

**MAJOR: CELL AND MOLECULAR BIOLOGY, B.S.**

DEPARTMENT OF BIOLOGY

Cell and molecular biology are two of the most rapidly growing areas of modern biology. This major prepares students for graduate school and careers in cell biology, genetics, developmental biology, physiology, immunology, biotechnology, molecular biology, and microbiology. The major is also appropriate for students considering professional schools of medicine, dentistry, pharmacy, and veterinary medicine.

TYPICAL PROGRAM OF STUDY			
FIRST YEAR			
FALL SEMESTER		SPRING SEMESTER	
BIOL 1011 General Biology I	5 cr	BIOL 1012 General Biology II	5 cr
CHEM 1151 General Chemistry I <sup>1</sup>	5 cr	CHEM 1152 General Chemistry II <sup>1</sup>	5 cr
COMP 1120 College Writing	<u>3 cr</u>	MATH 1290 Calculus for the Natural Sciences or MATH 1296 Calculus I <sup>2</sup>	<u>5 cr</u>
	Total: 13 cr		Total: 15 cr
SECOND YEAR			
CHEM 2521 Organic Chemistry I	4 cr	BIOL 2101 Cell Biology	3 cr
PHYS 1001 Introduction to Physics I <sup>3</sup>	5 cr	BIOL 2102 Cell Biology lab	2 cr
STAT 2411 Statistical Methods or STAT 3611 Intro to Probability & Stats	3-4 cr	CHEM 2522 Organic Chemistry II	4 cr
Liberal Education Course or Minor Field Course	<u>3 cr</u>	PHYS 1002 Introduction to Physics I <sup>3</sup>	<u>5 cr</u>
	Total: 15-16 cr		Total: 14 cr
THIRD YEAR			
BIOL 2201 Genetics	3 cr	BIOL 4801 Evolution	2 cr
BIOL 4501 Microbiology	4 cr	CHEM 3322 Biochemistry	3 cr
Biology elective <sup>4</sup>	3-4	CHEM 3324 Biochemistry lab	1 cr
Liberal Education Course or Minor Field Course	<u>4-6 cr</u>	COMP 3150 Advanced Writing: Science	3 cr
	Total: 14-17 cr	Liberal Education Course or Minor Field Course	<u>4-6 cr</u>
			Total: 13-15 cr
FOURTH YEAR			
Biology elective <sup>4</sup>	3-4 cr	BIOL 3998 Biology Seminar II	0.5 cr
BIOL 3703 Animal Physiology	3 cr	BIOL 4231 Molecular Biology	3 cr
BIOL 3997 Seminar I	0.5 cr	BIOL 5232 Molecular Biology lab	2 cr
BIOL 4361 Developmental Biology	3 cr	Liberal Education Course or Minor Field Course	<u>11 cr</u>
Liberal Education Course or Minor Field Course	<u>4-6 cr</u>		Total: 16.5 cr
	Total: 13.5-16.5 cr		

<sup>^</sup>First math course is determined by math placement exam. This schedule presupposes placement into Math 1296.

<sup>1</sup>CHEM 1161/1162 Honors General Chemistry I and II may substitute for CHEM 1151/1152

<sup>2</sup>MATH 1596 Honors Calculus I may be substituted for Math 1290 or 1296.

<sup>3</sup>PHYS 1001/1002 may be replaced by PHYS 2011/2012, a calculus-based physics series that requires the completion of MATH 1297 Calculus II. MATH 1297 is required by some graduate and professional schools.

<sup>4</sup>Take 5 or more credit(s) from the following: BIOL 2202, BIOL 2801, BIOL 3990, BIOL 3994, BIOL 4199, BIOL 4603, BIOL 5233, BIOL 5235, BIOL 5240, BIOL 5365, BIOL 5511, BIOL 5513, BIOL 5603, BIOL 5760, BIOL 5772, BIOL 5801, BIOL 5802, BIOL 5868, BIOL 5990, MATH 5233, MDBC 5501, MICB 5545, MICB 5555, PHSL 5601, PHSL 5602, SSP 3002-max 2 cr may be applied to major (only for a TA in genetics or cell biology).

FOR ADDITIONAL INFORMATION:

Department of Biology  
James I. Swenson Science Building 207  
726-6262 or 726-8811  
biol@d.umn.edu  
<http://www.d.umn.edu/biology>

## CELL AND MOLECULAR BIOLOGY, B.S.

MAJOR REQUIREMENTS	CREDITS	PREREQUISITES	SEMESTER TO BE COMPLETED	GRADE
<b>YEAR 1</b>				
BIOL 1011 General Biology I	5	1 yr of HS or 1 semester of college chemistry BIOL 1011		
BIOL 1012 General biology II	5			
CHEM 1151 General Chemistry I <sup>1</sup>	5	1 year HS chemistry; HS algebra CHEM 1151		
CHEM 1152 General Chemistry II <sup>1</sup>	5			
COMP 1120 College Writing	3			
MATH 1290 Calculus for the Natural Sciences <sup>2</sup>	5	Math placement or Math 1250 with a grade of 'C-' or better Math placement or Math 1250 with a grade of 'C-' or better		
or MATH 1296 Calculus I <sup>2</sup>	5			
<b>YEAR 2</b>				
BIOL 2101 Cell Biology	3	BIOL 1012; CHEM 1152 BIOL 2101 (concurrent registration OK)		
BIOL 2102 Cell Biology lab	2			
CHEM 2521 Organic Chemistry I	4	CHEM 1152 or 1162 CHEM 2521		
CHEM 2522 Organic Chemistry II	4			
PHYS 1001 Introduction to Physics I <sup>3</sup>	5	Algebra and trigonometry Phys 1001		
PHYS 1002 Introduction to Physics II <sup>3</sup>	5			
STAT 2411 Introduction to Statistics	3	MATH 1250 or 1160 MATH 1290, 1296 or 1596		
or STAT 3611 Probability & Statistics	4			
<b>YEAR 3</b>				
BIOL 2201 Genetics	3	BIOL 1012 BIOL 2101 BIOL 1012, 2201		
BIOL 4501 Microbiology	4			
BIOL 4801 Evolution	2			
BIOL elective <sup>4</sup>	3-4			
CHEM 3322 Biochemistry	3	CHEM 2522 or 2532 Concurrent registration in CHEM 3322		
CHEM 3324 Biochemistry lab	1			
COMP 3150 Advanced Writing: Science	3	COMP 1120; 60 credits		
<b>YEAR 4</b>				
BIOL 3703 Animal Physiology	3	BIOL 1011, 1012, one semester college chemistry 60 credits BIOL 3997 BIOL 2101, 2201 BIOL 2101 and 2201 Concurrent registration with BIOL 4231		
BIOL 3997 Seminar I	0.5			
BIOL 3998 Seminar II	0.5			
BIOL 4361 Developmental Biology	4			
BIOL 4231 Molecular Biology	3			
BIOL 5232 Molecular Biology lab	2			
BIOL elective <sup>4</sup>	3-4			

<sup>^</sup>First math course is determined by math placement exam. This schedule presupposes placement into Math 1296.

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NOTE: In addition to the above requirements, students must complete the liberal education program and a minor (or a second major) to earn a B.S. degree. Biology may not be used to satisfy this requirement.