Chemistry Major

Learning Goals and Objectives

Goal 1: Students will develop an understanding of the theoretical methods and models that chemists use to understand the properties and behavior of matter.

Objective 1.1: Students will demonstrate a mastery of the key concepts in the five major subdisciplines of chemistry: analytical chemistry, biochemistry, inorganic chemistry, organic chemistry, and physical chemistry.

Objective 1.2: Students will apply appropriate theoretical models to explain experimental observations.

Goal 2: Students will employ the experimental methods used by chemists.

Objective 2.1: Students will properly employ the instruments that are used to study problems in chemistry. The students will correctly interpret the data that they obtain from these instruments.

Objective 2.2: Students will store, handle, and use chemicals safely and responsibly.

Goal 3: Students will effectively communicate scientific information.

Objective 3.1: Students will present results from chemical investigations and the chemical literature both orally and in writing.

Objective 3.2: Students will search and properly cite the chemical literature for published work relevant to a problem of contemporary interest.

The traditional undergraduate programs include 40 courses distributed across three components: A General Education component divided into Signature Courses, Variable Courses, and an Integrative Learning requirement; a Major and Divisional component; and Free Electives. In addition to course requirements as specified in each area, students must complete one certified course in each of the following overlay areas:

1. Diversity, Globalization or Non-western Area Studies,
2. Ethics Intensive, and
3. Writing Intensive. Overlay requirements are part of the forty-course requirement.

General Education Signature Courses
See this page about Signature courses (https://academiccatalog.sju.edu/curricula/#signature). Six courses

General Education Variable Courses
See this page about Variable courses (https://academiccatalog.sju.edu/curricula/#variable). Six to Nine courses

Code    Title               Hours

Mathematics
MAT 161 Calculus I       4

Natural Science
CHM 120 General Chemistry I 3

General Education Overlays
See this page about Overlays (https://academiccatalog.sju.edu/curricula/#overlay).

General Education Integrative Learning Component
See this page about Integrative Learning Component (https://academiccatalog.sju.edu/curricula/#integrative-learning). Three courses:

Code  Title                      Hours
MAT 162 Calculus II            4

PHY 105 & PHY 106 University Physics I and University Physics II 6
PHY 105L & PHY 106L University Physics Lab I and University Physics Lab II 2

General Education Electives
Any eleven courses

Major Requirements

Foundation Course Requirements

Code    Title                      Hours
CHM 125 General Chemistry II     3
or CHM 126 General Chemistry Honors II 3

CHM 125L General Chemistry Lab II 2
& CHM 210 Organic Chemistry I     6
& CHM 215 and Organic Chemistry II 2

CHM 210L Organic Chemistry Lab I 2
& CHM 215L and Organic Chemistry Lab II 2

CHM 310 Physical Chemistry I     6
& CHM 315 and Physical Chemistry II 2

CHM 310L Physical Chemistry Lab I 2

CHM 330 Instrumental Analysis    3

CHM 330L Instrumental Analysis Lab 2

CHM 340 Biochemistry             3

CHM 340L Biochemistry Lab        1

CHM 350 Inorganic Chemistry      3

CHM 350L Inorganic Chemistry Lab 2

CHM 360 Nanochemistry            3

In-Depth Course Requirements
Select one of the following:

• Two In-Depth Chemistry courses (see list below)

Code    Title                      Hours

In-Depth Chemistry Courses
CHM 400 Chemistry of the Earth  3

CHM 410 Biophysical Chemistry    3

CHM 420 Atmospheric Environmental Chem  3
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHM 430</td>
<td>Mechanisms in Organic Chem</td>
<td>3</td>
</tr>
<tr>
<td>CHM 435</td>
<td>Tech Applications of Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHM 440</td>
<td>Organometallic Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHM 460</td>
<td>Aqueous Environmental Chem</td>
<td>3</td>
</tr>
<tr>
<td>CHM 480</td>
<td>Inorganic Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHM 490</td>
<td>Spectroscopy</td>
<td>3</td>
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Enrollment in CHM 390, is required each semester for junior and senior chemistry majors. In order to fulfill the requirements for an ACS certified degree, students must also take CHM 493 and CHM 494.