

# MOLECULAR AND CELLULAR BIOLOGY CONCENTRATION

BIO 452	Cell Biology	4
BIO/CHEM 475	Molecular Biology Laboratory	3
CHEM 217	Organic Chemistry II	3
CHEM 220	Organic Chemistry Laboratory For Life Sciences II	1
CHEM 369	Biochemical Principles	5
MCRO 224	General Microbiology I	5
<b>Advanced Cell and Molecular Applications</b> <sup>1, 2</sup>		
Select from the following:		10
ASCI 403	Applied Biotechnology in Animal Science	
BIO 405	Developmental Biology	
BIO 426	Immunology	
BIO 428	Hematology	
BIO/CHEM 441	Bioinformatics Applications	
BIO/CHEM 476	Gene Expression Laboratory	
CHEM 372	Metabolism	
CHEM 418	Neurochemistry	
CHEM 474	Protein Techniques Laboratory	
MCRO 402	General Virology	
MCRO 433	Microbial Biotechnology	
<b>Approved Electives</b> <sup>1,3,4,5</sup>		
Select from any 300-400 level BIO/BOT/MCRO/MSCI courses (including Advanced Cell and Molecular Applications from the list above) or select from the following:		12
At least 5 units must be upper-division		
ASCI 403	Applied Biotechnology in Animal Science	
ASCI 406	Applied Animal Embryology and Assisted Reproduction	
ASCI 407	Assisted Reproduction Technologies of Gametes and Embryos Laboratory	
BIO/CHEM 202	Orientation to Biotechnology	
BMED 470	Selected Advanced Topics (Topic: Cellular Immunotherapy)	
CHEM 218	Organic Chemistry III	
CHEM 223	Organic Chemistry Laboratory for Life Sciences III	
CHEM 331	Quantitative Analysis	
CHEM 372	Metabolism	
CHEM 377	Chemistry of Drugs and Poisons	
CHEM 418	Neurochemistry	
CHEM 428	Nutritional Biochemistry	
CHEM 474	Protein Techniques Laboratory	
CSC 101	Fundamentals of Computer Science	
DATA 301	Introduction to Data Science	
ENGR 322/ SCM 302	The Learn By Doing Lab Teaching Practicum <sup>6</sup>	

ES/WGQS 350 Gender, Race, Culture, Science & Technology

PHIL 323 Ethics, Science and Technology

or PHIL 339 Biomedical Ethics

or PHIL 341 Professional Ethics

STAT 313 Applied Experimental Design and Regression Models

**Total units** **43**

- Consultation with advisor is recommended prior to selecting electives; bear in mind your selections may impact pursuit of post-baccalaureate studies and/or goals.
- Excess units will be applied to Approved Electives.
- Consult with your faculty advisor for approval to use other relevant upper-division coursework in other departments.
- If a course is taken to meet a Major or Support requirement, it cannot be double-counted in the concentration.
- Maximum of 6 units may be applied toward Approved Electives: BIO 200, BIO 300, BIO 400, BIO 450, BIO 485, BIO 495, MSCI 401.
- Maximum of 2 units may be applied toward Approved Electives from ENGR 322/SCM 302.