

Bachelor of Science - Concentration in Cell & Molecular Biology

Note: All **BIOL** & **PHYS** prerequisites must be passed with a **C- or better**, unless stated otherwise. All **CHEM** & **MATH** prerequisites must be passed with a **C or better**, unless stated otherwise.

Requirement	if taken	Course		Units	Prerequisites by ID
		ID	Title		
Division Courses					
<i>Courses may be transferable from community college; check ASSIST.org for more information</i>					
All Required		BIOL 230	Introductory Biology 1	5	None
		BIOL 240	Introductory Biology 2	5	BIOL 230
		CHEM 115	General Chemistry 1 + Lab	5	see bulletin: http://bulletin.sfsu.edu/courses/chem/
		CHEM 215/216	General Chemistry 2 + Lab	3/2	CHEM 115, CHEM 215 (concurrent OK for lab)
		CHEM 233	Organic Chemistry I	3	CHEM 115, CHEM 215
		PHYS 111/112	General Physics 1 + Lab	3/1	MATH 198 or MATH 199
		PHYS 121/122	General Physics 2 + Lab	3/1	PHYS 111, PHYS 112
		MATH 226	Calculus 1	4	see bulletin: http://bulletin.sfsu.edu/courses/math/
CHOOSE 1 ONLY		MATH 227	Calculus 2	4	MATH 226
		CSC 210	Intro to Computer Programming	3	None
		BIOL 358	Forensic Genetics: Math Matters	4	BIOL 230, MATH 199
		BIOL 458	Biometry	4	One college-level Biology course

Total Units for Lower Division

Division Courses					
<i>Courses do not need to be taken in order, only requirement is taking the prerequisites</i>					
All Required		BIOL 350	Cell Biology	3	BIOL 230, BIOL 240, CHEM 115
		BIOL 351GW	Experiments in Cell and Molecular Biology	4	GE A2, BIOL 350, BIOL 355
		BIOL 355	Genetics	3	BIOL 230, BIOL 240, CHEM 115 (C- or better)
		BIOL 357	Molecular Genetics	3	BIOL 355
		CHEM 335	Organic Chemistry 2	3	CHEM 233
		CHEM 349 -OR- CHEM 340/341	General Biochemistry -OR- Biochemistry 1 + 2	3	CHEM 215, (CHEM 130 -OR- CHEM 335 (C- or better))
CHOOSE 11 S: 1 course MUST be/have a lab component (Lab indicated by *)		BIOL 332	Health Disparities in Cancer	3	BIOL 230, BIOL 240, BIOL 355
		BIOL 337	Evolution	3	BIOL 230, BIOL 240, BIOL 355
		BIOL 344GW	Research Skills	3	GE A2, BIOL 230, BIOL 240
		BIOL 349	Bioethics	3	GE A1, GE A2, GE A3, GE B4
		BIOL 356	Honors Genetics	2	BIOL 355
		BIOL 358**	Forensic Genetics: Math Matters	4	BIOL 230, MATH 199
		BIOL 380	Evolutionary Developmental Biology	3	BIOL 355
		BIOL 382	Developmental Biology	3	BIOL 350, BIOL 355
		BIOL 401	General Microbiology	3	BIOL 230, BIOL 240, CHEM 233 (C- or better)
		BIOL 402GW*	General Microbiology Lab	3	GE A2, BIOL 401 (concurrent OK)
		BIOL 411	Environmental Microbiology	3	BIOL 355, BIOL 401, BIOL 402GW, (CHEM 340 -OR- CHEM 349)
		BIOL 420	General Virology	3	BIOL 401, BIOL 402GW
		BIOL 425	Emerging Diseases	3	BIOL 230, BIOL 240, (BIOL 355 -OR- BIOL 401 -OR- BIOL 350), CHEM 130
		BIOL 435	Immunology	3	BIOL 350, BIOL 401
		BIOL 436*	Immunology Lab	2	BIOL 402GW, BIOL 435 (concurrent OK)
		BIOL 442	Microbial Physiology	3	BIOL 401, BIOL 402GW, CHEM 349
	BIOL 443*	Microbial Physiology Lab	3	BIOL 442 (concurrent OK)	
	BIOL 446	Microbial Genomics	4	BIOL 401, BIOL 402GW, BIOL 355	
	BIOL 453	General Parasitology	3	BIOL 230, BIOL 240, BIOL 355	
	BIOL 454*	Parasitology Lab	1	BIOL 453 (concurrent)	

	BIOL 458**	Biometry	4	One college-level Biology course
	BIOL 490	Ecology of Infectious Diseases	3	BIOL 230, BIOL 240
	BIOL 525	Plant Physiology	3	BIOL 230, BIOL 240, CHEM 130
	BIOL 526*	Plant Molecular Physiology Lab	2	BIOL 230, BIOL 240, CHEM 130
	BIOL 615	Molecular Pathophysiology	3	BIOL 350, BIOL 355, BIOL 612
	BIOL 618	Biology of Aging	3	(BIOL 212 -OR- BIOL 612), BIOL 350, BIOL 355
	BIOL 623	Pharmacology	3	BIOL 230, BIOL 240, BIOL 612, CHEM 130
	BIOL 630	Animal Physiology	3	BIOL 230, BIOL 240, (CHEM 130 -OR- CHEM 233)
	BIOL 631GW*	Animal Physiology Lab	3	GE A2, (BIOL 612 -OR- BIOL 630)
	BIOL 638*	Bioinformatics & Genome Annotation	4	BIOL 230
	BIOL 640	Cellular Neurosciences	3	BIOL 230, BIOL 240, CHEM 130, PHYS 121
	BIOL 652	Science Education Partners in Biology	4	BIOL 230, BIOL 240
	BIOL 699*	Special Study in Biology	1-3	Senior standing or consent from instructor
	CHEM 343*	Biochemistry I Lab	3	CHEM 216, CHEM 234, (CHEM 340 -OR- CHEM 349)
Substitutions, if any				

Total Units for Upper Division
Total Units Needed for Degree

Notes:

** can be an elective if not used to fulfill other upper division major requirement