BACHELOR OF ARTS (BA) DEGREE WITH A MAJOR IN CHEMISTRY

Program Learning Outcomes for the BA Degree with a Major in Chemistry

Upon completing the BA degree with a major in Chemistry, students will be able to:

1. Demonstrate understanding of and proficiency with:
   a. the structure, bonding, spectroscopy, and reactivity of organic compounds and functional groups;
   b. curved-arrow formalism to describe reaction mechanisms, and
   c. the synthesis of organic compounds.

2. Demonstrate understanding of and proficiency with:
   a. thermochemical principles, acid-base and redox reactions,
   b. structure of simple solids and construction of molecular orbital diagrams (group theory), and
   c. survey of main group chemistry.

3. Demonstrate understanding of:
   a. the principles of quantum mechanics and applications to atomic and molecular structure and spectroscopy,
   b. classical and basic statistical thermodynamics and applications to equilibrium physico-chemical systems, and
   c. kinetics of gas phase processes and chemical reactions.

Requirements for the BA Degree with a Major in Chemistry

For general university requirements, see Graduation Requirements (https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/). Students pursuing the BA degree with a major in Chemistry must complete:

- A minimum of 21-23 courses, depending on course selection, (55 credit hours) to satisfy major requirements.
- A minimum of 120 credit hours to satisfy degree requirements.
- A minimum of 60 credit hours outside of major requirements.
- A minimum of 9 courses (24 credit hours) taken at the 300-level or above.

The courses listed below satisfy the requirements for this major. In certain instances, courses not on this official list may be substituted upon approval of the major’s academic advisor, or where applicable, the department’s Director of Undergraduate Studies. (Course substitutions must be formally applied and entered into Degree Works by the major’s Official Certifier (https://registrar.rice.edu/facstaff/degreeworks/officialcertifier/).) Students and their academic advisors should identify and clearly document the courses to be taken.

### Degree Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td></td>
<td>Total Credit Hours Required for the Major in Chemistry</td>
<td>55</td>
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<tr>
<td></td>
<td>Total Credit Hours Required for the BA Degree with a Major in Chemistry</td>
<td>120</td>
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</tbody>
</table>

### Core Requirements

#### General Chemistry

- CHEM 151 & CHEM 153
  - HONORS CHEMISTRY I
  - and HONORS CHEMISTRY LABORATORY I
- CHEM 152 & CHEM 154
  - HONORS CHEMISTRY II
  - and HONORS CHEMISTRY LABORATORY II

#### Chemistry Foundation Courses

- BIOL 301
  - BIOCHEMISTRY I
  - 3 Credit Hours
- CHEM 211 & CHEM 213
  - ORGANIC CHEMISTRY I
  - and ORGANIC CHEMISTRY DISCUSSION
- CHEM 330
  - ANALYTICAL CHEMISTRY
  - 3 Credit Hours
- CHEM 360
  - INORGANIC CHEMISTRY
  - 3 Credit Hours

#### Select 2 courses from the following:

- BIOL 352
  - PHYSICAL CHEMISTRY FOR THE BIO SCIENCES
  - 3 Credit Hours
- CHEM 301
  - PHYSICAL CHEMISTRY I
  - 3 Credit Hours
- CHEM 302
  - PHYSICAL CHEMISTRY II
  - 3 Credit Hours

#### Mathematics

- MATH 101
  - SINGLE VARIABLE CALCULUS I
  - 3 Credit Hours
- MATH 105
  - AP/OTH CREDIT IN CALCULUS I
  - 3 Credit Hours
- MATH 102
  - SINGLE VARIABLE CALCULUS II
  - 3 Credit Hours
- MATH 106
  - AP/OTH CREDIT IN CALCULUS II
  - 3 Credit Hours
- MATH 212
  - MULTIVARIABLE CALCULUS
  - 4 Credit Hours

#### Physics

- PHYS 101 & PHYS 104
  - MECHANICS (WITH LAB)
  - and MECHANICS DISCUSSION
- PHYS 103
  - HONORS MECHANICS (WITH LAB)
- PHYS 111
  - GENERAL PHYSICS (WITH LAB)

#### Select 1 from the following:

- PHYS 102 & PHYS 104
  - ELECTRICITY & MAGNETISM (WITH LAB)
  - and ELECTRICITY AND MAGNETISM DISCUSSION
- PHYS 112
  - HONORS ELECTRICITY & MAGNETISM (WITH LAB)
- PHYS 126
  - GENERAL PHYSICS II (WITH LAB)

