CHEMISTRY, BA

Chair

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Faculty

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Program Description

Chemistry, the science concerned with the composition, structure, properties, and reactions of matter, especially of atomic, elemental, and molecular systems, is taught through courses in analytical, biological, inorganic, organic, and physical chemistry and through direct participation in original research. Undergraduate majors in chemistry may elect one of four programs, two leading to a B.A. degree, with an emphasis in either chemistry or biological chemistry, and two leading to the B.S. degree with an emphasis in either chemistry or medical chemistry. Either B.A. degree program requires fewer credits in chemistry than the B.S. option, and yet provides a foundation in the discipline adequate for either immediate professional engagements or for graduate studies. Students studying for a B.S. degree in chemistry gain a more extensive background as they fulfill a broader range of requirements; they must file a petition with the department chair indicating their intent to secure the B.S. degree before it can be awarded.

Students interested in a B.S. degree in biochemistry should see the biochemistry section here (https://coursecatalog.syracuse.edu/undergraduate/arts-sciences/biochemistry-bs/).

For information about certification to teach chemistry at the secondary school level, see Education/Arts and Sciences (dual program) (https://coursecatalog.syracuse.edu/graduate/education/science-chemistry-education-preparation-ms/) in this section of the catalog.

Student Learning Outcomes

1. Develop quantitative and qualitative problem solving skills in core disciplines of chemistry
2. Develop accurate and safe laboratory techniques, recognize hazards and wastes, disseminate results
3. Train on modern instrumentation, interpret results, analyze data
4. Communicate effectively, work in small groups, perform database literature reviews
5. Design experiments using ethical behavior, understand impact of Chemistry on society

B.A. Degree Requirements

To declare and remain a B.A. major in Chemistry (including Biological Chemistry track), a student must satisfy either of the following two requirements:

1. Earn a grade of C+ or better in General Chemistry lecture and laboratory courses (CHE 106 General Chemistry Lecture I/CHE 107 General Chemistry Laboratory I/CHE 116 General Chemistry Lecture II/CHE 117 General Chemistry Laboratory II or honors equivalents, or AP credit for CHE 106 General Chemistry Lecture I/CHE 107 General Chemistry Laboratory I/CHE 116 General Chemistry Lecture II/CHE 117 General Chemistry Laboratory II) **and** earn a grade of C or better in CHE 275 Organic Chemistry I;
   -or-
2. Earn a grade of A- or better in a General Chemistry lecture course (CHE 106 General Chemistry Lecture I/CHE 116 General Chemistry Lecture II/CHE 109 General Chemistry Lecture I (Honors and Majors)/CHE 119 General Chemistry Lecture II (Honors and Majors)) taken at Syracuse University.

Students declared in the Chemistry BA program (including the Biological Chemistry track) earning less than a C+ in the following courses:

CHE 106 General Chemistry Lecture I, CHE 107 General Chemistry Laboratory I, CHE 116 General Chemistry Lecture II, CHE 117 General Chemistry Laboratory II (or honors equivalent)
and/or less than a C in CHE 275 Organic Chemistry I, will be placed on "Major Probation."

Students on "major probation" must successfully pass the following courses with a C+ or better:

General Chemistry lecture and laboratory (CHE 106 General Chemistry Lecture I/CHE 107 General Chemistry Laboratory I/ CHE 116 General Chemistry Lecture II/CHE 117 General Chemistry Laboratory II or honors equivalent) and/or a C or better inCHE 275 in their next attempt. Failure to complete the respective course on the second attempt with the minimum grade requirement will result in "Major suspension". These courses must be retaken at Syracuse University. Students in the category of Major suspension will be required to change their major with the college.

Chemistry Track

Requirements include 36 credits in chemistry core courses, 32 of which are taken in specific courses. Each student's course of study includes the following:

Group 1

Code	Title	Credits
Select one of the following:		6
CHE 106 & CHE 116	General Chemistry Lecture I and General Chemistry Lecture II	
CHE 109 & CHE 119	General Chemistry Lecture I (Honors and Majors) and General Chemistry Lecture II (Honors and Majors)	
Select one of the following:		2
CHE 107 & CHE 117	General Chemistry Laboratory I and General Chemistry Laboratory II	
CHE 129 & CHE 139	General Chemistry Laboratory I (Honors and Majors) and General Chemistry Laboratory II (Honors and Majors)	
CHE 275	Organic Chemistry I	3
CHE 276	Organic Chemistry I Laboratory	2
CHE 325	Organic Chemistry II	3
CHE 326	Organic Chemistry II Laboratory	2
CHE 346	Physical Chemistry I	3

CHE 347	Physical-Analytical Chem Lab	2
CHE 356	Physical Chemistry II	3
CHE 357	Physical Chemistry Laboratory	2
CHE 335	Chemical and Biochemical Analysis with Laboratory	4
or CHE 444	Forensic Chemical Analysis	

Group 2

At least 4 credits chosen from

Code	Title	Credits
CHE 411	Inorganic Chemistry	3
CHE 412	Metals in Medicine	3
CHE 414	Introduction to Medicinal Chemistry	3
CHE 422	Inorganic Laboratory Technique	1
CHE 427	Organic Chemistry of Biological Molecules	3
CHE 436	Advanced Physical Chemistry	3
CHE 474	Structural and Physical Biochemistry	3
CHE 546	Molecular Spectroscopy and Structure	1-9
CHE 575	Organic Spectroscopy	3
BCM 475	Biochemistry I	3
BCM 476	Biochemistry II	3
selected graduate courses with the instructor's approval		

Group 3

One year of calculus and physics

Code	Title	Credits
Select one of the following:		6
MAT 285 & MAT 286	Life Sciences Calculus I and Life Sciences Calculus II	
MAT 295 & MAT 296	Calculus I and Calculus II	
PHY 211	General Physics I	3
PHY 212	General Physics II	3
PHY 221	General Physics Laboratory I	1
PHY 222	General Physics Laboratory II	1

Additional Information

Students are encouraged to gain some research experience by enrolling in CHE 450 Introduction to Chemical Research, which may be substituted for a 3-credit course listed in (2) above by petitioning the department.

