The Department of Chemical and Biological Engineering (CBE) at UW-Madison was established in 1905. It has a tradition of excellence dating back to its founding and consistently ranks among the best programs in the world (https://engineering.wisc.edu/facts-and-stats/). The department has 21 core faculty and eight affiliate faculty (https://directory.engr.wisc.edu/che/faculty/) who conduct experimental and theoretical research to address pressing societal, economic, and environmental challenges. R (https://engineering.wisc.edu/departments/chemical-biological-engineering/research/) in CBE (https://engineering.wisc.edu/departments/chemical-biological-engineering/research/) is highly collaborative and often involves diverse teams from within the department, across campus, at other campuses, and in industry. CBE researchers address the most pressing challenges facing society including developing approaches to sustainably produce new fuels and chemicals, combat the plastic pollution crisis, create new therapeutic molecules and materials, optimize energy infrastructure, computationally design new materials and chemical processes, understand transport in complex environments, engineer bacteria to produce biofuels, and more.

Research on campus is highly interdisciplinary, benefiting from prominent centers such as the Center for the Chemical Upcycling of Waste Plastics (CUWP) (https://cuwp.org/), Center for Cell Manufacturing Technologies (CMA) (https://cellmanufacturingusa.org/), Materials Research Science and Engineering Center (MRSEC) (https://mrsec.wisc.edu/), Great Lakes Bioenergy Research Center (GLBRC) (https://www.glbrc.org/), Wisconsin Institute for Discovery (WID) (https://wid.wisc.edu/), and the Stem Cell and Regenerative Medicine Center (https://stemcells.wisc.edu/).

CBE is strategically located in Engineering Hall (https://map.wisc.edu/s/p82kgyxu/) at the heart of the science and engineering areas of campus, facilitating interactions with students and researchers in other leading departments.

Graduate students in the department are encouraged to participate in international research experiences, industry internships, and entrepreneurial activities. For research interests and activities of faculty members, please see the department’s research website (https://engineering.wisc.edu/departments/chemical-biological-engineering/research/) and faculty directory (http://directory.engr.wisc.edu/che/faculty/).

### Admissions

Please consult the table below for key information about this degree program’s admissions requirements. The program may have more detailed admissions requirements, which can be found below the table or on the program’s website.

Graduate admissions is a two-step process between academic programs and the Graduate School. **Applicants must meet the minimum requirements (https://grad.wisc.edu/apply/requirements/) of the Graduate School as well as the program(s).** Once you have researched the graduate program(s) you are interested in, apply online (https://grad.wisc.edu/apply/).

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Deadline</td>
<td>December 1</td>
</tr>
<tr>
<td>Spring Deadline</td>
<td>September 1</td>
</tr>
<tr>
<td>Summer Deadline</td>
<td>The program does not admit in the summer.</td>
</tr>
<tr>
<td>GRE (Graduate Record Examinations)</td>
<td>Not required.</td>
</tr>
<tr>
<td>English Proficiency Test</td>
<td>Every applicant whose native language is not English, or whose undergraduate instruction was not exclusively in English, must provide an English proficiency test score earned within two years of the anticipated term of enrollment. Refer to the Graduate School: Minimum Requirements for Admission policy: (<a href="https://policy.wisc.edu/library/UW-1241/">https://policy.wisc.edu/library/UW-1241/</a>).</td>
</tr>
<tr>
<td>Other Test(s) (e.g., GMAT, MCAT)</td>
<td>n/a</td>
</tr>
<tr>
<td>Letters of Recommendation Required</td>
<td>3</td>
</tr>
</tbody>
</table>

Applicants with a strong background in chemical engineering or related disciplines and a serious interest in research are encouraged to apply for admission. Applications are accepted for both Fall (September) and Spring (January) admission, although historically most students start in the Fall and admission is seldom offered for the Spring semester. The Department of Chemical and Biological Engineering does not consider applications for a terminal MS degree; the department admits only to the PhD. An MS degree can be awarded post admission as an alternative to the PhD degree. The MS degree is not a prerequisite for the PhD degree.

