

BS in Chemical Engineering

Degree Program Description

The curriculum provides a well-rounded general education and rigorous technical education in order to hone an appreciation of the relationship between technology and society. The technical curriculum focuses on the basic sciences, as well as chemical engineering theory and practice. Throughout the curriculum, problem solving, design, critical thinking, and teamwork skills are built by integrating team-based design projects, laboratories, and reports. Our graduates work in traditional chemical engineering areas such as the petroleum and chemical industries, as well as microelectronics, pharmaceuticals, materials, polymers, environmental protection, consumer products, and engineering consulting. Our graduates also pursue careers in business management or government as well as advanced studies in medicine, law, business, basic sciences, and other engineering disciplines.

Major Program Requirements

Each graduate must complete the required curriculum designed to demonstrate knowledge and integration of chemical engineering science and practice using analytical, computational, and experimental techniques. In addition, each graduate must have a comprehensive background in advanced chemistry. Graduates have a detailed working knowledge of the entire spectrum of chemical engineering activities.

All requirements listed below are in addition to University graduation requirements (<https://catalog.missouri.edu/academicdegreerequirements/universityrequirements/>), including University general education (<https://catalog.missouri.edu/academicdegreerequirements/generaleducationrequirements/>) and College of Engineering requirements. Students may also add an emphasis in the Biochemical (<https://catalog.missouri.edu/collegeofengineering/chemicalengineering/bs-chemical-engineering-emphasis-biochemical/>), Environmental (<https://catalog.missouri.edu/collegeofengineering/chemicalengineering/bs-chemical-engineering-emphasis-environmental/>), or Materials (<https://catalog.missouri.edu/collegeofengineering/chemicalengineering/bs-chemical-engineering-emphasis-materials/>) areas by completing that emphasis area's requirements.

Major core requirements

Required entry-level courses

MATH 1500	Analytic Geometry and Calculus I	5
MATH 1700	Calculus II	5
MATH 2300	Calculus III	3
MATH 4100	Differential Equations	3
PHYSICS 2750	University Physics I	5
PHYSICS 2760	University Physics II	5
CHEM 1400 & CHEM 1401	College Chemistry I and College Chemistry I Laboratory	4
CHEM 1410 & CHEM 1411	College Chemistry II and College Chemistry II Laboratory	4
CHEM 2100	Organic Chemistry I	3
CHEM 2110	Organic Chemistry II	3
CHEM 2130	Organic Laboratory I	2
STAT 4710	Introduction to Mathematical Statistics	3
Chemical Engineering Core		
CH_ENG 1000	Introduction to Chemical Engineering	2

CH_ENG 2225	Mass and Energy Balance	3
CH_ENG 2226	Engineering Process Computations	3
CH_ENG 3233	Chemical Engineering Fluid Dynamics	3
CH_ENG 3234	Heat and Mass Transfer	3
CH_ENG 3235	Separation Processes	3
CH_ENG 3243	Chemical Engineering Laboratory I ¹	3
or CH_ENG 3243W	Chemical Engineering Laboratory I - Writing Intensive	
CH_ENG 3261	Chemical Engineering Thermodynamics I	3
CH_ENG 3262	Chemical Engineering Thermodynamics II	3
CH_ENG 4363	Chemical Reaction Engineering and Technology	3
CH_ENG 4370	Process Dynamics and Control ³	3
CH_ENG 4385	Chemical Engineering Design I	3
CH_ENG 4980	Process Synthesis and Design ^{1, 2}	3
or CH_ENG 4980W	Process Synthesis and Design - Writing Intensive	

Additional Requirements

Chemical engineering electives	9
Engineering technical elective	3
Humanities	9
Social/behavioral sciences	6
2000 level or greater course in humanities or social/behavioral sciences as part of 18 CR of humanities and social sciences	
Economics elective from approved list	3
Chemistry elective from approved list	3
One technical elective ³	3
One general elective	3

