

# BS in Chemical Engineering

## Program Codes:

20FQ0300BS

## Degree Requirements

To earn a Bachelor of Science in Chemical Engineering degree from UIC, students need to complete university, college, and department degree requirements. The Department of Chemical Engineering degree requirements are outlined below. Students should consult the [College of Engineering](#) section for additional degree requirements and college academic policies.

Code	Title	Hours
<b>Summary of Requirements</b>		
Nonengineering and General Education Requirements		68
Required in the College of Engineering		51
Selective		3
Technical Elective <sup>a</sup>		3
Electives outside the Major Rubric <sup>a</sup>		3
<b>Total Hours</b>		<b>128</b>

<sup>a</sup> Students in the Biochemical Engineering Concentration take a minimum of 8 hours of electives and 130 hours for the degree; see below.

## Nonengineering and General Education Requirements

Code	Title	Hours
<b>Required Courses</b>		
ENGL 160	Academic Writing I: Writing in Academic and Public Contexts	3
ENGL 161	Academic Writing II: Writing for Inquiry and Research	3
Exploring World Cultures course <sup>a</sup>		3
Understanding the Creative Arts course <sup>a</sup>		3
Understanding the Past course <sup>a</sup>		3
Understanding the Individual and Society course <sup>a</sup>		3
Understanding U.S. Society course <sup>a</sup>		3
MATH 180	Calculus I <sup>b</sup>	4
MATH 181	Calculus II <sup>b</sup>	4
MATH 210	Calculus III <sup>b</sup>	3
MATH 220	Introduction to Differential Equations	3
PHYS 141	General Physics I (Mechanics) <sup>b</sup>	4
PHYS 142	General Physics II (Electricity and Magnetism) <sup>b</sup>	4
CHEM 122 & CHEM 123	Matter and Energy and Foundations of Chemical Inquiry I <sup>b</sup>	5
or CHEM 116	Honors and Majors General and Analytical Chemistry I	

CHEM 124 & CHEM 125	Chemical Dynamics and Foundations of Chemical Inquiry II <sup>b</sup>	5
or CHEM 118	Honors and Majors General and Analytical Chemistry II	
CHEM 222	Analytical Chemistry <sup>c</sup>	4
CHEM 232	Structure and Function	3
CHEM 233	Synthesis Techniques Laboratory	2
CHEM 234	Chemical Synthesis	3
CHEM 342	Physical Chemistry I	3
<b>Total Hours</b>		<b>68</b>

<sup>a</sup> Students should consult the [General Education](#) section of the catalog for a list of approved courses in this category.

<sup>b</sup> This course is approved for the Analyzing the Natural World General Education category.

<sup>c</sup> Students who take CHEM 116 and CHEM 118 to fulfill the general chemistry requirement do not need to take CHEM 222. Instead they should enroll in one of the following: CHEM 314, CHEM 452, CHEM 402, or CHEM 444.

## Required in the College of Engineering

Code	Title	Hours
<b>Required Courses</b>		
ENGR 100	Engineering Success Seminar for Freshmen <sup>a</sup>	1
CHE 201	Introduction To Thermodynamics	3
CHE 205	Computational Methods in Chemical Engineering	3
CHE 210	Material and Energy Balances	4
CHE 230	Molecular Systems in Chemical Engineering <sup>b</sup>	3
CHE 301	Chemical Engineering Thermodynamics	3
CHE 311	Transport Phenomena I	3
CHE 312	Transport Phenomena II	3
CHE 313	Transport Phenomena III	3
CHE 321	Chemical Reaction Engineering	3
CHE 341	Chemical Process Control	3
CHE 381	Chemical Engineering Laboratory I	2
CHE 382	Chemical Engineering Laboratory II	2
CHE 396	Senior Design I <sup>c</sup>	3
CHE 397	Senior Design II	4
CME 260	Properties of Materials	3
ECE 210	Electrical Circuit Analysis	3
CHE 499	Professional Development Seminar	0
CS 109	Programming for Engineers with MatLab	3
<b>Total Hours</b>		<b>51</b>

<sup>a</sup> ENGR 100 is one-semester-hour course, but the hour does not count toward the total hours required for graduation.

