CHEMICAL ENGINEERING: BIOMEDICAL/BIOCHEMICAL, BSCH

Requirements for Students Matriculating in or before Academic Year 2023-2024. Learn more about University Academic Regulation 3.1 (http://catalog.okstate.edu/university-academic-regulations/#matriculation).

Minimum Overall Grade Point Average: 2.00
Total Hours: 130

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Code</td>
<td>Title</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hours</td>
</tr>
</tbody>
</table>

**General Education Requirements**
All General Education coursework requirements are satisfied upon completion of this degree plan.

**English Composition**
See Academic Regulation 3.5 (http://catalog.okstate.edu/university-academic-regulations/#english-composition)

- ENGL 1113 Composition I 3
- or ENGL 1313 Critical Analysis and Writing I 3
Select one of the following: 3

- ENGL 1213 Composition II 3
- ENGL 1413 Critical Analysis and Writing II 3
- ENGL 3323 Technical Writing 3

**American History & Government**
Select one of the following: 3

- HIST 1103 Survey of American History 3
- HIST 1483 American History to 1865 (H) 3
- HIST 1493 American History Since 1865 (DH) 3
- POLS 1113 American Government 3

**Analytical & Quantitative Thought (A)**
- MATH 2144 Calculus I (A) 4
- MATH 2153 Calculus II (A) 3
- MATH 2163 Calculus III 3

**Humanities (H)**
- PHIL 3833 Biomedical Ethics (H) (or equivalent with Chemical Engineering Advisor approval) 3
Select 3 hour course designated (H) 3

**Natural Sciences (N)**
Must include one Laboratory Science (L) course
- CHEM 1515 Chemistry II (LN) 5
- BIOL 1113 Introductory Biology (N) 4
- & BIOL 1111 and Introductory Biology Laboratory (LN) 4
- or BIOL 1114 Introductory Biology (LN) 3

**Social & Behavioral Sciences (S)**
Select 3 hours of any course designated (S) 3

**College/Departmental Requirements**

**Basic Science**
- PHYS 2014 University Physics I (LN) 4
- PHYS 2114 University Physics II (LN) 4

**Engineering**
- ENGR 1111 Introduction to Engineering 1
- ENGR 1412 Introductory Engineering Computer Programming 2
- ENGR 2421 Engineering Data Acquisition Controls Lab 1

**Engineering Science**
- ENSC 2113 Statics 3
- ENSC 2613 Introduction to Electrical Science 3
- ENSC 3231 Fluids and Hydraulics Lab 1
- ENSC 3233 Fluid Mechanics 3
- ENSC 3313 Materials Science 3

**Mathematics**
Select one of the following: 3
- STAT 4033 Engineering Statistics 3
- STAT 4073 Engineering Statistics with Design of Experiments 3

**Chemistry**
- CHEM 3053 Organic Chemistry I 3
Select one of the following: 5
- CHEM 3153 & CHEM 3112 Organic Chemistry II and Organic Chemistry Laboratory 5
- BIOC 3653 & BIOC 3723 Survey of Biochemistry and Biochemistry and Molecular Biology Laboratory 5

**Hours Subtotal** 36

**Major Requirements**

**Mathematics**
- MATH 2233 Differential Equations 3
- or MATH 3263 Linear Algebra and Differential Equations 3

**Chemistry**
- CHEM 3433 Physical Chemistry I 3

**Chemical Engineering**
- CHE 2023 Introduction to Chemical Engineering Thermodynamics 3
- CHE 2033 Introduction to Chemical Process Engineering 3
- CHE 2581 Chemical Engineering Seminar I 1
- CHE 3013 Rate Operations I 3
- CHE 3113 Rate Operations II 3
- CHE 3123 Chemical Reaction Engineering 3
- CHE 3333 Introduction to Transport Phenomena 3
- CHE 3473 Chemical Engineering Thermodynamics 3
- CHE 3581 Chemical Engineering Seminar II 1
- CHE 4002 Chemical Engineering Laboratory I 2
- CHE 4112 Chemical Engineering Laboratory II 2
- CHE 4124 Chemical Engineering Design I 4
- CHE 4224 Chemical Engineering Design II 4
- CHE 4581 Chemical Engineering Seminar III 1

**Hours Subtotal** 40

**Diversity (D) & International Dimension (I)**
May be completed in any part of the degree plan
Select at least one Diversity (D) course
Select at least one International Dimension (I) course
CHE 4843  Chemical Process Instrumentation and Control  3

Hours Subtotal  45

Controlled Electives

Advanced Chemical Science
Select 3 hours from the following:

CHE 3202  Interdisciplinary Design and Build for Chemical Systems I
or CHE 3211  Interdisciplinary Design and Build for Chemical Systems II

CHE 4073  Introduction to Tissue Engineering
CHE 4133  Introduction to Catalysis and Photocatalysis

CHE 4283  Bioprocess Engineering
CHE 4293  Biomedical Engineering
CHE 4323  Electrochemical Engineering
CHE 4343  Environmental Engineering
CHE 4493  Introduction to Molecular Modeling and Simulation

CHE 4523  Introduction to Colloid Processing
CHE 4533  Colloidal and Interfacial Phenomena
CHE 4543  Introduction to Chemical Engineering Data Science
CHE 4603  Introduction to Membrane Separations
CHE 4753  Introduction to Applied Numerical Computing for Scientists and Engineers
CHE 4773  Introduction to Computational Fluid-Particle Dynamics

Bioengineering/Bioscience Electives
Select 6 hours of the following:

BAE 3113  Biological Applications in Engineering
BAE 4413  Food Engineering
BIOC 3223  Physical Chemistry for Biologists
BIOC 3653  Survey of Biochemistry ¹
BIOC 3713  Biochemistry I ¹
BIOC 3723  Biochemistry and Molecular Biology Laboratory
BIOC 4113  Molecular Biology
BIOC 5824  Biochemical Laboratory Methods
BIOL 1604  Animal Biology
BIOL 3023  General Genetics
CHE 4283  Bioprocess Engineering
CHE 4293  Biomedical Engineering
CHE 5283  Advanced Bioprocess Engineering
CHE 5293  Advanced Biomedical Engineering
MICR 2123 & MICR 2132  Introduction to Microbiology and Introduction to Microbiology Laboratory
MICR 3033  Cell and Molecular Biology

Hours Subtotal  9

Total Hours  130

¹ Cannot use both ANSI 3423 Animal Genetics & BIOL 3023 General Genetics or BIOC 3653 Survey of Biochemistry & BIOC 3713 Biochemistry I.

Graduation Requirements

1. A minimum GPA of 2.00 is required in all CHE coursework.
2. Must Receive a "C" or better in the following CHE courses: CHE 2023, CHE 2033, CHE 3013, CHE 3113, CHE 3123, CHE 3333, CHE 3473, and CHE 4002.
3. The major engineering design experience, capstone course, is satisfied by CHE 4124 Chemical Engineering Design I and CHE 4224 Chemical Engineering Design II.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2029.