¹ Writing-intensive

² Satisfies capstone requirement

³ MATH 4140 is recommended for CH_ENG 4370

Approved Economics Electives

ABM 1041	Applied Microeconomics	3
ABM 1042	Applied Macroeconomics	3
ECONOM 1014	Principles of Microeconomics	3
ECONOM 1015	Principles of Macroeconomics	3
ISE 2710	Engineering Economic Decision-Making	3

Approved Chemistry Electives

BIOCHM 3630	General Biochemistry	3
BIOCHM 4270	Biochemistry (I)	3
BIOCHM 4272	Biochemistry (II)	3
CHEM 3200	Quantitative Methods of Analysis with Lab	4
CHEM 4330	Physical Chemistry II	3
CHEM 4340	Physical Chemistry Laboratory	3
CHEM 4010	Advanced Chemistry Laboratory	3
CHEM 4200	Instrumental Methods of Analysis with Lab	3
CHEM 4160	Intermediate Organic Chemistry	3
CHEM 4170	Medicinal Chemistry	3
CHEM 4280	Environmental Chemistry	3
CHEM 4400	Inorganic Chemistry	3
CHEM 4490	Physics and Chemistry of Materials ¹	3
CHEM 4600	Introduction to Radiochemistry with Lab	3

¹ CHEM 4490 is the same as BIOL_EN 4480, BME 4480, NU_ENG 4319, and PHYSCS 4190.

Accelerated BS in Chemical Engineering to MS in Chemical Engineering

Students enrolled in the Accelerated BS/MS program must complete at least 12 credit hours of 7000+ or higher level course work while dual enrolled as an undergraduate and graduate student during their senior year. While dual enrolled, students should take 3 credit hours of CH_ENG 8990 for research credit. Students should also complete two (2) 7000+ elective courses as well as a 7000+ MATH course.

The remaining 18 credit hours needed to fulfill the degree requirements (30 credit hours) will be completed when the student attains graduate standing.

Core Coursework

CH_ENG 8336	Advanced Heat and Momentum Transfer	3
CH_ENG 8337	Advanced Mass Transfer	3
CH_ENG 8451	Advanced Chemical Engineering Thermodynamics I	3
CH_ENG 8463	Advanced Chemical Reaction Engineering	3

Additional Requirements

CH_ENG 8087	Seminar in Chemical Engineering	1
CH_ENG 8990	Research-Masters Thesis in Chemical Engineering	5

Total Credits 18

Semester Plan

Below is a sample plan of study, semester by semester. A student's actual plan may vary based on course choices where options are available.

First Year

Fall	CR	Spring	CR
MATH 1500		5 MATH 1700	5
CHEM 1400		3 CHEM 1410	3
CHEM 1401		1 CHEM 1411	1
CH_ENG 1000		2 PHYSCS 2750	5
ENGLSH 1000		3 CH_ENG 2225	3
Approved history/poli. sci. elective		3	
		17	17

Second Year

Fall	CR	Spring	CR
MATH 2300		3 MATH 4100	3
CHEM 2100		3 CHEM 2110	3
PHYSCS 2760		5 CHEM 2130	2
CH_ENG 2226		3 CH_ENG 3262	3
CH_ENG 3261		3 Humanities/fine arts or social/behavioral sciences	3
		17	14

Third Year

Fall	CR	Spring	CR
STAT 4710		3 CH_ENG 3234	3

CH_ENG 3233	3 CH_ENG 3235	3
Economics elective	3 CH_ENG 4370	3
Technical elective	3 Chemistry elective	3
Humanities/fine arts or social/behavioral sciences	3 Engineering technical elective	3
		15

Fourth Year			
Fall	CR	Spring	CR
CH_ENG 3243W		3 CH_ENG 4980W	3
CH_ENG 4363		3 Chemical engineering elective	3
CH_ENG 4385		3 Chemical engineering elective	3
Chemical engineering elective		3 General elective	3
Humanities/fine arts or social/behavioral sciences		3 Humanities/fine arts or social/behavioral sciences	3
		15	15

Total Credits: 125