

# BACHELOR OF SCIENCE IN CHEMISTRY

Chemistry is the study of the miniaturized world of atoms and molecules. Chemists analyze the structure of this world of chemicals, discover the forces that govern chemical changes, and invent chemical reactions which create new molecules and materials for the benefit of mankind. For example, most of the clothes we wear and the containers that hold our food are made of synthetic fibers and polymers that were conceived and developed by chemists. Life-saving pharmaceuticals are designed and synthesized by chemists. The development of insecticides, cosmetics, fragrances, fertilizers, and high-tech materials are other examples of the impact of chemistry on society. The objective of the Illinois Institute of Technology undergraduate program in chemistry is to provide rigorous education in the fundamental areas of chemical theory and chemical experimentation. Students become well-trained for industrial careers in research and development, chemical analysis, or chemical manufacturing and marketing. The opportunity for participation in an original research project also provides the necessary experiences for entrance into graduate school in one of the chemical sciences. In addition, the undergraduate program in chemistry provides excellent pre-professional training for careers in medicine (see Preparatory Program for Medical Studies and [science.iit.edu/pre-medicine](http://science.iit.edu/pre-medicine)), law, business, and other areas of science and healthcare. Students learn not only the basic science of chemistry but also the practical aspects of the discipline and its numerous applications. The Bachelor of Science in Chemistry degree is approved by the American Chemical Society Committee on Professional Training.

## Coursework

The first stage of undergraduate training provides a solid foundation in all of the five basic areas of chemistry (analytical, inorganic, organic, physical, and biochemistry). Most of these courses include required laboratory work. These laboratories provide extensive practical exposure to each of these areas and experience with modern chemical instrumentation such as nuclear magnetic resonance spectroscopy, infrared spectroscopy, and gas and high-pressure liquid chromatography. Concurrently, students take courses to strengthen their understanding of mathematics and physics. Students are invited and encouraged to attend weekly chemistry colloquia where lectures are given by prominent chemists from industrial, governmental, and academic laboratories. In the second stage, students take advanced and specialized courses which focus on career interests. Students are encouraged to participate in a research project under the supervision of a member of the chemistry faculty. This research may lead to a senior thesis. Students may receive certification of their Bachelor of Science in Chemistry degree through the American Chemical Society ([acs.org](http://acs.org)) by selection of appropriate chemistry electives.

### Required Courses

Code	Title	Credit Hours
<b>Chemistry Requirements</b>		<b>(54)</b>
CHEM 100	Introduction to the Profession	2
CHEM 124	Principles of Chemistry I with Laboratory	4
CHEM 125	Principles of Chemistry II with Laboratory	4
CHEM 237	Organic Chemistry I	4
CHEM 239	Organic Chemistry II	3
CHEM 240	Organic Chemistry Laboratory	2
CHEM 247	Analytical Chemistry	3
CHEM 321	Instrumental Analysis	4
CHEM 343	Physical Chemistry I	3
CHEM 344	Physical Chemistry II	4
CHEM 415	Inorganic Chemistry	3
CHEM 416	Advanced Chemistry Laboratory	3
CHEM 434	Spectroscopic Methods in Identification and Analysis	4
CHEM 451	Undergraduate Seminar	3
CHEM 485	Chemistry Colloquium	1
CHEM 485	Chemistry Colloquium	1
Select two CHEM electives <sup>1</sup>		6
<b>Biology Requirements</b>		<b>(6-7)</b>
BIOL 107	General Biology Lectures	3
or BIOL 115	Human Biology	
BIOL 401	Introductory Biochemistry	3-4
or BIOL 403	Biochemistry	
<b>Mathematics Requirements</b>		<b>(18)</b>
MATH 151	Calculus I	5
MATH 152	Calculus II	5

