BIOCHEMISTRY AND CHEMICAL BIOLOGY (B.S.)

This degree offers students the opportunity to develop in-depth knowledge in five areas of biological chemistry (bioorganic, bioinorganic, bioanalytical, biophysical, and health sciences). The program teaches key chemical concepts and develops student ability to apply them to a wide variety of biological problems. The program serves to develop and train graduates who will be well prepared to enter graduate or professional schools as well as careers in the chemical, pharmaceutical, biomedical, agricultural and bioinformatic industries.

Admission Requirements

Admission requirements for this program are satisfied by the general requirements for undergraduate admission (http://bulletins.wayne.edu/undergraduate/general-information/admission/) to the University. Students planning to major in biochemistry and chemical biology should consult with an advisor in the Chemistry Department not later than the beginning of their sophomore year.

Program Requirements

Candidates must complete 120 credits in course work including satisfaction of the University General Education Requirements (http://bulletins.wayne.edu/undergraduate/general-information/general-education/) and the College of Liberal Arts and Sciences Group Requirements (http://bulletins.wayne.edu/undergraduate/college-liberal-arts-sciences/bachelors-degree-requirements/), as well as the departmental major requirements cited below. All course work must be completed in accordance with the regulations of the University (http://bulletins.wayne.edu/undergraduate/general-information/academic-regulations/) and the College (http://bulletins.wayne.edu/undergraduate/college-liberal-arts-sciences/academic-regulations/) governing undergraduate scholarship and degrees.

Those who wish to follow the curriculum in the College for the B.S. with a major in Biochemistry and Chemical Biology degree must complete the following courses:

Code	Title	Credits
CHM 1100	General Chemistry I	4
CHM 1130	General Chemistry I Laboratory	1
CHM 1140	General Chemistry II	4
CHM 1150	General Chemistry II Laboratory	1
CHM 1240	Organic Chemistry I	4
CHM 1250	Organic Chemistry I Laboratory	1
CHM 2220	Organic Chemistry II	4
CHM 2230	Organic Chemistry II Laboratory	1
CHM 3000	Metals in Biology	3
CHM 3120	Analytical Chemistry	3
CHM 3130	Analytical Chemistry Laboratory	1
CHM 5400	Biological Physical Chemistry	3
CHM 6610	Biological Chemistry Laboratory	3
CHM 6620	Metabolism: Pathways and Regulation	3
CHM 6635	Tools of Molecular Biology	3
CHM 6640	Molecular Biology	3
CHM 5999	Research in Chemistry [1]	2-4
or CHM 5998	Honors Thesis Research in Chemistry	
or CHM 5900	Biomedical Research as Discovery	
Three courses in approved advanced chemistry topics. Please see a chemistry undergraduate advisor for a list of appropriate electives.		8-10
PHY 2130	Physics for the Life Sciences I	4
or PHY 2170	University Physics I for Scientists and Engineers	
PHY 2131	Physics for the Life Sciences Laboratory	1
or PHY 2171	University Physics I Experimental Laboratory	
PHY 2140	Physics for the Life Sciences II	4
or PHY 2180	University Physics II for Scientists and Engineers	
PHY 2141	Physics for the Life Sciences Laboratory	1
or PHY 2181	University Physics II Experimental Laboratory	
MAT 2010	Calculus I	4
STA 1020	Elementary Statistics	3
BIO 1510 & BIO 1511	Basic Life Mechanisms and Basic Life Mechanisms Laboratory	4
Select one of the following:		4-5
BIO 2270 & BIO 2271	Principles of Microbiology and Principles of Microbiology Lab	
BIO 2600	Introduction to Cell Biology	
BIO 2870	Anatomy and Physiology	
BIO 3250 & BIO 3251	Molecular Mechanisms of Microbiology and Molecular Mechanisms of Microbiology Lab	
Total Credits		**77-82**

[1] By the first semester of the senior year, the student must enroll for at least two credits in independent research (CHM 5999 or CHM 5998) or two credits of CHM 5900. The student must work under the direction of a faculty member of the Department of Chemistry. It is advised that the student consult with the faculty during the term prior to beginning work, in order to choose the area and staff member under whose direction this research will be carried out. At the conclusion of the project, the student must present a written report for approval by the Chairperson of the Department. With prior approval by the Chairperson of the Department, students may be allowed to substitute to 2 credits of an internship experience (CHM 6991) in place of a research project.

A minimum grade of C is required in prerequisite chemistry courses.

At least fifteen credits in chemistry plus Research in Chemistry (CHM 5999) must be earned at Wayne State University.

Biochemistry and Chemical Biology Honors (B.S. Program)

1. All regular requirements for the Bachelor of Science with a major in Biochemistry and Chemical Biology degree must be fulfilled (no substitutions).
2. Minimum g.p.a.: 3.3 overall; 3.3 in chemistry courses.
3. Minimum of four credits must be earned in independent research (CHM 5998); this should commence in the junior year (or earlier).
4. Completion of one semester of an HON 42xx-level honors seminar. (For information about honors-designated coursework available each semester, including the required 42xx-level Honors seminar, visit the Honors College website (https://honors.wayne.edu/).) This course may be used to partially fulfill college Group Requirements and can be elected in either the junior or senior year.
5. Submission of a B.S. thesis (covering the undergraduate independent research project), or of a manuscript suitable for publication in a refereed chemical journal, to the Honors Subcommittee in Chemistry which will act to accept or reject the thesis (or manuscript).

6. An oral examination covering the B.S. Honors Research Project, by the Honors Subcommittee in Chemistry.

The AGRADE program enables highly qualified students pursuing a B.S. with a major in Chemistry or a B.S. with a major in Biochemistry and Chemical Biology to enroll simultaneously in the M.A. with a major in Chemistry. Students will be able to apply up to a maximum of 16 credits towards both the undergraduate and graduate degrees. AGRADE applicants must have a cumulative grade point average (g.p.a.) of 3.50 or better. Applicants are also expected to have performed at a superior level in the major, as determined by the department, *and the required g.p.a. in the major shall not be less than 3.6 at the time of application.* The earliest students may be admitted into the AGRADE Program is the semester in which they complete 90 credits towards the undergraduate degree. Students should consult with an undergraduate advisor in their major department to seek advice about the appropriate time to apply for AGRADE status.

Requirements

Depending on the degree, students may use up to 16 credits from the following courses to count towards their B.S. and M.A. degrees. Only those AGRADE-approved courses in which the student has earned a B or higher will transfer to the graduate transcript. Once in the master's program, students may be required to repeat an AGRADE course in which they earn less than a B grade.

Code	Title	Credits
CHM 6070	Advanced Bioinorganic Chemistry	3
CHM 6090	Organometallic Chemistry	3
CHM 6170	Advances in Bioanalytical Chemistry	3
CHM 6240	Organic Spectroscopy	3
CHM 6270	Advanced Bioorganic Chemistry and Drug Design	3
CHM 6440	Computational Chemistry	3
CHM 6610	Biological Chemistry Laboratory	3
CHM 6620	Metabolism: Pathways and Regulation	3
CHM 6635	Tools of Molecular Biology	3
CHM 6640	Molecular Biology	3