

Required Courses for the Chemical Engineering Degree, 2023-2024

This program is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>

Undergraduate Advising: ech-advising@ucdavis.edu To make an advising appointment: appointments.ucdavis.edu

Note: Curriculum and courses offerings are subject to change. You must fulfil the degree requirements stated in the catalog of the year you graduate or the year immediately prior. For additional detail on courses and requirements, please visit the course supplement located at <https://catalog.ucdavis.edu/departments-programs-degrees/chemical-engineering/>

Writing Requirements

Lower Division Composition (4 units)		
Select <u>ONE</u> of the following courses:		
UWP 1, 1V, or 1Y	Expository Writing	
ENL 3	Introduction to Literature	
COM 1	Bks of West Civ/Ancient World	
COM 2	Bks of West Civ/MidAge-English	
COM 3	Bks of West Civ/Modern Crisis	
COM 4	Bks of Contemporary World	
NAS 5	Intro to Native American Lit.	

Courses must be completed with a C- or better. A 4 or 5 on your AP English exam will also satisfy this requirement.

Upper Division Composition (0 to 4 units)		
Select <u>ONE</u> of the following courses:		
UWP 102E or 102F	Writing in Disciplines	
UWP 104A, 104E, or 104T	Writing in Professions	

Courses must be completed with a C- or better. This requirement can also be satisfied by passing the [Upper Division Composition Exam](#)

General Education Requirement

This requirement is partially satisfied with coursework completed for the Chemical Engineering degree.
A detailed GE checklist can be found [here](#).

Lower Division Major Requirements

Math, Physics and Chemistry (52-54 units)

Course	Description	Units	Quarter			Prerequisites
			F	W	S	
MAT 21A	Calculus	4	F	W	S	
MAT 21B	Calculus	4	F	W	S	C- or better in MAT 21A or MAT 21AH
MAT 21C	Calculus	4	F	W	S	C- or better in MAT 21B or MAT 21BH
MAT 21D	Vector Analysis	4	F	W	S	C- or better in MAT 21C or MAT 21CH
MAT 22A or MAT 27A	Linear Algebra	3 4	F	W	S	C- or better in MAT 21C or MAT 21CH, ENG 6, EME 5, ECH 60, or MAT 22AL ☺
MAT 22B or MAT 27B	Differential Equations	3 4	F	W	S	C- or better in MAT 22A or MAT 67
PHY 9A	Classical Physics	5	F		S	MAT 21B or 📖
PHY 9B	Classical Physics	5	F	W		PHY 9A; MAT 21C; MAT 21D ☺
PHY 9C	Classical Physics	5		W	S	PHY 9B; MAT 212D; MAT 22A ☺
CHE 2A or CHE 4A	General Chemistry Gen Che for Phys Sci & Eng	5	F	W		24+ on Chemistry Placement Exam; 28+ on Chemistry Placement Exam
CHE 2B or CHE 4B	General Chemistry Gen Che for Phys Sci & Eng	5		W	S	C- or better in CHE 2A or CHE 2AH or CHE 4A
CHE 2C or CHE 4C	General Chemistry Gen Che for Phys Sci & Eng	5	F		S	C- or better in CHE 2B or CHE 2BH or CHE 4B

Engineering (16 units)

Course	Descriptions	Units	Quarter			Prerequisites
ECH 5	BioChem/Materials Analysis	3		W		None
ECH 51	Materials Balances	4	F			C- or better in MAT 21B
ECH 60 or ECS 32A	Computational Methods Introduction to Programming	4	F	W	S	MAT 21C None
ECH 80	Chemical Engineering Professionals (SS GEE credit)	1	F			None

Choose ONE of the following

ENG 17	Circuits I	4	F	W	S	MAT 21C (C- or better recommended)
ENG 35	Statics	4	F	W	S	C- or better in PHY 9A or PHY 9AH; C- or better in MAT 21D ☺
ENG 45	Properties of Materials	4	F	W	S SS	C- or better in all of the following: MAT 21C, CHE 2A, PHY 9A; ENG 45Y is an online course only offered in Summer Session