<sup>b</sup> CHE 230 is only required for students who enrolled Fall 2022 or later, and for students taking the Energy & Environment, Nanotechnology, or Polymers & Molecular Engineering concentration. Students

should consult the archived catalog from their admission year for requirements.

c Students enrolled before Fall 2022 take CHE 396 as 4 hours.

## Selective

Code	Title	Hours
<b>Courses</b>		
Select one of the following:		3
CHE 330	Polymer Science	
CHEM 346	Physical Chemistry II	
<b>Total Hours</b>		<b>3</b>

## Technical Elective

Code	Title	Hours
<b>Courses</b>		
Select one of the following: <sup>a</sup>		3
CHE 392	Undergraduate Research <sup>b</sup>	
CHE 413	Introduction to Flow in Porous Media	
CHE 421	Combustion Engineering	
CHE 422	Biochemical Engineering	
CHE 423	Catalytic Reaction Engineering	
CHE 425	Nanotechnology for Pharmaceutical Applications	
CHE 433	Process Simulation With Aspen Plus	
CHE 438	Computational Molecular Modeling	
CHE 440	Non-Newtonian Fluids	
CHE 441	Computer Applications in Chemical Engineering	
CHE 450	Air Pollution Engineering	
CHE 451	Renewable Energy Technologies	
CHE 453	Fundamentals of Electrochemistry	
CHE 454	Molecular and Macromolecular Engineering	
CHE 455	Nanoscale Systems in Chemical Engineering	
CHE 456	Fundamentals and Design of Microelectronics Processes	
CHE 457	Colloidal and Interfacial Phenomena	
CHE 494	Selected Topics in Chemical Engineering	
<b>Total Hours</b>		<b>3</b>

a Possible technical elective credit for a 400-level CHE course not listed above will require departmental approval by petition to the Undergraduate Committee.

b An appropriate design-related research project may be selected with the approval of the Department of Chemical Engineering.

## Electives outside the Major Rubric

Code	Title	Hours
<b>Electives</b>		
Electives outside the CHE rubric		3
<b>Total Hours</b>		<b>3</b>

## Optional Concentrations

### BS in Chemical Engineering, Biochemical Engineering Concentration

Students in this concentration complete the following:

Code	Title	Hours
<b>Required Courses<sup>a</sup></b>		
<b>Technical Elective</b>		
CHE 422	Biochemical Engineering	3
<b>Electives</b>		
Select two electives in nonmajor rubric category from the following:		5-7
BIOS 350	General Microbiology	
BIOS 351	Microbiology Laboratory	
CHEM 352	Introductory Biochemistry	
CHEM 452	Biochemistry I	
<b>Total Hours</b>		<b>8-10</b>

a Due to structure of the concentration and the prerequisites required for some of the courses, students in the concentration will be required to take a minimum of 130 semester hours for the degree.

### BS in Chemical Engineering, Energy and Environment Concentration

Students in this concentration complete the following:

Code	Title	Hours
<b>Required Courses<sup>a</sup></b>		
CHE 230	Molecular Systems in Chemical Engineering	3
CHE 330	Polymer Science <sup>b</sup>	3
<b>Technical Elective</b>		
CHE 451	Renewable Energy Technologies	3
<b>Elective outside the Major Rubric</b>		
CME 322	Environmental Engineering	3
<b>Second Technical Elective</b>		
Select one of the following:		3
CHE 392	Undergraduate Research	
CHE 450	Air Pollution Engineering	
CHE 453	Fundamentals of Electrochemistry	
A 400-level course approved by the director of undergraduate studies		
<b>Total Hours</b>		<b>15</b>

a Due to structure of the concentration and the prerequisites required for some of the courses, students in the concentration will be required to take a minimum of 134 semester hours for the degree (6 additional semester hours).

b This course fulfills the degree's selective requirement.