Applications for Fall admission must be received by noon (CST) on the deadline. Admissions decisions are made by a committee of faculty with research expertise spanning the four research areas (https://engineering.wisc.edu/departments/chemical-biological-engineering/research/) of the department. Individual faculty do not recommend admissions decisions and advisors are not determined at the time of application. Instead, students will match with advisors (https://engineering.wisc.edu/blog/program-information-and-milestones/) after meeting with all faculty during the fall semester. Additional information about the application process, detailed information on required application materials, advice for preparing a competitive application, information on application fee waivers, and frequently asked questions are available here (https://engineering.wisc.edu/blog/how-to-apply-to-the-phd-program/).

### Funding

Students admitted to the graduate program are guaranteed financial support from the department in the form of research assistantships, teaching assistantships and fellowships. Support will continue as long as the student maintains satisfactory progress toward their degree.

Additional information on funding and financial resources is available here (https://engineering.wisc.edu/blog/funding-and-financial-information/).
GRADUATE SCHOOL RESOURCES
Resources to help you afford graduate study might include assistantships, fellowships, traineeships, and financial aid. Further funding information (https://grad.wisc.edu/funding/) is available from the Graduate School. Be sure to check with your program for individual policies and restrictions related to funding.

REQUIREMENTS

MINIMUM GRADUATE SCHOOL REQUIREMENTS
Review the Graduate School minimum academic progress and degree requirements (http://guide.wisc.edu/graduate/ #policiesandrequirementstext), in addition to the program requirements listed below.

MAJOR REQUIREMENTS

MODE OF INSTRUCTION

<table>
<thead>
<tr>
<th>Mode of Instruction</th>
<th>Face to Face</th>
<th>Evening/Weekend</th>
<th>Online</th>
<th>Hybrid</th>
<th>Accelerated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Mode of Instruction Definitions

**Accelerated:** Accelerated programs are offered at a fast pace that condenses the time to completion. Students typically take enough credits aimed at completing the program in a year or two.

**Evening/Weekend:** Courses meet on the UW–Madison campus only in evenings and/or on weekends to accommodate typical business schedules. Students have the advantages of face-to-face courses with the flexibility to keep work and other life commitments.

**Face-to-Face:** Courses typically meet during weekdays on the UW–Madison Campus.

**Hybrid:** These programs combine face-to-face and online learning formats. Contact the program for more specific information.

**Online:** These programs are offered 100% online. Some programs may require an on-campus orientation or residency experience, but the courses will be facilitated in an online format.

CURRICULAR REQUIREMENTS

<table>
<thead>
<tr>
<th>Requirement Detail</th>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
</table>

Other Grade Requirements
At least two of the core Chemical and Biological Engineering graduate classes must be taken in the first semester of residence in the graduate program, and at least four core graduate classes must be completed with grades of B or better, preferably by the end of the second semester of residence. A student who receives one grade of BC or lower in a core graduate class but who wishes to remains in the PhD program must take the fifth core course or re-take the low graded core course, preferably in the third semester, and the student must receive a B or better.

A student who receives more than one grade of BC or lower in core graduate classes will be placed in the MS program. Upon successful completion of the MS program, the student may petition the full faculty for return to the PhD program.

A student who receives an average of 3.0 or higher on their preliminary exam becomes a candidate for the PhD program. A student who does not receive an average score of 3.0 or higher in the qualifying process is placed in the MS program. Upon successful completion of the MS program, the student may petition the full faculty for return to the PhD program.

Assessments and Examinations
A doctoral student who has met the grade requirements must complete a preliminary exam in the second semester of their second year. The preliminary exam consists of a written report and oral examination.

During the first semester of the fourth year of the program, PhD Candidates will participate in a mandatory research progress meeting with their thesis committee.

