2+2 Articulation Agreement for Carroll Community College and Towson University

**Associate’s Degree:** A.S. in Physical Science, Chemistry Concentration

**Bachelor’s Degree:** B.S. in Molecular Biology, Biochemistry, & Bioinformatics (MB3), Molecular Biology Concentration

**Effective Term:** Fall 2019

Section 1: Course Completion Plan for Carroll CC
This section outlines the courses to take for the Carroll CC general education and program requirements in order to complete both Carroll CC and TU degrees within a total of 4 years and 120 credits. Refer to section 2 for specific course details and transfer planning information.

Table 1: General Education Courses Applied to TU Core Curriculum

<table>
<thead>
<tr>
<th>Carroll CC Requirement</th>
<th>Carroll CC Course to Take</th>
<th>Credits</th>
<th>Towson University Equivalent Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Composition</td>
<td>ENGL 101 College Writing</td>
<td>3</td>
<td>ENGL 102 Writing for a Liberal Education</td>
</tr>
<tr>
<td>Mathematics</td>
<td>MATH 135 Calculus of a Single Variable 1</td>
<td>4</td>
<td>MATH 273 Calculus I</td>
</tr>
<tr>
<td>Arts &amp; Humanities</td>
<td>Any arts &amp; humanities course.</td>
<td>3</td>
<td>Equivalency will vary by course.</td>
</tr>
<tr>
<td>Social &amp; Behavioral Sciences</td>
<td>Any social &amp; behavioral science course.</td>
<td>3</td>
<td>Equivalency will vary by course.</td>
</tr>
<tr>
<td>Biological &amp; Physical Sciences</td>
<td>CHEM 105 Principles of General Chemistry 1</td>
<td>4</td>
<td>CHEM 131 &amp; CHEM 131L General Chemistry I Lecture &amp; Lab</td>
</tr>
<tr>
<td>Biological &amp; Physical Sciences</td>
<td>PHYS 101 Fundamentals of Physics 1</td>
<td>4</td>
<td>PHYS 211 General Physics I Non Calculus-Based</td>
</tr>
<tr>
<td>English Literature</td>
<td>ENGL 102 Writing about Literature</td>
<td>3</td>
<td>ENGL TLL English Lower Level Elective</td>
</tr>
<tr>
<td>Program Requirement</td>
<td>BIOL 101 Fundamentals of Biology 1</td>
<td>4</td>
<td>BIOL 200 &amp; BIOL 200L Intro Cell Biology &amp; Genetics Lecture &amp; Lab</td>
</tr>
</tbody>
</table>

**Total general education applied to the TU Core Curriculum: 34 credits**

Students will transfer with a Core Package 3, which indicates that they must only complete the Advanced Writing Seminar (Core 9) and Ethical Perspectives (Core 14) requirements at TU. If a student takes an ethics course as an Arts & Humanities general education course, they will be required to complete another Core Curriculum requirement. The Towson Seminar (Core 1) requirement is waived for all incoming transfer students.
Table 2: Program Requirements and Electives Applied to TU Degree

<table>
<thead>
<tr>
<th>Carroll CC Requirement</th>
<th>Carroll CC Course to Take</th>
<th>Credits</th>
<th>Towson University Equivalent Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Requirement</td>
<td>CHEM 106 Principles of General Chemistry 2</td>
<td>4</td>
<td>CHEM 132 &amp; CHEM 132L General Chemistry II Lecture &amp; Lab</td>
</tr>
<tr>
<td>Program Requirement</td>
<td>CHEM 201 Organic Chemistry 1</td>
<td>5</td>
<td>CHEM T31 Organic Chemistry I</td>
</tr>
<tr>
<td>Program Requirement</td>
<td>CHEM 202 Organic Chemistry 2</td>
<td>5</td>
<td>CHEM T32 Organic Chemistry II</td>
</tr>
<tr>
<td>Program Requirement</td>
<td>MATH 136 Calculus of a Single Variable 2</td>
<td>4</td>
<td>MATH 274 Calculus II</td>
</tr>
<tr>
<td>Program Requirement</td>
<td>PHYS 102 Fundamentals of Physics 2</td>
<td>4</td>
<td>PHYS 212 General Physics I Non Calculus-Based</td>
</tr>
<tr>
<td>Program Elective</td>
<td>BIOL 240 Genetics</td>
<td>4</td>
<td>BIOL T09 Genetics</td>
</tr>
</tbody>
</table>

**Total program requirements applied to the TU degree: 26 credits**

**Total transferred to TU: 60 credits**

Students may transfer a maximum of 64 credits. If students do not adhere to the courses outlined above, they are not guaranteed completion of the bachelor’s degree in 2 years.
Section 2: Carroll CC Course Selection Details
This section explains any specific course selections made in section 1. To qualify for this agreement, students must follow the course selections outlined in this document. Students who do not complete any or all of the courses outlined in this agreement will be required to complete outstanding requirements at TU.

