III CHEMBE PROGRAM REQUIREMENTS

Required Courses for the ChemBE Undergraduate Degree Fall 2021

Required Mathematics and Science Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>020.305</td>
<td>Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>030.205</td>
<td>Organic Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>110.108</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>110.109</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>110.202</td>
<td>Calculus III</td>
<td>4</td>
</tr>
<tr>
<td>173.111</td>
<td>General Physics Lab I</td>
<td>1</td>
</tr>
</tbody>
</table>

Chemistry (8 credits)

Option 1: no AP credits, take ALL these courses:
- 030.101 Intro. Chemistry (3)
- 030.102 Intro. Chemistry II (3)
- 030.105 Intro. Chemistry Lab I (1)
- 030.106 Intro. Chemistry Lab II (1)

Option 2: 4 AP credits, take
- 030.103 Applied Chemical Equilibrium and Reactivity (4)

Option 3: 8 AP credits, requirement is fulfilled (continue to Organic Chemistry)
- 030.103 Applied Chemical Equilibrium and Reactivity (4)
  or for those who want a refresher, take
- 030.103 Applied Chemical Equilibrium and Reactivity (4)

Physics (8 credits)

Option 1: no AP credits, take one of the following course series:
- 171.101 General Physics I (4)
- 171.102 General Physics II (4)
  or
- 171.107 General Physics for Physical Science Majors I (4)
- 171.108 General Physics for Physical Science Majors II (4)

Option 2: 4 AP credits, take one of these courses
- 171.102 General Physics II (4)
  or
- 171.108 General Physics for Physical Science Majors II (4)

Option 3: 8 AP credits, requirement is fulfilled
- Take one of the following courses (1 to 3 credits):
  - 020.315 Biochemistry Project Laboratory (1)
  - 030.225 Introduction to Organic Chemistry Laboratory (3)
  - 030.305 Physical Chemistry Instrumentation Laboratory I (3)
  - 250.253 Protein Engineering and Biochemistry Laboratory (3)

Take one of the following courses (4 credits):
- 110.302 Differential Equations with Applications (4)
- 553.291 Linear Algebra and Differential Equations (4)

Required Core ChemBE Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.113</td>
<td>Gateway Computing/Python</td>
<td>3</td>
</tr>
<tr>
<td>540.101</td>
<td>Chemical Engineering Today</td>
<td>1</td>
</tr>
<tr>
<td>540.202</td>
<td>Intro to Chemical and Biological Process Analysis</td>
<td>4</td>
</tr>
<tr>
<td>540.203</td>
<td>Engineering Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>540.301</td>
<td>Kinetic Processes</td>
<td>4</td>
</tr>
<tr>
<td>540.303</td>
<td>Transport Phenomena I</td>
<td>3</td>
</tr>
<tr>
<td>540.304</td>
<td>Transport Phenomena II</td>
<td>4</td>
</tr>
<tr>
<td>540.306</td>
<td>Chemical and Biological Separations</td>
<td>4</td>
</tr>
<tr>
<td>540.315</td>
<td>Process Design with ASPEN</td>
<td>2</td>
</tr>
<tr>
<td>540.409</td>
<td>Modeling Dynamics and Control for Chemical and Biological Systems</td>
<td>4</td>
</tr>
<tr>
<td>540.490</td>
<td>Chemical and Biomolecular Lab Safety and Ethics</td>
<td>1</td>
</tr>
</tbody>
</table>

Take one of the following courses for Senior Lab:
- 540.311 Projects in Chemical Engineering Unit Operations (4)
- 540.313 Projects in Chemical and Biomolecular Engineering Unit Operations (4)
  Chemical Engineering Laboratory at DTU (Technical University of Denmark) (4)

Take one of the following course options for Product Design (3 - 6 Credits)

Option 1: One-semester design (spring)
- 540.314 ChemBE Product Design (3)

Option 2: Two-semester design (two consecutive semesters)
- 540.309 Product Design Part 1 (3)
- 540.310 Product Design Part 2 (3)
  Must take both courses to receive credit; 540.309 counts towards core credits; 540.310 counts toward engineering electives

Option 3: WSE two-semester design (two consecutive semesters)
- 500.308 Multidisciplinary Design (3)
- 500.309 Advanced Multidisciplinary Design (3)
  Must take both courses to receive credit; 500.308 counts towards core credits; 500.309 counts toward engineering electives

Required HS Course

661.315 Culture of the Engineering Profession (3)

Take Electives to Meet Credit Requirements

128 credits total
- 48 credits of Engineering (E designation)
- 16 credits of Mathematics (must be from 110 or 553)
- 13 credits Advanced Chemistry and Biology
- 18 H/S credits (must be six courses that are at least 3 credits each)

GPA Requirements

2.0 overall GPA
2.0 GPA in required core ChemBE courses