Biological Chemistry Track

Requirements include 21 credits from chemistry core courses, 6 credits from the list, (2) below, of approved biology/biochemistry core courses, and 9 additional credits from an approved list for a total of 36 required credits.

Each student's course of study must include the following:

Group 1

Code	Title	Credits
Select one of the following:		6
CHE 106 & CHE 116	General Chemistry Lecture I and General Chemistry Lecture II	
CHE 109 & CHE 119	General Chemistry Lecture I (Honors and Majors) and General Chemistry Lecture II (Honors and Majors)	
Select one of the following:		2
CHE 107 & CHE 117	General Chemistry Laboratory I and General Chemistry Laboratory II	
CHE 129 & CHE 139	General Chemistry Laboratory I (Honors and Majors) and General Chemistry Laboratory II (Honors and Majors)	
CHE 275	Organic Chemistry I	3
CHE 276	Organic Chemistry I Laboratory	2
CHE 325	Organic Chemistry II	3
CHE 326	Organic Chemistry II Laboratory	2
CHE 474	Structural and Physical Biochemistry	3

Group 2

Code	Title	Credits
BIO 475	Biochemistry Laboratory	4
or CHE 477	Proteins and Nucleic Acids Lab	
BCM 475	Biochemistry I	3

Group 3

At least 9 credits chosen from

Code	Title	Credits
CHE 335	Chemical and Biochemical Analysis with Laboratory	4
CHE 346	Physical Chemistry I	3
CHE 356	Physical Chemistry II	3
CHE 411	Inorganic Chemistry	3
CHE 412	Metals in Medicine	3
CHE 414	Introduction to Medicinal Chemistry	3
CHE 422	Inorganic Laboratory Technique	1
CHE 427	Organic Chemistry of Biological Molecules	3
CHE 436	Advanced Physical Chemistry	3
CHE 444	Forensic Chemical Analysis	4
CHE 546	Molecular Spectroscopy and Structure	1-9
CHE 575	Organic Spectroscopy	3
BCM 476	Biochemistry II	3
selected graduate courses with the instructor's approval		

Group 4

One year of calculus and physics

Code	Title	Credits
Select one of the following:		6
MAT 285 & MAT 286	Life Sciences Calculus I and Life Sciences Calculus II	
MAT 295 & MAT 296	Calculus I and Calculus II	
PHY 211	General Physics I	3
PHY 212	General Physics II	3
PHY 221	General Physics Laboratory I	1
PHY 222	General Physics Laboratory II	1

Additional Information

Students are strongly encouraged to take BIO 326 Genetics and BIO 327 Cell Biology. Students are also encouraged to take BIO 465 Molecular Biology Laboratory

Students may also gain some research experience by enrolling in CHE 450 Introduction to Chemical Research, which may be substituted for a 3-credit course listed in (3) above, by petitioning the department.

Degree with Distinction

Distinction in Chemistry is awarded by the chemistry department upon completion of the chemistry major and a high-quality chemistry thesis. The thesis will be evaluated and judged by a committee consisting of the research advisor and two other chemistry faculty members. Other requirements include a minimum cumulative GPA of 3.4 by the end of the senior year, and a minimum cumulative GPA of 3.4 in chemistry department courses. See Professor Totah for additional requirements.

College of Arts and Sciences Requirements

For all Arts and Sciences|Maxwell students, successful completion of a bachelor's degree in this major requires a minimum of 120 credits, 96 of which must be Arts and Sciences|Maxwell credits, completion of the Liberal Arts Core (https://coursecatalog.syracuse.edu/undergraduate/arts-sciences/#text) requirements, and the requirements for this major (30 credits) that are listed above.

Dual Enrollments:

Students dually enrolled in **Newhouse*** and Arts and Sciences|Maxwell will complete a minimum of 122 credits, with at least 90 credits in Arts and Sciences|Maxwell coursework and an Arts and Sciences|Maxwell major.

*Students dually enrolled in the College of Arts and Sciences|Maxwell as first year students must complete the Liberal Arts Core (https://coursecatalog.syracuse.edu/undergraduate/arts-sciences/#text). Students who transfer to the dual program after their first year as singly enrolled students in the Newhouse School will satisfy general requirements for the dual degree program by completing the Newhouse Core Requirements.

Undergraduate University Requirements

The following requirements and experiences apply to all Syracuse University Undergraduate matriculated degree programs.

- IDEA Course Requirement (https://coursecatalog.syracuse.edu/undergraduate/idea-course-requirement/)
- First Year Seminar (https://coursecatalog.syracuse.edu/undergraduate/courses/fys/)