**Program Learning Outcomes**

1. Students should demonstrate mastery of a body of knowledge represented by the curricula in Chemistry and Biochemistry. Students should have mastered the critical knowledge in each level in the curriculum that is necessary to move on to the next level in the curriculum.

2. The ability to read, evaluate and interpret chemical and numerical information for a novel problem using their foundational knowledge in science.

3. Students should have knowledge of appropriate safe-handling procedures and disposal of chemicals.

4. Students at lower level should demonstrate an ability to carry out key experimental techniques used in the chemical and life sciences disciplines.

5. Students at upper level should be able to design experiment to test specific hypotheses, carry out these experiments using appropriate instrumentation and analyze the results.

6. Students should demonstrate the ability to use the broader scientific literature to select appropriate information to support his/her work.

7. Students should effectively communicate, both verbally and in writing, the processes of science and the results of scientific inquiry using appropriate language and models of chemistry (i.e. equations, symbolism, etc).

8. Students should understand the importance of good ethical practices in scientific research.

9. Students should continue their career in science through gainful employment or entrance into a graduate or professional school.

**Admission to the Major**

Chemistry and Biochemistry are part of a Limited Enrollment program (LEP) within the College of Computer, Mathematical, and Natural Sciences (CMNS). Current UMCP students who wish to declare in CHEM or BCHM must complete a series of gateway courses (CHEM146/CHEM177 or CHEM131/CHEM132, CHEM237 or CHEM231/CHEM232, and MATH140 and MATH141) prior to applying to the program. Information is available at: http://www.lep.umd.edu.

**Placement in Courses**

The Department of Chemistry and Biochemistry rigorously enforces all of its prerequisites. Enrollment in CHEM131/CHEM132 or CHEM146/CHEM177 requires placement in calculus (MATH120 or MATH135 or MATH140).

**Requirements**

All required chemistry, biochemistry, and upper-level biological sciences courses must be passed with a minimum grade of "C-". Required supporting courses, including BSCI170 & BSCI171, must be passed with a 2.0 grade point average.

**Course**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>UNIV100</td>
<td>The Student in the University</td>
<td>1</td>
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<tr>
<td></td>
<td><strong>Lower-Level CHEM Courses</strong></td>
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</tr>
<tr>
<td>CHEM146</td>
<td>Principles of General Chemistry</td>
<td>5</td>
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<tr>
<td>&amp; CHEM177</td>
<td>and Introduction to Laboratory Practices and Research in the Chemical Sciences</td>
<td></td>
</tr>
<tr>
<td>CHEM237</td>
<td>Principles of Organic Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM247</td>
<td>Principles of Organic Chemistry II</td>
<td>4</td>
</tr>
<tr>
<td>CHEM276</td>
<td>General Chemistry and Energetics - Majors</td>
<td>5</td>
</tr>
<tr>
<td>&amp; CHEM277</td>
<td>and Fundamentals of Analytical and Bioanalytical Chemistry Laboratory</td>
<td></td>
</tr>
</tbody>
</table>

**Supporting Courses**

- BSCI170 Principles of Molecular & Cellular Biology
- BSCI171 and Principles of Molecular & Cellular Biology Laboratory
- PHYS161 General Physics: Mechanics and Particle Dynamics
- & PHYS260 General Physics: Vibration, Waves, Heat, Electricity and Magnetism
- & PHYS261 and General Physics: Vibrations, Waves, Heat, Electricity and Magnetism (Laboratory)
- MATH140 Calculus I 4
- MATH141 Calculus II 4

**Required Upper Level CHEM/BCHM Courses**

- CHEM395 Professional Issues in Chemistry and Biochemistry 1
- CHEM425 Instrumental Methods of Analysis 4
- CHEM481 Physical Chemistry I & CHEM483 and Physical Chemistry Laboratory I 5
- BCHM461 Biochemistry I 3
- BCHM462 Biochemistry II 3
- BCHM464 Biochemistry Laboratory 3
- BCHM465 Biochemistry III 3
- BCHM485 Physical Biochemistry 3
- Approved biological science courses 6

**Total Credits** 69

1 **Note:** All majors and potential majors are encouraged to take MATH241 prior to beginning Physical Chemistry.

- Specific information about course requirements can be obtained in the undergraduate office.
- Students who enroll in the chemistry or biochemistry program at any time following the first semester of study typically will complete all or part of the non-majors introductory sequence (CHEM131, CHEM132, CHEM231/CHEM232, CHEM241/CHEM242 and CHEM271/CHEM272, CHEM132, CHEM232, CHEM242 and CHEM272 are co-requisite laboratory courses). In this situation, completion of an additional approved upper level CHEM or BCHM course may be required to fulfill the lower-level departmental major requirements. Transfer students who wish to pursue chemistry or biochemistry majors will have their previous chemistry course work carefully evaluated for placement in the appropriate courses.

- More information about and requirements for the Biochemistry major can be found at: http://www.chem.umd.edu/undergraduateprogram/
current-students/majoradvising (http://www.chem.umd.edu/undergraduateprogram/current-students/majoradvising/).

Four Year Plan
Click here (https://cmns.umd.edu/undergraduate/advising-academic-planning/academic-planning/four-year-plans/four-year-plans-gened/) for roadmaps for four-year plans in the College of Computer, Mathematical, and Natural Sciences.

Additional information on developing a four-year academic plan can be found on the following pages:

• 4yearplans.umd.edu (http://4yearplans.umd.edu/)
• the Student Academic Success-Degree Completion Policy (https://academiccatalog.umd.edu/undergraduate/registration-academic-requirements-regulations/academic-advising/) section of this catalog