Language Requirements
No language requirements.

Graduate School Breadth Requirement
All doctoral students are required to complete a doctoral minor or graduate/professional certificate. Refer to the Graduate School: Breadth Requirement in Doctoral Training policy: https://policy.wisc.edu/library/UW-1200 (https://policy.wisc.edu/library/UW-1200/).

REQUIRED COURSES

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
</table>

**General Requirements**

Research Credits (CBE 790, 890, 990) at least 21
Coursework, including: at least 30

4 out of 5 CBE Core Courses 12

CBE 620 Intermediate Transport Phenomena
CBE 660 Intermediate Problems in Chemical Engineering
CBE 710 Advanced Chemical Engineering Thermodynamics
CBE 735 Kinetics and Catalysis
CBE 781 Biological Engineering: Molecules, Cells & Systems

2 CBE Electives 6
1 PhD Elective 3
**Breadth Requirement**

| Total Credits | 51 |

- Grades of B or better are required in all Chemical and Biological Engineering courses used towards degree requirements.
- Chemical and Biological Engineering Elective courses shall be in the range numbered 500-899 and will not be laboratory courses, Independent Studies or Research.
- The requirement of four core Chemical and Biological Engineering graduate courses shall not be met by substitution of other courses.

Students taking advanced courses outside the department in excess of breadth requirements may, with department approval, use up to two of these courses toward the requirement of two Chemical and Biological Engineering Elective courses. Seminar courses may not be used to satisfy Chemical and Biological Engineering Elective course requirements.

**PhD Elective Course Requirement**

Students must complete at least one course from another program outside Chemical and Biological Engineering totaling at least three credits. Courses must be numbered 300 and above. A B average is required. Pass/fail or audit courses may not be used for the elective course requirement. Courses used to satisfy the breadth program may not be used for the PhD Elective course requirement. Advisor approval is required and secured through submission of the PhD Elective Course Approval Form. PhD Elective courses can be foreign language courses.

**Breadth Requirement**

The breadth requirement is designed to represent a coherent body of work and should not be simply an after-the-fact ratification of a number of courses taken outside the major department. To ensure coherence, the student must consult with his or her advisor. The minor/certificate should be submitted for approval at an early date, before the student is halfway through the proposed course sequence.

**Teaching Assistantship**

Each student in the PhD program is required to serve as a teaching assistant (TA) for two semesters. Under normal circumstances, each student should serve as a teaching assistant one semester of the second year and one semester of the third year. Requests for alternate arrangements, partial or full waiver of the requirement, should be submitted in writing to the Graduate Program Committee.

**Policies**

**Graduate School Policies**

The Graduate School’s Academic Policies and Procedures (https://grad.wisc.edu/acadpolicy/) provide essential information regarding general university policies. Program authority to set degree policies beyond the minimum required by the Graduate School lies with the degree program faculty. Policies set by the academic degree program can be found below.

**Major-Specific Policies**

**Prior Coursework**

**Graduate Credits Earned at Other Institutions**

Refer to the Graduate School: Transfer Credits for Prior Coursework (https://policy.wisc.edu/library/UW-1216/) policy.

Students matriculating with an MS degree from another university may, with department approval, use up to two courses from their MS work toward the requirement of two Chemical and Biological Engineering Elective graduate courses, the PhD Elective, or the breadth requirement, if the minor department or graduate/professional certificate program approves.

**Undergraduate Credits Earned at Other Institutions or UW-Madison**

Undergraduate coursework credits are not allowed to satisfy requirements.

**Credits Earned as a Professional Student at UW-Madison (Law, Medicine, Pharmacy, and Veterinary careers)**

Refer to the Graduate School: Transfer Credits for Prior Coursework (https://policy.wisc.edu/library/UW-1216/) policy.

**Credits Earned as a University Special student at UW-Madison**

Refer to the Graduate School: Transfer Credits for Prior Coursework (https://policy.wisc.edu/library/UW-1216/) policy.

