



Department of Biology

Undergraduate Advising Handbook

2024-2025

Biology website: <https://www.wcupa.edu/sciences-mathematics/biology/>

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BIOLOGY FACULTY

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MER 132	STEVENSON, Ms. Natalie <i>Instructor</i> B.A., University of Delaware M.S., University of Delaware	Microbiology nstevenson@wcupa.edu
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610-436-3009 SCN 377	TURNER, Dr. Gregory <i>Professor</i> B.S., Virginia Commonwealth University M.A., Hunter College M.Ed., Columbia University Ph.D., Fordham University	Graduate Coordinator Community Ecology gturner@wcupa.edu
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PROGRAM INFORMATION

BACHELOR OF SCIENCE: INTEGRATIVE CONCENTRATION

The B.S. Biology: Integrative Concentration is for students who wish to earn a general degree in Biology. Students may select from a variety of courses that provide skills needed to achieve a number of different career goals. This program prepares students for admission into graduate or professional schools. Students preparing for professional school who need to take the MCAT should take at least one semester of psychology and one semester of sociology.

For more information contact **Dr. Uehling**.

ACCELERATED PROGRAM - BACHELOR OF SCIENCE: INTEGRATIVE CONCENTRATION + MASTER OF SCIENCE IN BIOLOGY

The Accelerated Program allows students to start making progress on the Master's degree before completing their Bachelor's degree. Twelve credits of graduate coursework are used to satisfy the Bachelor's degree, allowing a student to earn both a B.S. and M.S. degree in as few as 138 credits. Students are considered undergraduates until conferral of the B.S. degree. Students can apply to the Accelerated Program in their junior year. *Students are responsible for finding a biology faculty member that is willing to serve as their thesis advisor as well as a thesis committee that will supervise the project.*

This program allows students to complete the Master's degree without doing a thesis project.

For more information contact **Dr. Turner**.

ACCELERATED PROGRAM - BACHELOR OF SCIENCE: INTEGRATIVE CONCENTRATION + MASTER OF SCIENCE IN BIOLOGY – THESIS OPTION

The Accelerated Program allows students to start making progress on the Master's degree before completing their Bachelor's degree. Twelve credits of graduate coursework are used to satisfy the Bachelor's degree, allowing a student to earn both a B.S. and M.S. degree in as few as 138 credits. Students are considered undergraduates until conferral of the B.S. degree. Students can apply to the Accelerated Program in their junior year. *Students are responsible for finding a biology faculty member that is willing to serve as their thesis advisor as well as a thesis committee that will supervise the project.*

This program involves a thesis project. To enroll in BIO 608 (Thesis Proposal), students must have attained (completed) 75 credits with a minimum of 18 biology credits. Students must have a minimum cumulative GPA of 3.00 including a minimum GPA of 3.00 for biology courses. BIO 608 requires departmental permission to enroll; students must arrange a committee meeting prior to

enrolling in BIO 608 (e.g., during their third year). Once admitted to the graduate program, graduate policies apply, including minimum GPA (3.00).

For more information contact **Dr. Turner**.

BACHELOR OF SCIENCE: CELL AND MOLECULAR CONCENTRATION

The B.S. Biology: Cell and Molecular Biology Concentration is designed to prepare students for graduate study or employment in research positions within the Cell and Molecular Biology field. The curriculum entails a core of concentration requirements (designed to provide an appropriate academic foundation) followed by a selection of upper-level concentration electives to be chosen in consultation with the student's Academic Advisor. Several Biology Department faculty members are actively engaged in Cell and Molecular Biology related research, and opportunities exist for qualified undergraduates to obtain hands-on research experience working in one of these laboratories. This program is appropriate for students anticipating a career in Medicine or other Health Professions. Students preparing for professional school who need to take the MCAT should take at least one semester of psychology and one semester of sociology.

For more information contact **Dr. Sullivan-Brown**.

