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|  | **School of Theoretical and Applied Science** |

**Biochemistry**

Recommended Four-Year Plan (Fall 2019)

The recommended four-year plan is designed to provide a blueprint for students to complete their degrees within four years. Students must meet with their Major Advisor to develop a more individualized plan to complete their degree. This plan assumes that no developmental courses are required. If developmental courses are needed, students may have additional requirements to fulfill which are not listed in the plan and may extend degree completion.

**NOTE:** This recommended Four-Year Plan is applicable to students admitted into the major during the 2019-2020 academic year.

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| **First Year** | | | | | |
| **Fall Semester** | **HRS** | **✓** | **Spring Semester** | **HRS** | **✓** |
| BIOL 111 & BIOL 111L - Fundamentals of Biology I Lec & Lab **WI** | 4+1 |  | BIOL 113 & BIOL 113L - Fundamentals of Biology II Lecture & Lab | 4+1 |  |
| CHEM 116 & CHEM 116L - General Chemistry I Lecture & Lab1 | 4+1 |  | CHEM 117 & CHEM 117L - General Chemistry II Lecture & Lab | 4+1 |  |
| Gen Ed: INTD 101 - First Year Seminar | 4 |  | Gen Ed: Quantitative Reasoning - MATH 121 - Calculus I | 4 |  |
| Gen Ed: CRWT 102 - Critical Reading and Writing II | 4 |  | Gen Ed: Historical Perspectives | 4 |  |
|  |  |  | TAS Pathways Module 1: (SCIN-001)  Career Assessment/Advising |  |  |
| **Total:** | 18 |  | **Total:** | 18 |  |

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| **Second Year** | | | | | |
| **Fall Semester** | **HRS** | **✓** | **Spring Semester** | **HRS** | **✓** |
| CHEM 211 & CHEM 211L - Organic Chemistry I Lec & Lab | 4+1 |  | CHEM 213 & CHEM 213L - Organic Chemistry II Lecture & Lab | 4+1 |  |
| MATH 122 - Calculus II | 4 |  | PHYS 117 - Physics II w/ Calculus & PHYS 119L - Introductory Physics II Lab | 4+1 |  |
| PHYS 116 - Physics I w/ Calculus & PHYS 118L - Introductory Physics I Lab | 4+1 |  | Gen Ed: AIID 201 - Studies in the Arts & Humanities | 4 |  |
| Gen Ed: SOSC 110 - Social Science Inquiry | 4 |  |  |  |  |
| TAS Pathways Module 2: (SCIN-002)  Resume/CV Writing |  |  | TAS Pathways Module 3: (SCIN-003)  Interview Preparation |  |  |
| **Total:** | 18 |  | **Total:** | 14 |  |

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| **Third Year** | | | | | |
| **Fall Semester** | **HRS** | **✓** | **Spring Semester** | **HRS** | **✓** |
| CHEM 324 & CHEM 324L - Quantitative Chemical Analysis Lecture & Lab | 4+1 |  | CHEM 350 - Physical Chemistry I | 4 |  |
| CHEM 425 - Biochemistry**\*\*** | 4 |  | CHEM 446 - Biochemistry II **C, WI** | 4 |  |
| BIOL 332& BIOL 332L**\*\*** - Genetics Lecture & Lab | 4+1.5 |  | Gen Ed: Distribution - Choose one course from one category - Culture & Creativity, Systems Sustainability & Society, or Values & Ethics | 4 |  |
| Elective: TAS Research Honors Course **RE #** | 1 |  | Elective: TAS Research Honors Course **RE #** | 1 |  |
| **Total:** | 15.5 |  | **Total:** | 13 |  |

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| **Fourth Year** | | | | | |
| **Fall Semester** | **HRS** | **✓** | **Spring Semester** | **HRS** | **✓** |
| CHEM 430 - Experimental Biochemistry Lab | 2 |  | BIOL 407 & BIOL 407L**\*\*** - Cell and Molecular Biology Lecture & Lab **WI** | 4+1.5 |  |
| CHEM 350L - Physical Chemistry I Lab **WI** | 1.5 |  | Elective Courses | 4 |  |
| Elective Course **RE** | 4 |  | Elective: TAS Research Honors Course **RE #** | 1 |  |
| Elective: TAS Research Honors Course **RE #** | 1 |  | Electives for ACS Certification# | 5 |  |
| Gen Ed: Global Awareness | 4 |  |  |  |  |
| Gen Ed: Distribution - Choose one course from another category - Culture & Creativity, Systems Sustainability & Society, or Values & Ethics | 4 |  |  |  |  |
| **Total:** | 16.5 |  | **Total:** | 15.5 |  |

**Total Credits Required:** 128 credits

**GPA Required:** overall GPA 2.0 and major GPA 2.0

\*\*Offered in both fall and spring semesters

1Also satisfies Gen-Ed: Scientific Reasoning Category

2Also satisfies Gen-Ed: Quantitative Reasoning Category

# For biochemistry major students, there are two different options to follow to be certified by the

American Chemistry Society (ACS), (this is not required to graduate)

* Option 1: Complete Advanced Inorganic Chemistry Lecture (CHEM 451), Advanced Inorganic

Chemistry Lab (CHEM 451L) and at least one semester of TAS Research Honors as electives

* Option 2: Complete Advanced Inorganic Chemistry Lecture (CHEM 451), Advanced Inorganic

Chemistry Lab (CHEM 451L), Instrumental Analysis Lecture (CHEM 427) and Instrumental

Analysis Lab (CHEM 427L) as electives

**RE** Although no additional electives are required to graduate, the Biochemistry Program strongly recommends taking optional recommended electives (see list of the recommended elective courses from biochemistry major requirements at www.ramapo.edu/catalog)

Biochemistry Program strongly recommends taking TAS Research Honors courses (SRSH 301,

302, 401 and 402) during the 3rd and 4th year for hands-on research experience. Students who

complete all of TAS Research courses (SRSH 301, 302, 401, and 402) will graduate with TAS

Research Honors Distinction.

**C** Biochemistry II (CHEM 446) capstone course is designed to draw from and build on content

and skills learned during a student’s progression through the major with a significant writing

component. In undertaking this course, students will demonstrate: a thorough understanding of

the relevant biochemistry material, an ability to apply problem-solving strategies, oral and written

communication and presentation skills, an ability to comprehend and critically evaluate scientific

literature. Senior presentation for biochemistry major will be one of the requirements for this

course. Requires prerequisite CHEM 425

WI: Writing Intensive – 3 courses required in the major