CHBE

Chemical and Biomolecular Engineering

WEB LINKS	http://chbe.rice.edu/undergraduate
FRANK ADVICE	Start talking to your adviser as early as possible and explore the many options available to you!
ADVICE FOR STUDENTS WITH AP CREDIT	Consider taking more advanced MATH (211/212), organic chemistry or the introductory CHBE courses during your freshman year. Contact Ken Cox (krcox@rice.edu) for advice.
ALTERNATIVE CURRICULA	Students following the B.S. program can use their electives to create a concentration or focus area in one of five disciplines: biotechnology/bioengineering, environmental engineering, computational engineering, energy and sustainability engineering, or materials science and engineering. The more flexible B.A. program allows students to pursue a double major.
BS VERSUS BA	Our department offers two undergraduate degrees: the Bachelor of Science in Chemical Engineering (B.S.Ch.E.) and Bachelor of Arts (B.A.) degree. Only the program leading to the B.S.Ch.E. degree is accredited by the Engineering Accreditation Commission (EAC) of ABET, http://www.abet.org. The B.S.Ch.E. degree is the more appropriate path for students wanting to pursue a professional career in the field of chemical and biomolecular engineering. The B.A. program is more flexible and allows a student to pursue other areas of interest or prepare for professional careers in medicine, law or business.

NOT REQUIRED BUT HIGHLY RECOMMENDED COURSES	Biochemistry, numerical analysis, cell biology, courses on environmental studies (ENST), other courses listed in the specialization areas.
RESEARCH AND INTERNSHIPS	Most ChBE majors participate in undergraduate research, either through the courses (CHBE 495 or CHBE 499) or through summer research internships. For further information on research opportunities talk to ChBE undergraduate advisers or contact directly the faculty whose research interests you. Most students also pursue industrial or national lab internships.
STUDY ABROAD	Study abroad semesters are possible and encouraged. Keep in mind that core ChBE courses are offered only once a year, and some courses are somewhat hard to match. With advanced planning however, several international locations work for ChBE students, who commonly go abroad in their sophomore or junior spring terms.
PROFESSIONAL ORGANIZATION	The American Institute of Chemical Engineers (AIChE) has a very active student chapter at Rice that provides real-world experience with internships at sponsor companies, talks on technical, career, and professional topics, scholarships, etc. See http://aiche.rice.edu for details on membership, meetings and more.

B.S. In Chemical Engineering

Specializations: Bioengineering
Computational Engineering
Environmental Engineering
Materials Science and Engineering
Energy and Sustainability Engineering
Engineering Breadth

Sample Degree Plan

THIS IS ONE EXAMPLE OF MANY POSSIBLE SCHEDULES.
CONSULT A DIVISIONAL OR DEPARTMENTAL ADVISER TO CUSTOMIZE YOUR DEGREE PLAN.

