

# UNDERGRADUATE STUDIES: BIOLOGY – EMPHASIS IN CELLULAR AND MOLECULAR BIOLOGY CHECKLIST

Visit the Biology Undergraduate Advising Center in LSN 102  
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## Preparation for the Major Coursework

Cell and molecular biology is the study of the macromolecules and mechanisms involved in basic biological processes. This discipline crosses traditional boundaries between genetics, biochemistry, cell biology, physics and chemistry. Graduates will have training appropriate for entry-level positions in the biotechnology industry, and the prerequisites for cell and molecular biology graduate programs. Students should obtain research experience through Biology 497/499 Special Studies (discuss with professors).

### Four Year Degree

To finish your degree in four years, all 9 sets of premajor courses listed below will need to be finished by the end of your 4<sup>th</sup> semester, or the 5<sup>th</sup> at the latest

### Impaction

Biology is impacted. After admission to SDSU, students are initially placed into the Biology premajor. Premajors must meet department specific criteria in order to be admitted into the major. Admission to Biology Major requires the following:

- Completion of all the preparation for the Major courses *and* a combined GPA of 2.8 or higher in these courses (*excluding Phys 180A, 180B, 182A, and 182B*).
- A minimum of C or better in every course (Recommended A's and B's).
- Courses in the Preparation for the Major cannot be taken Cr/Nc.

After completing these requirements, you will be admitted to the Major automatically. *If* you are not admitted automatically meet with the Undergraduate Biology Advisor as soon as possible.

Students who do not meet one or more requirements should meet with the Undergraduate Biology Advisor each semester to determine an appropriate course of action

**NOTE:** Not all upper division Biology courses are offered every semester. Check the current class schedule for complete course listings.

### **PREPARATION FOR THE MAJOR (37 units of lower division courses)**

Biol 203	Princ. of Cell Molec. Biology	3	
Biol 203L	Princ. of Cell Molec. Biology Lab	1	
Biol 204	Princ. of Organismal Biology	3	
Biol 204L	Princ. of Organismal Biology Lab	1	
Biol 215	Biostatistics	3	
Chem 200	General Chemistry	5	
Chem 201	General Chemistry	5	

Chem 232	Organic Chemistry	3	
Chem 232L	Organic Chemistry Lab	1	
Math 124	Calculus of Life Sciences	4	
Phys 180A	Fundamentals of Physics	3	
Phys 182A	Physical Measurements	1	
Phys 180B	Fundamentals of Physics	3	
Phys 182B	Physical Measurements	1	

## UPPER DIVISION MAJOR

(36 units)

Cumulative 2.0 GPA required in all upper division coursework applied to the major.

### Required Core Coursework (21 units)

Biol 351 Genetics	3		Biol 366 Cell and Molecular Biology	3	
Biol 352 Evolution	3		Biol 366L Biochem, CMB Lab	2	
Biol 354 Eco. and the Environment	3		Biol 567 Advanced Biochem, CMB	4	
Chem 365 Fundamentals of Biochemistry	3		-----		

### Elective Coursework (15 Units Minimum)

**Required:** Two courses must be taken from this list.

<b>Biol 350</b> <b>General Microbiology (4)</b> <sub>L</sub>	Biol 570    Neurobiology (3)	Biol 570    Neurobiology (3)
Biol 464    Functional Genomics Laboratory (2)	Biol 575    Molecular Basis of Heart Disease (3)	Biol 575    Molecular Basis of Heart Disease (3)
Biol 480    Clinical Hematology (3)	Biol 576    Developmental Biology (3)	Biol 576    Developmental Biology (3)
Biol 490    Undergraduate Honors Research (3)	Biol 584    Medical Microbiology (3)	Biol 584    Medical Microbiology (3)
Biol 510    Molecular Evolution (3)	Biol 485    Principles of Immunology (3)	Biol 485    Principles of Immunology (3)
<b>Biol 528</b> <b>Microbial Ecology (3)</b> <sub>L</sub>	or 585    Cellular and Molecular Immunology (3)	or 585    Cellular and Molecular Immunology (3)
Biol 549    Microbial Genetics and Physiology (3)	Biol 589    Stem Cell and Regenerative Biology (3)	Biol 589    Stem Cell and Regenerative Biology (3)
Biol 554    Molecular Virology (3)	Biol 590    Physiology of Human Systems (4)	Biol 590    Physiology of Human Systems (4)
Biol 556    Scanning Electron Microscopy Lab (2) <sub>L</sub>	Bio/Chem    Experimental topics/Selected Topics in	Bio/Chem    Experimental topics/Selected Topics in
Biol 557    Transmission Electron Microscopy Lab (3) <sub>L</sub>	496 and/or 596    Chemistry (1-3)	496 and/or 596    Chemistry (1-3)
Biol 562    Ecological Metagenomics (3) <sub>L</sub>	(Max. 3    and/or	(Max. 3    and/or
Biol 567L    Biochemistry, Cellular and Molecular Biology	units)    Special Topics in Biology/Advanced	units)    Special Topics in Biology/Advanced
Lab II (2) <sub>L</sub>	special Topics in Chemistry (1-3)	special Topics in Chemistry (1-3)
Biol 568    Bioinformatics (3)		

