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>
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<tbody>
<tr>
<td>ENGL 1113</td>
<td>Composition I</td>
<td>3</td>
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<tr>
<td>or ENGL 1313</td>
<td>Critical Analysis and Writing I</td>
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<tr>
<td>Select one of the following:</td>
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<tr>
<td>ENGL 1213</td>
<td>Composition II</td>
<td></td>
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<tr>
<td>ENGL 1413</td>
<td>Critical Analysis and Writing II</td>
<td></td>
</tr>
<tr>
<td>ENGL 3323</td>
<td>Technical Writing</td>
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American History & Government
Select one of the following: 3
- HIST 1103 | Survey of American History |
- HIST 1483 | American History to 1865 (H) |
- HIST 1493 | American History Since 1865 (DH) |
- POLS 1113 | American Government |

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

Humanities (H)
- PHIL 3833 | Biomedical Ethics (H) (or equivalent with Chemical Engineering Advisor approval) |

Select 3 hour course designated (H) 3

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

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

College/Departmental Requirements

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

Engineering
- ENGR 1111 | Introduction to Engineering |
- ENGR 1412 | Introductory Engineering Computer Programming |
- ENGR 2421 | Engineering Data Acquisition Controls Lab |

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

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

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

Hours Subtotal 36

Major Requirements

Mathematics
- MATH 2233 | Differential Equations |
- or MATH 3263 | Linear Algebra and Differential Equations |

Chemistry
- CHEM 3433 | Physical Chemistry I |

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

Hours Subtotal 40
<table>
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<tr>
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<tbody>
<tr>
<td>CHE 4843</td>
<td>Chemical Process Instrumentation and Control</td>
<td>3</td>
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### Hours Subtotal

| 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 Machine Learning for Chemical Processes
- 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 from the following:
- BAE 3113 Biological Applications in Engineering
- BAE 4413 Food Engineering
- BIOC 3223 Physical Chemistry for Biologists
- BIOC 3653 Survey of Biochemistry
- BIOC 3713 Biochemistry
- 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 Introduction to Microbiology and Introduction to Microbiology Laboratory
- MICR 3033 Cell and Molecular Biology

### Hours Subtotal

| Hours Subtotal | 9 |

### Total Hours

| Total Hours | 130 |

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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.