CHEMISTRY

Graduates with a degree in chemistry will be well prepared for employment, graduate study in a chemistry-related field, or professional school. Chemists are employed in research, quality control, design, sales and management. Many graduates pursue masters and doctoral degrees in chemistry, biochemistry, medicinal chemistry, materials science, or environmental science, among others. A chemistry degree is excellent preparation for medical school and related fields, and also for careers in business, law or education.

The curriculum at Rose-Hulman Institute of Technology provides a rigorous introduction to all subdisciplines of chemistry. Students have access to modern instrumentation, a new biochemistry lab, and a new environmental chemistry lab. Rose-Hulman students are introduced to modern computational methods beginning in the sophomore year. There are many opportunities for research or other individual projects, and students are encouraged to present their results at regional and national chemistry conferences. Close interaction with engineering departments provides students with a point of view not available at most other undergraduate institutions.

Students may broaden their education by choosing a minor or second major. Many students, including chemistry majors, may be interested in a second major or minor in biochemistry and molecular biology. Other common choices include biology, chemical engineering and mathematics.

Requirements

List of Required Chemistry Courses

Code	Title	Hours
General Chemistry	111, 113, 115	12
Organic Chemistry	251, 252, 253	12
Analytical Chemistry	225, 326, 327	12
Physical Chemistry	361, 362, 463	12
Inorganic Chemistry	441, 442	8
Biochemistry	330	4
Research	291, 395, 490, 491, 495, 496, 497	11
Career Preparation	200	1
Electives		11
Total Hours		**83**

Summary of Minimum Graduation Requirements

Course or Areas	Required	Elective	Total
Chemistry	72	11	83
Physics	12	0	12
Mathematics	19	0	19
Biology	4	0	4
Humanities, Social Sciences, and the Arts	8	28	36
Math/Science Elective	0	4	4
Electives	0	32	32
Foundations for Rose-Hulman Success	1	0	1
Total	**116**	**75**	**191**

Plan of Study

Below is a sample plan of study that illustrates one way to achieve the program requirements. Any given student's plan of study may differ based on a variety of factors (e.g., advanced credit, placement exams, adding a minor). Enrolled students will work with their academic advisor; utilize the degree audit/planner to create a specific plan of study.

Course	Title	Hours
Freshman		
Fall		
CHEM 111	General Chemistry I	3
CHEM 111L	General Chemistry I Lab	1
MA 111	Calculus I	5
HUM H190	First-Year Writing Seminar	4
RHIT 100	Foundations for Rose-Hulman Success	1
	Hours	**14**
Winter		
CHEM 113	General Chemistry II	3
CHEM 113L	General Chemistry II Laboratory	1
MA 112	Calculus II	5
PH 111	Physics I	4
BIO 110	Cell Structure and Function [1]	4
	Hours	**17**
Spring		
CHEM 115	General Chemistry III	3
CHEM 115L	General Chemistry III Laboratory	1
MA 113	Calculus III	5
HSSA Elective		4
PH 112	Physics II	4
	Hours	**17**
Sophomore		
Fall		
CHEM 251	Organic Chemistry I	3
CHEM 251L	Organic Chemistry I Laboratory	1
PH 113	Physics III	4
Select one of the following:		4
MA 223	Engineering Statistics	
MA 381	Introduction to Probability with Applications to Statistics (Prob. Stat.)	
Prob. Stat.		
CHEM 225	Analytical Chemistry	3
CHEM 225L	Analytical Chemistry Laboratory	1
	Hours	**16**
Winter		
CHEM 200	Career Preparation	1
CHEM 252	Organic Chemistry II	3
CHEM 252L	Organic Chemistry II Laboratory	1
CHEM 291	Introduction to Chemical Research	3
Math/Science Elective [2]		4
HSSA Elective		4
	Hours	**16**
Spring		
HSSA Elective		4
CHEM 253	Organic Chemistry III	3
CHEM 253L	Organic Chemistry III Laboratory	1
Free Elective		4

ENGL H290	Technical & Professional Communication	4
	Hours	**16**
Junior		
Fall		
HSSA Elective		4
CHEM 361	Physical Chemistry I [3]	4
CHEM 330	Biochemistry I	4
CHEM 395	Chemistry Seminar	0
CHEM 490	Chemical Research	2
	Hours	**14**
Winter		
CHEM 326	Bioanalytical Chemistry	4
CHEM 362	Physical Chemistry II [3]	4
CHEM 490	Chemical Research	2
HSSA Elective		4
Free Elective		4
	Hours	**18**
Spring		
CHEM 463	Quantum Chemistry & Molecular Spectroscopy	4
Advanced CHEM Elective		4
HSSA Elective		4
CHEM 490	Chemical Research	2
CHEM 327	Advanced Analytical Chemistry	4
	Hours	**18**
Senior		
Fall		
CHEM 441	Inorganic Chemistry I	4
Free Elective		4
CHEM 495	Chemistry Seminar	0
Advanced CHEM Elective		4
HSSA Elective		4
	Hours	**16**
Winter		
CHEM 442	Inorganic Chemistry II	4
Advanced CHEM Elective		3
*Advanced CHEM Elective defined as 300 level or above coursework with CHEM prefix		
CHEM 496	Chemistry Seminar	0
Free Elective		4
Free Elective		4
	Hours	**15**
Spring		
CHEM 491	Senior Thesis	1
CHEM 497	Senior Presentation	1
Free Elective		4
Free Elective		4
Free Elective		4
	Hours	**14**
	Total Hours	**191**

1 BIO 120 Comparative Anatomy & Physiology or BIO 130 Evolution & Diversity may be substituted for BIO 110 Cell Structure and Function

2 Math/ScienceElective defined as 200 level or above coursework with any of the following prefixes: BIO, BMTH, CSSE, GEOL, ECONS, MA, or PH

3 CHE 303 Chemical Engineering Thermodynamics, CHE 304 Multi-Component Thermodynamics and CHEM 360 Introduction to Physical Chemistry for Engineers may be substituted for CHEM 361 Physical Chemistry I and CHEM 362 Physical Chemistry II.

Notes

Two degree or double major programs in biochemistry and either chemistry or biochemistry and molecular biology is not allowed.

Students must complete at least 3 credits of CHEM 490 Chemical Research prior to the Spring quarter of their senior year.

Learning Outcomes
Student Outcomes

Student Outcomes are statements that describe what students are expected to have by the time of graduation.

1. An ability to design and conduct experiments as well as to analyze and interpret data.
2. An ability to recognize the professional and ethical responsibilities of a chemist.
3. An ability to communicate effectively in presentations and reports.
4. An ability to recognize chemistry practices outside of the academic environment.
5. An ability to operate safely and effecitvely in a chemistry laboratory.