



**Oregon State**  
University

# School of Chemical, Biological, and Environmental Engineering (CBEE)

**College of Engineering**  
cbee.oregonstate.edu

## Undergraduate Advising Guide

# Chemical Engineering (CHE)

Revised 06/13/18

Chemical engineering is the study and modeling of systems where heat and fluid flow are coupled with chemical reactions. Examples of systems are the human body, ground water, the atmosphere, the ocean, and chemical reactors. Natural systems are measured and modeled in order to understand present and future behavior. Man-made systems are specifically designed to convert raw materials into more useful products.

Making useful products requires using mathematics and science to plan, develop, design, operate, and improve processes. Some processes are micro-scale, as in computer chip manufacturing, and some are large-scale, as in petroleum refining. Typical products from these processes include computer chips, solar cells, batteries, pharmaceuticals, plastics, synthetic fibers, composite materials, pulp and paper, and consumer products ranging from detergents to cosmetics. Chemical engineers find employment in large high-tech companies, environmental consulting firms, large commodity companies and small software companies. Employment prospects for graduates in Oregon and the Pacific Northwest are strong.

**General questions? Email [cbee.advising@oregonstate.edu](mailto:cbee.advising@oregonstate.edu)**

### **Kimberly Compton**

Head Undergraduate Advisor  
[kimberly.compton@oregonstate.edu](mailto:kimberly.compton@oregonstate.edu)

### **Lindsay Wills**

Undergraduate Advisor  
[lindsay.wills@oregonstate.edu](mailto:lindsay.wills@oregonstate.edu)

# CBEE Advising Practices & Policies

Per College of Engineering rules, advising appointments are required once per term minimum for all engineering undergraduate students. You should schedule your advising appointment online at [cbee.oregonstate.edu/undergraduate-advising](http://cbee.oregonstate.edu/undergraduate-advising).

## Appointment Types:

Don't know what type of appointment to schedule? Below are common appointment types and the required appointment time for each.

### 15-Minute Appointment

- Form Signed
- Letter Requests
- Graduate/Degree Check
- ProSchool Application
- Class Overrides

### 30-Minute Appointment

- General Advising
- PIN Number
- Registration Issues
- Academic Standing
- Change of Major
- Transfer Advising
- Degree Partner Program (DPP)
- Research/Job/Internships
- Grad School

## Walk-In Hours:

CBEE Advisors provide one walk-in hour daily, from 3-4pm. These hours are intended for students with quick 1-15 minute questions. No PINs will be distributed during walk-in hours.

## Late policy:

If you arrive to a scheduled advising appointment 5 minutes or more late, you may be asked to reschedule. If you arrive 10 minutes or more late, you must reschedule. When we reserve time for you, we require all of that time to provide you with the best quality work possible. When you are late it decreases the advisors ability to accomplish this.

We strive to see every student as close to their appointment time as possible. It is your responsibility to remember your appointment and to be on time. We understand that true emergencies happen. We ask that you please be courteous of your advisors valuable time and attention. The Advisors, Faculty and Staff thank you.

## No show policy:

No penalty for the first no show on a scheduled appointment. If you no show on a 2nd appointment or more, we will withhold your PIN for registration until the final day of Phase I registration. If you schedule an appointment and need to cancel, please contact your advisor.

