CHEMICAL ENGINEERING

Although chemical engineering has existed for only 100 years, its name is no longer completely descriptive of this dynamic profession. The work of the chemical engineer is not restricted to the chemical industry, chemical changes or chemistry. Instead, modern chemical engineers are concerned with all the physical, chemical and biological changes of matter that can produce an economic product or result that is useful to mankind.

About this Program

- **College**: Herbert Wertheim College of Engineering
- **Degree**: Bachelor of Science in Chemical Engineering
- **Credits for Degree**: 134
- **Additional Information**
- **Related Chemical Engineering Programs**

To graduate with this major, students must complete all university, college, and major requirements.

The education of the chemical engineer is based on the fundamental sciences of physics, chemistry and biology, on mathematical and computer techniques, and on basic engineering principles. This background makes the chemical engineer extremely versatile and capable of working in a variety of industries: chemical, biochemical, petroleum, materials, microelectronics, environmental, food processing, consumer products, consulting and project management. It is also good preparation for law and medical schools.

Department Requirements

Successful applicants must have earned a minimum 2.5 grade point average in the better of two attempts of the eight preprofessional courses and have earned a minimum grade point average in the better of two attempts of 2.5 in the preprofessional calculus course sequence.

For the purposes of determining admission to or retention in the department, grade point averages will be based on no more than two attempts for each course. Students must maintain satisfactory progress (minimum GPA of 2.0) in chemical engineering courses and in their overall record.

To proceed to succeeding courses, minimum grades of C are required in the following within two enrollments (including drops and/or withdrawals) for each course:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECH 3023</td>
<td>Material and Energy Balances</td>
<td>4</td>
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<tr>
<td>ECH 3101</td>
<td>Process Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>ECH 3203</td>
<td>Fluid and Solid Operations</td>
<td>3</td>
</tr>
<tr>
<td>ECH 3223</td>
<td>Energy Transfer Operations</td>
<td>3</td>
</tr>
<tr>
<td>ECH 3264</td>
<td>Elementary Transport Phenomena</td>
<td>3</td>
</tr>
<tr>
<td>COT 3502</td>
<td>Computer Model Formulation</td>
<td>4</td>
</tr>
<tr>
<td>ECH 4714</td>
<td>Safety and Experimental Evaluation</td>
<td>3</td>
</tr>
</tbody>
</table>

Any course taken to satisfy a degree requirement (general education, required course or technical elective) cannot be taken S-U, with the exception of the following:

- Graduates will demonstrate professional engineering competence via promotions and/or positions of increasing responsibility.
- Graduates will be successful in pursuing advanced degrees in chemical engineering or in other disciplines.
- Graduates will be able to work in diverse professional environments as demonstrated in their pursuit of continuing education, professional certification/registration and/or career path into business, government, education, etc.

The chemical industry alone provides an opportunity for the chemical engineer to participate in the research, development, design or operation of plants for the production of new synthetic fibers, plastics, chemical fertilizers, vitamins, antibiotics, rocket fuels, nuclear fuels, paper pulp, photographic products, paints, fuel cells, semiconductors and the thousands of chemicals that are used as intermediates in the manufacture of these products.

Goal

To prepare students for lifelong careers in chemical engineering.

Mission

To offer high-quality undergraduate and graduate degree programs in chemical engineering and to conduct research that helps educate graduate students and serves the needs of Florida and the nation.

Related Chemical Engineering Programs

- **Combined Degree**

Critical Tracking

Critical Tracking records each student's progress in courses that are required for entry to each major. Please note the critical-tracking requirements below on a per-semester basis.

Equivalent critical-tracking courses as determined by the State of Florida Common Course Prerequisites may be used for transfer students.

Semester 1

- 2.5 GPA in MAC 2311, MAC 2312 and MAC 2313 sequence based on the best of two attempts
- Complete 1 of 8 critical-tracking courses with a minimum grade of C within two attempts: CHM 2045 or CHM 2095, CHM 2046 or CHM 2096, MAC 2311, MAC 2312, MAC 2313, MAP 2302, PHY 2048, PHY 2049
- 2.5 GPA required for all critical-tracking courses based on the best of two attempts
- 2.0 UF GPA required
Semester 2
- Complete 1 additional critical-tracking course with a minimum grade of C within two attempts
- 2.5 GPA required for all critical-tracking courses based on the best of two attempts
- 2.5 GPA in MAC 2311, MAC 2312 and MAC 2313 sequence based on the best of two attempts
- 2.0 UF GPA required

Semester 3
- Complete 2 additional critical-tracking courses with minimum grades of C within two attempts
- 2.5 GPA required for all critical-tracking courses based on the best of two attempts
- 2.5 GPA in MAC 2311, MAC 2312 and MAC 2313 sequence based on the best of two attempts
- 2.0 UF GPA required

Semester 4
- Complete 2 additional critical-tracking courses with minimum grades of C in each course within two attempts and a 2.5 GPA on all critical-tracking courses based on the best of two attempts.
- 2.5 GPA in MAC 2311, MAC 2312 and MAC 2313 sequence based on the best of two attempts
- 2.5 GPA required for all critical-tracking courses based on the best of two attempts
- 2.0 UF GPA required

Semester 5
- Complete all 8 critical-tracking courses with minimum grades of C in each course within two attempts and a 2.5 GPA on all critical-tracking courses based on the best of two attempts.
- 2.5 GPA in MAC 2311, MAC 2312 and MAC 2313 sequence based on the best of two attempts
- 2.5 GPA required for all critical-tracking courses based on the best of two attempts
- 2.0 UF GPA required

Model Semester Plan
To remain on track, students must complete the appropriate critical-tracking courses, which appear in bold. These courses must be completed by the terms as listed above in the Critical Tracking criteria.

