

**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** General Biology II\* (4)
- MATH 190** Calculus and Analytic Geometry I\* (4)
- PHIL 270** Philosophy and Ethics of Science\* (3) [recommended]

**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)†

**Junior Year - Semester I**

- PHYS 163** General Physics II and Lab, Calculus Based\* (4)†

**Upper Level Required Courses**

- CHEM 301** Chemistry Seminar\*\* (1) SII
- CHEM 310** Analytical Chemistry\*\* (5) SI
- CHEM 370** Physical Chemistry I\*\* (3) SI
- CHEM 375** Physical Chemistry Laboratory\*\* (2) SII [capstone]

**Choose either a Bachelor of Arts or a Bachelor of Science in Chemistry:**

**Bachelor of Arts<sup>^</sup>**

- CHEM ELEC** Chemistry Electives (7 hours at CHEM230 level or above)\*\*
- ELEC XXX** Science, Math, or Computer Science electives outside of Chemistry (at or above the 155 level)\* (16)

**Bachelor of Science**

- CHEM 380** Physical Chemistry II\*\* (3) SII – AND
- CHEM 280** Inorganic Chemistry\*\* (4) OR
- CHEM 400** Advanced Laboratory Techniques\*\* (4) SII
- ELEC XXX** Science, Math, or Computer Science electives outside of Chemistry (at or above the 155 level)\* (16)

\* Requires a grade of C- or above

\*\*Requires a grade of C or above

†**PHYS153** and **PHYS163** are recommended. **PHYS150** and **PHYS160** also may be used to satisfy the major requirement. **PHYS153** and **PHYS163** are required for the Chemical Physics concentration.

<sup>^</sup>The Bachelor of Arts Degree requires competency in a modern language through the 201-level (additional 4 credits). See the General Education Core Guide requirements for details.

**The Chemistry major requires a minimum of 72 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.

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You may choose a concentration from the 5 choices below:

### Biochemistry Concentration

#### Required Chemistry Courses

- CHEM 280 Inorganic Chemistry\*\* (4) **or**
- CHEM 400 Advanced Lab Techniques\*\* (4) SII
- CHEM 380 Physical Chemistry II\*\* (3) SII

#### Required Biology Courses

- BIOL 225 Introduction to Genetics\*\* (4)
- BIOL 335 Cell Biology\*\* (4) **or**
- BIOL 390 Molecular Biology\*\* (4)
- BIOL 320 Biochemistry I\*\* (3) SI
- BIOL 355 Biochemistry Lab\*\* (1) SII
- BIOL 395 Biochemistry II\*\* (3) SII

#### Required Support Courses

- ELEC XXX Science, Math, or Computer Science electives outside of Chemistry (at or above the 155 level)\* (2)

\* Requires a grade of C- or above

\*\*Requires a grade of C or above

### Completion of the Chemistry Major–Biochemistry Concentration requires a minimum of 73 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 380 Physical Chemistry II\*\* (3) SII
- CHEM 400 Advanced Laboratory Techniques\*\* (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)

\* Requires a grade of C- or above

\*\*Requires a grade of C or above

### 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).

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## Environmental Chemistry Concentration (Default degree=BA)

### Required Chemistry Courses

- CHEM 230** Environmental Chemistry\*\* (4) SII
- CHEM 400** Advanced Laboratory Techniques\*\* (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 410** Survey of Hydrogeology\*\* (4)
- ESCI 450** Physics of the Solid Earth\*\* (4)

### Required Support Courses

- BIOL 155** General Biology: the Diversity of Life \*\* (4)
- BIOL 265** Ecology\*\* (4)
- ANTH 200** Global Problems\*\* (3) **or**
- SOC 235** Environmental Sociology\*\* (3)

\* Requires a grade of C- or above

\*\*Requires a grade of C or above

## Completion of the Chemistry Major–Environmental Chemistry Concentration requires a minimum of 76-78 hours.

The above courses earn the student a Bachelor of Arts in Chemistry with an Environmental Chemistry concentration and a minor in Environmental Science. The Bachelor of Arts Degree requires competency in a modern language through 201-level (additional 4 credits). Addition of CHEM-380 will earn the student a Bachelor of Science in Chemistry.

## Forensic Chemistry Concentration (Default degree=BA)

### Required Chemistry Courses

- CHEM 280** Inorganic Chemistry\*\* (4) SI (every other year)
- CHEM 400** Advanced Laboratory Techniques\*\* (4) SII (every other year)

### Required Science Support Courses

- BIOL 155** Introduction to the Diversity of Life \*\* (4)
- MATH 245** Statistics for Sciences\* (4)
- ELEC XXX** Science, Math, or Computer Science electives outside of Chemistry (at or above the 155 level)\* (4) Note that Biochemistry II (3) and Biochemistry Lab (1) can count toward this requirement, also consider BIOL 225 Genetics, BIO 220L Microbiology, or BIOL 335 Cell Biology

### Required Criminal Justice Courses

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

\* Requires a grade of C- or above

\*\*Requires a grade of C or above

## Completion of the Chemistry Major–Forensic Chemistry Concentration requires a minimum of 76 hours.

The above courses earn the student a Bachelor of Arts in Chemistry with a Forensic Chemistry concentration. The Bachelor of Arts Degree requires competency in a modern language through 201-level (additional 4 credits). Addition of CHEM-380 will earn the student a Bachelor of Science in Chemistry.

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## Industrial Chemistry Concentration

### Required Chemistry Courses

- CHEM 280** Inorganic Chemistry\*\* (4)
- CHEM 380** Physical Chemistry II\*\* (3)
- CHEM 400** Advanced Laboratory Techniques\*\* (4)

### Required Support Courses

- MATH 245** Statistics for the Sciences\* (4)
- ELEC XXX** Science, Math, or Computer Science electives outside of Chemistry (at or above the 155 level)\* (8)

\* Requires a grade of C- or above

\*\*Requires a grade of C or above

**Completion of the Chemistry Major – Industrial Chemistry Concentration requires a minimum of 72 hours.**

The above courses earn the student a Bachelor of Science in Chemistry.

**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 and its requirements, contact a faculty advisor from the Chemistry Department (Dr. David Styers-Barnett; 317-788-2061; Lilly Science Hall, Room 332D), or The Center for Advising and Academic Achievement (788-2057, Schwitzer Center, Room 206). Courses and requirements sometimes change, so keep in contact with your advisor.