BACHELOR OF ARTS WITH A MAJOR IN CHEMISTRY

OPTION 1

The Department of Chemistry offers two options for the bachelor of arts degree, each designed to give students a broad background in the basic divisions of chemistry: analytical, biochemistry, inorganic, organic, and physical.

Option 1 provides considerable concentration in chemistry while permitting a wider selection of electives. It should meet the needs of students preparing to enter the fields of medicine, law, dentistry, and business, among others.

The following requirements must be fulfilled:

The general requirements stated under Columbian College of Arts and Sciences, Undergraduate Programs (http://bulletin.gwu.edu/arts-sciences/#degreeregulationtext) and the required curriculum, below:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td><strong>Prerequisite courses for the bachelor of arts degree:</strong></td>
<td></td>
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<tr>
<td>CHEM 1111 &amp; CHEM 1112</td>
<td>General Chemistry I and General Chemistry II</td>
<td></td>
</tr>
<tr>
<td>CHEM 2122 &amp; CHEM 2123W</td>
<td>Introductory Quantitative Analysis and Introductory Quantitative Analysis Laboratory</td>
<td></td>
</tr>
<tr>
<td>MATH 1231 &amp; MATH 1232</td>
<td>Single-Variable Calculus I and Single-Variable Calculus II</td>
<td></td>
</tr>
<tr>
<td>PHYS 1021 &amp; PHYS 1022</td>
<td>University Physics I and University Physics II</td>
<td></td>
</tr>
<tr>
<td>or PHYS 1025</td>
<td>University Physics I with Biological Applications</td>
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<td><strong>Required courses:</strong></td>
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<tr>
<td>CHEM 2122</td>
<td>Instrumental Analytical Chemistry</td>
<td></td>
</tr>
<tr>
<td>CHEM 4134</td>
<td>Inorganic Chemistry</td>
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</table>

Suggested Program of Study:

Students should follow this sequence in general and are urged to consult with the chemistry and premedical advisors concerning their academic program.

**First Year**

- CHEM 1111, & CHEM 1112 General Chemistry I
- Select one of the following:
  - MATH 1231 & MATH 1232* Single-Variable Calculus I
  - MATH 1220 & MATH 1221 Calculus with Precalculus I

**Second Year**

- CHEM 2122 Introductory Quantitative Analysis
- CHEM 2151 & CHEM 2153 Organic Chemistry I
- CHEM 2152 & CHEM 2154 Organic Chemistry II
- PHYS 1021 or 1025 University Physics I
- PHYS 1022 or 1026 University Physics II
- MATH 1232 (if not taken in the first year) Single-Variable Calculus II

**Third Year**

- CHEM 2123 Introductory Quantitative Analysis Laboratory
- CHEM 3171 & CHEM 3172 Physical Chemistry I
- CHEM 3173 Physical Chemistry Laboratory

**Fourth Year**

- CHEM 3165 (if not taken in the junior year) Biochemistry I
- CHEM 4122 Instrumental Analytical Chemistry
- CHEM 4134 (if not taken in the junior year) Inorganic Chemistry

* Or MATH 1220 Calculus with Precalculus I-MATH 1221 Calculus with Precalculus II (if necessary);

**OPTION 2**

The Department of Chemistry offers two options for the bachelor of arts degree, each designed to give students a broad background in the basic divisions of chemistry: analytical, biochemistry, inorganic, organic, and physical.
Option 2 is intended primarily for students preparing for graduate study in chemistry or those students planning to enter the chemical profession and wishing certification by the American Chemical Society (ACS) as having met the minimum requirements for professional training.

The following requirements must be fulfilled:

The general requirements stated under Columbian College of Arts and Sciences, Undergraduate Programs (http://bulletin.gwu.edu/arts-sciences/#degreeeregulationtext) and the required curriculum, below:

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<tr>
<td>or PHYS 1025</td>
<td>University Physics I with Biological Applications</td>
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A course in a structured computer programming language, such as one of the following courses, is recommended:

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<tr>
<td>STAT 1129</td>
<td>Introduction to Computing</td>
<td></td>
</tr>
<tr>
<td>CSCI 1011</td>
<td>Introduction to Programming with Java</td>
<td></td>
</tr>
<tr>
<td>CSCI 1041</td>
<td>Introduction to FORTRAN Programming</td>
<td></td>
</tr>
<tr>
<td>CSCI 1121</td>
<td>Introduction to C Programming</td>
<td></td>
</tr>
<tr>
<td>CSCI 1131</td>
<td>Introduction to Programming with C</td>
<td></td>
</tr>
</tbody>
</table>

Suggested Program of Study:

Students should follow this sequence in general and are urged to consult with the chemistry and premedical advisors concerning their academic program.