Upper Division Major Requirements**Chemistry (8 units)**

Course	Descriptions	Units	Quarter			Prerequisites
CHE 128A	Organic Chemistry	3	F	W	S	C or better in CHE 2C or CHE 4C
CHE 129A	Organic Chemistry	2	F	W		C or better in CHE 2C or CHE 4C; CHE 128A☺
CHE 128B	Organic Chemistry	3		W	S	CHE 128A or 📖

Engineering core courses (56 units)

Course	Descriptions	Units	Quarter			Prerequisites
ECH 140	Mathematical Methods	4	F			MAT 22B; ECH 60 or ECS 32A, or equivalent
ECH 141	Fluid Mechanics	4	F			C- or better in ECH 51 ☺; ECH 140 ☺
ECH 142	Heat Transfer	4		W		ECH 141
ECH 143	Mass Transfer	4			S	ECH 142
ECH 145A	Chemical Engineering Thermodynamics Lab	3		W		ECH 152A ☺, UWP 102E ☺
ECH 145B	Chemical Engineering Transport Lab	3			S	ECH 142, ECH 145A, UWP 102E
ECH 148A	Chemical Kinetics and Reaction Engineering	3	F			ECH 143, ECH 152B
ECH 148B	Chemical Kinetics and Reaction Engineering	4		W		ECH 148A
ECH 152A	Thermodynamics	3		W		ECH 51; MAT 21C
ECH 152B	Thermodynamic	4			S	ECH 152A
ECH 155	Chemical Engineering Kinetics and Reactor Design Lab	4		W		ECH 145B, ECH 148B ☺, ECH 157 ☺
ECH 157	Process Dynamics	4	F			ECH 140
ECH 158AN	Separations and Unit Operations	4	F			ECH 142, ECH 143
ECH 158BN	Process Economics and Green Design (SS GE3 credit)	4		W		ECH 158AN or ECH 161AN
ECH 158C	Plant Design Project (SS GE3 credit)	4			S	ECH 158B or ECH 161C

Chemical Engineering Technical Electives continue on next page...

☺ May be taken concurrently

📖 May be taken with consent of instructor

* Not offered regularly

** Offered in alternate years

Chemical Engineering Technical Electives (20 units)

	1. At least 3 units must be completed in any upper division engineering course(s) (BIM-Biomedical Engineering , EAE-Aerospace Science & Engineering , EBS-Biological Systems Engineering , ECH- Chemical Engineering , ECI- Civil & Environmental Engineering , ECS- Computer Science Engineering , EEC- Electrical & Computer Engineering , EME- Mechanical Engineering , EMS- Materials Science & Engineering , ENG-Engineering) not numbered 190C, 192, 198, and 199 (independent study, research, seminar, or internship).
	2. The remaining 17 units, for a total minimum of 20 units, are subject to the following:
	a. Units must be completed in a science, engineering or business course carrying one of the following subject designations: ARE-Agricultural & Resource Econ , ATM-Atmospheric Science , BIM-Biomedical Engineering , BIS-Biological Sciences , BIT-Biotechnology , CHE-Chemistry , EAE-Aerospace Science & Engineering , EBS-Biological Systems Engineering , ECH- Chemical Engineering , ECN-Economics , ECS- Computer Science Engineering , EEC- Electrical & Computer Engineering , EME- Mechanical Engineering , EMS-Materials Science & Engineering , ENG-Engineering , FPS-Fiber & Polymer Science , FST-Food Science & Technology , MAT-Mathematics , MCB-Molecular & Cellular Biology , MGT- Management , PHY-Physics , STA-Statistics , VEN-Viticulture & Enology .
	b. A minimum of 9 units must be completed in upper division courses (100-199) courses.
	c. A maximum of 4 units may be completed in courses numbered ECH 192, ECH 198 and ECH 199 combined (192's, 198's, 199's from outside the department require a petition, see item d)
	d. Credit for independent studies (199s) or internships (192s) completed outside of the department must be approved by the department's Undergraduate Affairs Committee. Additionally, students applying for these credits must submit an essay of at least 4 pages and no more than 10 pages detailing the engineering and/or science aspects of their work, results or outcomes (figures and graphs may be included), and how the experience relates to their educational program and objectives. The report must be submitted in pdf format and use 1.5 line spacing, 1" margins, and 12pt Times New Roman font. No intellectual property should be contained in the report. Applications must also include a written evaluation of the students' performance by the student's supervisor or faculty advisor.
	e. Courses numbered 92, 98 and 99 may not be used to satisfy this requirement.
	3. Courses used to satisfy other major requirements cannot be used to satisfy the technical elective requirements.

