### 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, MIC 205, MIC 301, PSL 250 3-4

### College Requirements (29)
- CEM 151 General and Descriptive Chemistry 4
- CSE 131 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 361 Analytical-Physical Chemistry I 3
- CEM 362 Analytical-Physical Chemistry II 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 371 Chemical Engineering Materials 3
- 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

### Options:
The Department offers options in biochemical engineering, environmental engineering and food science 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)
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):
- BCH 401 Basic Biochemistry 4
- BS 111 Cells & Molecules 3
- CHE 481 Biochemical Engineering 3
- MIC 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

#### 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
- MIC 205 Allied Health Microbiology 3

### Total Credits Required for Degree 128
The requirements listed above apply to students admitted to MSU beginning Fall, 1999. 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) 355-8816 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.

**Archived Curriculum**
Fall 1999
Chemical Engineering
Sample Program

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<thead>
<tr>
<th>Freshman Year</th>
<th>Fall Credits</th>
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Program Objectives

The undergraduate program in chemical engineering builds a strong foundation for the professional development of its students. 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 competitive engineering and scientific disciplines. To achieve this, the intensive chemical engineering program provides the stimulus and knowledge for continued learning and professional development over a lifetime. 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 materials and bioprocessing.

The faculty of the chemical engineering program are committed to sharing with the students the responsibility of learning and to providing a vigorous academic environment that encourages active learning and high quality student performance. The curriculum provides a thorough base of mathematics, physical science, engineering science, laboratory experience, and design experience which prepares students to apply chemical engineering principles to a variety of contemporary problems. In addition, the curriculum provides the general education necessary to identify the impact of engineering decisions in the broader societal context. This chemical engineering program integrates the knowledge and skills acquired in a rigorous set of courses, the extracurricular experiences, and the faculty expertise and scholarship needed to enable the graduates of the program to:

- understand, analyze and design chemical processes;
- identify and solve chemical engineering problems;
- be proficient in the oral and written communication of their work and ideas;
- be proficient in the use of modern engineering tools;
- learn and work independently;
- participate effectively in same-discipline and cross-disciplinary groups;
- design and perform laboratory experiments to gather data and test theories;
- understand the safety and environmental consequences of their work as chemical engineers;
- understand the global and societal impact of engineering problems and solutions;
- be prepared for a lifetime of continuing education;
- conduct themselves in accordance with the highest professional and ethical standards.

Last revised April, 1999