University of Indianapolis – Shaheen College of Arts & Sciences
2025-2026 Curriculum Guide for Chemistry Majors (CHEM)
Bachelor of Science or Bachelor of Arts

Chemistry Core Courses (these courses must be completed for all concentration areas)

Freshman Year - Semester I

- **CHEM 150** General Chemistry I (3) **and CHEM 151** General Chemistry Lab I (1)

Freshman Year - Semester II

- **CHEM 160** General Chemistry II (3) and **CHEM 161** General Chemistry Lab II (1)
- **BIOL 165** Introduction to Cell Biology (4)
- **MATH 190** Calculus and Analytic Geometry I (4)

Sophomore Year - Semester I

- **CHEM 250** Organic Chemistry I (3) and **CHEM 251** Organic Chemistry Lab I (2)
- **MATH 191** Calculus and Analytic Geometry II (4)

Sophomore Year - Semester II

- **CHEM 260** Organic Chemistry II (3) and **CHEM 261** Organic Chemistry Lab II (2)
- **PHYS 153** General Physics I and Lab, Calculus Based (4) (recommended) **OR**
- **PHYS 150** General Physics I and Lab (4)

Junior Year - Semester I

- **PHYS 163** General Physics II and Lab, Calculus Based (4) (recommended) **OR**
- **PHYS 160** General Physics II and Lab (4)

Upper Level Required Courses

- **CHEM 301** Chemistry Seminar (1) SII
- **CHEM 310** Analytical Chemistry (5) SI

- **CHEM 370** Physical Chemistry: Thermodynamics and Kinetics (3) **AND**
- **CHEM 375** Thermodynamics Laboratory (1) [capstone]

- **CHEM 380** Physical Chemistry: Quantum Mechanics and Spectroscopy (3) **AND**
- **CHEM 385** Quantum Laboratory (1)

Upper-Level Electives

- **CHEM ELEC** Chemistry Elective (see list A on last page for eligible courses) (4)
- **ELEC XXX** Science, Math, or Computer Science electives outside of Chemistry (See list B on last page of this guide for eligible courses) (8)

All CHEM courses require a grade of C or above
Required support courses require a grade of C- or above

The Chemistry major requires a minimum of 64 hours.
The above courses allow the student to have a major in chemistry. Students are encouraged to use courses outside of Chemistry to build a minor or second major area. Consult curriculum guides for minors or majors of interest for details.

If desired, you may choose a concentration from the 5 choices below:

Biochemistry Concentration

Required Chemistry Courses

- **CHEM 320** Biochemistry I (3) SI
- **CHEM 355** Biochemistry Lab (1) SII

Required Biology Courses

- **BIOL 225** Introduction to Genetics (4)
- **BIOL 335** Cell Biology (4) **or**
- **BIOL 390** Molecular Biology (4)
- **BIOL 395** Biochemistry II (3) SII

Completion of the Chemistry Major–Biochemistry Concentration requires a minimum of 67 hours.
The above courses allow the student to earn a Bachelor of Science in Chemistry. This concentration can be used to build a second major in Biology with limited additional work. Consult the Curriculum Guide for Biology Majors for details.

Chemical Physics Concentration

Required Chemistry Courses

- **CHEM 400** Instrumental Methods (4) SII

Required Physics Courses

- **PHYS 230** Laboratory Instrumentation I (3)
- **PHYS 250** Modern Physics (5)
- **PHYS 280** Scientific Computing I (3)
- **PHYS 390** Electricity and Magnetism (3)

Required Support Courses

- **CSCI 155** Introduction to Programming Using C++ (4)
- **MATH 330** Differential Equations (3)

Completion of the Chemistry Major–Chemical Physics Concentration requires a minimum of 77 hours.
The above courses earn the student a Bachelor of Science in Chemistry with a minor in Physics. A student can receive a math minor by adding MATH-280 Linear Algebra (4) and a Statistics course (4).

Environmental Chemistry Concentration

Required Chemistry Courses

- **CHEM 230** Environmental Chemistry (4) SII
- **CHEM 400** Instrumental Methods (4) SII

Required Environmental Sciences Courses (take 3 of the following)

- **ESCI 150** Physical Geology (3)
- **ESCI 211** Meteorology (3)
- **ESCI 230** Introduction to Geographic Information Systems (2)
- **ESCI 360** Earth Systems (4)
- **ESCI 410** Survey of Hydrogeology (4)
- **ESCI 450** Physics of the Solid Earth (4)

Required Support Courses

- **BIOL 159** Introduction to Ecology and Evolution (4) **OR**
- **ENSC 150** Introduction to Environmental Science (4)
- **BIOL 265** Ecology (4)
- **ANTH 200** Global Problems (3) **or**
- **SOC 235** Environmental Sociology (3)

Completion of the Chemistry Major–Environmental Chemistry Concentration requires a minimum of 79 hours.
The above courses earn the student a Bachelor of Science in Chemistry with an Environmental Chemistry concentration and a minor in Environmental Science.

Forensic Chemistry Concentration

Required Chemistry Courses

- **CHEM 280** Inorganic Chemistry (4)
- **CHEM 400** Instrumental Methods (4)

Required Science Support Courses

- **BIOL 159** Introduction to Ecology and Evolution(4)
- **MATH 245** Statistics for Sciences (4)

Required Criminal Justice Courses

- **CRIM 220** Criminal Evidence (3)
- **CRIM 320** Criminalistics (4)

Completion of the Chemistry Major–Forensic Chemistry Concentration requires a minimum of 75 hours.
The above courses earn the student a Bachelor of Science in Chemistry with a Forensic Chemistry concentration.

Industrial Chemistry Concentration

Required Chemistry Courses

- **CHEM 280** Inorganic Chemistry (4)
- **CHEM 400** Instrumental Methods (4)

Required Support Courses

- **MATH 245** Statistics for the Sciences (4)
- **ELEC XXX** Science, Math, or Computer Science electives outside of Chemistry (4) (See list B on last page of this guide for eligible courses)

Completion of the Chemistry Major – Industrial Chemistry Concentration requires a minimum of 68 hours.
The above courses earn the student a Bachelor of Science in Chemistry.

List A: Below are the options for Chemistry Elective:

- CHEM 230 (4)
- CHEM 280 (4)
- CHEM 320 (3) **AND** CHEM 355 (1)
- CHEM 390 (4)
- CHEM 395 (3) **AND** CHEM 355 (1)
- CHEM 400 (4)

List B: Below are the options for Science Electives outside of Chemistry (ELEC XXX as noted on this guide)

BIOL: 155, 159 and any course above 210
CSCI: Any course 155 or higher
ENSC 150
ESCI: Any course 150 or higher
MATH: Any course 220 or higher
PHYS: Any course above 200

Other courses may be allowed to fulfill this requirement with approval of the Chemistry Department Chair. You must gain approval prior to registering for the course if not listed above.

NOTE: The Bachelor of Science and Bachelor of Arts Degrees require a minimum of 120 hours.
See the Shaheen College of Arts & Sciences General Education Core Guide/Bachelor of Science and General Education Core Guide/Bachelor of Arts for additional course requirements.
A student may complete more than one major as long as each major has at least 24 discrete hours. Please see the Academic Catalog for additional details.

REMEMBER: If you have any questions about the Chemistry major and its requirements, contact a faculty advisor from the Chemistry Department (Dr. David Styers-Barnett; 317-788-2061; Lilly Science Hall, Room 332D), or your academic advisor. Courses and requirements sometimes change, so keep in contact with your advisor.