### BS in Chemical Engineering, Entrepreneurship Concentration

Students in this concentration complete the following:

Code	Title	Hours
<b>Required Course<sup>a</sup></b>		
CHE 427	Entrepreneurship in Engineering <sup>b</sup>	3
<b>Electives</b>		
Select two of the following: <sup>c</sup>		6
ENTR 200	Survey of Entrepreneurship	
ENTR 310	Introduction to Entrepreneurship	
ENTR 445	New Venture Planning	
400-level course approved by the Chemical Engineering director of undergraduate studies		
<b>Total Hours</b>		<b>9</b>

a Due to structure of the concentration and the prerequisites required for some of the courses, students in the concentration will be required to take a minimum of 131 semester hours for the degree (3 additional semester hours).

b This course fulfills the degree's technical elective requirement.

c One non-CHE course fulfills the degree's Elective outside the Major Rubric requirement

## BS in Chemical Engineering, Nanotechnology Concentration

Students in this concentration complete the following:

Code	Title	Hours
<b>Required Courses<sup>a</sup></b>		
CHE 230	Molecular Systems in Chemical Engineering	3
CHE 330	Polymer Science <sup>b</sup>	3
<b>Technical Elective</b>		
CHE 455	Nanoscale Systems in Chemical Engineering	3
<b>Elective outside the Major Rubric</b>		
Select one of the following:		3-4
ECE 346	Solid State Device Theory	
PHYS 431	Modern Physics: Condensed Matter	
ME 418	Transport Phenomena in Nanotechnology	
ECE 440	Nanoelectronics	
ECE/ME 449	Microdevices and Micromachining Technology	
CHEM/BIOS 458	Biotechnology and Drug Discovery	
BME 485	Nanobiosensors	
<b>Second Technical Elective</b>		
Select one of the following:		3
CHE 392	Undergraduate Research	
CHE 425	Nanotechnology for Pharmaceutical Applications	
CHE 457	Colloidal and Interfacial Phenomena	
A 400-level course approved by the director of undergraduate studies		
<b>Total Hours</b>		<b>15-16</b>

a Due to structure of the concentration and the prerequisites required for some of the courses, students in the concentration will be required

to take a minimum of 134 semester hours for the degree (6 additional semester hours).

b This course fulfills the degree's selective requirement.

## BS in Chemical Engineering, Polymers and Molecular Engineering Concentration

Students in this concentration complete the following:

Code	Title	Hours
<b>Required Courses<sup>a</sup></b>		
CHE 230	Molecular Systems in Chemical Engineering	3
CHE 330	Polymer Science <sup>b</sup>	3
<b>Technical Elective</b>		
CHE 454	Molecular and Macromolecular Engineering	3
<b>Elective outside the Major Rubric</b>		
Select one of the following:		3-4
BME 485	Nanobiosensors	
CHEM 452	Biochemistry I	
CHEM/BIOS 458	Biotechnology and Drug Discovery	
PHAR 422	Fundamentals of Drug Action	
PHAR 423	Fundamentals of Drug Action II	
PHAR 461	Pharmacy and the U.S. Healthcare System	
PHYS/BME 450	Molecular Biophysics of the Cell	
<b>Second Technical Elective</b>		
Select one of the following:		3
CHE 392	Undergraduate Research	
CHE 425	Nanotechnology for Pharmaceutical Applications	
CHE 438	Computational Molecular Modeling	
CHE 440	Non-Newtonian Fluids	
CHE 453	Fundamentals of Electrochemistry	
CHE 455	Nanoscale Systems in Chemical Engineering	
CHE 457	Colloidal and Interfacial Phenomena	
A 400-level course approved by the director of undergraduate studies		
<b>Total Hours</b>		<b>15-16</b>

a Due to structure of the concentration and the prerequisites required for some of the courses, students in the concentration will be required to take a minimum of 134 semester hours for the degree (6 additional semester hours).

b This course fulfills the degree's selective requirement.

