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.

The PSM in Natural Sciences, Biological Data Analytics Specialization is an affiliated Professional Science Master's (PSM) degree. Affiliation is administered by the Commission on Affiliation of PSM Programs (https://www.professionalsciencemasters.org/) (formerly named PSM National Office) to ensure a strong and distinctive PSM brand. The PSM is designed for students who are seeking a graduate degree in science or mathematics and understand the need for developing workplace skills valued by top employers.

Students interested in graduate work should refer to the Graduate and Professional Bulletin (https://catalog.colostate.edu/general-catalog/graduate-bulletin/).

Learning Objectives

Upon successful completion of this program, students will be able to:

1. Describe how quantitative biological data are generated;
2. Computationally analyze large biological data sets;
3. Analytically interpret results; and
4. Integrate the above aspects into a business setting.

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[1]	Molecular Genetics	
CM 505		
CM 506		
MIP 543	RNA Biology	
	Total Credits	**13-17**
Second Year		
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[1]	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)[2]		4-10
	Total Credits	**21-29**
	Program Total Credits:	**40**

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

Electives

Code	Title	Credits
Math/Computational Electives:		
BC 571	Quantitative Biochemistry	
CS 548/STAT 548		
DSCI 475	Topological Data Analysis	

MATH 532	Mathematical Modeling of Large Data Sets
Statistics Electives:	
ERHS 534	SAS and Epidemiologic Data Management
HORT 579	Mass Spectrometry Omics-Methods and Analysis
STAR 511	Design and Data Analysis for Researchers I
Science Electives:	
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	
Business Electives:	
MGT 430	Leadership and Social Responsibility
MGT 450	
Communications Electives:	
GRAD 550	STEM Communication

[1] BC 563 is generally required in either the first or second year, but may be waived if the student has sufficient prior coursework.

[2] 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.

Requirements for All Graduate Degrees

For more information, please visit Requirements for All Graduate Degrees (https://catalog.colostate.edu/general-catalog/graduate-bulletin/graduate-study/procedures-requirements-all-degrees/) in the Graduate and Professional Bulletin (https://catalog.colostate.edu/general-catalog/graduate-bulletin/).

Summary of Procedures for the Master's and Doctoral Degrees

NOTE: Each semester the Graduate School publishes a schedule of deadlines. Deadlines are available on the Graduate School website (https://graduateschool.colostate.edu/deadline-dates/). Students should consult this schedule whenever they approach important steps in their careers.

Forms (https://graduateschool.colostate.edu/forms/) are available online.

Step	Due Date
1. Application for admission (online)	Six months before first registration
2. Diagnostic examination when required	Before first registration
3. Appointment of advisor	Before first registration
4. Selection of graduate committee	Before the time of fourth regular semester registration
5. Filing of program of study (GS Form 6)	Before the time of fourth regular semester registration
6. Preliminary examination (Ph.D. and PD)	Two terms prior to final examination
7. Report of preliminary examination (GS Form 16) - (Ph.D. and PD)	Within two working days after results are known
8. Changes in committee (GS Form 9A)	When change is made
9. Application for Graduation (GS Form 25)	Refer to published deadlines from the Graduate School Website
9a. Reapplication for Graduation (online)	Failure to graduate requires Reapplication for Graduation (online) for the next time term for which you are applying
10. Submit thesis or dissertation to committee	At least two weeks prior to the examination or at the discretion of the graduate committee
11. Final examination	Refer to published deadlines from the Graduate School Website
12. Report of final examination (GS Form 24)	Within two working days after results are known; refer to published deadlines from the Graduate School website
13. Submit a signed Thesis/ Dissertation Submission Form (GS Form 30) to the Graduate School and Submit the Survey of Earned Doctorates (Ph.D. only) prior to submitting the electronic thesis/ dissertation	Refer to published deadlines from the Graduate School website.
14. Submit the thesis/dissertation electronically	Refer to published deadlines from the Graduate School website
15. Graduation	Ceremony information is available from the Graduate School website