**Probation**

Refer to the Graduate School: Probation (https://policy.wisc.edu/library/UW-1217/) policy.

**Advisor / Committee**


**Credits Per Term Allowed**

15 credits

**Time Limits**

The Chemical and Biological Engineering department expects students to complete their PhD degree within five years. Any student unable to defend their thesis in this period must petition the faculty for an extension by May 1 of the fifth year, specifying reasons for the request and length of requested extension.

**Grievances and Appeals**

These resources may be helpful in addressing your concerns:

- Bias or Hate Reporting (https://doso.students.wisc.edu/bias-or-hate-reporting/)
- Graduate Assistantship Policies and Procedures (https://hr.wisc.edu/policies/gapp/#grievance-procedure)
- Hostile and Intimidating Behavior Policies and Procedures (https://hr.wisc.edu/hib/)
  - Office of the Provost for Faculty and Staff Affairs (https://facstaff provost.wisc.edu/)
- Employee Assistance (http://www.eao.wisc.edu/) (for personal counseling and workplace consultation around communication and conflict involving graduate assistants and other employees, post-doctoral students, faculty and staff)
- Employee Disability Resource Office (https://employeedisabilities.wisc.edu/) (for qualified employees or applicants with disabilities to have equal employment opportunities)
• Graduate School (https://grad.wisc.edu/) (for informal advice at any level of review and for official appeals of program/departamental or school/college grievance decisions)
• Office of Compliance (https://compliance.wisc.edu/) (for class harassment and discrimination, including sexual harassment and sexual violence)
• Office Student Assistance and Support (OSAS) (https://osas.wisc.edu/) (for all students to seek grievance assistance and support)
• Office of Student Conduct and Community Standards (https://conduct.students.wisc.edu/) (for conflicts involving students)
• Ombuds Office for Faculty and Staff (http://www.ombuds.wisc.edu/) (for employed graduate students and post-docs, as well as faculty and staff)
• Title IX (https://compliance.wisc.edu/titleix/) (for concerns about discrimination)

**Grievance Procedures**

If a student feels unfairly treated or aggrieved by faculty, staff, or another student, the University offers several avenues to resolve the grievance. Students’ concerns about unfair treatment are best handled directly with the person responsible for the actionable action. If the student is uncomfortable making direct contact with the individual(s) involved, they should contact the advisor or the person in charge of the unit where the action occurred (program or department chair, section chair, lab manager, etc.). For more information see the Graduate School Academic Policies & Procedures: https://grad.wisc.edu/acadpolicy/?policy=grievancesandappeals The Assistant Dean for Graduate Affairs (engr-dean-graduataffairs@engr.wisc.edu) provides overall leadership for graduate education in the College of Engineering (CoE), and is a point of contact for graduate students who have concerns about education, mentoring, research, or other difficulties.

**Procedures**

1. The student is encouraged to speak first with the person toward whom the grievance is directed to see if a situation can be resolved at this level.

2. Should a satisfactory resolution not be achieved, the student should contact the CBE Graduate Associate Chair, or Department Chair if the grievance involves the Graduate Associate Chair, to discuss the grievance. The Graduate Associate Chair or Department Chair will facilitate problem resolution through informal channels and facilitate any complaints or issues of students. The first attempt is to help students informally address the grievance prior to any formal complaint. Students are also encouraged to talk with their faculty advisors regarding concerns or difficulties if necessary. University resources for sexual harassment, discrimination, disability accommodations, and other related concerns can be found above.

3. If the issue is not resolved to the student’s satisfaction the student can submit the grievance to the Graduate Associate Chair in writing, within 60 calendar days of the alleged unfair treatment.

4. On receipt of a written complaint, a faculty committee will be convened by the Graduate Associate Chair to manage the grievance. The faculty committee will obtain a written response from the person, organization, or governing committee toward whom the complaint is directed. This response will be shared with the person filing the grievance.

