# Chemical Engineering

## University Requirements (23-24)
- Writing – American Thought and Language (ATL) 4
- Integrative Studies in Humanities (IAH) 8
- Integrative Studies in Social Sciences (ISS) 8
- Bioscience (one of the following):
  - BS 111, MMG 205, MMG 301, PSL 250 3-4

## College Requirements (29)
- CEM 151 General and Descriptive Chemistry 4
- CSE 131 Introduction to Technical Computing 3
- MTH 132 Calculus I 3
- MTH 133 Calculus II 4
- MTH 234 Multivariable Calculus 4
- MTH 235 Differential Equations 3
- PHY 183 Physics for Scientists & Engineers I 4
- PHY 184 Physics for Scientists & Engineers II 4

## Major Requirements (68)
- CEM 152 Chemistry II 3
- CEM 161 Chemistry Laboratory I 1
- CEM 162 Chemistry Laboratory II 1
- CEM 351 Organic Chemistry I 3
- CEM 352 Organic Chemistry II 3
- CEM 355 Organic Laboratory I 2
- CEM 391 Molecular Thermodynamics 3
- CEM 392 Quantum Chemistry 3
- CHE 201 Material & Energy Balances 3
- CHE 301 Chemical Engineering as a Profession 1
- CHE 311 Fluid Flow & Heat Transfer 4
- CHE 312 Mass Transfer & Separations 4
- CHE 316 Unit Operations Laboratory 3
- CHE 321 Thermodynamics 4
- CHE 422 Transport Phenomena 3
- CHE 431 Chemical Reaction Engineering 3
- CHE 432 Process Dynamics & Control 3
- CHE 433 Process Design & Optimization I 4
- CHE 434 Process Design & Optimization II 2
- CHE 473 Principles in Polymers & Materials Systems 3
- ECE 345 Electronic Instrumentation & Systems 3
- STT 351 Probability & Statistics for Engineering 3
- Select one of the following courses:
  - CHE 472 Composite Materials Processing 3
  - CHE 481 Biochemical Engineering 3
  - Engineering Science Elective 3

## Other Electives (Variable)

**Note:** Elective courses must be taken at the 200 level or higher with the following exception: 100 level courses may be taken if they are prerequisites for higher level required courses for the major in which they are offered.

1. If PHY 231 is taken in place of PHY 183, PHY 233B must also be completed. If PHY 232 is taken in place of PHY 184, PHY 234B must also be completed.

## Options:

### Biochemical Engineering Option (16)
- The Department offers options in biochemical engineering, environmental engineering, food science, and polymer science and engineering to students wishing an area of specialization in their degree. Options are available to, but not required of, any student enrolled in the Bachelor of Science degree program in chemical engineering. **NOTE:** Completing the Bachelor of Science degree in chemical engineering with an option may require more than 128 credits. Upon completion of the required courses for one of these options, certification will appear on the student’s official transcript.

#### Biochemical Engineering Option (16)
- BMB 401 Basic Biochemistry 4
- BS 111 Cells & Molecules 3
- CHE 481 Biochemical Engineering 3
- MMG 301 Introductory Microbiology 3
- Select one of the following courses (3 credits):
  - CHE 491 Selected Topics in Chemical Engineering 1-4
  - CHE 882 Advanced Biochemical Engineering 3

#### Environmental Option (18)
- To earn a Bachelor of Science degree in Chemical Engineering with a biochemical engineering option, students must complete Major Requirements above and the following (Bioscience, CHE 472/481, and the Engineering Science Elective are not required):
  - CE 280 Introduction to Environmental Engineering 3
  - CHE 481 Biochemical Engineering 3
  - MMG 205 Allied Health Microbiology 3
- Select three of the following courses (9 credits):
  - CE 481 Environmental Engineering Chemistry 3
  - CE 483 Water and Wastewater Treatment 3
  - CE 485 Solid and Hazardous Waste Management 3
  - CE 487 Microbiology for Environmental Health Engr 3

#### Food Science Option (15)
- To earn a Bachelor of Science degree in Chemical Engineering with a food science option, students must complete Major Requirements, CHE 472/481 above and the following (Bioscience and the Engineering Science Elective are not required):
  - BE 477 Food Engineering 3
  - FSC 401 Food Chemistry 3
  - FSC 421 Food Laws and Regulations 3
  - FSC 440 Food Microbiology 3
  - MMG 205 Allied Health Microbiology 3

**Archived Curriculum**
- Spring 2000 – Fall 2000
The requirements listed above apply to students admitted to MSU beginning Spring, 2000. The department of Chemical Engineering (CHE) constantly reviews program requirements and reserves the right to make changes as necessary. Consequently, each student is strongly encouraged to consult with his/her advisor to obtain assistance in planning an appropriate schedule of courses. Students who have questions about Chemical Engineering should contact the Chemical Engineering Department Advising Office, 1415 Engineering Building, phone (517)355-6616 ext. 1.

