

**ADVISING SHEET:
B. S. IN BIOLOGY: MICROBIOLOGY CONCENTRATION**

Fall 2024 – Spring 2025

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 or 123	3	_____	_____	_____
Effective Writing II	WRT 200	3	_____	_____	_____
Mathematics: Statistics	MAT 121 [♦] or 125 [♦]	3	_____	_____	_____
Interdisciplinary (“INT”)	_____	3	_____	_____	_____
Diverse Communities (“DIV”)	_____♥	3	_____	_____	_____
Ethics (“ETH”)	_____♥	3	_____	_____	_____

Writing Emphasis (“WRT”) *Nine credits**, integrated across General Education & Major courses.

_____	BIO 211	4	_____	_____	_____
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One at 300/400-level:

_____	_____	_____	_____	_____	_____
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Speaking Emphasis (“SPE”) *Nine credits**, integrated across General Education & Major courses.

_____	_____	_____	_____	_____	_____
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One at 300/400-level:

_____	BIO 490/491/492	3	_____	_____	_____
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II. GENERAL EDUCATION DISTRIBUTIVE REQUIREMENTS

- Courses must be selected from the approved General Education list (see the [catalog](#)).
- Interdisciplinary 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[♦].

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 (28-29 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	_____	_____	_____
General Physics I **	PHY 130	4	_____	_____	_____
General Physics II	PHY 140	4	_____	_____	_____

V. BIOLOGY COURSES (45 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	_____	_____	_____
Biology Capstone **** [△]	BIO 490/491/492	3	_____	_____	_____

B. Other Required Courses (12 credits)

General Microbiology ***	BIO 214	4	_____	_____	_____
Microbial Physiology ***	BIO 464	4	_____	_____	_____
Immunology ***	BIO 465	4	_____	_____	_____

C. Biology Electives [△] (12 credits)

Select courses under advisement from the following:

Pathogenic Microbiology	BIO 314	4	_____	_____	_____
Molecular Biology Techniques	BIO 333	2	_____	_____	_____
Microbial Genetics ****	BIO 334	4	_____	_____	_____
Applied & Industrial Microbiology	BIO 414	3	_____	_____	_____
Molecular Genetics ****	BIO 431	3	_____	_____	_____
Parasitology	BIO 452	3	_____	_____	_____
Mycology	BIO 454	3	_____	_____	_____
Virology	BIO 456	3	_____	_____	_____
Microbial Ecology	BIO 474	4	_____	_____	_____
Light Microscopy	BIO 480	3	_____	_____	_____
Epidemiology	BIO 484	3	_____	_____	_____

Research in Biology ^Δ	BIO 391	1-3	_____	_____	_____
Internship in Biology ^Δ	BIO 392	1-3	_____	_____	_____

Notes and Requirements

Total degree program: 120 credits.

♥ The Diverse Communities (“DIV”) course and the Ethics (“ETH”) courses can be satisfied through another requirement (e.g., General Education 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).

♣ Students must take at least 9 credits of Writing Emphasis courses and 9 credits of Speaking Emphasis courses. Students who enter WCU with 30-60 transfer credits only need 6 credits of each; students who enter with 61-90 transfer credits only need 3 credits of each. **All students with < 91 transfer credits must take at least 3 credits of Writing Emphasis and 3 credits of Speaking Emphasis at the 300-400 level.** Students who enter WCU with > 90 transfer credits are exempt from all Writing and Speaking Emphasis courses.

♦ 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 students will need to complete the Math Placement Exam before they can enroll in MAT courses. For information, please visit the [Math Department website](#). Please direct any questions to mathexam@wcupa.edu.

* 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 60 or lower on the exam, you must take MAT 113 (Algebra and Functions) or MAT 115 (Algebra, Functions, and Trigonometry) as preparation for Calculus (MAT 143 or MAT 145). If you score a 44 or lower, you will need to take MAT 112 (Algebra and Functions with Support) before you can enroll in MAT 113 or MAT 115. If you score 29 or lower, you will need to take MAT Q30 before you can enroll in MAT 112. If you receive a score of 61 or above, you can enroll directly into MAT 143 or MAT 145. You must score a 75 or above to enroll into MAT 161 or take the pre-requisite of MAT 131. Students can repeat the math placement exam to improve their score.

** 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.

**** Only one of BIO 334 (Microbial Genetics) or BIO 431 (Molecular Genetics) can be used as a Biology Elective.

^Δ Students may only do one Capstone course (BIO 490/491/492). Students taking BIO 490/491/492 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 of BIO 391 and 392 can be used towards Biology Electives. Projects are required to have a microbiology focus and must be approved by the Biology Department.

Suggested Sequence for B.S. Biology Majors

Microbiology Concentration

Fall 2024 – Spring 2025

_____	Semester #1 (15 credits)	_____	Semester #2 (17 credits)
_____	FYE 100 (4)	_____	WRT 200 (3)
_____	WRT 120 (3)	_____	BIO 111 (4)
_____	BIO 110 (4)	_____	CHE 104 (3) & CRL 104 (1)
_____	CHE 103 (3) & CRL 103 (1)	_____	MAT 121 or MAT 125 (3)
		_____	Gen Ed Distributive: Behavioral & Social Science (3)
	Semester #3 (16 credits)		Semester #4 (17-18 credits)
_____	BIO 210 (3) & BIO 210L (1)	_____	BIO 211 (WRT) (4)
_____	CHE 231 (4) & CRL 231 (2)	_____	BIO 214 (4)
_____	Gen Ed Distributive: Arts (3)	_____	CHE 232 (3)
_____	Gen Ed Distributive: Humanities & Ethics Course (ETH) (3)	_____	MAT 145 (3) or MAT 143 (3) /161 (4)
		_____	Gen Ed Distributive: Behavioral & Social Science (3)
	Semester #5 (16 credits)		Semester #6 (13 credits)
_____	BIO Elective (3)	_____	BIO Elective (3)
_____	PHY 130 (4)	_____	PHY 140 (4)
_____	Diverse Communities Course (DIV) (3)	_____	Interdisciplinary Course (INT) (3)
_____	Directed Elective (WRT) (3)	_____	Speaking Emphasis Course (SPE) (3)
_____	Directed Elective (3)		
	Semester #7 (13 credits)		Semester #8 (13-16 credits)
_____	BIO 465 (4)	_____	BIO 464 (4)
_____	BIO Elective (3)	_____	BIO Elective (3)
_____	Upper-level Directed Elective (WRT)(3)	_____	Directed Elective (3) (if needed)
_____	Gen Ed Distributive: Humanities (3)	_____	Directed Elective (3) (if needed)
		_____	BIO 490/491/492 (SPE) (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.
- Students may choose to take MAT 145, 143 or 161 Semester 4.
- Students must take at least 9 credits of Writing Emphasis courses and 9 credits of Speaking Emphasis courses. Students who enter WCU with 30-60 transfer credits only need 6 credits of each; students who enter with 61-90 transfer credits only need 3 credits of each. **All students with < 91 transfer credits must take at least 3 credits of Writing Emphasis and 3 credits of Speaking Emphasis at the 300-400 level.** Students who enter WCU with > 90 transfer credits are exempt from all Writing and Speaking Emphasis courses.