BACHELOR OF SCIENCE: MICROBIOLOGY CONCENTRATION

The B.S. Biology: Microbiology Concentration is designed to provide students with the special preparation required for careers in clinical laboratories, industrial, academic research and government service in the areas of microbiology, immunology, virology, and mycology. The training students receive should make them especially attractive to biotechnology industries, several of which are developing or expanding in Pennsylvania and surrounding areas. Generation of highly trained individuals requires that the courses incorporated into the program provide extensive "hands-on" experience with the techniques that are most useful and important to modern biomedical sciences. Students will be exposed to fundamental knowledge of the characteristics, genetics, cultivation, metabolic properties, and host interaction of microorganisms including bacteria, fungi, intracellular and extracellular parasites, and viruses. Also included is the identification and characterization of such microorganisms. Emphasis will also be placed on acquisition of skills needed to evaluate and technically interpret results obtained.

Satisfactory completion of this program gives the student the option of taking the National Registry Examinations that provide recognition by the National Registry of Microbiologists at specific levels of training and/or experience mastered. Circulation of the student's name in the registry brings the student to the attention of prospective employers.

This program also provides the basic preparation needed for entry into graduate school in several specialized areas of biology or into professional schools.

Students whose primary interests relate to the role of microorganisms in nature (i.e., Microbial Ecology) should consider taking the following courses as directed electives: Chemistry of the Environment (CHE 403), Wastewater Systems (ENV 463), and Water Quality and Health (ENV 462).

For more information contact **Dr. Pisciotta**.

BACHELOR OF SCIENCE: ECOLOGY AND CONSERVATION CONCENTRATION

The B.S. Biology: Ecology and Conservation Concentration provides an opportunity for interested students to obtain a strong background in field biology. The required core curriculum and choice of electives provide opportunities for later careers as biologists in State and Federal Environmental agencies, industry, environmental consulting firms and similar organizations. Internships are strongly recommended as part of the program. Coursework emphasizes skills obtained in Biology, Chemistry and Mathematics. Additional coursework from other departments may be recommended to fulfill particular career objectives. Whereas many students obtain jobs in some area of Ecology directly after obtaining the B.S. degree, many jobs in Ecology today require a M.S. degree.

Although the basic purpose of the program is to develop strong analytical skills suitable for a broad range of careers in ecology, conservation, and environmental biology, the opportunity exists for some specialization at the undergraduate level through 1) recommended courses, 2) internships with local organizations, and 3) summer courses offered at appropriate biological field stations.

1) Recommended Courses: Students interested in aquatic ecology, water quality, fisheries and related fields should consider taking Freshwater Ecology (BIO 476), Wetlands (BIO 471), Water Quality and Health (ENV 462), and Chemistry of the Environment (CHE 403). Students interested in plant ecology, horticulture, and related fields should take Plant Physiology (BIO 466), Wetlands (BIO 471), Plant Communities (BIO 475), Systematic Botany (BIO 485), and selected courses such as Entomology (BIO 477) and Fundamentals of Soil (ESS 490). Students wishing to specialize in wetland ecology should plan to take Wetlands (BIO 471), Freshwater Ecology (BIO 476), Hydrogeology (ESS 339) and Soils (ESS 490). Students interested in microbial ecology should consider taking General Microbiology (BIO 214), Microbial Ecology (BIO 474), Microbial Physiology (BIO 464), Chemistry of the Environment (CHE 403), and Water Quality and Health (ENV 462). Students with an interest in animal ecology should plan to take Vertebrate Ecology (BIO 277), Entomology (BIO 477), Invertebrate Zoology (BIO 387) and Animal Behavior (PSY 335, 336).

2) Internships: A large number of local organizations are interested in providing student internships, and can supply valuable experience and contacts. Students should expect to seek internships during their senior year, or during the summer between their junior and senior years. Internships receive course credit as BIO 392 (1-3 credits of Biology Elective) or as BIO 492 (3-credit Biology Capstone course).

3) Biological Field Stations: Course taken during the summer at Biological Field Stations are highly recommended. Field stations provide an intensive exposure to field biology and can offer courses

complementary to those available at West Chester. Courses taken under advisement can be applied to the degree.

For more information contact **Dr. Schedlbauer**.