List your course for Chemical Engineering Technical Electives below

Course (Ex: ECH 168)	# of Units
Units	

College of Engineering Course Tips

- [BIM-Biomedical Engineering](#) – Most require BIS 2A or BIS 2B
- [EAE-Aerospace Science & Engineering](#) – Most courses require upper-division ENG courses
- [EBS-Biological Systems Engineering](#) – Most require EBS 75 and upper-division ENG courses
- [ECH-Chemical Engineering](#) – Most non-required ECH courses will have their pre-reqs already satisfied
- [ECI-Civil & Environmental Engineering](#) – Most upper-division courses require ENG 35
- [ECS-Computer Science Engineering](#) – Most require a programming course/series &/or ENG 17
- [EEC-Electrical & Computer Engineering](#) – Most upper-division courses require ENG 17
- [EME-Mechanical Engineering](#) – Most upper-division courses require upper-division ENG courses.
- [EMS-Materials Science & Engineering](#) – most upper-division courses require ENG 45
- [ENG-Engineering](#)– Most upper-division courses require ENG 35

Sample Academic Plans - Chemical Engineering Major

Sample Four Year Schedule

Fall Quarter		Winter Quarter		Spring Quarter	
MAT 21A	4	MAT 21B	4	MAT 21C	4
CHE 2A or 4A [^]	5	CHE 2B or 4B [^]	5	CHE 2C or 4C [^]	5
ECH 80	1	ECH 5	3	PHY 9A	5
Lower Division Composition	4	GE	4		
Total units	14	Total units	16	Total units	14
MAT 21D	4	MAT 22A	3	MAT 22B	3
CHE 128A	3	CHE 128B	3	Tech. Elective	4
ECH 51	4	CHE 129A	2	ECH 60 or ECS 32A	4
PHY 9B	5	PHY 9C	5	ECH 152B	4
		ECH 152A	3		
Total units	16	Total units	16	Total units	15
ECH 140	4	ECH 142	4	ECH 143	4
ECH 141	4	ECH 145A	3	ECH 145B	3
Tech. Elective	4	ENG 17, 35 or 45	4	Tech. Elective	4
UWP 102E (or exam)	4	GE	4	GE	4
Total units	16	Total units	15	Total units	15
ECH 148A	3	ECH 148B	4	ECH 158C	4
ECH 157	4	ECH 155	4	Tech. Elective	4
ECH 158AN	4	ECH 158BN	4	Tech. Elective	4
GE	4	GE	4	GE	4
Total units	15	Total units	16	Total units	16

This is only one example of several possible combinations

[^] CHE 4 series recommended

Sample Two Year Transfer Schedule

Fall Quarter		Winter Quarter		Spring Quarter	
ECH 51	4	ECH 142	4	ECH 143	4
ECH 80	1	ECH 145A	3	ECH 145B	3
ECH 140	4	ECH 152A	3	ECH152B	4
ECH 141	4	ENG 17, 35, 45*	4	Tech. Elective	4
UWP 102E	4				
Total units	17	Total units	14	Total units	15
ECH 148A	3	ECH 148B	4	ECH 158C	4
ECH 157	4	ECH 155	4	Tech. Elective	4
ECH 158AN	4	ECH 158BN	4	Tech. Elective	4
Tech. Elective	4	Tech. Elective	4	GE	4
Total units	15	Total units	16	Total units	16

This is only one example of several possible combinations

** ENG 17, 35, or 45 will not be required if course work was completed prior to transfer*

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