PH.D. IN CELL AND MOLECULAR BIOLOGY

The graduate program in Cell and Molecular Biology is an interdisciplinary degree-granting program that involves over 100 faculty members from 16 departments and 5 colleges who share common interests in cell and molecular biology. The program offers training leading to the M.S. and Ph.D. degrees in Cell and Molecular Biology; there also is a Cancer Biology Specialization (https://catalog.colostate.edu/general-catalog/university-wide-programs/interdisciplinary-studies/cell-molecular-biology/phd-cell-molecular-cancer-biology-specialization/). The program includes a core of lecture courses in advanced molecular genetics and cell biology, laboratory research techniques, and ethical conduct of science. The program also includes elective courses in specialized areas and in grant writing, a graduate seminar series in which students present research, and a weekly seminar series for presentations by CSU faculty and nationally prominent scientists each year. Core courses typically are completed during the first year. On average, the M.S. degree is completed within two years, and the Ph.D. degree within five years.

Current focus areas of research include, but are not limited to the following: Cancer Biology; Gene Expression; Genome Structure, Evolution & Repair; Infectious Disease; Metabolism & Physiology; Microbiomes; Plant Molecular Biology; Prions & Neurobiology; Stem Cells & Development; and Synthetic Biology. Students are encouraged to complete coursework in computational / quantitative approaches.

Students interested in this graduate program should refer to the Cell and Molecular Biology website for further details.

Requirements Effective Fall 2021

Code	Title	Credits
BC 563	Molecular Genetics	4
BC 565	Molecular Regulation of Cell Function	4
CM 510	Introduction to Cell and Molecular Biology	1
CM 792	Cell and Molecular Biology Seminar [1, 2]	4-10
CM 793	Seminar [1, 2]	4-10
GRAD 550	STEM Communication	1
MIP 611	Advanced Microbiological Research Methods	4
Independent Study and Dissertation (select a minimum of 6 credits from the following):		**6**
CM 795	Independent Study [2]	
CM 799	Dissertation [2]	
Electives must contain at least one course from each section list: [2]		**44**
Ethics Elective (see list below)		1-3
Statistics Elective (see list below)		3-4
Topics Elective (see list below)		2
Writing Elective (see list below)		1-3
Master's Degree Credit (a maximum of 30 credits may be accepted from a master's degree)		30
Program Total Credits:		**72**

Ethics Electives

Code	Title	Credits
Select at least one course from the following:		
BC 601	Responsible Conduct in Biochemistry	1
CM 601	Responsible Conduct of Research in CMB	1
CM 666/PHIL 666	Science and Ethics	3
GRAD 544	Ethical Conduct of Research	1
MIP 654	Research Policies and Regulations	1
NSCI 575/GRAD 575	Ethical Issues in Big Data Research	1

Statistics Electives

Code	Title	Credits
Select at least one course from the following:		
STAR 511	Design and Data Analysis for Researchers I	4
STAR 512	Design and Data Analysis for Researchers II	4
STAT 540	Data Analysis and Regression	3
VS 562	Applied Data Analysis	3
VS 733	Advanced Veterinary Epidemiology	4

Topics Electives

Topics Electives provide guided practice in reading, interpreting, and critiquing scientific literature relevant to the field of Cell & Molecular Biology.

Code	Title	Credits
Preferred course, to be taken two semesters, 2 credits total:		
CM 700	Critical Analysis of Scientific Literature	2
Courses that could substitute for CM 700 in consultation with advisor:		
BSPM 502B	Topics in Plant Pathology: Plant Bacteriology	1
BMS 796A/NB 796C	Group Study: Topics in Neuroscience	1-4
BMS 796B	Group Study: Cardiopulmonary Physiology	1-18
BMS 796C	Group Study: Reproductive Physiology	1-18
CHEM 651B	Special Topics in Chemistry: Inorganic Chemistry	1-4
FSHN 650A	Recent Developments in Human Nutrition: Protein, Vitamins, and Minerals	2
FSHN 650B	Recent Developments in Human Nutrition: Carbohydrates, Lipids, and Energy	2
FSHN 650C	Recent Developments in Human Nutrition: Genomic, Proteomics, and Metabolomics	2
MIP 700	Topics in Microbiology	1
SOCR 730	Topics in Plant Breeding and Genetics	1

Writing Electives

Code	Title	Credits
Select at least one course from the following:		
BC 701	Grant Proposal Writing and Reviewing	1
BSPM 530/SOCR 530	Scientific Writing	1
BZ 544	Presenting Research in Biology	2
CM 640	Creative Science Writing	3
HES 700	Professional Skills in Bioenergetics	3

MIP 643	Grant Writing for Microbiology/Pathology	1
MIP 666	Writing Scientific Manuscripts	3
NB 771	Writing, Submitting, and Reviewing Grants	1

A minimum of 72 credits are required to complete this program.

1 CM 792 and CM 793 must be taken each year in spring or fall semester.

2 Students must complete at least one credit from each CM 795 and CM 799, and select enough independent study, dissertation, seminar, and other elective course credits to bring the program total to a minimum of 72 credits, with approval of graduate advisory committee.