ACCELERATED PROGRAM - BACHELOR OF SCIENCE: ECOLOGY AND CONSERVATION CONCENTRATION + MASTER OF SCIENCE IN BIOLOGY

The Accelerated Program allows students to start making progress on the Master's degree before completing their Bachelor's degree. Twelve credits of graduate coursework are used to satisfy the Bachelor's degree, allowing a student to earn both a B.S. and M.S. degree in as few as 138 credits. Students are considered undergraduates until conferral of the B.S. degree. Students can apply to the Accelerated Program in their junior year. *Students are responsible for finding a biology faculty member that is willing to serve as their thesis advisor as well as a thesis committee that will supervise the project.*

To enroll in BIO 608 (Thesis Proposal), students must have attained (completed) 75 credits with a minimum of 18 biology credits. Students must have a minimum cumulative GPA of 3.00 including a minimum GPA of 3.00 for biology courses. BIO 608 requires departmental permission to enroll; students must arrange a committee meeting prior to enrolling in BIO 608 (e.g., during their third year). Any student wishing to switch out of the thesis option will be required to complete all requirements of the B.S. degree. Once admitted to the graduate program, graduate policies apply, including minimum GPA (3.00).

For more information contact **Dr. Turner**.

BACHELOR OF SCIENCE: MARINE SCIENCE CONCENTRATION

The B.S. Biology: Marine Science Concentration provides the opportunity for interested students to obtain a strong educational background in marine biology and other topics in a field that stretches from marine organisms to biotechnology and even oceanography interests, from the coastal waters to deep oceans. The required core curriculum and electives will allow students the opportunity to draw on educational resources at West Chester University and Marine Field stations, such as the Wallops Island Marine Science Consortium, VA. Course work emphasizes techniques in biological sciences, oceanography, chemistry, physics and mathematics. Field and laboratory courses form a strong foundation of this program and students are encouraged to engage in directed research projects or internships.

For more information contact **Dr. Boettger**.

BACHELOR OF SCIENCE: MEDICAL LABORATORY SCIENCE CONCENTRATION

The B.S. Biology: Medical Laboratory Science Concentration offers students the opportunity to enter the field of medical laboratory science with emphasis on the techniques and instrumentation used to evaluate patient samples. This concentration allows students to complete the necessary general education and departmental requirements in three years. The fourth year is spent in a hospital internship training program at one of the several affiliated hospitals and students receive 26 semester hour credits for the internship year (BIO 407 & 408, Internship in Medical Laboratory Science). To qualify for the internship, students must have a minimum 2.75 GPA and be accepted by an accredited hospital Medical Laboratory Science program. Applications should be submitted by the summer of the junior year (60 credits completed). Internships are very competitive and acceptance depends on the cumulative GPA, excellent letters of recommendation and successful completion of an on-site interview. Please note that some programs require Computer Science or Anatomy and Physiology courses. Students completing the internship will receive a B.S. in Biology: Medical Laboratory Science concentration and the training necessary to take the national certification exam.

Affiliated hospitals include Pennsylvania Hospital, Pennsylvania College of Health Sciences (formerly Lancaster General Hospital), Reading Hospital, and St. Christopher's Hospital.

For more information contact **Dr. Pisciotta**.

MINOR IN BIOLOGY

The Department of Biology offers a minor in biology. The Minor in Biology requirements include the following:

1. Students must take either BIO 110 (4 credits, requires C- or better) or BIO 100 (3 credits, requires A- or better)
2. Students must complete a minimum of 21 total credits of Biology courses (BIO). Therefore, up to 18 additional credits of Biology courses are required for the minor in addition to BIO 100 or BIO 110. A student can take either BIO 100 or BIO 110, not both.
3. Students must complete a minimum of 6 credits of advanced standing coursework in their minor. Advanced Standing coursework is defined as any 300-level course or above and specific 200-level courses. In Biology, 200-level Advanced Standing courses include Human Anatomy and Physiology II (BIO 269) and Vertebrate Ecology (BIO 277).
4. Prerequisites for all courses need to be satisfied. An A- or better in BIO 100 will count when BIO 110 is needed as a pre-requisite. Please contact the Biology Office to add a course if this applies to you.
5. Courses must be completed with C- or better AND at least 3 credits must be in addition to BIO courses required for student's major AND, for a student's first minor, at least 50% of these credits MUST be taken at a PASSHE institution.
6. Students must complete 6 credits in addition to those required by their major to achieve the minor. This is a University requirement.