**First Year**

CHEM 1111 & CHEM 1112 | General Chemistry I and General Chemistry II |
MATH 1231 & MATH 1232* | Single-Variable Calculus I and Single-Variable Calculus II |
MATH 1220 & MATH 1221 | Calculus with Precalculus I and Calculus with Precalculus II |

One of the following:

**Second Year**

CHEM 2122 | Introductory Quantitative Analysis |
CHEM 2151 & CHEM 2153 | Organic Chemistry I and Organic Chemistry Laboratory I |
CHEM 2152 & CHEM 2154 | Organic Chemistry II and Organic Chemistry Laboratory II |
PHYS 1021 or 1025 | University Physics I |
PHYS 1022 or 1026 | University Physics II |
MATH 1232 (if not taken in the first year) | Single-Variable Calculus II |

**Third Year**

CHEM 2123 | Introductory Quantitative Analysis Laboratory |
CHEM 3171 & CHEM 3172 | Physical Chemistry I and Physical Chemistry II |
CHEM 3173 | Physical Chemistry Laboratory |

**Fourth Year**

CHEM 3165 | Biochemistry I |
CHEM 4122 | Instrumental Analytical Chemistry |
CHEM 4123 | Instrumental Analytical Chemistry Laboratory |
CHEM 4134 | Inorganic Chemistry |
CHEM 4195 | Undergraduate Research |
or CHEM 4195W | Undergraduate Research |

* Or MATH 1220 Calculus with Precalculus I-MATH 1221 Calculus with Precalculus II (if necessary);
GENERAL EDUCATION

In addition to the University General Education Requirement (http://bulletin.gwu.edu/university-regulations/general-education/#text), undergraduate students in Columbian College must complete a further, College-specific general education curriculum—Perspective, Analysis, Communication, or G-PAC. Together with the University General Education Requirement, G-PAC engages students in active intellectual inquiry across the liberal arts. Students achieve a set of learning outcomes that enhance their analytical skills, develop their communication competencies, and invite them to participate as responsible citizens who are attentive to issues of culture, diversity, and privilege.

G-PAC approved courses, Dean’s Seminars, and Sophomore Colloquia that may be available for registration are listed on the CCAS Advising website (https://advising.columbian.gwu.edu/general-education-courses/).

Coursework for the University General Education Requirement is distributed as follows:

- Writing—one approved course in university writing and two approved writing in the disciplines (WID) courses.
- Humanities—one approved course in the humanities that involves critical or creative thinking skills.
- Mathematics or Statistics—one approved course in either mathematics or statistics.
- Natural or Physical Science—one approved laboratory course that employs the process of scientific inquiry.
- Social Sciences—two approved courses in the social sciences.

Coursework for the Columbian College general education curriculum is distributed as follows:

- Arts—one approved course in the arts that involves the study or creation of artwork based on an understanding or interpretation of artistic traditions or knowledge of art in a contemporary context.
- Global or Cross-Cultural Perspective—one approved course that analyzes the ways in which institutions, practices, and problems transcend national and regional boundaries.
- Humanities—one approved course in the humanities that involves critical thinking skills (in addition to the one course in this category required by the University General Education Requirement).
- Local or Civic Engagement—one approved course that develops the values, ethics, disciplines, and commitment to pursue responsible public action.
- Natural or Physical Science—one approved laboratory course that employs the process of scientific inquiry (in addition to the one course in this category required by the University General Education Requirement).
- Oral Communication—one course in oral communication.

Certain courses are approved to fulfill the requirement in more than one of these categories.

Courses taken in fulfillment of G-PAC also may be counted toward majors or minors. Transfer courses taken prior to, but not after, admission to George Washington University may count toward the University General Education Requirement and G-PAC, if those transfer courses are equivalent to GW courses that have been approved by the University and the College.

SPECIAL HONORS

In addition to meeting the general requirements stated under University Regulations, a candidate for graduation with Special Honors in chemistry must maintain a cumulative 3.0 grade-point average in chemistry courses and take CHEM 4195 Undergraduate Research or CHEM 4195W Undergraduate Research for at least 3 credits over two semesters. In addition to the final report for CHEM 4195 or CHEM 4195W, a poster or oral presentation is required.

Bachelor of Arts with a Major in Chemistry