

Career Options

Many career paths are open to chemical engineering graduates. In today's rapidly changing business climate, industry sectors from petrochemicals to biotechnology and semiconductor manufacturing offer a wide variety of employment opportunities to our graduates. As a result, chemical engineering graduates may get involved with (among others):

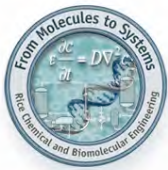
- product and process development for the chemical industry;
- exploration, production, and refining of oil & natural gas;
- design and optimization of fabrication facilities for semiconductors or magnetic storage devices;
- production of advanced materials - from plastics and fibers to catalysts and biomaterials;
- design of water and air pollution control devices;
- production of pharmaceuticals and biologic devices used for medical applications.

While industry employs the majority of chemical engineering students receiving a bachelor's degree, a large fraction of our graduates continue their education in:

- graduate schools to prepare for academic careers and industrial research jobs, or
- professional schools (medical, law or business).

Rice Chemical Engineering Curriculum

What opens all these career options to our graduates is a broad education that encompasses both fundamentals and applications to give students a sound scientific and technical grounding for further development in a variety of professional environments.



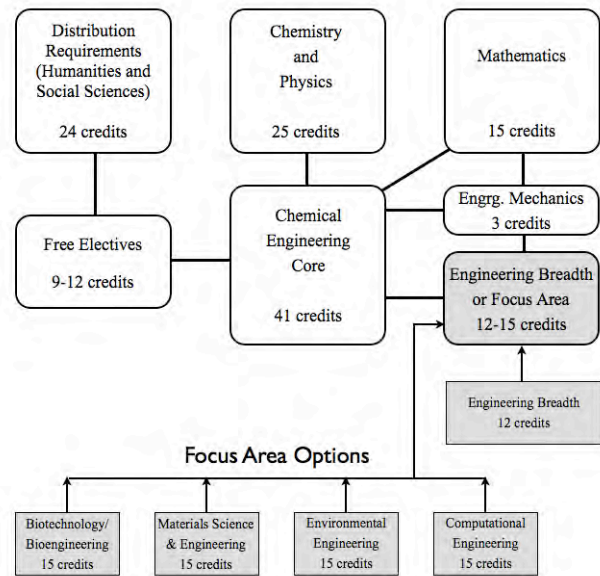
Courses in mathematics, chemistry, physics and computational engineering provide the foundation for the chemical engineering core, which introduces students to chemical process fundamentals, fluid mechanics, heat and mass transfer, thermodynamics, kinetics, reactor design, process control and process design. Chemical

engineering curricula place an emphasis on **chemistry** not found in other engineering disciplines. This background allows chemical engineers to tackle a wide variety of technical problems arising in the chemical, electronic, pharmaceutical and biotechnology industries.

To complete their technical education, Rice students seeking a BS degree in chemical engineering (BSChE) take course electives in at least two other engineering disciplines to satisfy a "breadth" requirement. Or, they can use their electives to create a **focus** (or **concentration**) **area** in one of the following four disciplines:

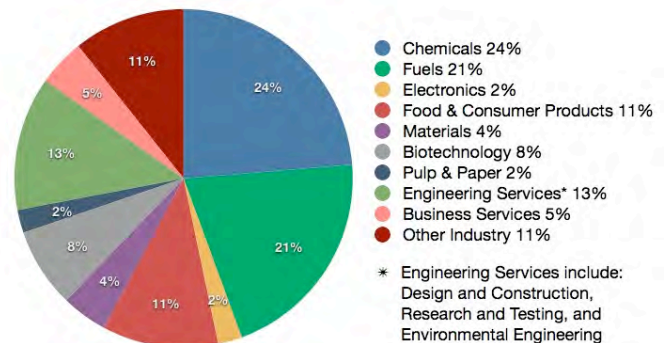
- biotechnology/bioengineering,
- computational engineering,
- environmental engineering, and
- materials science and engineering.

The diagram in the next column shows the components of the program that leads to the BSChE degree. This program requires a total of **132 semester hours** and is accredited by the Engineering Accreditation Commission of ABET (<http://www.abet.org>).



