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 (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 (55 credit hours) depending on course selection 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 10 courses (27 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/degeworks/officialcertifier).) Students and their academic advisors should identify and clearly document the courses to be taken.

Summary

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<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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Degree Requirements

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Core Requirements

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

- **Chemistry Foundation Courses**
  - BIOC 301 BIOCHEMISTRY I
  - CHEM 211 ORGANIC CHEMISTRY I
  - & CHEM 213 and ORGANIC CHEMISTRY DISCUSSION
  - CHEM 330 ANALYTICAL CHEMISTRY
  - CHEM 360 INORGANIC CHEMISTRY

- **Select 2 courses from the following:**
  - BIOC 352 PHYSICAL CHEMISTRY FOR THE BIOSCIENCES
  - CHEM 301 PHYSICAL CHEMISTRY I
  - CHEM 302 PHYSICAL CHEMISTRY II

- **Mathematics**
  - MATH 101 SINGLE VARIABLE CALCULUS I
  - or MATH 105 AP/OTH CREDIT IN CALCULUS I
  - MATH 102 SINGLE VARIABLE CALCULUS II
  - or MATH 106 AP/OTH CREDIT IN CALCULUS II
  - MATH 212 MULTIVARIABLE CALCULUS

- **Physics**
  - PHYS 101 MECHANICS (WITH LAB)
  - & PHYS 103 and MECHANICS DISCUSSION
  - PHYS 111 HONORS MECHANICS (WITH LAB)
  - PHYS 125 GENERAL PHYSICS (WITH LAB)

- **Select 1 from the following:**
  - PHYS 102 ELECTRICITY & MAGNETISM (WITH LAB)
  - & PHYS 104 and ELECTRICITY AND MAGNETISM DISCUSSION
  - PHYS 112 HONORS ELECTRICITY & MAGNETISM (WITH LAB)
  - PHYS 126 GENERAL PHYSICS II (WITH LAB)

- **Advanced Laboratories**
  - **Select 3 courses from the following:**
    - BIOC 311 ADVANCED EXPERIMENTAL BIOSCIENCES
    - CHEM 365 ORGANIC CHEMISTRY LAB
    - CHEM 366 INORGANIC CHEMISTRY LAB
    - CHEM 367 MATERIALS CHEMISTRY LAB
    - CHEM 368 CHEMICAL MEASUREMENT LAB

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

Select 2 courses from the following: 5

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<th>Course Code</th>
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<tr>
<td>BIOC 302</td>
<td>BIOCHEMISTRY II</td>
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<tr>
<td>CHEM 212</td>
<td>ORGANIC CHEMISTRY II</td>
</tr>
<tr>
<td>CHEM 320</td>
<td>ORGANIC CHEMISTRY II</td>
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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 (ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements) 60

Total Credit Hours 120

Footnotes and Additional Information

4 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.

1 The CHEM 121/CHEM 123 and CHEM 122/CHEM 124 General Chemistry sequence is an acceptable substitute for the CHEM 151/CHEM 153 and CHEM 152/CHEM 154 Honors sequence.

2 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.

3 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.

4 MATH 221 and MATH 222 may substitute for MATH 212.

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 (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.