FALL			SPRING		
FRESHMAN		**18 credits**	**FRESHMAN**		**17 credits**
MATH 101	Single Variable Calculus I	3	MATH 102	Single Variable Calculus II	3
PHYS 101• or 111	Mechanics w/Lab	4*	PHYS 102•• or 112	Electricity and Magnetism w/Lab	4*
CHEM 121	General Chemistry I w/Lab	4*	CHEM 122	General Chemistry II w/Lab	4*
FWIS	Freshman Writing	3	DIST	Distribution elective	3
OPEN	Open elective	3	DIST	Distribution elective	3
LPAP	Lifetime Phys Activity elective	1			
SOPHOMORE		**15 credits**	**SOPHOMORE**		**18 credits**
MATH 211	Ordinary Diff Eqs & Linear Alg	3	MATH 212	Multivariable Calculus	3
CHEM 211§	Organic Chemistry	3	CHBE 305	Comp Methods Chem Eng	3*
CHEM 217	Organic Lab for Chem Eng	1	CHBE 310	Fund of Biomolecular Eng	3
CHBE 301	Chemical Engineering Fund	3	CHEM 212	Organic Chemistry	3
CHBE 303	Comp Prog Chemical Eng	2*	CHEM 311 or 312		
DIST	Distribution elective	3	DIST	Distribution elective	3
			OPEN	Open elective	3
JUNIOR		**18 credits**	**JUNIOR**		**16 credits**
CHEM 311	Physical Chemistry or CHEM 312	3	CAAM 336	Diff Eqs in Science and Eng	3
CHBE 390	Kinetics and Reactor Design	3	CHBE 343	Chemical Engineering Lab I	3*
CHBE 401	Transport Phenomena I	3	CHBE 350	Process Safety in Chem Eng	1
CHBE 411	Thermodynamics I	3	CHBE 402	Transport Phenomena II	3
SPEC	CHBE Specialization area elec	3	CHBE 412	Thermodynamics II	3
DIST	Distribution elective	3	SPEC	CHBE Specialization area elec	3
SENIOR		**16 credits**	**SENIOR**		**16 credits**
CHBE 403	Design Fundamentals	4*	CHBE 404	Product and Process Design	4
CHBE 443	Chemical Engineering Lab II	3*	SPEC	CHBE specialization area elec	3
CHBE 470	Process Dynamics and Control	3	SPEC	CHBE specialization area elec	3
SPEC	CHBE specialization area elec	3	DIST	Distribution elective	3
OPEN	Open elective	3	OPEN	Open elective	3

** In addition to class hours, these courses have a regularly scheduled lab and/or discussion session that must fit into your schedule.*

• When registering for PHYS 101, you must also register for PHYS 103, the discussion section for 101.

•• When registering for PHYS 102, you must also register for PHYS 104, the discussion section for 102.

§ When registering for CHEM 211, you must also register for CHEM 213, the discussion section for 211.

BASIC REQUIREMENTS	General math & science courses	41
	Core courses in major	44
ELECTIVE REQUIREMENTS	Specialization area courses	12–15
	Open electives and LPAP	11–14
	FWIS and distribution courses	21
	Minimum credit required for the B.S.	132

Of the 132 total degree credits, the B.S. in Chemical Engineering requires 85 credits in general math and science courses and core courses.

Major Requirements

NUMBER	CREDIT	TITLE
MATH 101	3	Single Variable Calculus I
MATH 102	3	Single Variable Calculus II
MATH 211	3	Ordinary Differential Equations and Linear Algebra
MATH 212	3	Multivariable Calculus
CAAM 336	3	Differential Equations in Science and Engineering
PHYS 101•/111	4*	Mechanics w/Lab
PHYS 102••/112	4*	Electricity and Magnetism w/Lab
CHEM 121	4*	General Chemistry I w/Lab
CHEM 122	4*	General Chemistry II w/Lab
CHEM 211§	3	Organic Chemistry
CHEM 217	1	Organic Chemistry Lab for Chem Engineers
CHEM 212/311/312	6	Organic/Physical Chemistry (2 required)
CHBE 301	3	Chemical Engineering Fundamentals
CHBE 303	2*	Computer Programming in Chemical Engineering
CHBE 305	3*	Computational Methods in Chemical Engineering
CHBE 310	3	Fundamentals of Biomolecular Engineering
CHBE 343	3*	Chemical Engineering Lab I
CHBE 350	1	Process Safety in Chemical Engineering
CHBE 390	3	Transport Phenomena I
CHBE 401	3	Kinetics and Reactor Design
CHBE 402	3	Transport Phenomena II
CHBE 403	4*	Design Fundamentals
CHBE 404	4	Product and Process Design
CHBE 411	3	Thermodynamics I
CHBE 412	3	Thermodynamics II
CHBE 443	3*	Chemical Engineering Lab II
CHBE 470	3	Process Dynamics and Control
SPEC	3	CHBE specialization area elective
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