## Chemical Engineering (192 Credits)

Revised 6/13/18

Credits	First Year = 47 credits			Second Year = 49 credits			Third Year = 49 credits			Fourth Year = 47 credits							
	Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring					
1	Chemistry CH 231 (4FW)	Chemistry CH 232 (4WS)	Chemistry CH 233 (4FS)	Organic Chemistry CH 331 (4FW)	Organic Chemistry CH 332 (4WS)	EE Fund. ENGR 201 (3FWS)	P Chem CH 440 (3F)	P Chem CH 441 (3W)	P Chem CH 442 (3S)	Reaction Engineering CHE 443 (4F)	Design CHE 431 (3W)	Design CHE 432 (3S)					
2						Statics ENGR 211 (3FWS)	Transport I CHE 331 (4F)	Transport II CHE 332 (3W)	Transport III CHE 333 (3WS)				Process Laboratory CBEE 414 (3F)	CHE Laboratory CHE 415 (3W)	Engineering Elective (3-4FWS)		
3											Technical Writing WR 327 (3FWS)	Thermo I CHE 311 (3F)				Thermo II CHE 312 (3W)	Transport Lab CHE 334 (2S)
4													CH 261 (1)	CH 262 (1)	CH 263 (1)		
5	Differential Calculus MTH 251 (4FWS)	Integral Calculus MTH 252 (4FWS)	Vector Calculus MTH 254 (4FWS)	Physics w/ Calculus PH 212 (4FWS)	Physics w/ Calculus PH 213 (4FWS)	Process Analysis CBEE 213 (4S)	Engr. Ethics CHE 320 (3F)	Process Dynamics CHE 361 (3W)	Advanced Chemistry Elective (3-4FWS)	Advanced Chemistry Elective (3-4FWS)	DPD (3FWS)	Synthesis (3FWS)					
6													Orientation CBEE 101 (3F)	Engr. Comp. CBEE 102 (3W)	Physics w/ Calculus PH 211 (4FWS)	Material Balances CBEE 211 (3F)	Energy Balances CBEE 212 (3W)
7	English Composition WR 121 (3FWS)	COMM 111/114 (3FWS)	HHS 231 (2FWS)	Material Balances CBEE 211 (3F)	Energy Balances CBEE 212 (3W)	Perspective (3FWS)	Engineering Elective (3-4FWS)	BioSci w/ Lab (4FWS)	Advanced Chemistry Elective (3-4FWS)	Advanced Chemistry Elective (3-4FWS)	Free Elective (4FWS)	Synthesis (3FWS)					
8													PAC (1FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)
9	English Composition WR 121 (3FWS)	COMM 111/114 (3FWS)	HHS 231 (2FWS)	Material Balances CBEE 211 (3F)	Energy Balances CBEE 212 (3W)	Perspective (3FWS)	Engineering Elective (3-4FWS)	BioSci w/ Lab (4FWS)	Advanced Chemistry Elective (3-4FWS)	Advanced Chemistry Elective (3-4FWS)	Free Elective (4FWS)	Synthesis (3FWS)					
10													PAC (1FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)
11	PAC (1FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)	Engineering Elective (3-4FWS)	BioSci w/ Lab (4FWS)	Advanced Chemistry Elective (3-4FWS)	Advanced Chemistry Elective (3-4FWS)	Free Elective (4FWS)	Synthesis (3FWS)					
12													PAC (1FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)
13	PAC (1FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)	Engineering Elective (3-4FWS)	BioSci w/ Lab (4FWS)	Advanced Chemistry Elective (3-4FWS)	Advanced Chemistry Elective (3-4FWS)	Free Elective (4FWS)	Synthesis (3FWS)					
14													PAC (1FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)
15	PAC (1FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)	Engineering Elective (3-4FWS)	BioSci w/ Lab (4FWS)	Advanced Chemistry Elective (3-4FWS)	Advanced Chemistry Elective (3-4FWS)	Free Elective (4FWS)	Synthesis (3FWS)					
16													PAC (1FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)
17	PAC (1FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)	Engineering Elective (3-4FWS)	BioSci w/ Lab (4FWS)	Advanced Chemistry Elective (3-4FWS)	Advanced Chemistry Elective (3-4FWS)	Free Elective (4FWS)	Synthesis (3FWS)					
18													PAC (1FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)	Perspective (3FWS)

- Pre-Core classes used in GPA calculation
- Pre-requisites for Pro School classes not used in GPA calculation
- Engineering & Advanced Chemistry Electives
- Baccalaureate Core course not covered by major requirements (S/U grading allowed)

This advising guide is intended for scheduling only. Course offerings and requirements are subject to change. Please reference the OSU Online catalog for a complete list of degree requirements.

# Chemical Engineering Major

Total Credits: 188

## Required Courses

### Math

Course #	Credit Hours	Description	Prerequisites	Terms Offered
MTH 251	4	Differential Calculus	MTH 112	FWS
MTH 252	4	Integral Calculus	MTH 251	FWS
MTH 254	4	Vector Calculus I	MTH 252	FWS
MTH 256	4	Differential Equations	MTH 254	FWS
MTH 306	4	Matrix & Power Series	MTH 252	FWS
20				

### Science

Course #	Credit Hours	Description	Prerequisites	Terms Offered
CH 231/261	5	General Chemistry + Lab	MTH 111	FW
CH 232/262	5	General Chemistry + Lab	CH 231	WS
CH 233/263	5	General Chemistry + Lab	CH 232	FS
CH 331	4	Organic Chemistry (Series CH334/5/6 can substitute)	CH 233	FW
CH 332	4	Organic Chemistry (Series CH334/5/6 can substitute)	CH 331	WS
CH 440	3	Physical Chemistry	MTH 254, CH 233, PH 213	F
CH 441	3	Physical Chemistry	CH 440	W
CH 442	3	Physical Chemistry	CH 441	S
PH 211	4	General Physics with Calculus	MTH 251, MTH 252 (co)	FWS
PH 212	4	General Physics with Calculus	PH 211, MTH 252	FWS
PH 213	4	General Physics with Calculus	PH 212, MTH 254	WS
44				