#### Advanced Laboratories

- BIOL 311
  - ADVANCED EXPERIMENTAL BIO SCIENCES
  - 6 Credit Hours
- CHEM 365
  - ORGANIC CHEMISTRY LAB
  - 3 Credit Hours
- CHEM 366
  - INORGANIC CHEMISTRY LAB
  - 3 Credit Hours
- CHEM 367
  - MATERIALS CHEMISTRY LAB
  - 3 Credit Hours
- CHEM 368
  - CHEMICAL MEASUREMENT LAB
  - 3 Credit Hours

#### Elective Requirements
Bachelor of Arts (BA) Degree with a Major in Chemistry

Select 2 courses from the following: 5

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>BIOC 302</td>
<td>BIOCHEMISTRY II</td>
</tr>
<tr>
<td>CHEM 320</td>
<td>ORGANIC CHEMISTRY II</td>
</tr>
<tr>
<td>or CHEM 212</td>
<td>ORGANIC CHEMISTRY II</td>
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</table>

Any lecture course between CHEM 400 and CHEM 489

Any lecture course between CHEM 495 and CHEM 699

Total Credit Hours Required for the Major in Chemistry 55

Additional Credit Hours to Complete BA Degree Requirements 5

University Graduation Requirements (https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/) 60

Total Credit Hours 120

Footnotes and Additional Information

1. Includes coursework completed as distribution credit, FWIS, LPAP, upper-level, residency (hours taken at Rice), 60 hours outside of the major (if applicable), and any additional academic program requirements. The "hours outside of the major" requirement may include all of the above university requirements.

2. CHEM 121 or CHEM 111 may be substituted for CHEM 151; CHEM 123 or CHEM 113 may be substituted for CHEM 153; CHEM 122 or CHEM 112 may be substituted for CHEM 152; CHEM 124 or CHEM 114 may be substituted for CHEM 154.

3. Chemistry students may enroll in BIOC 301 without the prerequisite BIOC 201. Requests to waive the prerequisite course are approved by the course instructor. Students should contact the course instructor for more information.

4. Though not required, MATH 211 is strongly recommended for students planning to specialize in Physical and Theoretical chemistry or planning to pursue graduate studies. Additionally, the Department of Mathematics may, after consultation with a student concerning his/her previous math preparation, recommend that a student be placed into a higher level math course than that for which the student has received official credit. The Department of Chemistry will accept this waiver of the math classes upon a written confirmation of the waiver from the Department of Mathematics and upon the student’s successful completion of the higher level math course.

5. For the purposes of this requirement, "advanced coursework" includes chemistry lecture courses at the 400-level or higher (courses in Rice's course catalog that have a course type listed as 'lecture'). CHEM 212 or CHEM 320 or BIOC 302 counts as "advanced coursework" for purposes of this requirement. Courses in other departments with substantial chemistry content may count toward this requirement with approval of the Director of the Undergraduate Program.

Policies for the BA Degree with a Major in Chemistry

Transfer Credit

For Rice University’s policy regarding transfer credit, see Transfer Credit (https://ga.rice.edu/undergraduate-students/academic-policies-procedures/transfer-credit). Some departments and programs have additional restrictions on transfer credit. The Office of Academic Advising maintains the university’s official list of transfer credit advisors on their website: https://oaa.rice.edu. Students are encouraged to meet with their academic program’s transfer credit advisor when considering transfer credit possibilities.

Departmental Transfer Credit Guidelines

Students pursuing the major in Chemistry should be aware of the following departmental transfer credit guidelines:

- Requests for transfer credit will be considered by the program director (and/or the program’s official transfer credit advisor) on an individual case-by-case basis.

Additional Information

For additional information, please see the Chemistry website: https://chemistry.rice.edu

Opportunities for the BA Degree with a Major in Chemistry

Academic Honors

The university recognizes academic excellence achieved over an undergraduate’s academic history at Rice. For information on university honors, please see Latin Honors (https://ga.rice.edu/undergraduate-students/honors-distinctions/university/) (summa cum laude, magna cum laude, and cum laude) and Distinction in Research and Creative Work (https://ga.rice.edu/undergraduate-students/honors-distinctions/university/). Some departments have department-specific Honors awards or designations.

Additional Information

For additional information, please see the Chemistry website: https://chemistry.rice.edu