For more information contact **Dr. Maresh**.

OTHER OPTIONS

Pre-Professional Studies

West Chester University has a Pre-Professional program design to help students gain entry into professional school once they graduate with an undergraduate degree from the University. The program aids student admission into programs such as medicine, veterinary sciences, physical assistants, physical therapists and dentistry. The program advises students on the courses appropriate for entry into the above programs and conducts mock interviews with applicants in their junior year to prepare them for successful admission. If recommended by the program, each applicant receives a committee letter of recommendation forwarded directly to their schools of choice. Although any biology major can qualify for these programs the department strongly encourages majors to be in either the *Integrative* or the *Cell and Molecular Biology* concentrations, as these offer almost all of the pre-requisite courses needed for entry into future programs.

Appropriate Biology courses students should take to gain admission to the schools include Organic Chemistry II lab (CRL 232) (not a biology requirement), Human Anatomy & Physiology I and II (BIO 259 and BIO 269), Comparative Vertebrate Anatomy (BIO 357), Animal Histology (BIO 428), Animal Development (BIO 448) and Comparative Vertebrate Physiology (BIO 468) *or* Human Physiology (BIO 469); with the exception of BIO 259 and BIO 269, these BIO courses fulfill Biology Elective credit. Other useful courses include Molecular Biology Techniques (BIO 333), Cellular and Molecular Biology (BIO 421), Molecular Genetics (BIO 431), Human Genetics (BIO 440), Virology (BIO 456), Immunology (BIO 465), Light Microscopy and the Living Cell (BIO 480), Epidemiology (BIO 484), and Research in Biology (BIO 391 and/or 491).

Other courses that are highly recommended include Biomedical Ethics (PHI 371), Business & Organizational Writing (ENG 368), Technical Writing (ENG 371), and Biochemistry I (CHE 476, an optional Biology Elective for Cell & Molecular students).

Interested students may apply in their second semester. Please note that five letters of reference are required for an interview or eligibility for a letter of recommendation from the Pre-Med committee. MCAT and GRE prep assistance is available through the Pre-Professional Office as well.

Pre-Physical Therapy Option

There are several academic paths a student may follow to prepare for a professional physical therapy program. The Department of Kinesiology has a Pre-Physical Therapy Concentration in Exercise Science, for students who wish to emphasize Exercise Science; we strongly recommend a Minor in Biology for those students. Students may also meet the requirements for Physical Therapy programs by following the BS: Integrative Biology program. In addition, within the College of Arts and Sciences, the Department of Biology and the Liberal Studies Program have cooperated on a degree plan that will allow students the flexibility necessary to meet the requirements of virtually all physical therapy schools in the Northeast. Students who are interested in a career in physical therapy are strongly advised to write to the admissions office of the schools they are interested in to determine specific prerequisites for those programs. Required biology courses are variable.

Students interested in pre-physical therapy in the College of Arts and Sciences should enter West

Chester University as majors in the BS: Integrative Biology program, and identify themselves as pre- physical therapy during their summer orientation and advising session. They will be given a pre- physical therapy guidance sheet, and all assigned to the same advisor. The basic skills, science, and math courses taken during the first year are virtually the same as the BS: Integrative Biology program, but specific courses are recommended for the general education electives. These include Psychology 100 and Philosophy 180.

After completing 32 credits with a minimum GPA of 2.00, the student may elect to transfer to the B.S. in Liberal Studies – Science and Mathematics Track, and declare a Biology Minor. Biology courses that will fulfill the requirements of the minor will be selected after advisement and consideration of the particular physical therapy school the student plans to enter.

