3</p>
<p>FALL 4</p> <p>ECHE 430 Chem. Engr. Kinetics 3 ECHE 440 Separation Process Des. 3 ECHE 465 Chem. Proc. Anal. & Des. I 3 ECHE 550 Chem. Proc. Dyn. & Contr. 3 Liberal Arts Liberal Arts Elective 3 <u>15</u></p>	<p>SPRING 4</p> <p>ECHE 460 Chem. Engr. Lab I 3 ECHE 466 Chem. Proc. Anal. & Des. II 3 ECHE 567 Safety, Health & Loss Prev. 3 Technical Technical Elective 3 CHEM Chemistry Elective 3 <u>15</u></p>
<p>FALL 5</p> <p>ECHE 461 Chem. Engr. Lab II 3 Engineering Engineering Elective 3 Technical Technical Elective 3 Technical Technical Elective 3 Technical Technical Elective 3 <u>15</u></p>	

Chemical Engineering Undergraduate Student Options

Beyond the Classroom Experience - Many valuable experiences are possible outside of the traditional academic classroom. USC has developed [USC Connect](#) to encourage students to develop outside the traditional classroom. Some typical possibilities for chemical engineering students include:

Industrial Co-Op - Students gain valuable industrial experience while working full-time in industry. Placement rates and initial salaries are typically higher for co-op students. [Contact CEC Career Center.](#)

Undergraduate Research - Students can work with world-class researchers during the school year. Students can perform research for elective credit (up to 3 hours) or sometimes for payment. [Contact ChE Faculty.](#)

Summer Internships - Some companies offer internships, providing experience and funding. [Contact CEC Career Center.](#)

Summer REU - The National Science Foundation supports [Research Experience for Undergraduates \(REU\)](#) programs at numerous universities where students spend 8-10 weeks in the summer working in a research lab. [Google search for chemical engineering reu.](#)

Study Abroad - Students have various international opportunities, ranging from Maymester to summer classes to full semester / year abroad. [Contact USC Study Abroad Office.](#)

Professional Societies - Participation in professional societies offer various educational and leadership opportunities. Meetings may be a guest speaker from industry, a discussion of [SET job fair](#), or preparation for competitions at [national and regional conferences](#). Most chemical engineering students join the [American Institute of Chemical Engineers \(AIChE\)](#) but there are a variety of [student groups](#) in the [College of Engineering and Computing](#) that students can also participate in, as well as the hundreds of [USC student organizations](#).

Co-Op for Credit - To encourage participation in the industrial co-op program, a student can elect to take three engineering elective credit hours related to industrial preparation. The student would complete one hour of professional preparation [ECHE 202](#) before their first co-op experience and one hour of [ECHE 499](#) after each co-op rotation.

Concentrations - A concentration requires fewer than 19 credit hours. Concentrations appear on the official transcript. Chemical Engineering students can select elective courses to complete one or more of the following concentrations:

[Concentration in Biomolecular Engineering](#)

[Concentration in Energy](#)

[Concentration in Interdisciplinary Engineering](#)

[Concentration in Materials](#)

Minors - A minor typically requires more than 18 credit hours of coursework in a given major. Students can select electives in support of a

coursework in a given major. Students can select electives in support of a minor but they may need to take additional courses beyond those required for a Chemical Engineering degree. Students should check the programs for updated information. There are [many minors \(scroll down past undergraduate majors\)](#) to consider. Some possible minors include:

[Minor in Biology](#)

[Minor in Chemistry](#)

[Minor in Computer Science](#)

[Minor in Geological Sciences](#)

[Minor in Physics](#)

[Minor in Mathematics](#)

[Minor in Nuclear Engineering](#)

Degree With Distinction - Chemical Engineering undergraduates interested in cutting-edge research may apply to the Degree with Distinction program. The student must have a 3.5 GPA and must take an elective course related to their research topic as approved by their thesis committee. The student must ultimately defend an original research thesis in front of a committee of three faculty members. [Program details.](#)

Honors Thesis - Chemical Engineering undergraduates in the USC Honors College are encouraged to perform laboratory research in support of their Senior Thesis. The capstone senior design project is group work for a required class and will not be acceptable as a USC Honors Thesis without significant individual modification or expansion. Alternatively, the Honors Thesis may be completed in another academic discipline. Note that Honors College students may simultaneously complete a Degree With Distinction. [Program details.](#)

Accelerated BS / MS Program - A student in this program can count graduate level courses toward both an undergraduate and graduate degree. The student must first enroll in the program and then take 700 level courses or take 500 level courses for graduate credit. [Program details.](#)

Senior Privilege - A student can take up to six hours of 700 level graduate coursework if not enrolled in the accelerated BS / MS program. These courses will not count toward an undergraduate degree and the course/s may only be taken in the final semester before graduation. The student should gain experience that could be beneficial in graduate school or industry. [Program details.](#)

Note, the [official USC bulletin](#) contains the ultimate description of all requirements for degrees, minors, and concentrations. Some links on this page are to other sources of information that may not be updated as frequently.

[USC Links:](#)

[Safety/Emergency Information](#)

[USC LinkDirectory: Find](#)

[Map: Find Places](#)

[Calendar: Find Events](#)

[VIP](#)