**Required:** 2 Lab Courses (One class *cannot* fulfill both lab course requirements.)

1. Organismal Lab Requirement – select at least one <b>Organismal lab</b> in bold from below.		
2. Lab Elective Requirement – select at least one additional lab course from below		

<b>Biol 350</b> <b>General Microbiology (4)</b>	<b>Biol 525</b> <b>Mammalogy (3)</b>	<b>Biol 525</b> <b>Mammalogy (3)</b>
Biol 354L    Experimental Ecology (2)	<b>Biol 526</b> <b>Terrestrial Arthropod Biology (4)</b>	<b>Biol 526</b> <b>Terrestrial Arthropod Biology (4)</b>
Biol 436    Human Physiology Lab (2)	Biol 527L    Animal Behavior Lab (1)	Biol 527L    Animal Behavior Lab (1)
Biol 464    Functional Genomics Laboratory	<b>Biol 528</b> <b>Microbial Ecology (3)</b>	<b>Biol 528</b> <b>Microbial Ecology (3)</b>
Biol 490    Undergraduate Honors Research (3)	<b>Biol 530</b> <b>Plant Systematics (4)</b>	<b>Biol 530</b> <b>Plant Systematics (4)</b>
<b>Biol 512</b> <b>Evolutionary &amp; Ecology of Marine</b>	<b>Biol 531</b> <b>Taxonomy of California Plants (4)</b>	<b>Biol 531</b> <b>Taxonomy of California Plants (4)</b>
<b>Mammals (3)</b>	<b>Biol 535</b> <b>Plant Ecology (4)</b>	<b>Biol 535</b> <b>Plant Ecology (4)</b>
<b>Biol 514</b> <b>Biology of Algae (4)</b>	Biol 540    Conservation Ecology (3)	Biol 540    Conservation Ecology (3)
<b>Biol 515</b> <b>Marine Invertebrate Biology (4)</b>	Biol 556    Scanning Electron Microscopy Lab (2)	Biol 556    Scanning Electron Microscopy Lab (2)
<b>Biol 516A</b> <b>Marine Larval Ecology Research Pt.1 (4)</b>	Biol 557    Transmission Electron Microscopy Lab (3)	Biol 557    Transmission Electron Microscopy Lab (3)
Biol 516B    Marine Larval Ecology Research Pt.2 (4)	Biol 562    Ecological Metagenomics (3)	Biol 562    Ecological Metagenomics (3)
Biol 517    Marine Ecology (3)	Biol 567L <sub>1</sub> Biochemistry, Cellular and Molecular Biology	Biol 567L <sub>1</sub> Biochemistry, Cellular and Molecular Biology
Biol 518    Biology of Fishes (4)	Lab II (2)	Lab II (2)
<b>Biol 523</b> <b>Herpetology (3)</b>	Biol 568    Bioinformatics (3)	Biol 568    Bioinformatics (3)
<b>Biol 524</b> <b>Ornithology (4)</b>		

### Custom Electives

- Customize your major by taking courses that you're interested in that are upper division Biology courses numbered 350-599 (except Biol 452) and upper division Chemistry courses (except Chem 300, 308, 497, 499, 560).
- Prior approval of the Biology Undergraduate Advisor (LSN-102) is needed and paperwork must be filed in order to enroll in Biol 497, 499, and/or 490.
- A maximum of 6 units between Biol 497 and 499 may be applied to the major.
- Elective courses (including Chem 498, Biol and Chem 496 and 596) must be approved by the emphasis Advisor.


No transfer courses will substitute for courses in the major without prior departmental approval.

<sub>1</sub> Only offered during Fall. See Biology Undergraduate Advisor to plan your coursework accordingly.

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