Pre-MBA Option

Students interested in pursuing a Master's in Business Administration following a Bachelor of Science degree in Biology can be admitted to the M.B.A. program with a GMAT score of 460 (or its equivalent GRE score). The GMAT requirement will be waived if your overall GPA is 3.3 (or higher), and you earn a B or better in each of the following courses: Management, Accounting, Marketing, Economics (ECO 111 or ECO 112), Finance, and Statistics (MAT 121).

INFORMATION & POLICIES

Research Opportunities in Biology

All of the Biology professors hold doctoral degrees and most are actively engaged in research in such areas as molecular genetics, immunology, cell physiology, ecology, animal and plant biology, and functional morphology. These individuals are nationally and internationally recognized with over 50 articles and papers appearing over the last five years in prestigious journals. Almost half have recently received grant support from either the National Institutes of Health or the National Science Foundation. Research facilities, as well as classrooms, are equipped with such state-of-the-art equipment as liquid scintillation and gamma counters, spectrophotometers with recorders, a digitized HPLC system, and scanning and transmitting electron microscopes. The Biology Department also manages the 20,000 specimen William Darlington Herbarium and a 126-acre Robert B. Gordon Natural Area for Environmental Studies.

Undergraduates interested in receiving academic credit for participating in departmental research activities should take BIO 391 (Research in Biology) and/or BIO 491 (Capstone: Independent Research in Biology). Biology majors interested in gaining research experience in an off-campus external agency or university should take BIO 392 (Internship in Biology) and/or BIO 492 (Capstone: Professional Development in Biology). BIO 491 and BIO 492 are alternatives to the capstone course (BIO 490: Capstone: Seminar in Biology). Students interested in these courses should consult their academic advisor or any faculty member in their field of interest. An overall GPA of 2.5 and a GPA 2.5 or better in BIO courses is required before taking BIO 491 or BIO 492.

Advising & Graduation Requirements

The following pages (advising sheets) list the requirements for each of the programs within the Biology Department. You should use the appropriate section to plan and record your academic progress. Students are assigned to an Academic Advisor during summer orientation; consult with your Academic Advisor regularly. As academic advisors, Biology faculty members are expected to provide accurate, helpful information to students; students are expected to be knowledgeable about the academic policies and procedures governing the completion of their degrees. The ultimate responsibility for satisfying all graduation requirements is the student's. The ultimate responsibility for constructing each semester's schedule is also the student's. For university policy information and degree requirements, refer to the WCU Undergraduate Catalog for the year you entered the university. This is your contract with the university for your General Education Requirements, provided you maintain full-time student status, for the duration of your academic career and terminates upon earning your degree. You may at any time review your major requirements with your academic advisor. Students are expected to utilize campus email.

Every semester, a Scheduling Hold is placed on your account. This hold prevents you from scheduling until you meet with your Academic Advisor. Your advisor then removes the hold. This system is designed to assist you selecting the best coursework each semester to meet graduation guidelines in a timely fashion.

Please note that several courses WILL NOT count as a Biology major elective: BIO 102, 204, 259, 269, 307, and 469, and SCB courses. *See the WCU Undergraduate Catalog for prerequisites for individual courses.*

Be aware as well, that Interdisciplinary (“INT”) courses can **ONLY** be used to fulfill an Interdisciplinary requirement, not a General Education Distributive requirement.

You must apply for graduation one full year before you anticipate graduating. This allows you the time to take required courses that may be offered only once per year in case you need them to graduate. The application process begins online in your myWCU account. The Registrar’s Office will review your general education requirements with you prior to graduation. You should review your major requirements with your Academic Advisor. Students must have a GPA of 2.0 both overall, *and* in their BIO classes, to receive a degree in Biology. Transfer students must complete at least half of their Biology credits at WCU to receive a degree in Biology.

Transfer Students

To receive a degree in Biology from West Chester University, a transfer student must successfully complete 30 credits at WCU, and a minimum of 50 percent of the required biology credits (excluding cognates such as Chemistry, Physics, & Calculus) in the WCU Department of Biology.

Advanced Placement Policy

A score of three or better on the Biology Advanced Placement Exam will transfer as credit for BIO 110, General Biology I.

