

# Chemical Engineering (MS)

## Degree Requirements

With the ever-increasing pace of technological development in society, new opportunities are becoming available that require chemical engineering graduates with increased levels of specialization. The Department offers a Master of Science degree in Chemical Engineering that blends scholarship and research with advanced coursework to provide excellent training for students to pursue careers in the chemical industry. Graduate students have opportunities to undertake cutting-edge research with faculty for both thesis and project work. In addition, a coursework-only program is also offered by the department for those who intend to further their professional development while pursuing a graduate degree. Students with a Bachelor's degree in a major other than chemical engineering can qualify for admission by taking a prescribed series of undergraduate courses.

### Admission To The MSChE Program

The following criteria supplement the College of Engineering admission criteria ([see Admission To Graduate Programs](#)):

- I. Admission Requirements
  - A. A Bachelor's degree in chemical engineering or a related field such as chemistry, physics, mathematics or engineering.
  - B. A grade-point average of 3.0 or greater (A=4.0) on all undergraduate work.
  - C. A minimum score of 151 in the quantitative section and a minimum score of 141 in the verbal section of the Graduate Record Examination (GRE).
  - D. For applicants whose native language is not English, a minimum score of 79 in the internet-based TOEFL or a minimum band score of 6.5 in the IELTS test.

Depending on the student's background, additional undergraduate preparatory courses may be required. These courses will not count toward the Master's degree.

The minimum credit hour requirements for the different options for the MSChE degree are:

- Thesis Option 30 credit hours
- Project Option 30 credit hours
- Course Option 33 credit hours

## Graduation Plan

### Chemical Engineering (MS) : (30-33 Total Hours)

The Graduation Plan is an example of course progression. Individual student plans may vary. Students should consult with an academic advisor to create a personalized plan. Thesis and Project students are required to receive Responsible Conduct of Research (RCR) training from CITI PROGRAM.

#### First Year Thesis Option- Fall Semester

Course ID	Course Description	Hours
CHE 520	Advanced Transport Phenomena I	3
Graduate Elective	**Thesis/Project Option Electives	3
CHE 501	Chemical Engineering Seminar	1

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Total Hours 7

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**First Year Thesis Option- Spring Semester**

Course ID	Course Description	Hours
CHE 521	Advanced Transport Phenomena II	3
CHE 551	Advanced Chemical Engineering Modeling	3
CHE 501	Chemical Engineering Seminar	1
Total Hours		7

**First Year Thesis Option - Summer Semester**

Course ID	Course Description	Hours
CHE 592	Directed Independent Study	3
Total Hours		3

**Second Year Thesis Option- Fall Semester**

Course ID	Course Description	Hours
CHE 510	Advanced Chemical Thermodynamics	3
CHE 599	Thesis	3
CHE 501	Chemical Engineering Seminar	1
Total Hours		7

**Second Year Thesis Option- Spring Semester**

Course ID	Course Description	Hours
CHE 525	Chemical Reactor Analysis	3
CHE 599	Thesis	3
CHE 501	Chemical Engineering Seminar	0
Total Hours		6

**First Year Project Option- Fall Semester**

Course ID	Course Description	Hours
CHE 520	Advanced Transport Phenomena I	3
Graduate Elective	**Thesis/Project Option Electives	3
CHE 501	Chemical Engineering Seminar	1
Total Hours		7

**First Year Project Option - Spring Semester**

Course ID	Course Description	Hours
CHE 521	Advanced Transport Phenomena II	3
CHE 551	Advanced Chemical Engineering Modeling	3
CHE 501	Chemical Engineering Seminar	1
Total Hours		7

**First Year Project Option - Summer Semester**

Course ID	Course Description	Hours
CHE 592	Directed Independent Study	3
Total Hours		3

**Second Year Project Option- Fall Semester**

Course ID	Course Description	Hours
CHE 510	Advanced Chemical Thermodynamics	3
CHE 594	Project in Chemical Engineering	3
CHE 501	Chemical Engineering Seminar	1
Total Hours		7

**Second Year Project Option-Spring Semester**

Course ID	Course Description	Hours
CHE 525	Chemical Reactor analysis	3
CHE 594	Project in Chemical Engineering	3
CHE 501	Chemical Engineering Seminar	0
Total Hours		6