Career Paths of ChemE Graduates

About 20% of the students who graduate with a BS in chemical engineering continue their studies in graduate or professional schools. The vast majority of BS graduates, however, find industrial jobs. The chart below presents the initial placement of chemical engineering BS graduates according to the most recent survey published in 2007 by the American Institute of Chemical Engineers. The chemicals and fuels sectors employ just over one third of the graduates, followed by the engineering services and food & consumer product sectors.



Starting salaries

Because of their broad education and ability to work in interdisciplinary teams, chemical engineering graduates are heavily recruited and command high starting salaries. According to the *2011 Salary Survey* (published by the National Association of Colleges and Employers), the average starting salaries for students graduating with a 4-year bachelor's degree in engineering are:

Chemical Engineering	\$66,886
Computer Science	\$63,017
Mechanical Engineering	\$60,739
Electrical/Computer Engineering	\$60,646



Suggested Timetable for BS in Chemical Engineering

<i>Freshman Year</i>	Credits
MATH 101; 102	6
PHYS 111; 112 [or PHYS 101; 102]	7
CHEM 121; 122 [or CHEM 151; 152]	8
LPAP 101; 102	0
Distribution and Open Electives	12
Total	33

<i>Sophomore Year</i>	Credits
MATH 211; 212	6
CHEM 211; 217 [Lab]; CHEM 212**	7
CHBE 301; 305; 310	9
CHBE 303 [Computer programming – Coreq. 301]	1
MECH 211	3
Distribution or Specialization Electives	9
Total	35

<i>Junior Year</i>	Credits
CAAM 336 [or MATH 381]	3
CHEM 310** (or CHEM 330; 360)	3
CHBE 390; 401; 402; 411; 412	15
CHBE 343 [Lab]	3
Distribution or Specialization Electives	9
Total	33

<i>Senior Year</i>	Credits
CHBE 470*; 443 [Lab]	9
CHBE 403; 404*	4
Distribution, Specialization or Open Electives	18
Total	31

Elective courses must be chosen to satisfy the:

- Engineering breadth or specialization area requirement, and
- Distribution Requirements.

* A student pursuing the B.A. degree may substitute free electives for the courses indicated with an asterisk (*).

** Any two of CHEM 212, 310, 330 and 360 are required for the BS or BA degree.

For more information visit our web site at
<http://www.rice.edu/chbe/>

Engineering Breadth and Specialization Areas for the BSCHE Degree

In addition to taking MECH 211, students pursuing the BSCHE degree must use 12-15 elective credits to satisfy **either** the engineering breadth **or** a specialization area requirement.

A. Engineering Breadth Option

- One approved basic science course (Approved list includes BIOC 201; ESCI 333; ESCI 334; ESCI 340; PHYS 201 or 202; any of the four chemistry courses - CHEM 212, 310, 330 and 360 - not used to satisfy the chemistry requirement).
- Three more courses selected from the following groups: energy and sustainability, environmental engineering, bioengineering, computational engineering, materials science & engineering or other. Only one course from each group may be selected.
- Three credits for CHBE 500 (Undergraduate Research) may be substituted for any of the group electives, but not for the basic science requirement.

Electives can also be used to create a **focus** (or **concentration area**) in one of the following four disciplines: bioengineering, computational engineering, environmental engineering and materials.

B. Environmental Engineering

- CEVE 310; CEVE 434
- Three additional CEVE courses chosen from an approved list.

C. Biotechnology/Bioengineering

- BIOC 201; BIOC 301
- Three BIOE courses chosen from an approved list.
- CHEM 212 is strongly recommended as one of the 3 CHEM electives.

D. Materials Science and Engineering

- MSCI 301; MSCI 402; MSCI 406
- Two additional courses chosen from an approved list.

E. Computational Engineering

- Math choice must be CAAM 336.
- CAAM 335; CAAM 353; CAAM 420.
- Two additional courses chosen from an approved list.

Computer Programming: MATLAB and Fortran are taught in CHBE 303 and 305. Computer programming is vertically integrated throughout the chemical engineering curriculum.

CONTACT INFORMATION

Department Chair

Kyriacos Zygourakis kyzy@rice.edu

Undergraduate Committee

Ken Cox krcox@rice.edu
 Lisa Biswal biswal@rice.edu
 Ramon Gonzalez ramon_gonzalez@rice.edu
 Rafael Verduzco rafaelv@rice.edu