

## B. S. IN BIOLOGY: CELL AND MOLECULAR CONCENTRATION

Fall 2023 – Spring 2024

### I. ACADEMIC FOUNDATIONS & DEGREE REQUIREMENTS

<i>Requirement</i>	<i>Course</i>	<i>Credits</i>	<i>Term</i>	<i>Year</i>	<i>Grade</i>
First Year Experience	FYE 100	4	_____	_____	_____
Effective Writing I	WRT 120	3	_____	_____	_____
Effective Writing II	WRT 2__ <sup>▲</sup>	3	_____	_____	_____
Mathematics: Statistics	MAT 121+ or 125+	3	_____	_____	_____
Interdisciplinary (“I”)	_____	3	_____	_____	_____
Diverse Communities (“J”)	_____ <sup>♥</sup>	3	_____	_____	_____
Ethics (“ET”)	_____ <sup>♥</sup>	3	_____	_____	_____

**Writing Emphasis (“W”)** *Nine credits<sup>▲</sup>, integrated across General Education & Major courses.*

	<u>BIO 211</u>	_____	_____	_____	_____
<i>One at 300/400-level:</i>	_____	_____	_____	_____	_____

**Speaking Emphasis (“SE”)** *Nine credits<sup>▲</sup>, integrated across General Education & Major courses.*

	_____	_____	_____	_____	_____
<i>One at 300/400-level:</i>	<u>BIO 490</u>	_____	_____	_____	_____

### II. GENERAL EDUCATION DISTRIBUTIVE REQUIREMENTS

- Courses must be selected from the approved General Education list (see the [catalog](#)).
- Interdisciplinary (“I”) courses cannot also be a General Education distributive course.
- Biology majors fulfill their science requirements with CHE 103 and PHY 130/170.
- Distributive requirements can be simultaneously satisfied with other degree requirements, see some examples <sup>♦</sup>.

#### A. Humanities (6 credits): E.g., Literature (LIT/CLS), History (HIS), Philosophy (PHI)

*Courses must be selected from two different subject areas.*

_____	3	_____	_____	_____
_____	3	_____	_____	_____

#### B. Behavioral and Social Sciences (6 credits): E.g., Psychology (PSY), Sociology (SOC), Anthropology (ANT), Political Science (PSC), Geography (GEO), Economics (ECO)

*Courses must be selected from two different subject areas.*

*Note: Students taking the MCAT should take PSY 100 and SOC 100.*

_____	3	_____	_____	_____
_____	3	_____	_____	_____

#### C. Arts (3 credits): E.g., Art (ART), Art History (ARH), Dance (DAN), Film (FLM), Music (MHL, MTC), Theater (THA)

_____	3	_____	_____	_____
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**III. DIRECTED ELECTIVES – 14 credits (as many as needed to reach 120 total credits)**

_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

**IV. SUPPORTING COURSES (31-32 credits)**

Calculus **	MAT	3	_____	_____	_____
General Chemistry I	CHE 103	3	_____	_____	_____
General Chemistry I Lab	CRL 103	1	_____	_____	_____
General Chemistry II	CHE 104	3	_____	_____	_____
General Chemistry II Lab	CRL 104	1	_____	_____	_____
Organic Chemistry I	CHE 231	4	_____	_____	_____
Organic Chemistry I Lab	CRL 231	2	_____	_____	_____
Organic Chemistry II	CHE 232	3	_____	_____	_____
Biochemistry 1	CHE 476	3	_____	_____	_____
General Physics I **	PHY 130	4	_____	_____	_____
General Physics II	PHY 140	4	_____	_____	_____

**V. BIOLOGY COURSES (42 credits) -- GPA must be 2.0 or higher to graduate.**

*A. Required Core Courses (19 credits)*

General Biology I ***	BIO 110	4	_____	_____	_____
General Biology II ***	BIO 111	4	_____	_____	_____
Genetics ***	BIO 210	3	_____	_____	_____
Genetics Lab ***	BIO 210L	1	_____	_____	_____
Cell Biology ***	BIO 211	4	_____	_____	_____
Seminar or Internship or Independent Study*** <sup>△</sup>	BIO 490/491/492	3	_____	_____	_____

*B. Other Required Courses (13 credits)*

General Microbiology ***	BIO 214	4	_____	_____	_____
Molecular Biol. Techniques	BIO 333	2	_____	_____	_____
Cellular and Molecular ***	BIO 421	4	_____	_____	_____
Molecular Genetics	BIO 431	3	_____	_____	_____

*C. Biology or Chemistry electives<sup>△</sup> (10 credits)*

Select 10 semester hours from courses in BIO or CHE at or above the 300 level (except BIO 307). Because of content overlap, students may take either BIO 468 or BIO 469 as an elective, but not both. Courses should be chosen in consultation with the student's advisor.

_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

## Notes and Requirements

Total degree program: 120 credits.

♠ The second (200-level) WRT course is chosen from WRT 200, 204, 205, 206, 208, or 220.

♥ The Diverse Communities (“J”) course and the Ethics (“ET”) courses can be satisfied through another requirement (e.g., Interdisciplinary or Distributive) as long as the course carries the appropriate attribute(s). *Note:* Credits are not duplicated such that if a course satisfies two requirements, those credits must be made up via directed electives (the minimum total credits for a B.S. degree is 120).