MATH 251	Multivariate and Vector Calculus	4
MATH 252	Introduction to Differential Equations	4
<b>Physics Requirements</b>		<b>(8)</b>
PHYS 123	General Physics I: Mechanics	4
PHYS 221	General Physics II: Electricity and Magnetism	4
<b>Computer Science Requirement</b>		<b>(2)</b>
CS 105	Introduction to Computer Programming	2
or CS 110	Computing Principles	
<b>Humanities and Social Sciences Requirements</b>		<b>(21)</b>
See Illinois Tech Core Curriculum, sections B and C		21
<b>Interprofessional Projects (IPRO)</b>		<b>(6)</b>
See Illinois Tech Core Curriculum, section E		6
<b>Free Electives</b>		<b>(12)</b>
Select 12 credit hours		12
<b>Total Credit Hours</b>		<b>127-128</b>

<sup>1</sup> Students may choose from CHEM 400+ and CHEM 500+ level courses. Students planning to take CHEM 487 must complete CHEM 450 in a previous semester and are required to take one semester of CHEM 485.

## Bachelor of Science in Chemistry Curriculum

		Year 1	
Semester 1	Credit Hours	Semester 2	Credit Hours
CHEM 124	4	CHEM 100	2
CS 105 or 110	2	CHEM 125	4
MATH 151	5	MATH 152	5
Humanities 200-level Course	3	PHYS 123	4
		Social Sciences Elective	3
<b>14</b>		<b>18</b>	
		Year 2	
Semester 1	Credit Hours	Semester 2	Credit Hours
CHEM 237	4	CHEM 239	3
BIOL 107 or 115	3	CHEM 240	2
MATH 251	4	CHEM 247	3
PHYS 221	4	MATH 252	4
Humanities or Social Sciences Elective	3	Humanities Elective (300+)	3
<b>18</b>		<b>15</b>	
		Year 3	
Semester 1	Credit Hours	Semester 2	Credit Hours
CHEM 321 <sup>2</sup>	4	CHEM 344	4
CHEM 343	3	CHEM 434 <sup>2</sup>	4
Chemistry Elective <sup>1</sup>	3	CHEM 485	1
I PRO Elective I	3	Humanities Elective (300+)	3
Social Sciences Elective (300+)	3	Free Elective	3
<b>16</b>		<b>15</b>	
		Year 4	
Semester 1	Credit Hours	Semester 2	Credit Hours
CHEM 415 <sup>2</sup>	3	CHEM 416	3
CHEM 451 <sup>2</sup>	3	CHEM 485	1
BIOL 401 or 403	3-4	Chemistry Elective <sup>1</sup>	3
Free Elective	3	I PRO Elective II	3
Free Elective	3	Social Sciences Elective (300+)	3
		Free Elective	3
<b>15-16</b>		<b>16</b>	

**Total Credit Hours: 127-128**

<sup>1</sup> Students may choose from CHEM 400+ and CHEM 500+ level courses. Students planning take CHEM 487 must complete CHEM 450 in a previous semester and are required to take one semester of CHEM 485.

<sup>2</sup> CHEM 321, CHEM 434, CHEM 415, and CHEM 451 are not offered every semester. The curriculum may differ in semesters five through eight depending on course offerings.

## Optional Chemistry Degree Program Course Requirements

Students choosing to pursue the optional degree program below must take the following prescribed courses as chemistry and free electives.

### Premedical Program for Chemistry Majors

**Program Adviser:** K. Spink

Students majoring in chemistry can earn a Bachelor of Science in Chemistry degree and, at the same time, fulfill the prerequisites for medical school. For detailed information, visit the Premedical Program website ([science.iit.edu/pre-medicine](http://science.iit.edu/pre-medicine)). The following is a list of university science courses that fulfill the premedical requirements of most medical schools:

BIOL 107	General Biology Lectures	3
BIOL 109	General Biology Laboratory	1
BIOL 115	Human Biology	3
BIOL 117	Human Biology Laboratory	1
CHEM 124	Principles of Chemistry I with Laboratory	4
CHEM 125	Principles of Chemistry II with Laboratory	4
CHEM 237	Organic Chemistry I	4
CHEM 239	Organic Chemistry II	3
CHEM 240	Organic Chemistry Laboratory	2
PHYS 123	General Physics I: Mechanics	4
PHYS 221	General Physics II: Electricity and Magnetism	4