### Engineering

Course #	Credit Hours	Description	Prerequisites	Terms Offered
CBEE 101	3	Chemical, Biological and Environmental Engineering Orientation	-	F
CBEE 102	3	Engineering Problem Solving and Computation	MTH 112	W
CBEE 211	3	Material Balances and Stoichiometry	MTH 252, CH 233, 2nd year engr standing	F
CBEE 212	3	Energy Balances	CBEE 211, MTH 256 (co)	W
CBEE 213	4	Process Data Analysis	CBEE 212	S
CBEE 414	3	Process Engineering Laboratory	CBEE 213 (co), CHE 311, CHE 333	F
CHE 311	3	Thermodynamics	CBEE 212, MTH 256	F
CHE 312	3	Chemical Engineering Thermodynamics	CHE 311	W
CHE 320	3	Safety, Engineering Ethics, and Professionalism	-	F
CHE 331	4	Transport Phenomena I: Fluids	CBEE 212 (co), MTH 256	F
CHE 332	3	Transport Phenomena II: Heat	CHE 311 and 331	W
CHE 333	3	Transport Phenomena III: Mass	CHE 331	S
CHE 334	2	Transport Phenomena Laboratory	CBEE 213 (co), CHE 333	S
CHE 361	3	Chemical Process Dynamics & Simulation	MTH 256, CHE 331 (co)	W
CHE 411	4	Mass Transfer Operations	CHE 312, CHE 333	F
CHE 415	3	Chemical Engineering Laboratory	CBEE 414, CHE 411, CHE 443, CHE 361 (co)	W
CHE 431	3	Chemical Plant Design I	CHE 411, CHE 443	W
CHE 432	3	Chemical Plant Design II	CHE 431	S
CHE 443	4	Chemical Reaction Engineering	CHE 312, CHE 333	F
CHE 461	3	Process Control	CHE 331, CHE 332 (co), CHE 361	S
ENGR 201	3	Electrical Engineering Fundamentals	MTH 252, 2nd year engr standing	FWS
ENGR 211	3	Statics	MTH 252, 2nd year engr standing	FWS
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## Elective Courses

ChE majors are required to take 11 credits of engineering topics and 7 credits of advanced chemistry electives. It is recommended that electives be selected within one of three possible concentrations (biochemical processes, environmental processes, or microelectronics and materials science).

### Biochemical Processes Electives

Course #	Credit Hours	Description	Prerequisites	Terms Offered
<b>Advanced Chemistry</b>				
BB 450	4	General Biochemistry	CH 332 or CH 336	FWS
BB 451	3	General Biochemistry	CH 332 or CH 336	FWS
CH 324	4	Quantitative Analysis	CH 233/263	FWS
CHE 417	4	Instrumentation in CBEE Lab	CH 233/263	S
<b>Engineering Topics</b>				
BIOE 351	3	Biomaterials and Biointerfaces	BB 451, CHE 333	S
BIOE 440	3	Bioconjugation	BB 450	S
BIOE 445	3	Surface Analysis	BIOE 351	
BIOE 457	3	Bioreactors	BB 451, CHE 333	F
BIOE 459	3	Cell Engineering	BB 451, CHE 333	W
BIOE 462	3	Bioseparations	BB 451, CHE 332	S

### Environmental Processes Electives

Course #	Credit Hours	Description	Prerequisites	Terms Offered
<b>Advanced Chemistry</b>				
BB 350	4	Elementary Biochemistry	CH 332	FWS
CH 324	4	Quantitative Analysis	CH 233/263	FWS
CH 422	3	Analytical Chemistry	PH 213, CH 441 (co)	W
CHE 417	4	Instrumentation in CBEE Lab	CH 233/263	S
TOX 430	3	Chemical Behavior in the Environment	CH 233	F
<b>Engineering Topics</b>				
CBEE 416	3	Process Engineering Project	CHE or BIOE or ENVE 315	S
CE 412	3	Hydrology	-	FS
ENVE 322	4	Fundamentals of Environmental Engineering	CH 232, MTH 256	W
ENVE 421	4	Water and Wastewater Characterization	ENVE 321 or 322	F
ENVE 422	4	Environmental Engineering Design	ENVE 421	W
ENVE 425	3	Air Pollution Control	ENVE 321 or 322	S
ENVE 431	3	Fate and Transport of Chemicals in Environmental Systems	CH 440 or CHE 331, ENVE 421	W
ENVE 456	3	Sustainable Water Resources Development	senior standing	S