COURSE AVAILABILITY
Certain courses at Carroll CC are only offered in the fall or spring term. Students must be mindful of course availability and plan accordingly to complete a course in fall or spring when it is offered. The Carroll CC catalog provides a recommended sequence of courses for students to follow based on course availability.

GENERAL EDUCATION
- Take PHYS 101 Fundamentals of Physics 1 or PHYS 111 Physics 1 for Scientists & Engineers for the second Biological & Physical Sciences general education course in order to satisfy the major requirement of PHYS 211 or 241.
- The program requirement BIOL 101 is counted toward the total of General Education credits completed at Carroll CC. This enables TU to apply a core package and recognize the completion of the associate’s degree’s general education requirements without course-by-course placement in the Core Curriculum.

PROGRAM REQUIREMENTS & ELECTIVES
Students must make the following course selections in order to also satisfy required courses in the major at TU:
- **Second Physics Course:** Take PHYS 102 Fundamentals of Physics 2 or PHYS 212 Physics 2 for Scientists & Engineers in order to satisfy the major requirement of PHYS 212 or 242.
- **Program Elective:** Take BIOL 240 Genetics in order to satisfy the major requirement of BIOL 309.

LOWER-LEVEL EQUIVALENTS OF UPPER-LEVEL COURSES
A course number beginning with T indicates that it is a lower-level equivalent of an upper-level TU course. CHEM T31, CHEM T32, and BIOL T09 satisfy major requirements but do not count toward the TU degree requirement for 32 upper-level units.
Section 3: Degree Requirements to Be Completed at TU
This section outlines the remaining degree requirements for students transferring into the Biochemistry concentration, which examines the molecules of life with emphasis on the chemical structure and reactivity that shape biological function. Refer to section 4 for university-wide degree requirements.

CORE CURRICULUM REQUIREMENTS: 6 UNITS
Core 9 Advanced Writing Seminar
Core 14 Ethical Perspectives

MB3 MAJOR REQUIRED COURSES: 23 UNITS
BIOL 409 Molecular Biology (4 units)
CHEM 351 Biochemistry I (3 units)
MATH 237 Elementary Biostatistics (4 units)
Select one of the following for 4 units:
  ▪ MBBB 201 Programming for Biologists
  ▪ COSC 175 General Computer Science
MBBB 301 Intro to Bioinformatics (4 units)
MBBB 493 Seminar in Bioethics (1 unit)
Select one of the following for 3 units:
  ▪ MBBB 495 Capstone Project in MBBB
  ▪ BIOL 491 Elective in Independent Research
  ▪ CHEM 491 Research in Chemistry
  ▪ COSC 495 Independent Study
  ▪ An approved upper-level elective in BIOL, CHEM, COSC, CIS, or MBBB

MOLECULAR BIOLOGY CONCENTRATION COURSES: 9-10 UNITS
BIOL 408 Cell Biology (4 units)
Select one of the following for 2 units:
  ▪ BIOL 312 Genetics Laboratory
  ▪ BIOL 410 Molecular Biology Laboratory
  ▪ BIOL 412 Cell Biology Laboratory
Upper-level Biology Elective (3-4 units)

GENERAL ELECTIVES: 21-22 UNITS
The number of elective units required to meet the minimum 120 units will be determined by the total units taken within the major at TU. Electives may include additional major electives or courses of personal interest. Students may also consider adding a minor, which typically requires 18-24 units.
Section 4: Additional Requirements for TU Degree Completion

BACHELOR’S DEGREE REQUIREMENTS FOR ALL STUDENTS:

- A C (2.0) or higher is required in all major courses and prerequisites.
- A cumulative grade point average (GPA) of 2.0 is required.
- 32 units of the bachelor’s degree must be completed at the upper level (courses numbered 300 or above).

Degree Completion Summary

<table>
<thead>
<tr>
<th>TOTAL UNITS REQUIRED FOR B.S. DEGREE</th>
<th>120 UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carroll CC A.S. Degree in Physical Science – Chemistry Concentration</td>
<td>60</td>
</tr>
<tr>
<td>Completion of Core Curriculum at TU</td>
<td>6</td>
</tr>
<tr>
<td>MB3 Major – Molecular Biology Concentration Coursework Taken at TU</td>
<td>32-33</td>
</tr>
<tr>
<td>General Electives Taken at TU</td>
<td>21-22</td>
</tr>
</tbody>
</table>