

# BACHELOR OF ARTS (BA) DEGREE WITH A MAJOR IN CHEMICAL ENGINEERING

## Program Learning Outcomes for the BA Degree with a Major in Chemical Engineering

Upon completing the BA degree with a major in Chemical Engineering, students will be able to demonstrate:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to communicate effectively with a range of audiences.
3. 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.
4. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
5. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

## Requirements for the BA Degree with a Major in Chemical Engineering

For general university requirements, see [Graduation Requirements \(https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/\)](https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/). Students pursuing the BA degree with a major in Chemical Engineering must complete:

- A minimum of 72 credit hours to satisfy major requirements.
- A minimum of 120 credit hours to satisfy degree requirements.
- A minimum of 13 courses (39 credit hours) taken at the 300-level or above.

The BA with a Major in Chemical Engineering is a flexible program and allows a student to pursue other areas of interest with or without a second major (or an academic minor).

The courses listed below satisfy the requirements for this major. In certain instances, courses not on this official list may be substituted upon approval of the major's academic advisor or, where applicable, the department's Director of Undergraduate Studies. (Course substitutions must be formally applied and entered into Degree Works by the major's [Official Certifier \(https://registrar.rice.edu/facstaff/degreeworks/officialcertifier/\)](https://registrar.rice.edu/facstaff/degreeworks/officialcertifier/).) Students and their academic advisors should identify and clearly document the courses to be taken.

### Summary

Code	Title	Credit Hours
Total Credit Hours Required for the Major in Chemical Engineering		72

Total Credit Hours Required for the BA Degree with a Major in Chemical Engineering	120
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### Degree Requirements

Code	Title	Credit Hours
Core Requirements		
Chemistry		
CHEM 121 or CHEM 111	GENERAL CHEMISTRY I AP/OTH CREDIT IN GENERAL CHEMISTRY I	3
CHEM 123 or CHEM 113	GENERAL CHEMISTRY LABORATORY I AP/OTH CREDIT IN GENERAL CHEMISTRY LAB I	1
CHEM 122 or CHEM 112	GENERAL CHEMISTRY II AP/OTH CREDIT IN GENERAL CHEMISTRY II	3
CHEM 124 or CHEM 114	GENERAL CHEMISTRY LABORATORY II AP/OTH CREDIT IN GENERAL CHEMISTRY LAB II	1
CHEM 211 & CHEM 213	ORGANIC CHEMISTRY I and ORGANIC CHEMISTRY DISCUSSION I	3
CHEM 301	PHYSICAL CHEMISTRY I	3
Mathematics and Computational Applied Mathematics and Operations Research		
MATH 101 or MATH 105	SINGLE VARIABLE CALCULUS I AP/OTH CREDIT IN CALCULUS I	3
MATH 102 or MATH 106	SINGLE VARIABLE CALCULUS II AP/OTH CREDIT IN CALCULUS II	3
MATH 211	ORDINARY DIFFERENTIAL EQUATIONS AND LINEAR ALGEBRA	3
MATH 212	MULTIVARIABLE CALCULUS <sup>1</sup>	3
Physics		
Select 1 from the following: <sup>2</sup>		4
PHYS 101 & PHYS 103	MECHANICS (WITH LAB) and MECHANICS DISCUSSION	3
PHYS 111	HONORS MECHANICS (WITH LAB)	
Select 1 from the following: <sup>3</sup>		4
PHYS 102 & PHYS 104	ELECTRICITY & MAGNETISM (WITH LAB) and ELECTRICITY AND MAGNETISM DISCUSSION	3
PHYS 112	HONORS ELECTRICITY & MAGNETISM (WITH LAB)	
Chemical and Biomolecular Engineering Core Courses		
CHBE 243	CHEMICAL ENGINEERING LAB I	2
CHBE 301	CHEMICAL ENGINEERING FUNDAMENTALS	3
CHBE 302	APPLIED MATHEMATICS AND NUMERICAL METHODS FOR CHEMICAL ENGINEERS I	3
CHBE 305	APPLIED MATHEMATICS AND NUMERICAL METHODS FOR CHEMICAL ENGINEERS II	3
CHBE 310	FUNDAMENTALS OF BIOMOLECULAR ENGINEERING	3
CHBE 344	CHEMICAL ENGINEERING LAB II	2

CHBE 390	CHEMICAL KINETICS AND REACTOR DESIGN	3
CHBE 401	TRANSPORT PHENOMENA I	3
CHBE 402	TRANSPORT PHENOMENA II	3
CHBE 403	DESIGN FUNDAMENTALS	4
CHBE 411	THERMODYNAMICS I	3
CHBE 412	THERMODYNAMICS II	3
Select 1 course from the following:		3
CHBE 410	APPLIED BIOMOLECULAR ENGINEERING	
CHBE 415	SEPARATION TECHNOLOGIES FOR CHEMICAL AND BIOMOLECULAR PROCESSES	
<b>Total Credit Hours Required for the Major in Chemical Engineering</b>		<b>72</b>
Additional Credit Hours to Complete Degree Requirements *		17
University Graduation Requirements ( <a href="https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/">https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/</a> ) *		31
<b>Total Credit Hours</b>		<b>120</b>

### Footnotes and Additional Information

\* **Note:** University Graduation Requirements include 31 credit hours, comprised of Distribution Requirements (Groups I, II, and III), FWIS, and LPAP coursework. In some instances, courses satisfying FWIS or distribution requirements may additionally meet other requirements, such as the Analyzing Diversity (AD) requirement, or some of the student's declared major, minor, or certificate requirements. Additional Credit Hours to Complete Degree Requirements include general electives, coursework completed as upper-level, residency (hours taken at Rice), and/or any other additional academic program requirements.