### Microelectronics and Materials Science Electives

Course #	Credit Hours	Description	Prerequisites	Terms Offered
<b>Advanced Chemistry</b>				
CH 324	4	Quantitative Analysis	CH 233/263	FWS
CH 411	3	Inorganic Chemistry	CH 233/263	F
CH 421	3	Analytical Chemistry	PH 213, CH 440 (co)	F
CH 422	3	Analytical Chemistry	PH 213, CH 441 (co)	W
CHE 417	4	Instrumentation in CBEE Lab	CH 233/263	S
<b>Engineering Topics</b>				
BIOE 351	3	Biomaterials and Biointerfaces	BB 451, CHE 333	S
CBEE 416	3	Process Engineering Project	CHE or BIOE or ENVE 315	S
CHE 444	4	Thin Film Materials	CHE 443	W
CHE 445	4	Polymer Engineering and Science	CH 336, MTH 256	FS
CHE 450	3	Conventional and Alternative Energy Systems	-	W
CHE 451	3	Solar Energy Technologies	CHE 311	F
ECE 415	3	Materials Science of Nanotechnology	ECE 416 or EGR 321	
ECE 416	4	Electronic Materials and Devices	ENGR 201	F
ECE 417	4	Basic Semiconductor Devices	ECE 416	W
ECE 418	4	Semiconductor Processing	ECE 416	S
ENGR 221	3	The Science, Engineering, and Social Impact of Nanotechnology	sophomore engr standing	
IE 355	4	Statistical Quality Control	IE 255 or ST 314	FS
IE 356	4	Experimental Design for Industrial Processes	IE 255 or ST 314	WS
MATS 321	4	Materials Science	CH 232	FWS
MATS 322	3	Materials Properties	ENGR 213, ENGR 321 or MATS 321	FWS

## Baccalaureate Core

OSU requires completion of a set of Baccalaureate Core ("Bacc Core") courses, divided into 4 categories- Skills, Perspectives, Synthesis, and Difference, Power, and Discrimination (DPD). Some of these course requirements are met by technical courses within your major. Those Bacc Core requirements not fulfilled through technical course requirements are outlined below.

**Total Credits:** 37

### Skills (12 credits)

Course #	Credit Hours	Description	S/U Allowed
WR 121	3	English Composition	No
WR 327	3	Technical Writing	No
COMM 111 or 114	3	Public Speaking (COMM 111) or Argument and Critical Discourse COMM (114)	No
HHS 231	2	Lifetime Fitness for Health	Yes
HHS 24x or PAC	1	Lifetime Fitness or Physical Activity Courses	Yes

### Perspectives (16 credits)

Course Categories	Credit Hours	S/U Allowed
Biological Science w/ Lab	4	No
Cultural Diversity	3	Yes
Literature & Arts	3	Yes
Social Processes & Institutions	3	Yes
Western Culture	3	Yes

### Synthesis (6 credits)

Course Categories	Credit Hours	S/U Allowed
Contemporary Global Issues	3	Yes
Science, Technology, and Society	3	Yes

**Difference, Power, & Discrimination (3 credits)- No S/U grading**

# Important Links

**Student Online Services:** [myosu.oregonstate.edu](https://myosu.oregonstate.edu)

In your online account, you can register for classes, access MyDegrees, view & order transcripts, view account holds, and pay your student fees & tuition.

**Catalog:** <https://catalog.oregonstate.edu/>

The general OSU catalog contains information about all of the different major and minor programs at OSU, including course requirements and prerequisites.

**Course Descriptions:** <https://catalog.oregonstate.edu/courses/>

Detailed course descriptions can be found here, sorted by subject.

**OSU Schedule of Classes Searcher:** <https://catalog.oregonstate.edu/course-search/>

Use this tool to search for class availability sorted by term, requirement, subject, or campus.

**Transfer Credits:** <http://registrar.oregonstate.edu/transfer-credits>

General guide to transferring credits to OSU.

**Transfer Course Search:**

[https://adminfo.ucsadm.oregonstate.edu/prod/OSU\\_ADMTAM.P\\_tcs\\_splash\\_page](https://adminfo.ucsadm.oregonstate.edu/prod/OSU_ADMTAM.P_tcs_splash_page)

This tool allows you to search course equivalencies by the institution and course subject/number.

**Registrar Forms:** <http://registrar.oregonstate.edu/forms>

Forms relating to registration, grading, student records, veterans benefits, and graduation.

**College of Engineering (COE):** <http://engineering.oregonstate.edu/>

College of Engineering home page.

**Professional School:** <http://engineering.oregonstate.edu/pro-school>

College of Engineering Professional School information, including application cycles and the link to the application.

**MY COE:** <http://engineering.oregonstate.edu/my-coe>

Page with information about COE procedures and links to other OSU websites that are relevant to COE students.

**CBEE Advising:** <http://cbee.oregonstate.edu/undergraduate-advising>

Go to this site to book an appointment with your advisor! This page also contains general advising information and the latest copy of the advising guide.

**Research, Internships, and Careers:** <http://cbee.oregonstate.edu/careers>.

Practical work experience in a research laboratory or in industry is essential to your future employment and educational goals. CBEE students have a variety of opportunities to develop laboratory skills and obtain career advice from faculty and peer mentors.