This semester plan represents an example progression through the major. Actual courses and course order may be different depending on the student's academic record and scheduling availability of courses. Prerequisites still apply.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>ABE 2062 or BSC 2100</td>
<td>Biology for Engineers</td>
<td>3</td>
</tr>
<tr>
<td>CHM 2045</td>
<td>General Chemistry 1 (Critical Tracking; State Core Gen Ed Physical Sciences)</td>
<td>3</td>
</tr>
<tr>
<td>CHM 2095</td>
<td>Chemistry for Engineers 1 (Critical Tracking; State Core Gen Ed Physical Sciences)</td>
<td>3</td>
</tr>
<tr>
<td>CHM 2045L</td>
<td>General Chemistry 1 Laboratory (Gen Ed Physical Sciences)</td>
<td>1</td>
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<tr>
<td>IUF 1000</td>
<td>What is the Good Life (Gen Ed Humanities)</td>
<td>3</td>
</tr>
<tr>
<td>MAC 2311</td>
<td>Analytic Geometry and Calculus 1 (Critical Tracking; State Core Gen Ed Mathematics)</td>
<td>4</td>
</tr>
<tr>
<td>CHM 2046</td>
<td>General Chemistry 2 (Critical Tracking; State Core Gen Ed Biological and Physical Sciences)</td>
<td>3</td>
</tr>
<tr>
<td>CHM 2096</td>
<td>Chemistry for Engineers 2 (Critical Tracking; State Core Gen Ed Biological and Physical Sciences)</td>
<td>3</td>
</tr>
<tr>
<td>ENC 1101</td>
<td>Expository and Argumentative Writing (State Core Gen Ed Composition)</td>
<td>3</td>
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<tr>
<td>MAP 2302</td>
<td>Elementary Differential Equations (Critical Tracking)</td>
<td>4</td>
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<tr>
<td>PHY 2048</td>
<td>Physics with Calculus 1 (Critical Tracking; Gen Ed Physical Sciences)</td>
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<tr>
<td>PHY 2048L</td>
<td>Laboratory for Physics with Calculus 1 (Gen Ed Physical Sciences)</td>
<td>1</td>
</tr>
<tr>
<td>MAC 2311</td>
<td>Analytic Geometry and Calculus 3 (Critical Tracking; Gen Ed Mathematics)</td>
<td>3</td>
</tr>
<tr>
<td>CHM 4411 or PHY 3513</td>
<td>Physical Chemistry - Thermodynamics and Kinetics</td>
<td>3</td>
</tr>
<tr>
<td>COT 3502</td>
<td>Computer Model Formulation</td>
<td>4</td>
</tr>
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Semester Six
- Complete 1 additional critical-tracking course with a minimum grade of C within two attempts
- 2.0 UF GPA required

Semester Seven
- Complete 1 additional critical-tracking course with a minimum grade of C within two attempts
- 2.0 UF GPA required
Approved Electives

Technical Electives

Technical electives are defined as department-approved, upper-division courses with significant technical science, engineering, and/or math content. Provision is made to receive up to five credits of approved co-op, internship and/or research experience with no more than three credits coming from industry work and no more than three coming from academic research. Military courses cannot be used for technical electives.

Academic Learning Compact

The chemical engineering program enables students to apply knowledge of mathematics, science and engineering principles to chemical engineering problems; to design and conduct chemical engineering experiments and to analyze and interpret the data; to design a chemical engineering system, component or process to meet desired needs within realistic economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability constraints; and to communicate technical data and design information effectively in speech and in writing to other chemical engineers.

Accredited by the Engineering Accreditation Commission of ABET.

Before Graduating Students Must

- Pass an assessment by two or more faculty and/or industry practitioners of performance on a major design experience.
- Pass assessment in two courses of individual assignments targeted to each learning outcome. Assessment will be provided by the instructor of the course according to department standards.
- Complete an exit interview in your final semester.
- Complete requirements for the baccalaureate degree, as determined by faculty.

Students in the Major Will Learn to

Content

1. Apply knowledge of mathematics, science and engineering principles to chemical engineering problems.
2. Design and conduct chemical engineering experiments and analyze and interpret the data.

Critical Thinking

3. Design a chemical engineering system, component or process to meet desired needs within realistic economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability constraints.

Communication

4. Communicate technical data and design information effectively in writing and in speech to other chemical engineers.

Curriculum Map

| I = Introduced; R = Reinforced; A = Assessed |

<table>
<thead>
<tr>
<th>Courses</th>
<th>SLO 1</th>
<th>SLO 2</th>
<th>SLO 3</th>
<th>SLO 4</th>
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<tbody>
<tr>
<td>ECH 3101</td>
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<td>ECH 4934</td>
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</tbody>
</table>

Assessment Types

- Exams
- Oral and written reports
- Group presentations
- Co-op and internship employer evaluations
- Additional assessments include the student survey and exit interview