

### Bioinformatics with MS in Data Science 4+1

Recommended Five-Year Plan (Fall 2021)

The recommended five-year plan is designed to provide a blueprint for students to complete their degrees within five years. These plans are the recommended sequences of courses. 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.

**NOTE:** This recommended Five-Year Plan is applicable to students admitted into the major during the 2021-2022 academic year. To enroll, visit <https://www.ramapo.edu/data-science/4plus1/>. Changes to the traditional four-year plan are noted in **light red**.

First Year					
Fall Semester	HRS	✓	Spring Semester	HRS	✓
Gen Ed: INTD 101-First Year Seminar	4		BIOL 113 & BIOL 113L-Fundamentals of Biology II Lecture & Lab*	4+1	
Gen Ed: CHEM 116 & CHEM 116L-General Chemistry I Lecture & Lab	4+1		CHEM 117 & CHEM 117L-General Chemistry II Lecture & Lab*	4+1	
Gen Ed: CRWT 102 - Critical Reading & Writing II	4		CMPS 130 - SCI PROBLEM SOLVING-PYTHON	4	
BIOL 111 & BIOL 111L-Fundamentals of Biology I Lecture & Lab <b>WI</b>	4+1		Gen Ed: MATH 121-Calculus I*	4	
			TAS Pathways Module 1: PATH TS1-Career Assessment/ Advising	Degree Rqmt.	
<b>Total:</b>	18		<b>Total:</b>	18	

Second Year					
Fall Semester	HRS	✓	Spring Semester	HRS	✓
CHEM 211 & CHEM 211L -Organic Chemistry I Lecture & Lab * OR CHEM 206 & CHEM 206L-Essentials of Organic Chemistry Lecture* & Lab*	4+1		CHEM 213 & CHEM 213L-Organic Chemistry II Lecture* & Lab* OR Elective(s)	4+1	
CMPS 240 – DATA ANALYTICS IN PYTHON*	4		BIOL 332 & BIOL 332L-Genetics Lecture & Lab*	4+1.5	
DATA 101 – Introduction to Data Science	4		PSYC 242-Statistics OR ENSC 345-Research Design & Statistics	4	
Gen Ed: SOSC 110-Social Science Inquiry	4				
TAS Pathways Module 2: PATH TS2 - Resume/ CV Writing	Degree Rqmt.		TAS Pathways Module 3: PATH TS3 Interview Preparation	Degree Rqmt.	
<b>Total:</b>	17		<b>Total:</b>	14.5	

Third Year					
Fall Semester	HRS	✓	Spring Semester	HRS	✓
BIOL 407 & BIOL 407L-Cell & Molecular Biology Lecture & Lab* <b>WI</b>	4+1.5		BIIN 430-Bioinformatics*	4	
MATH 237-Discrete Structures*	4		CMPS 364-Database Design*	4	
Gen Ed Distribution Category: Culture & Creativity, or Systems Sustainability & Society, or Values & Ethics	4		MATH 262 - Linear Algebra*	4	
Gen Ed: AIID 201-Studies in the Arts & Humanities	4		Gen Ed: Historical Perspectives	4	
<b>Total:</b>	17.5		<b>Total:</b>	16	

Fourth Year					
Fall Semester	HRS	✓	Spring Semester	HRS	✓
Bioinformatics Elective (Group I)	4		BIIN 450-Advanced Bioinformatics* <b>WI</b>	4	
Gen Ed: Global Awareness	4		Gen Ed Distribution Category: Culture & Creativity, or Systems Sustainability & Society, or Values & Ethics ( <b>Must be outside of TAS</b> )	4	
DATA 601 - Introduction to Data Science (MS)	3		Bioinformatics Elective (Group I or II)	4	
CMPS 530 - Python for Data Science** (MS)	3		DATA 620: Ethics for Data Science (MS)	3	
<b>Total:</b>	14		<b>Total:</b>	15	

Fifth Year					
Fall Semester	HRS	✓	Spring Semester	HRS	✓
MATH 570: Applied Statistics	3		CMPS 664: Advanced Database and Big Data Systems	3	
MATH 680: Advanced Mathematical Modeling	3		Data Science Technical Elective	3	
Technical Elective AND/OR Interdisciplinary Elective AND/OR DATA 730 Fieldwork Experience***	3 + 3		DATA 750: Data Science Thesis	3	
<b>Total:</b>	12		<b>Total:</b>	9	

**Total Undergraduate Credits Required:** 128 credits (all courses listed in first four years)

**Major GPA required for undergraduate graduation:** 2.0

**WI: Writing Intensive - 3 courses required in the major.**

**Total Graduate Credits Required:** 30 credits (listed with MS in fourth year and all fifth year courses)

**Student must be in good academic standing:** <https://www.ramapo.edu/provost/policy/graduate-academic-standing/>

\* This course has a prerequisite. Please refer to the course catalog for information about pre-requisites.

\*\* This course satisfies a Group II Bioinformatics Elective

\*\*\* Students must complete two technical electives and one interdisciplinary elective. DATA 730 Fieldwork Experience may be used to replace one of the three total electives.