Darlington Biological Society

The Darlington Biological Society (DBS) is the Biology Club at WCU. This dedicated group of students meets regularly to discuss a variety of topics and events with the assistance of a biology faculty advisor. Past service opportunities include Gordon Natural Area Clean-Up Days, West Chester's Adopt-a-Block program, Alex's Lemonade Stand, Earth Week, Aid to South Africa, and Native Plant Garden (planted outside Merion's window wall). They also hold an annual Paintball Tournament and All Science Semi-Formal along with the Chemistry Club. Trips to the Philadelphia Zoo, NYC, Mutter Museum and Franklin Institute were also taken last year. Camping and hiking events take place throughout the year. DBS hosts a successful monthly Seminar Series highlighting faculty and guests' research. Additionally, the DBS runs a tutoring program for biology courses. The first meeting of the year is announced via campus email to Biology students using OrgSync. Meetings are held in the Biology Student Lounge in Science Center Link, Room 159.

Students should contact the Darlington Biological Society at BioClub@wcupa.edu.

Approved General Education Distributive Requirements

Beginning Fall 2014, only certain courses will be approved for general education credit for incoming first-year students. For a complete list of approved General Education Distributive classes consult the online Undergraduate Catalog. This can be found by going to www.wcupa.edu and typing in the words "approved general education course" using the search engine. or entering the following URL:

<https://catalog.wcupa.edu/undergraduate/general-education-requirements/approved-gen-ed-course-list/>

For transfer students, WCU will continue to accept transfer credit for courses other than those identified as "approved" general education courses, if the course equivalent has the same prefix as those in the sciences, behavioral and social sciences, humanities, or arts categories within the distributed requirements, including those assigned the 199 course number.

ADVISING SHEET:
B. S. IN BIOLOGY: CELL AND MOLECULAR 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	_____	_____	_____
<i>One at 300/400-level:</i>	_____	_____	_____	_____	_____

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

	_____	_____	_____	_____	_____
<i>One at 300/400-level:</i>	BIO 490/491/492	3	_____	_____	_____

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 – 12 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 (43 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 (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 Electives [△] (11 credits)

Select courses under advisement in BIO at or above the 300 level (except BIO 307). **Cell and Molecular Concentration students can take Biochemistry I (CHE 476) as a Biology Elective.** Because of content overlap, students may take either BIO 468 or BIO 469 for Biology Elective credit, but not both.

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

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.

△ 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 from BIO 391 and BIO 392 may be applied to the total Biology Elective credits. **CHE 476 (Biochemistry 1) is the only Chemistry course that can be used as a Biology Elective.**

Suggested Sequence for B.S. Biology Majors

Cell and Molecular 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 (15 credits)		Semester #6 (13 credits)
_____	BIO 333 (2)	_____	BIO Elective (suggested CHE 476*) (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 (15 credits)		Semester #8 (13-16 credits)
_____	BIO 431 (3)	_____	BIO 421 (4)
_____	BIO Elective (3)	_____	BIO Elective (3)
_____	BIO Elective (3)	_____	Directed Elective (3) (if needed)
_____	Upper-level Directed Elective (WRT)(3)	_____	Directed Elective (3) (if needed)
_____	Gen Ed Distributive: Humanities (3)	_____	BIO 490/491/492 (SPE) (3)

*** Although CHE 476 (Biochemistry 1) is not required, most medical school programs and some graduate programs require it. CHE 476 is the only Chemistry course that can be used as Biology Elective.**

- 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.

ADVISING SHEET:

B. S. IN BIOLOGY: ECOLOGY AND CONSERVATION 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.

_____	_____	_____	_____	_____	_____
-------	-------	-------	-------	-------	-------

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 – 13 credits (as many as needed to reach 120 total credits)

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

IV. SUPPORTING COURSES (25-26 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 ^Ω	CHE 231	4	_____	_____	_____
Organic Chemistry I Lab	CRL 231	2	_____	_____	_____
General Physics I **	PHY 130	4	_____	_____	_____
General Physics II	PHY 140	4	_____	_____	_____

V. BIOLOGY COURSES (40 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 *** ^Δ	BIO 490/491/492	3	_____	_____	_____

B. Other Required Courses (6 credits)

General Ecology ***	BIO 270	3	_____	_____	_____
Biostatistical Applications	BIO 310	3	_____	_____	_____

C. Biology Electives ^Δ (15 credits)

Select courses under advisement from the list below.

