

CHEMISTRY (BA)

The Department of Chemistry & Biochemistry offers four undergraduate major degree programs: BA in Chemistry, BA in Biochemistry, BS in Chemistry, and the BS in Biochemistry. These programs follow prescribed professional guidelines and the CHEM-BS degree is approved by the American Chemical Society. Loyola programs are unique because of the close contact between students and faculty, due to smaller class sizes in advanced classes. Chemistry & Biochemistry faculty members spend significant time assisting students both in and out of the classroom.

Loyola's Bachelor of Science (BS) degree programs in Chemistry or Biochemistry offer opportunities to excel in a fundamental area of science. The prestige of these programs is based on the success of students in developing their goals for work in industry, academia, and/or diverse professional schools and in adopting the Loyola mission of applying knowledge in the service of humanity.

The programs in Chemistry and Biochemistry lay firm foundations for majors and give other students a cultural background in these fields. The BS programs are intended primarily for those undergraduates who have career goals in Chemistry or Biochemistry (i.e., an industrial or academic chemistry career most probably following graduate training for the MS and/or PhD degrees) but are also good preparation for careers in medicine, law, pharmacy and other professions.

The BA programs are intended for those undergraduates who have career goals in fields other than Chemistry or Biochemistry, but for which a strong background is desirable (e.g., medicine, dentistry, technical sales, patent law). These programs are also intended to provide additional schedule flexibility for students (e.g., study abroad, early graduation, double majors).

Related Programs

Major

- Secondary Education (BSEd) (<https://catalog.luc.edu/undergraduate/education/secondary-education-bsed/>)

Curriculum

LUC Chemistry is taking a modern, integrated approach to foundational coursework.

- Aligns with the latest American Chemical Society (ACS) and American Association of Medical Colleges (AAMC) standards & guidelines
- Themes: structure-activity relationships; culture and practice of science; energy; polymers, proteins, and macromolecules; sustainability; chemical synthesis, purification, characterization, and analysis.
- With such knowledge and skills, you should be prepared to further excel in upper-level coursework that specializes your work in the specific major you have chosen.

In addition to the required courses listed below, CHEM 300 Undergraduate Research is strongly recommended. Credit hours earned in CHEM 300 Undergraduate Research or CHEM 380 Chemistry Seminar do not count as elective hours satisfying the BS degree requirement. Both CHEM 300 Undergraduate Research and CHEM 380 Chemistry Seminar are required for Departmental honors.

| Code | Title | Hours |
|-----------------------------------|---|-----------|
| Chemistry Courses Required | | |
| CHEM 160 | Chemical Structure and Properties | 3 |
| CHEM 161 | Chemical Structure and Properties Laboratory | 1 |
| CHEM 180 | Chemical Reactivity I | 3 |
| CHEM 181 | Chemical Reactivity I Lab | 1 |
| CHEM 240 | Chemical Reactivity II | 3 |
| CHEM 242 | Chemical Synthesis Laboratory | 2 |
| CHEM 260 | Quantitative Methods in Chemistry | 3 |
| CHEM 272 | Analytical Chemistry Laboratory | 2 |
| CHEM 280 | Environmental & Chemical Analysis | 3 |
| CHEM 301 | Physical Chemistry I | 3 |
| CHEM 302 | Physical Chemistry II | 3 |
| CHEM 303 | Physical Chemistry Lab I | 2 |
| CHEM 314 | Instrumental Analysis | 4 |
| CHEM 340 | Advanced Inorganic Chemistry | 3 |
| Physics Courses Required | | |
| PHYS 121 | College Physics I with Calculus Lecture/ Discussion | 3 |
| PHYS 122 | College Physics II with Calculus Lecture/ Discussion | 3 |
| PHYS 111L | College Physics Laboratory I | 1 |
| PHYS 112L | College Physics Lab II | 1 |
| Math Courses Required | | |
| MATH 161 | Calculus I | 4 |
| MATH 162 | Calculus II | 4 |
| STAT 203 | Introduction to Probability & Statistics | 3 |
| Total Hours | | 55 |

- Core requirements (<https://catalog.luc.edu/undergraduate/university-requirements/university-core/>)
- Please visit http://www.luc.edu/cas/academics_degreerequirements.shtml#college (https://www.luc.edu/cas/academics_degreerequirements.shtml/#college) to view other CAS requirements.
- For chemistry course descriptions and pre and co-requisite information, please visit here (<https://catalog.luc.edu/undergraduate/arts-sciences/chemistry-biochemistry/#coursestext>).

All chemistry majors are assigned a chemistry faculty advisor. Please meet with your advisor on a regular basis, at least twice a year, for assistance with your chemistry schedule, research possibilities, graduate school information and more. If you do not know who your advisor is please call the chemistry department at 773/508-3100 or come to the department office located in Flanner Hall room 125.