- <sup>1</sup> MATH 221 and MATH 222 or MATH 232 may substitute for MATH 212.
- <sup>2</sup> The Chemical and Biomolecular Engineering department has determined that credit awarded for PHYS 141 *CONCEPTS IN PHYSICS I* is not eligible for meeting the requirements of the Chemical Engineering major.
- <sup>3</sup> The Chemical and Biomolecular Engineering department has determined that credit awarded for PHYS 142 *CONCEPTS IN PHYSICS II* is not eligible for meeting the requirements of the Chemical Engineering major.

## Policies for the BA Degree with a Major in Chemical Engineering

### Program Restrictions and Exclusions

Students pursuing the BA Degree with a Major in Chemical Engineering should be aware of the following program restriction:

- As noted in [Majors, Minors, and Certificates](https://ga.rice.edu/undergraduate-students/academic-opportunities/majors-minors-certificates/) (<https://ga.rice.edu/undergraduate-students/academic-opportunities/majors-minors-certificates/>), under *Declaring Majors, Minors and Certificates*, students may not obtain both a BA and a BS in the same major. Students pursuing the BA Degree with a Major in Chemical Engineering may not additionally pursue the Bachelor of Science in Chemical Engineering (BSChE) Degree.

### Transfer Credit

For Rice University's policy regarding transfer credit, see [Transfer Credit](https://ga.rice.edu/undergraduate-students/academic-policies-procedures/transfer-credit/) (<https://ga.rice.edu/undergraduate-students/academic-policies-procedures/transfer-credit/>). Some departments and programs have additional restrictions on transfer credit. Requests for transfer credit must be approved for Rice equivalency by the designated transfer credit advisor for the appropriate academic department offering the Rice equivalent course (corresponding to the subject code of the course content). The Office of Academic Advising maintains the university's official list of [transfer credit advisors](https://oaa.rice.edu/advising-network/transfer-credit-advisors/) (<https://oaa.rice.edu/advising-network/transfer-credit-advisors/>) on their website: <https://oaa.rice.edu>. Students are encouraged to meet with the applicable transfer credit advisor as well as their academic program director when considering transfer credit possibilities.

### Additional Information

For additional information, please see the Chemical and Biomolecular Engineering website: <https://chbe.rice.edu/>.

## Opportunities for the BA Degree with a Major in Chemical Engineering Academic Honors

The university recognizes academic excellence achieved over an undergraduate's academic history at Rice. For information on university honors, please see [Latin Honors](https://ga.rice.edu/undergraduate-students/honors-distinctions/university/) (<https://ga.rice.edu/undergraduate-students/honors-distinctions/university/>) (*summa cum laude*, *magna cum laude*, and *cum laude*) and [Distinction in Research and Creative Work](https://ga.rice.edu/undergraduate-students/honors-distinctions/university/) (<https://ga.rice.edu/undergraduate-students/honors-distinctions/university/>). Some departments have department-specific Honors awards or designations.

### Fifth-Year Master's Degree Option for Rice Undergraduate Students

In certain situations and with some terminal master's degree programs, Rice students have an option to pursue a master's degree by adding an additional fifth year to their four years of undergraduate studies.

Advanced Rice undergraduate students in good academic standing typically apply to the master's degree program during their junior or senior year. Upon acceptance, depending on course load, financial aid status, and other variables, they may then start taking some required courses of the master's degree program. A plan of study will need to be approved by the student's undergraduate major advisor and the master's degree program director.

As part of this option and opportunity, Rice undergraduate students:

- must complete the requirements for a bachelor's degree and the master's degree independently of each other (i.e. no course may be counted toward the fulfillment of both degrees).
- should be aware there could be financial aid implications if the conversion of undergraduate coursework to that of graduate level reduces their earned undergraduate credit for any semester below that of full-time status (12 credit hours).
- more information on this *Undergraduate - Graduate Concurrent Enrollment* opportunity, including specific information on the registration process can be found [here](https://ga.rice.edu/undergraduate-students/academic-opportunities/undergraduate-graduate-concurrent-enrollment/) (<https://ga.rice.edu/undergraduate-students/academic-opportunities/undergraduate-graduate-concurrent-enrollment/>).

Rice undergraduate students completing studies in science and engineering may have the option to pursue the Master of Chemical Engineering (MChE) degree. For additional information, students should contact their undergraduate major advisor and the MChE chair of the department graduate studies committee.

### **Additional Information**

For additional information, please see the Chemical and Biomolecular Engineering website: <https://chbe.rice.edu/>.