CHEMICAL ENGINEERING, MS

The Department of Chemical and Biological Engineering does not consider applications for a terminal MS degree; the department admits only to the PhD program. The MS degree can be awarded post-admission for work completed leading to the PhD degree. The MS degree is not a prerequisite for the PhD degree.

The Department of Chemical and Biological Engineering (CBE) (https://engineering.wisc.edu/departments/chemical-biological-engineering/) 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 8 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/)esearch 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 (CMaT) (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

ADMISSIONS

This master's program is offered for work leading to the PhD. Students may not apply directly for the master's, and should instead see the admissions information for the PhD. (http://guide.wisc.edu/graduate/chemical-biological-engineering/chemical-engineering-phd/)

FUNDING

FUNDING

Financial support for qualified graduate students is available in the form of research assistantships, teaching assistantships, and fellowships.

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

Face to Face	Evening/ Weekend	Online	Hybrid	Accelerated
Yes	No	No	No	No

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

Requirement	Detail
Minimum Credit Requirement	30 credits
Minimum Residence Credit Requirement	16 credits
Minimum Graduate Coursework Requirement	15 credits must be graduate-level coursework. Refer to the Graduate School: Minimum Graduate Coursework (50%) Requirement policy: https://policy.wisc.edu/library/UW-1244 (https://policy.wisc.edu/library/UW-1244/).
Overall Graduate GPA Requirement	3.00 GPA required. Refer to the Graduate School: Grade Point Average (GPA) Requirement policy: https://policy.wisc.edu/library/UW-1203 (https://policy.wisc.edu/library/UW-1203/).
Other Grade Requirements	Grades of B or better are required for all courses in the professional and elective groups.
Assessments and Examinations	An MS candidate not planning to petition to return to the PhD program must successfully complete an oral examination before a departmental examining committee of the advisor(s) plus two other CBE faculty members, for a total of 3-4 committee members. The candidate may defend an MS thesis or an independent study project report that will comprise a minimum of three credits of supervised CBE 790 and may involve a lab project, theoretical work, or a critical review of an advanced engineering topic. An MS candidate who is planning to petition to return to the PhD program must successfully complete an oral examination before a departmental examining committee of the advisor(s) plus three other CBE faculty members, for a total of 4-5 committee members. The candidate must defend an MS thesis in order to petition to return to the PhD.
Language Requirements	No language requirements.

REQUIRED COURSES

To qualify for the MS degree, students must complete a minimum of 30 graduate-level credits (numbered 300 and above).

1. An MS student must complete 24 credits, divided into two groups:
   a. Professional group: minimum of 12 credits of chemical engineering courses. At least 6 credits must be numbered 600–899 (excluding research).
   b. Elective group: minimum of 12 credits of graduate courses. At least 6 of these credits shall be in departments other than chemical and biological engineering and shall be chosen in consultation with the advisor(s) for their relevance to chemical and biological engineering.
   c. In groups I and II combined, up to 6 credits will be allowed for chemical and biological engineering courses numbered between 300 and 499, provided equivalent courses were not previously taken by the student.
2. An MS candidate must successfully complete an oral examination before a departmental examining committee. Therefore, students must also choose one of the options below:
   a. When a candidate presents an independent study project report, no fewer than 3 and no more than 12 credits of supervised CBE 790 Master's Research or Thesis may be counted toward the 30-credit-total requirement. It may involve a lab project, theoretical work, or a critical review of an advanced engineering topic.
   b. When a candidate presents a thesis, no fewer than 5 and no more than 14 credits of supervised CBE 790 Master's Research or Thesis may be counted toward the 30-credit-total requirement.

Any additional credits needed to meet the 30-credit minimum can come from other coursework.

Students who enter the program without a Bachelor of Science in Chemical Engineering may be required to take remedial coursework.

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

An MS candidate not planning to petition to return to the PhD program must successfully complete an oral examination before a departmental examining committee of the advisor(s) plus two other chemical and biological engineering faculty members. An MS candidate who is planning to petition to return to the PhD program must successfully complete an oral examination before a departmental examining committee of the advisor(s) plus three other chemical and biological engineering faculty members.

CREDITS PER TERM ALLOWED

15 credits

TIME LIMITS

Refer to the Graduate School: Time Limits (https://policy.wisc.edu/library/UW-1221/) policy.

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/departmental 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)

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 objectionable 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-graduateaffairs@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 on the UW Office of Equity and Diversity website: https://oed.wisc.edu/. Other campus resources include:
   - The Graduate School – www.grad.wisc.edu (http://www.grad.wisc.edu/)
   - McBurney Disability Resource Center – www.mcburney.wisc.edu (http://www.mcburney.wisc.edu/)
   - Employee Assistance Office – www.eao.wisc.edu (http://www.eao.wisc.edu/)
   - Ombuds Office – www.ombuds.wisc.edu (http://www.ombuds.wisc.edu/)
   - University Health Services – www.uhs.wisc.edu (http://www.uhs.wisc.edu/)
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-graduateaffairs@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/acadpolicy/?policy=grievancesandappeals.

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 are reviewed case by case. Although students can be awarded MS degrees, there is no direct admission to the MS program.

PROFESSIONAL DEVELOPMENT

PROFESSIONAL DEVELOPMENT

GRADUATE SCHOOL RESOURCES

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

LEARNING OUTCOMES

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1. Demonstrate a strong understanding of mathematical, scientific, and engineering principles in the field.
2. Demonstrate an ability to formulate, analyze, and solve advanced engineering problems.
3. Demonstrate creative, independent problem solving skills.
4. Apply the latest scientific and technological advancements, advanced techniques, and modern engineering tools to these problems.
5. Recognize and apply principles of ethical and professional conduct.

PEOPLE

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/).