Suggested Sequence of Chemistry, Math, and Physics Courses

The below sequence of courses is meant to be used as a suggested path for completing coursework. An individual student's completion of requirements depends on course offerings in a given term as well as the start term for a major or graduate study. Students should consult their advisor for assistance with course selection.

Students **not** placing in Math 118 or higher cannot start the Chemistry sequence until MATH 117 Precalculus I is completed with a grade of C- or

better. Such students are advised to enroll in first-year Chemistry courses in the summer sessions (after meeting the math requirement) in order to complete the major in four years.

| Course | Title | Hours |
|------------------|---|-----------|
| Freshman | | |
| Fall | | |
| CHEM 160 | Chemical Structure and Properties | 3 |
| CHEM 161 | Chemical Structure and Properties Laboratory | 1 |
| MATH 161 | Calculus I | 4 |
| Hours | | 8 |
| Spring | | |
| CHEM 180 | Chemical Reactivity I | 3 |
| CHEM 181 | Chemical Reactivity I Lab | 1 |
| MATH 162 | Calculus II | 4 |
| Hours | | 8 |
| Sophomore | | |
| Fall | | |
| CHEM 240 | Chemical Reactivity II | 3 |
| CHEM 242 | Chemical Synthesis Laboratory | 2 |
| PHYS 121 | College Physics I with Calculus Lecture/Discussion | 3 |
| PHYS 111L | College Physics Laboratory I | 1 |
| STAT 203 | Introduction to Probability & Statistics | 3 |
| Hours | | 12 |
| Spring | | |
| CHEM 260 | Quantitative Methods in Chemistry | 3 |
| CHEM 272 | Analytical Chemistry Laboratory | 2 |
| PHYS 122 | College Physics II with Calculus Lecture/Discussion | 3 |
| PHYS 112L | College Physics Lab II | 1 |
| Hours | | 9 |
| Junior | | |
| Fall | | |
| CHEM 280 | Environmental & Chemical Analysis | 3 |
| CHEM 301 | Physical Chemistry I | 3 |
| Hours | | 6 |
| Spring | | |
| CHEM 302 | Physical Chemistry II | 3 |
| CHEM 303 | Physical Chemistry Lab I | 2 |
| CHEM 314 | Instrumental Analysis | 4 |
| Hours | | 9 |
| Senior | | |
| Fall | | |
| CHEM 340 | Advanced Inorganic Chemistry | 3 |
| CHEM elective | | 3 |
| Hours | | 6 |
| Spring | | |
| CHEM 341 | Advanced Inorganic Laboratory | 1 |

| | |
|--------------------|-----------|
| CHEM elective | 3 |
| Hours | 4 |
| Total Hours | 62 |

CHEM 300 Undergraduate Research and CHEM 380 Chemistry Seminar are strongly recommended and required to receive Departmental Honors with graduation. CHEM 361 Principles of Biochemistry does not count towards the CHEM-BA degree.

Mathematics Preparedness for Chemistry

Students intending to register for a chemistry course will need a background in mathematics that is commensurate with the computational requirements of the chemistry course. Evidence of math preparedness is obtained from results of the ACT/SAT and of a Mathematics Placement Assessment (MPA) administered by the College in conjunction with the Department of Mathematics and Statistics. Students who are found to be mathematically under prepared are required to pass the appropriate course or sequence of courses in mathematics with a grade of "C-" or better before they register for a chemistry course. More information regarding placement by ACT/SAT and the MPA can be found at <http://www.luc.edu/math/placement/>.

College of Arts and Sciences Graduation Requirements

All Undergraduate students in the College of Arts and Sciences are required to take two Writing Intensive courses (6 credit hours) as well as complete a foreign language requirement at 102-level or higher (3 credit hours) or a language competency test. More information can be found here (<https://www.luc.edu/cas/college-requirements/>).

Additional Undergraduate Graduation Requirements

All Undergraduate students are required to complete the University Core, at least one Engaged Learning course, and UNIV 101. SCPS students are not required to take UNIV 101. Nursing students in the Accelerated BSN program are not required to take core or UNIV 101. You can find more information in the University Requirements (<https://catalog.luc.edu/undergraduate/university-requirements/>) area.

Learning Outcomes

At the completion of the Undergraduate Major in Chemistry or Biochemistry, students will be able to:

- answer knowledge and comprehension type questions related to fundamental chemical concepts and demonstrate fluency with basic facts, terminology, and principles in the various subfields of chemistry.
- understand and describe the chemical basis of life, our natural resources and environments, and the universe.
- retrieve, research, synthesize, and critically evaluate scientific literature.
- design and implement experiments that test predictive hypotheses, gather relevant data, analyze results, and interpret the significance of these results.
- operate state of the art equipment used by chemists and biochemists.

- engage in scientific reasoning with claims based on supported evidence and communicate effectively results and interpretations of scientific research.