Chemical Engineering
PhD

The Chemical Engineering graduate program, administered from the Department of Chemical Engineering, offers the Master of Science with thesis and non-thesis options, the Master of Engineering, and the Doctor of Philosophy degrees. The department also sponsors the Energy, Environmental, and Interdisciplinary Engineering tracks of the College of Engineering and Mines Ph.D. Engineering program, administers the Sustainable Energy Engineering masters program and participates in the multidisciplinary Environmental Engineering masters program. The M.S. and Ph.D. degrees are the most common options and financial aid is provided to the vast majority of students working towards these degrees. The M.S. or M.Engr. degree is typically completed in 18-24 months of full time study by students holding an accredited baccalaureate degree in chemical engineering.

The mission of the Chemical Engineering Ph.D. program is to prepare students for research careers in industry, government and academia using chemical engineering principles to develop energy and material resources for the benefit of society.

**Goal 1:** Graduates will have mastered fundamental topics in chemical engineering and be able to apply them to research problems of practical significance.

**Goal 2:** Graduates will be proficient researchers, having the skills required to formulate, assess, and document a hypothesis.

**Goal 3:** Graduates will be proficient at designing, conducting, and managing an independent research project.

**Goal 4:** Graduates will be well prepared for a career in industry, government, or academia in the field of chemical engineering.

**Admission Requirements**

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog.

1. B.S. degree in chemical engineering from an ABET accredited program with a GPA of at least 3.3 or a M.S. degree in chemical engineering with a GPA of at least 3.0. Students holding a B.S. degree in a science or other engineering field may be admitted to Qualified Status with an obligation to acquire background undergraduate engineering knowledge. The exact requirements will be determined on a case-by-case basis.
2. Graduate Record Examination General Test for those with undergraduate degrees from non-ABET accredited programs.
3. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.

**Degree Requirements**

1. A minimum of 90 semester credits, including acceptable master’s degree work and credits granted for the dissertation and the research leading to the dissertation.
2. Successful completion of an oral comprehensive exam when at least 45 post baccalaureate credits have been completed. This exam will be based on the four core chemical engineering courses and their application to the student’s research. The exam will be administered by at least three faculty members from the Department of Chemical Engineering. Candidates who fail the exam will be allowed one opportunity to repeat the exam. The reexamination must take place no later than 13 months after the initial exam attempt.
3. Students must present to their advisory committee an annual oral progress report describing research progress.
4. Preparation and defense of a dissertation documenting original and independent research on a topic related to chemical engineering.

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**Deadlines apply. See our website for more details.**

**Last Updated:** 6/5/2014

**Email:** questions@gradschool.und.edu
## Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>CHE 501</td>
<td>Advanced Transport Phenomena</td>
<td>3</td>
</tr>
<tr>
<td>CHE 509</td>
<td>Advanced Chemical Engineering Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>CHE 511</td>
<td>Advanced Chemical Engineering Kinetics</td>
<td>3</td>
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<tr>
<td>CHE 515</td>
<td>Design of Engineering Experiments</td>
<td>3</td>
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<tr>
<td>CHE 562</td>
<td>Seminar in Chemical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CHE 591</td>
<td>Research</td>
<td>36-45</td>
</tr>
<tr>
<td>CHE 999</td>
<td>Dissertation</td>
<td>12</td>
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</tbody>
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At least 9 credits of graduate coursework from outside chemical engineering, which may contribute to a minor or cognate. 9 credits

**Additional graduate coursework** 9-18 credits

Successful completion of the four core chemical engineering courses with a GPA of at least 3.3. 12 credits

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</tbody>
</table>

**Total Credits** 93-111

## Faculty and Areas of Expertise

- **Steve Benson**, Renewable and fossil fuel properties, Clean and efficient gasification and combustion systems, Fireside behavior of ash and slag, Carbon products, Carbon dioxide separation, capture, and sequestration, Materials analysis – electron microscopy and x-ray microanalysis
- **Frank Bowman**, Atmospheric aerosols, organic aerosol partitioning, mathematical modeling of multicomponent aerosols, air quality modeling, educational technology, assessment of student learning, educational air pollution models
- **Yun Ji**, Renewable and sustainable energy, chemicals and biofuels from biomass, enzymatic hydrolysis, integrated energy and environmental projects, process simulation
- **Edward Kolodka**, Polymer reaction engineering, synthesis, rheological, and mechanical properties of novel polymers, biopolymers, development of improved adhesives for wood laminates
- **Gautham Krishnamoorthy**, Computational fluid dynamics, simulations of combustion reaction flows, carbon capture technologies, radiative heat transfer
- **Michael Mann**, Performance issues in advanced energy systems firing coal and biomass, emission control, renewable energy systems, and the development of energy strategies based on thermodynamics and economics
- **Wayne Seames**, Mitigation of the environmental impact of heavy metals, trace element partitioning from combustion and incineration, alternative fuels development, new products and improved processing of agriculture, biochemical unit operations, environmental impacts from wood and concrete contamination
- **Brian Tande**, Phase behavior and rheology of polymeric and nanodisperse systems, block copolymer morphology, neutron scattering of polymers, novel materials for hydrogen storage, biopolymers and biocomposites
- **Robert Wills**, Non-thermal drying of solids by chemical dehydration, vegetative oil extraction and product enhancement

## Contact Information

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