Some courses may have prerequisites, which are not otherwise required in the program. Students should check course descriptions to ensure they are aware of prerequisites.
## Chemical Engineering

### Sample Program

#### Freshman Year

<table>
<thead>
<tr>
<th>Fall Credits</th>
<th>Spring Credits</th>
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<tbody>
<tr>
<td>CEM 151 4</td>
<td>ATL 1XX 4</td>
</tr>
<tr>
<td>CEM 161 1</td>
<td>CEM 152 3</td>
</tr>
<tr>
<td>CSE 131 3</td>
<td>CEM 162 1</td>
</tr>
<tr>
<td>ISS 2XX 4</td>
<td>ISS 3XX 4</td>
</tr>
<tr>
<td>MTH 132 3</td>
<td>MTH 133 4</td>
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#### Sophomore Year

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<tbody>
<tr>
<td>CEM 351 3</td>
<td>CEM 352 3</td>
</tr>
<tr>
<td>CHE 201 3</td>
<td>CEM 355 2</td>
</tr>
<tr>
<td>Elective 4</td>
<td>CHE 321 4</td>
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<tr>
<td>MTH 234 4</td>
<td>MTH 235 3</td>
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<tr>
<td>PHY 183 4</td>
<td>PHY 184 4</td>
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#### Junior Year

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<tbody>
<tr>
<td>CEM 391 3</td>
<td>CEM 392 3</td>
</tr>
<tr>
<td>CHE 301 1</td>
<td>CHE 312 4</td>
</tr>
<tr>
<td>CHE 311 4</td>
<td>CHE 316 3</td>
</tr>
<tr>
<td>Egr Sci Elec 3</td>
<td>CHE 431 3</td>
</tr>
<tr>
<td>IAH 20X 4</td>
<td>Elective 4</td>
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<td><strong>Total 15</strong></td>
<td><strong>Total 17</strong></td>
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</table>

#### Senior Year

<table>
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<th>Fall Credits</th>
<th>Spring Credits</th>
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<tbody>
<tr>
<td>Bioscience (AT) 3/4</td>
<td>CHE 422 3</td>
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<tr>
<td>CHE 432 3</td>
<td>CHE 434 2</td>
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<td>CHE 433 4</td>
<td>ECE 345 3</td>
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<tr>
<td>CHE 472/481 3</td>
<td>CHE 473 3</td>
</tr>
<tr>
<td>STT 351 3</td>
<td>IAH XXX 4</td>
</tr>
<tr>
<td><strong>Total 16/17</strong></td>
<td><strong>Total 15</strong></td>
</tr>
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### Program Objectives

The undergraduate program in chemical engineering builds a strong foundation for the professional development of its students and prepares them to meet the technological challenges of the future. With a bachelor’s degree, the graduates are well equipped for a wide variety of positions as practicing chemical engineers or for graduate studies in engineering and scientific disciplines. The intensive program encourages continued learning and professional development by providing the proper knowledge and stimulation in a setting that promotes personal growth. The program emphasizes its historic, nationally recognized strength in chemical process design, yet draws on the scholarly accomplishments of its faculty to integrate traditional chemical engineering topics with specialized studies in the contemporary fields of bioprocessing, materials, environmental engineering, and food engineering.

The faculty of the chemical engineering program is committed to sharing the responsibility of learning with the students, providing a rigorous academic environment that encourages active learning, high quality student performance, and ethical conduct. While the faculty recognizes that the professional accomplishments of the program graduates stem from the personal aspirations and individual initiative, the program faculty seeks to optimize graduates’ opportunities for success and continued professional development through the integration of knowledge and skills acquired in a demanding set of courses, extracurricular experiences, and faculty expertise and scholarship. The Chemical Engineering Program seeks to prepare its graduates:

- to become successful in their chosen career path, whether it be in the practice of chemical engineering, in advanced studies in engineering or science or in other complementary disciplines;
- to assume leadership roles in industry, business government, and/or their communities;
- to contribute to the advancement of their profession;
- to contribute to the economic environment of their communities; and
- to advance career skills through life-long learning.

*Last revised April, 2003*