CHEMICAL ENGINEERING, MS

Department Chair

Shikha Nangia
329F Link Hall
315-443-1931; fax: 443-9175

Faculty

Christian Aponte-Rivera, Jesse Q. Bond, Michal Blatchley, Katie D. Cadwell, Ruth Chen, Julie M. Hasenwinkel, James H. Henderson, Era Jain, Andrea Joseph, Zhen Ma, Shikha Nangia, Ashok Sangani, Cindy Smith, Pranav Soman, Radhakrishna Sureshkumar, Theodore Walker, Yaoying Wu, Pun To Yung, Jialiu Zeng, Yi Zheng

Adjunct/Research Faculty

Eric Finkelstein, Kent Ogden, David Quinn, Katherine Tsokas, Lin Lin, Dacheng Ren

Affiliate Faculty

Samuel Herberg, Juntao Luo, Liviu Movileanu, Davoud Mozhdehi, Alison Patteson, Rachel Steinhardt

Emeritus Faculty

Gustav Engbretson, John Heydweiller, George Martin, Philip Rice, Robert L. Smith, Lawrence L. Tavalrides

Graduate Chemical Engineering Program Director

Zhen Ma
CST 2-171
315-443-4057; zma112@syr.edu

The Department of Biomedical and Chemical Engineering offers a comprehensive set of graduate programs in bioengineering and chemical engineering, including Master's of Science (MS) degrees and Doctor of Philosophy (PhD) degrees. Graduates of these programs work in the medical profession, the biomechanics and bioinstrumentation industries, the pharmaceutical industry, the chemical engineering industry, the government, and in education.

The graduate program in chemical engineering features a core of courses in chemical engineering, elective courses in areas of student interest, and an intense research or independent study experience with the student's faculty advisor. Elective courses may be concentrated in a large number of special areas, including bioengineering, environmental engineering, computer science, materials science, and manufacturing engineering. New initiatives are underway in the multidisciplinary area of environmental systems that should provide a wealth of opportunities to graduate students in chemical engineering.

Student Learning Outcomes

1. Use the principles of science and mathematics to identify, formulate and solve advanced engineering problems
2. Apply both analysis and synthesis in the engineering design process, resulting in designs that meet constraints and specifications, including societal, economic, environmental, and other factors as appropriate to the design
3. Communicate advanced technical contents effectively with a range of audiences through various media
4. Establish goals, plan tasks, meet deadlines, manage risk and uncertainty, and function effectively on teams
5. Analyze and design units for advanced chemical engineering processes

M.S. in Chemical Engineering

The Master's of Science degree in Chemical Engineering is a flexible and individually-structured program, determined by the student and his/her advisor. The MS can be a terminal degree or an introduction to research before pursuing the Ph.D.

There are two degree plans a student can choose:

Plan 1 has a minimum requirement of 30 credit hours of graduate study, including 24 credits of coursework and 6 credits of thesis. At least 12 credits of coursework must consist of the chemical engineering graduate core. A master's thesis must be completed and defended in an oral examination.

Plan 2 also has a minimum requirement of 30 credit hours of graduate study, including the 12 credit chemical engineering graduate core and a 3 credit MS project course. A comprehensive examination must be completed as part of the MS Project course.

Residence Time

The MS degree typically requires three to four semesters to complete.

General Requirements

Bridging Coursework

Applicants who do not hold a bachelor's degree in chemical engineering may be required to complete a number of additional undergraduate engineering courses as corequisites for graduate coursework.

The need for such bridging coursework will be considered on a case by case basis, and applicants will be notified of any such requirements at the time of admission into the program.

Bridging courses if assigned, are usually completed in the first year of study. All assigned bridging coursework must be completed prior to graduation.

Graduate Seminar

Attendance at the BMCE Graduate Seminars is expected of students in all graduate programs.

Limit of 500-Level Credits

Graduate students may not count more than 15 credits of 500-level coursework toward the completion of their program of study.

Minimum GPA

- Minimum GPA of 3.000 for all credits counted toward the completion of coursework requirements
- Minimum cumulative GPA of 2.800 for all credits earned

Coursework Requirements

30 credits total

Code	Title	Credits
Chemical Engineering Graduate Core		
All graduate students in Chemical Engineering are required to complete a set of 4 core courses:		
CEN 651	Molecular and Statistical Thermodynamics	3
CEN 671	Chemical Engineering Methods I	3
CEN 786	Kinetics	3
CEN 741	Transport Phenomena I	3
or CEN 643	Fluid Dynamics	
Electives		
Complete 12 credits of advisor-approved coursework		12
Degree Plans		
Select one of the following degree plans		6
Thesis (Plan 1)		
CEN 997	Masters Thesis	
CEN 991	Introduction to MS Research	
Advanced Design & Comprehensive Exam (Plan 2)		
Both CEN 687 and CEN 996 must be taken in the same semester.		
CEN 687	Advanced Chemical Engineering Design	
CEN 996	Masters Project	
Additional Chemical Engineering (CEN) coursework		
Total Credits		**30**

Exit Requirement Overview

Thesis Requirement (Plan 1)

Successful completion of the MS degree with thesis requires a written MS thesis and an oral defense.

Proposal

Students interested in pursuing a thesis must first register for CEN 991 Introduction to MS Research and perform their initial thesis research under the supervision of their thesis advisor.

At the conclusion of this course the proposal research will be graded, and the student and advisor will determine whether to continue with the proposed thesis.

If not, CEN 991 Introduction to MS Research may be counted toward degree completion.

If so, the student will register for CEN 997 Masters Thesis, complete any remaining work, and defend their thesis.

Deadlines

Students must submit a Request for Examination Form to the Graduate School at least three full weeks prior to the oral defense.

The thesis document must be delivered to the MS Thesis defense committee at least two weeks prior to the date of the oral defense.

Defense Committee

The MS Thesis defense committee consists of four members:

- The thesis advisor;
- No fewer than two tenure-track members of the BMCE faculty; and
- The Chair of the Oral Examination Committee.

The Chair of the Oral Examination Committee must be a Syracuse University tenured or tenure-track faculty member outside the department and program.

All proposed committee members must be full-time or adjunct faculty members at Syracuse University. Outside committee members (e.g. from SUNY-ESF, Upstate Medical University, etc.) may be allowed by petition.

Additional Requirements

Defenses must comply with Graduate School policy and requirements, including proper formatting.

Comprehensive Exam Overview (Plan 2)

Successful completion of the MS Project course and the accompanying Oral Comprehensive Examination.

Timing

The MS Project course, CEN 687 Advanced Chemical Engineering Design, and the Comprehensive Exam (CEN 996 Masters Project), are only offered during the fall semester.

Oral Comprehensive Examination

The Oral Comprehensive Examination will be the culminating event of the M.S. Project course. Students will prepare and present the products/outcomes of their project to the departmental faculty and respond to questions from the faculty.

The examination committee will be composed of at least three department faculty, but all faculty are invited, and the examination will be scheduled to maximize faculty participation.

The examination committee will meet separately to determine if the student has passed the examination, and the student will be informed of the decision.

Students are required to submit an electronic copy of presentation materials to the Department prior to the presentation.