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 [Link]. 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 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 [Link].) Students and their academic advisors should identify and clearly document the courses to be taken.

Summary

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
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<tr>
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Degree Requirements

<table>
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<th>Credit Hours</th>
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Core Requirements

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credit Hours</th>
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<tbody>
<tr>
<td>CHEM 121</td>
<td>GENERAL CHEMISTRY I</td>
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<tr>
<td>&amp; CHEM 123</td>
<td>and GENERAL CHEMISTRY LABORATORY I</td>
<td>4</td>
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<td>Select 1 from the following:</td>
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<tr>
<td>CHEM 122</td>
<td>GENERAL CHEMISTRY II</td>
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</tr>
<tr>
<td>&amp; CHEM 124</td>
<td>and GENERAL CHEMISTRY LABORATORY II</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 201</td>
<td>ADVANCED TOPICS IN GENERAL CHEMISTRY</td>
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<tr>
<td>&amp; CHEM 205</td>
<td>and ADVANCED TOPICS IN GENERAL CHEMISTRY LABORATORY</td>
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Chemistry Foundation Courses

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<td>BIOS 301</td>
<td>BIOCHEMISTRY I</td>
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<tr>
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<tr>
<td>CHEM 211</td>
<td>ORGANIC CHEMISTRY I</td>
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</tr>
<tr>
<td>&amp; CHEM 213</td>
<td>and ORGANIC CHEMISTRY DISCUSSION</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 319</td>
<td>ORGANIC CHEMISTRY I</td>
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<tr>
<td>CHEM 330</td>
<td>ANALYTICAL CHEMISTRY</td>
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<td>CHEM 360</td>
<td>INORGANIC CHEMISTRY</td>
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<td>Select 2 courses from the following:</td>
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<td>BIOS 352</td>
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<tr>
<td>CHEM 301</td>
<td>PHYSICAL CHEMISTRY I</td>
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<td>CHEM 302</td>
<td>PHYSICAL CHEMISTRY II</td>
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Mathematics

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<tr>
<td>MATH 101</td>
<td>SINGLE VARIABLE CALCULUS I</td>
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<tr>
<td>or MATH 105</td>
<td>AP/OTH CREDIT IN CALCULUS I</td>
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<tr>
<td>MATH 102</td>
<td>SINGLE VARIABLE CALCULUS II</td>
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<tr>
<td>or MATH 106</td>
<td>AP/OTH CREDIT IN CALCULUS II</td>
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</tr>
<tr>
<td>MATH 212</td>
<td>MULTIVARIABLE CALCULUS</td>
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Physics

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<tr>
<td>PHYS 101</td>
<td>MECHANICS (WITH LAB)</td>
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<tr>
<td>&amp; PHYS 103</td>
<td>and MECHANICS DISCUSSION</td>
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</tr>
<tr>
<td>PHYS 111</td>
<td>HONORS MECHANICS (WITH LAB)</td>
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<td>PHYS 125</td>
<td>GENERAL PHYSICS (WITH LAB)</td>
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<td>PHYS 102</td>
<td>ELECTRICITY &amp; MAGNETISM (WITH LAB)</td>
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<tr>
<td>&amp; PHYS 104</td>
<td>and ELECTRICITY AND MAGNETISM DISCUSSION</td>
<td>4</td>
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<tr>
<td>PHYS 112</td>
<td>HONORS ELECTRICITY &amp; MAGNETISM (WITH LAB)</td>
<td>4</td>
</tr>
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<td>PHYS 126</td>
<td>GENERAL PHYSICS II (WITH LAB)</td>
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<tr>
<td>Advanced Laboratories</td>
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<td>Select 3 courses from the following:</td>
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<tr>
<td>BIOS 311</td>
<td>ADVANCED EXPERIMENTAL BIO SCIENCES</td>
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<tr>
<td>CHEM 365</td>
<td>ORGANIC CHEMISTRY LAB</td>
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<tr>
<td>CHEM 366</td>
<td>INORGANIC CHEMISTRY LAB</td>
<td>6</td>
</tr>
<tr>
<td>CHEM 367</td>
<td>MATERIALS CHEMISTRY LAB</td>
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<tr>
<td>CHEM 368</td>
<td>CHEMICAL MEASUREMENT LAB</td>
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</table>

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

Select 2 courses from the following:

| BIOS 302 | BIOCHEMISTRY II |
| CHEM 320 | ORGANIC CHEMISTRY II |
| or CHEM 212 | ORGANIC CHEMISTRY II |

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 Degree Requirements: 34

University Graduation Requirements: 31

Total Credit Hours: 120

Footnotes and Additional Information

* Note: University Graduation Requirements include 31 credit hours, comprised of Distribution Requirements (Groups I, II, and III), FWIS, and LPAP coursework. In some instances, courses satisfying major requirements may additionally meet distribution requirements. Additional Credit Hours to Complete Degree Requirements include general electives, coursework completed as upper-level, residency (hours taken at Rice), and/or any other additional academic program requirements.

1. CHEM 111 may be substituted for CHEM 121; CHEM 113 may be substituted for CHEM 123; CHEM 112 may be substituted for CHEM 122; CHEM 114 may be substituted for CHEM 124.

2. Chemistry students may enroll in BIOS 301 without the prerequisite BIOS 201 (previously 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 BIOS 302 (previously 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://oa.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://oa.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. Please see https://chemistry.rice.edu/UG-transfer-credit/ for more information.

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