**First Year Course Option - Fall Semester**

Course ID	Course Description	Hours
CHE 520	Advanced Transport Phenomena I	3
Graduate Elective I	***Course Option Electives	3
MA 507	Advanced Ordinary Differential Equations	3
Total Hours		9

**First Year Course Option - Spring Semester**

Course ID	Course Description	Hours
CHE 521	Advanced Transport Phenomena II	3
CHE 551	Advanced Chemical Engineering Modeling	3
Graduate Elective II	***Course Option Electives	3
Total Hours		7

**Second Year Course Option - Fall Semester**

Course ID	Course Description	Hours
CHE 510	Advanced Chemical Thermodynamics	3
MA 508	Advanced Partial Differential Equations	3
SE 601	Systems Engineering Fundamentals	3
Total Hours		9

## Second Year Course Option-Spring Semester

Course ID	Course Description	Hours
CHE 525	Chemical Reactor Analysis	3
Graduate Electives III	***Course Option Electives	3
	Total Hours	6

### Notes

\*\* Thesis/Project Electives: CHE 590, SE 601, MA 507, MA 508, ST 540, ST 545

\*\*\*Course Option Electives: must be approved by department graduate coordinator

## Department Information

Department of Chemical and Biomolecular Engineering Staff	(251) 460-6160
Chair	F. Carl Knopf
Professors	Glover, Knopf, Leavesley, West
Associate Professors	Wheeler
Assistant Professors	Dennis, Rabideau, Walker

Department of Chemical and Biomolecular Engineering website  
<https://www.southalabama.edu/colleges/engineering/chbe/index.html>

Chemical Engineering is a profession in which knowledge of mathematics, chemistry, biology and other natural sciences gained by study, experience, and practice is applied with judgment to develop economical ways of using material and energy for the benefit of mankind. The program required for the degree of Bachelor of Science in Chemical Engineering provides fundamental instruction in mathematics, chemistry, biology, physics, and engineering. This education prepares the graduate to seek employment in the petrochemical, pharmaceutical, healthcare, microelectronics, polymers, energy and environmental industries. In addition, the graduate is well-prepared to pursue graduate school.

All electives must be approved by the student's advisor. Degree requirements include a minimum of 18 semester hours of approved electives in the Humanities and Social Sciences.

Satisfactory completion of the 126 hour program outlined below leads to the degree of Bachelor of Science in Chemical Engineering. Students must also comply with the College of Engineering Requirements for a Degree, which are covered in the Bulletin under the College of Engineering.

### BSCHE Program Educational Objectives

The educational objectives of the Department of Chemical & Biomolecular Engineering's undergraduate program are that, within a few years of program completion, graduates will have used the knowledge and skills gained through academic preparation and post-graduation experience so they have:

1. Advanced in the chemical engineering profession and applied engineering knowledge and problem-solving skills to multi-disciplinary projects.

2. Incorporated economic environmental, social, regulatory, constructability, safety, and sustainability considerations into the practice of chemical engineering.
3. Exhibited effective communication skills, teamwork, leadership, initiative, project management, and professional and ethical behavior.
4. Continued their technical and professional development, which may include graduate level education, continuing education, and participation in professional organizations.

## **BSCHE Student Outcomes**

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By the time of graduation from the BSCHE program, a student will have demonstrated attainment of the following outcomes:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The BSCHE curriculum is designed to ensure the attainment of the student outcomes.

The Bachelor of Science in Chemical Engineering program is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>

## **BSCHE Accelerated Bachelor's To Master's (ABM) Degree Option**

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The Department of Chemical and Biomolecular Engineering allows well-qualified undergraduates in the program to follow an "Accelerated Bachelor's to Master's" study plan. This plan permits up to six credit hours of graduate coursework to count towards both the Bachelor's (as Technical Electives) and the Master's degrees, so that the Master's degree is earned faster than usual. (The coursework concerned must individually satisfy the requirements of both degrees.) See a departmental advisor for specific details.

## **BSCHE Departmental Honors Designation**

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To receive a designation of "Departmental Honors," students must:

1. successfully complete 4 to 6 credit hours of Honors Senior Project in Chemical Engineering (CHE 499).
2. have at least a 3.50 GPA at the time of graduation.
3. have both submitted a written report and made an oral presentation of the Honors Senior Project in keeping with the expectations of the Honors College (<https://www.southalabama.edu/colleges/honors/seniorproject.html>).

See a departmental advisor for specific details.