## BS in Chemical Engineering, Process Automation Concentration

Students in this concentration complete the following:

Code	Title	Hours
<b>Required Courses<sup>a</sup></b>		
CHE 433	Process Simulation With Aspen Plus <sup>b</sup>	3
<b>Electives outside the Major Rubric</b>		

Select two of the following:	6
ECON 120 Principles of Microeconomics	
IE 201 Financial Engineering	
MATH 310 Applied Linear Algebra	
MATH 419 Models in Applied Mathematics	
<b>Total Hours</b>	<b>9</b>

a Due to structure of the concentration and the prerequisites required for some of the courses, students in the concentration will be required to take a minimum of 131 semester hours for the degree (3 additional semester hours).

b This course fulfills the degree's technical elective requirement.

## Sample Course Schedule

Course	Title	Hours
<b>Freshman Year</b>		
<b>First Semester</b>		
ENGR 100	Engineering Success Seminar for Freshmen <sup>a</sup>	1
ENGL 160	Academic Writing I: Writing in Academic and Public Contexts	3
MATH 180	Calculus I	4
CHEM 122 & CHEM 123 or CHEM 116	Matter and Energy or Honors and Majors General and Analytical Chemistry I	5
General Education Core Course		3
<b>Hours</b>		<b>15</b>
<b>Second Semester</b>		
CS 109	Programming for Engineers with MatLab	3
MATH 181	Calculus II	4
PHYS 141	General Physics I (Mechanics)	4
CHEM 124 & CHEM 125 or CHEM 118	Chemical Dynamics or Honors and Majors General and Analytical Chemistry II	5
<b>Hours</b>		<b>16</b>
<b>Sophomore Year</b>		
<b>First Semester</b>		
ENGL 161	Academic Writing II: Writing for Inquiry and Research	3
PHYS 142	General Physics II (Electricity and Magnetism)	4
CHE 201	Introduction To Thermodynamics	3
MATH 210	Calculus III	3
CHEM 232	Structure and Function	3
<b>Hours</b>		<b>16</b>
<b>Second Semester</b>		
CHE 205	Computational Methods in Chemical Engineering	3
CHE 210	Material and Energy Balances	4
CHE 230	Molecular Systems in Chemical Engineering	3
MATH 220	Introduction to Differential Equations	3
CHEM 222	Analytical Chemistry	4
<b>Hours</b>		<b>17</b>
<b>Junior Year</b>		
<b>First Semester</b>		
CHE 301	Chemical Engineering Thermodynamics	3
CHE 311	Transport Phenomena I	3
CHEM 233	Synthesis Techniques Laboratory	2
CHEM 234	Chemical Synthesis	3
CHEM 342	Physical Chemistry I	3
General Education Core Course		3
<b>Hours</b>		<b>17</b>
<b>Second Semester</b>		
CHE 312	Transport Phenomena II	3

CHE 313	Transport Phenomena III	3
CHE 321	Chemical Reaction Engineering	3
CME 260	Properties of Materials	3
ECE 210	Electrical Circuit Analysis	3
General Education Core Course		3
<b>Hours</b>		<b>18</b>

### Senior Year

#### First Semester

CHE 330	Polymer Science (Or CHEM 346 Junior Year second semester)	3
CHE 381	Chemical Engineering Laboratory I	2
CHE 396	Senior Design I	3
CHE Technical Elective (select from list)		3
CHE 499	Professional Development Seminar	0
General Education Core Course		3
<b>Hours</b>		<b>14</b>

#### Second Semester

CHE 341	Chemical Process Control	3
CHE 382	Chemical Engineering Laboratory II	2
CHE 397	Senior Design II	4
Elective outside the Major Rubric		3
General Education Core course		3
<b>Hours</b>		<b>15</b>
<b>Total Hours</b>		<b>128</b>

a ENGR 100 is a one-semester-hour course, but the hour does not count toward the total hours required for graduation.