5. The faculty committee will determine a decision regarding the grievance. The Graduate Associate Chair will report on the action taken by the committee in writing to both the student and the person, organization, or governing committee toward whom the complaint was directed within 20 working days from the date the complaint was received.

6. At this point, if either party (the student or the person, organization, or governing committee toward whom the grievance is directed) is unsatisfied with the decision of the faculty committee, the party may file a written appeal. Either party has 10 working days to file a written appeal to the College of Engineering. The Assistant Dean for Graduate Affairs (engr-dean-graduataffairs@engr.wisc.edu) provides overall leadership for graduate education in the College of Engineering (CoE), and is a point of contact for graduate students who have concerns about education, mentoring, research, or other difficulties.

7. Documentation of the grievance will be stored for at least 7 years. Significant grievances that set a precedent will be stored indefinitely.

The Graduate School has procedures for students wishing to appeal a grievance decision made at the College of Engineering level. These policies are described in the Graduate School’s Academic Policies & Procedures (https://grad.wisc.edu/documents/grievances-and-appeals/).

**OTHER**

Admitted students are offered research assistantships to support the pursuit of dissertation or degree research in chemical engineering. The stipend, after tuition and fees, is guaranteed for the duration of a student’s graduate studies provided satisfactory progress is made toward their degree. Support for students receiving external funding or other program opportunities is reviewed case by case. Although students can be awarded MS degrees, there is no direct admission to the MS program.

Students placed in the MS program are expected to finish the MS program within five semesters of admission into the PhD program.

**PROFESSIONAL DEVELOPMENT**

**DEPARTMENT RESOURCES**

The CBE Graduate Program office coordinates ongoing professional development workshops. Topics have included: life in industry, ethical decision making, intellectual property agreements, maintaining self-motivation, how to utilize software in creating figures, effective management of undergraduate researchers, effective management of your thesis advisor and individual development plans (IDPs).

Also, the Graduate School Office of Professional Development offers training opportunities for graduate students and this information is e-mailed to all of the CBE grad students on a regular basis. Examples of these training offerings include sharing of information about DELTA, dissertation writing, grant writing and job search strategies.

In order to foster effective teaching among our graduate students, all students are required to serve as a TA for two semesters. Before graduate students are allowed to TA, each must participate in the New Educator’s Orientation (NEO) training offered each semester. They are also encouraged to connect with the University’s DELTA program.
**GRADUATE SCHOOL RESOURCES**

Take advantage of the Graduate School’s professional development resources ([https://grad.wisc.edu/pd/](https://grad.wisc.edu/pd/)) to build skills, thrive academically, and launch your career.

**LEARNING OUTCOMES**

1. Demonstrate an ability to synthesize knowledge from a subset of the biological, physical, and social sciences to help frame problems critical to the future of their discipline.
2. Conduct original research.
3. Demonstrate an ability to create new knowledge and communicate it to their peers.
4. Fosters ethical and professional conduct.

**PEOPLE**

**PROFESSORS**
Eric V. Shusta (Chair)
Michael Graham
George Huber
Daniel J. Klingenberg
David Lynn
Manos Mavrikakis
Sean P. Palecek
Brian Pfleger
Thatcher Root
John Yin
Victor Zavala

**ASSOCIATE PROFESSORS**
Ross E. Swaney
Reid Van Lehn

**ASSISTANT PROFESSORS**
Styliana Avraamidou
Rose Cersonsky
Quentin Dudley
Matthew Allen Gebbie
Siddarth Krishna
Whitney Loo
Mai Ngo
Marcel Schreier

**TEACHING FACULTY**
Brendan Blackwell
Eric Codner
Kate Dahlke
Andrew Greenberg

**RESEARCH PROFESSOR**
William Banholzer

See also Chemical and Biological Engineering Faculty Directory ([https://directory. engr.wisc.edu/che/faculty/](https://directory. engr.wisc.edu/che/faculty/)).