CHEMICAL ENGINEERING
UNIVERSITY OF SOUTH CAROLINA

THE DISCIPLINE

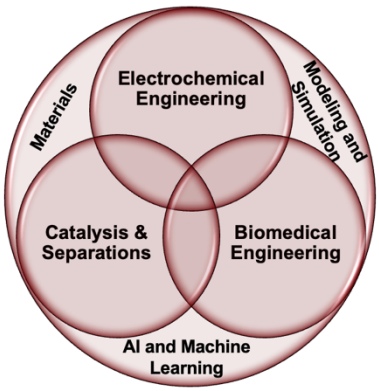
Through discovery, design, creation, and transformation, chemical engineering is the engineering of systems at scales ranging from the molecular to the macroscopic that integrate chemical, physical, and biological elements in order to develop processes and produce materials and products for the benefit of society. Chemical Engineers are at the forefront of solving the major challenges to our society, from energy system decarbonization, ensuring environmental sustainability, and enabling flexible manufacturing for a circular economy, to discovering novel and improved materials for a variety of applications (e.g., batteries), and engineering targeted and accessible medicines.

STUDENT OPPORTUNITIES

Our Chemical Engineering students engage with nationally recognized faculty in a challenging and supportive environment. In addition to their academic coursework, they participate in many "beyond-the-classroom" experiences, including:

Industrial Experience: Most of our students participate in paid internships and co-ops (>$20/hr) that allow them to gain the "real world" experience that prepare them for future careers in industry. Our major employers over the past ten years span a wide range of industrial sectors (below, left image).

Research Experience: Due to the low ~10:1 student-to-faculty ratio, significant research funding, and large research groups, our students have opportunities to conduct cutting edge research under the guidance of our faculty. Click on this link to see the list of faculty and explore their research areas, which fit broadly into several areas (below, middle image).



Study Abroad Experience: In addition to traditional study abroad experiences available to our students, our department has developed two Maymester international courses run by Chemical Engineering faculty: Next Energy in Germany and Sustainable Development in Engineering in Thailand (above, right image). In these courses students explore the course topics from a country-specific perspective, and then experience the actual practice of those concepts through a 2-week trip abroad.

Professional and Leadership Experience: Our department has a very active student chapter of the American Institute of Chemical Engineers (http://www.aiche.org/), which fosters their professional development and gives them the opportunity to network with professionals from across the country. A recent highlight was our 1st place in the ChemE Cube competition at the 2023 AIChE Annual Meeting in Orlando (https://www.aiche.org/community/awards/cheme-cube-competition), where our students designed a device that captures carbon dioxide directly from the air (right).

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Comprehensive Degree

Building on the foundational math and science courses, the B.S.E. in Chemical Engineering covers the core of chemical engineering, preparing students for either an industrial position or to pursue advanced degrees in the field. These courses are:

MATH AND SCIENCE
Calculus I and II
Vector Calculus
Differential Equations
General Chemistry I and II and Labs
Organic Chemistry 1 and 2 and Labs
Physics 1 and 2 and Labs

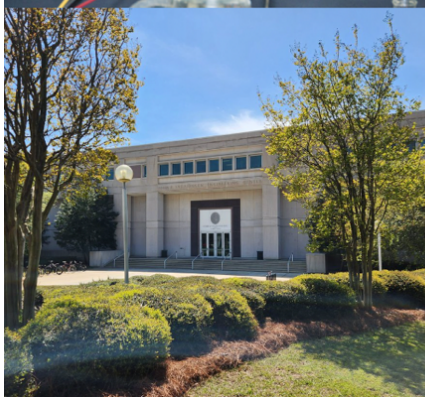
CHEMICAL ENGINEERING
Introduction to Chemical Engineering
Chemical Process Principles
Thermodynamics
Fluid Mechanics
Heat-Flow Analysis
Mass Transfer
Chemical Engineering Kinetics
Separation Process Design
Computational Methods for Engineers
Chemical Engineering Lab I, II
Chemical-Process Analysis and Design I, II
Chemical-Process Dynamics and Control
Process Safety, Health, and Loss Prevention

ELECTIVES
Chemistry and Chem. Lab Electives
Computer Programming Elective
Engineering Electives
Technical Electives
Professional Development Elective

GENERAL EDUCATION
Critical Reading and Composition
Rhetoric and Composition
Persuasive Communication
Information Literacy
Historical Thinking
Foreign Language
Social Sciences
Values, Ethics and Social Responsibility
Aesthetic and Interpretive Understanding
Career Elective

16
AVERAGE SIZE OF CHEMICAL ENGINEERING UNDERGRADUATE CLASS

172
UNDERGRADUATE CHEMICAL ENGINEERING STUDENTS



Flexible Curriculum

A large number of elective credits allow students to tailor the undergraduate experience to their specific interests. Students may pursue concentrations (e.g., Energy, Materials, Biomolecular Engineering, etc.) or minors (Business Administration, Data Science, Chemistry, Computer Science, Math, etc.) within the required credit hours for the B.S.E degree. In addition, these electives can allow for more college coursework taken during high school to count towards the degree. Finally, Accelerated Graduate Study allows students to complete both B.S.E. and M.S. Degrees within five years.

CONCENTRATIONS
Energy
Materials
Biomolecular Engineering
Environmental Engineering
Interdisciplinary Engineering
Numerical Methods/Computing

POPULAR MINORS
Business Administration
Data Science
Computer Science
Chemistry
Math

For additional information about Chemical Engineering and other programs in engineering and computing, visit cec.sc.edu.

UNIVERSITY OF South Carolina