♣ All students must take at least 9 credits of Writing Emphasis courses and 9 credits of Speaking Emphasis courses. Students who enter WCU with 40-70 transfer credits only need 6 credits of each; students who enter with >70 transfer credits only need 3 credits of each. **All students must take at least 3 credits of Writing Emphasis and 3 credits of Speaking Emphasis at the 300-400 level.**

♦ Students should think about how requirements can be simultaneously satisfied. As examples: LNC 110 is a Humanities distributive that satisfies the Ethics requirement; PHI 180 is a Humanities distributive that satisfies the Diverse Communities & Ethics requirements; LIT 165 is a Humanities distributive that is also Writing Emphasis; PSC 101 is a Behavioral & Social Science distributive that satisfies the Diverse Communities requirement.

+ All student will need to complete the Math Placement Exam before they can enroll in MAT courses. For information, please visit the link below. Please direct any questions to [mathexam@wcupa.edu](mailto:mathexam@wcupa.edu).  
<https://www.wcupa.edu/sciences-mathematics/mathematics/mathematicsPlacement.aspx>

\* The Biology department recommends MAT 145 (Calculus for the Life Sciences; 3 credits) or MAT 161 (Calculus I; 4 credits). MAT 143 (Brief Calculus; 3 credits) is also acceptable. You must meet the necessary pre-requisites or obtain a minimum score on the Math Placement Exam to enroll in a calculus class. Visit the Math Department website to take the exam. If you receive a score of 3 or lower on the placement exam, you must take MAT 115 (Algebra, Functions, and Trigonometry) or MAT 131 (Precalculus) as preparation for Calculus (MAT 143 or MAT 145). If a student scores a 2 or lower, they will need to take MAT Q30 before they can enroll in MAT 115 or MAT 131. Students can repeat the mathematics assessment to improve their score. If you receive a score of 4 or above, you can enroll directly into MAT 143 or MAT 145. You must score a 5 to enroll into MAT 161 or take the pre-requisite of MAT 131.

\*\* The recommended Physics sequence is PHY 130 & PHY 140. Students may substitute the PHY 170 & PHY 180 sequence, but PHY 130 may not be used as a prerequisite for PHY 180 and PHY 170 may not be used as a prerequisite for PHY 140.

\*\*\* Course must be passed with a "C-" or better.

△ Students may only do one capstone course (BIO 490/491/492). Students using BIO 491/492 must be aware that they are fulfilling a capstone requirement, the credits will not also count as Biology electives. A maximum of 3 combined credits from BIO 391 and BIO 392 may be applied to the total BIO credits. Students who take CHE 491 instead of BIO 490/491/492 must take 10 credits of upper-level CHE or BIO courses.

# Suggested Sequence for B.S. Biology Majors

## Cell & Molecular Concentration

Fall 2023 – Spring 2024

____ ____ ____ ____ ____	<b>Semester #1 (15 credits)</b>	____ ____ ____ ____ ____	<b>Semester #2 (17 credits)</b>
	FYE 100 (4) WRT 120 (3) BIO 110 (4) CHE 103 (3) & CRL 103 (1)		WRT 2__ (3) BIO 111 (4) CHE 104 (3) & CRL 104 (1) Gen Ed Distributive: Behavioral & Social Science (3) MAT 125 or MAT 121 (3)
____ ____ ____ ____ ____	<b>Semester #3 (16 credits)</b>	____ ____ ____ ____ ____	<b>Semester #4 (17-18 credits)</b>
	BIO 210 (3) & BIO 210L (1) CHE 231 (4) & CRL 231 (2) Gen Ed Distributive: Humanities & Ethics Course (ET) (3) Gen Ed Distributive: Arts (3)		BIO 211 (W) (4) BIO 214 (4) CHE 232 (3) MAT 145 (3) or MAT 143 (3) / 161 (4) Gen Ed Distributive: Behavioral & Social Science (3)
____ ____ ____ ____ ____	<b>Semester #5 (15 credits)</b>	____ ____ ____ ____ ____	<b>Semester #6 (16 credits)</b>
	BIO 333 (2) PHY 130 (4) Diverse Communities Course (J) (3) Directed Elective (W) (3) Directed Elective (3)		CHE 476 (3) PHY 140 (4) Interdisciplinary Course (I) (3) Speaking Emphasis Course (SE) (3) BIO/CHE Elective (3)
____ ____ ____ ____ ____	<b>Semester #7 (15 credits)</b>	____ ____ ____ ____ ____	<b>Semester #8 (13-16 credits)</b>
	BIO 431 (3) BIO/CHE Elective (3) BIO/CHE Elective (3) Upper-level Directed Elective (W) (3) Gen Ed Distributive: Humanities (3)		BIO 421 (4) BIO/CHE Elective (3) Directed Elective (3) (if needed) Directed Elective (3) (if needed) BIO 490/491/492 (SE) (3)

All required 200 level Biology courses should be completed by the end of Semester #5.

Students should take Statistics (MAT 121 or 125) in the first year.

CRL 232 is recommended but not required for any student considering Professional training. CRL 232 is required for Graduate training following completion of their degree.

All students must take at least 9 credits of Writing Emphasis courses and 9 credits of Speaking Emphasis courses. Students who enter WCU with 40-70 transfer credits only need 6 credits of each; students who enter with >70 transfer credits only need 3 credits of each. **All students must take at least 3 credits of Writing Emphasis and 3 credits of Speaking Emphasis at the 300-400 level.**