

# PROFESSIONAL SCIENCE MASTER'S IN NATURAL SCIENCES, BIOLOGICAL DATA ANALYTICS SPECIALIZATION

The Professional Science Master's (PSM) program with a specialization in Biological Data Analytics is a graduate degree program that was designed in coordination with leaders in the biotechnology industries in order to ensure that students will have the scientific, business, and communication skills required to be competitive for jobs in these industries. Students will develop skills that will allow them to analyze data from genomic, transcriptomic, proteomic, and metabolomic studies to find statistically relevant information, while interfacing with biologists in data interpretation and experimental design.

## Requirements Effective Fall 2021

Because this program is intended to serve students with a wide range of backgrounds, each student must work with an advisor to determine an appropriate selection of courses.

First Year		Credits
BUS 500	Foundations for Business Impact	2
DSCI 510	Linux as a Computational Platform	1
DSCI 511	Genomics Data Analysis in Python	2
NSCI 693C	Graduate Seminar: Biological Data Analytics	1
Select one course from the following:		1-3
BC 601	Responsible Conduct in Biochemistry	
BUS 505	Legal and Ethical Environment of Business	
CM 666/PHIL 666	Science and Ethics	
GRAD 544	Ethical Conduct of Research	
NSCI 575/GRAD 575	Ethical Issues in Big Data Research	
Select one course from the following:		3-4
ERHS 535	R Programming for Research	
STAR 511	Design and Data Analysis for Researchers I	
Select a minimum of 3 credits from the following:		3-4
BC 563 <sup>1</sup>	Molecular Genetics	
CM 505	Nucleic Acids for Non-Life Scientists	

CM 506	Protein Basics for NonBiologists	
MIP 543	RNA Biology	
<b>Total Credits</b>		<b>13-17</b>
<b>Second Year</b>		
DSCI 512	RNA-Sequencing Data Analysis	1
MGT 340	Fundamentals of Entrepreneurship	3
NSCI 693C	Graduate Seminar: Biological Data Analytics	1
NSCI 696F	Group Study: Biological Data Analytics Project Proposal	6
Select one course from the following:		3-4
BC 563 <sup>1</sup>	Molecular Genetics	
MIP 543	RNA Biology	
Select one course from the following:		3-4
ERHS 544/STAT 544	Biostatistical Methods for Quantitative Data	
STAR 512	Design and Data Analysis for Researchers II	
Electives (select from the list below with approval of advisor) <sup>2</sup>		4-10
<b>Total Credits</b>		<b>21-29</b>
<b>Program Total Credits:</b>		<b>40</b>

A minimum of 40 credits are required to complete this program.

## Electives

Code	Title	Credits
<b>Math/Computational Electives:</b>		
BC 571	Quantitative Biochemistry	
CS 548/STAT 548		
DSCI 475	Topological Data Analysis	
MATH 532	Mathematical Modeling of Large Data Sets	
<b>Statistics Electives:</b>		
ERHS 534	SAS and Epidemiologic Data Management	
HORT 579	Mass Spectrometry Omics-Methods and Analysis	
STAR 511	Design and Data Analysis for Researchers I	
<b>Science Electives:</b>		
BC 512	Principles of Macromolecular Structure	
BC 565	Molecular Regulation of Cell Function	
BC 663	Gene Expression	
MIP 543	RNA Biology	
MIP 565/BZ 565	Next Generation Sequencing Platform/Libraries	
MIP 570	Functional Genomics	
MIP 576/BSPM 576	Bioinformatics	
<b>Business Electives:</b>		
MGT 430	Leadership and Social Responsibility	

MGT 450	Biomedical Entrepreneurship I
---------	-------------------------------

**Communications Electives:**

GRAD 550	STEM Communication
----------	--------------------

- <sup>1</sup> BC 563 is generally required in either the first or second year, but may be waived if the student has sufficient prior coursework.
- <sup>2</sup> Select enough elective credits to bring the program total to a minimum of 40 credits. Students are required to take elective courses from at least 2 of the 5 categories. Electives may be taken in the first or second year with the approval of advisor.