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

Biology Ecology Electives to be selected from:

BIO 275	Field Botany	BIO 453	Marine Mammals
BIO 277	Vertebrate Ecology	BIO 454	Mycology
BIO 312	Marine Botany	BIO 466	Plant Physiology
BIO 313	Marine Biology	BIO 470	Population Biology
BIO 315	Terrestrial Ecosystem Ecology	BIO 471	Wetlands
BIO 377	Entomology	BIO 473	Conservation Biology
BIO 387	Invertebrate Zoology	BIO 474	Microbial Ecology
BIO 391	Research in Biology	BIO 475	Plant Communities
BIO 392	Internship in Biology	BIO 476	Freshwater Ecology
BIO 412	Organic Evolution	BIO 478	Plant Evolution
BIO 415	Tropical Ecology & Conservation	BIO 485	Systematic Botany

VI. ECOLOGY-RELATED ELECTIVES (6 credits)

To be chosen under advisement from Biology Department approved list below. Student-originated requests to use a course not on the list to fulfill this requirement must be signed by their Advisor, then by the Department Chair.

Department of Biology		Department of Geology & Astronomy	
Any Biology Ecology Elective (above)		ESS 301	Environmental Geochemistry
BIO 214	General Microbiology	ESS 330	Introduction to Oceanography
BIO 457	Functional Animal Morphology	ESS 332	Advanced Oceanography
BIO 464	Microbial Physiology	ESS 336	Environmental Geology
BIO 468	Comparative Vertebrate Physiology	ESS 343	Geomorphology
		ESS 435	Remote Sensing
Department of Chemistry		ESS 439	Hydrogeology
CHE 232	Organic Chemistry II	ESS 490	Fundamentals of Soil
CHE 321	Analytical Chemistry I		
CHE 403	Chemistry of the Environment	Department of Geography & Planning	
CHE 424	Advanced Analytical Chemistry	GEO 225	Introduction to Maps & Remote Sensing
CRL 321	Experimental Analytical Chemistry I	GEO 316	Planning for Resilient Communities & Natural Disasters
CRL 424	Advanced Analytical Chemistry Lab	GEO 324	Introduction to GIS
		GEO 332	Environmental Crises
Department of Health		GEO 336	Environmental Planning
ENV 324	Environmental Sustainability	GEO 338	Environmental Applications of GIS
ENV 447	Environmental Regulations	GEO 341	Landscape Ecology
ENV 451	Environmental Toxicology	GEO 401	Internet Mapping
ENV 462	Water Quality and Health	GEO 402	Field Methods in Environmental Geography
		GEO 424	GIS Applications
Department of Psychology		PLN 320	Land Use Planning
PSY 335	Animal Behavior		
PSY 336	Animal Behavior Lab	Department of Political Science	
PSY 490	Course topics: Primate Behavior & Culture	PSC 354	Environmental Politics & Policy
ANT/PSY 230	Introduction to Primatology		
		Department of Economics	
		ECO 385	Environmental and Resource Economics

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.

^Ω While only CHE 231 is required for the major, students considering graduate studies should consult with their academic advisor regarding using CHE 232 as an Ecology-Related Elective, as some graduate programs require the course for admission.

** 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 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 from BIO 391 and BIO 392 may be applied to the total Biology Elective credits.

Suggested Sequence for B.S. Biology Majors

Ecology & Conservation 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 (16-17 credits)
_____	BIO 210 (3) & BIO 210L (1)	_____	BIO 211 (WRT) (4)
_____	CHE 231 (4) & CRL 231 (2)	_____	BIO 270 (3)
_____	Gen Ed Distributive: Arts (3)	_____	BIO ECOLOGY Elective (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 (13 credits)		Semester #6 (16 credits)
_____	BIO ECOLOGY Elective (3)	_____	BIO 310 (3)
_____	PHY 130 (4)	_____	BIO ECOLOGY Elective (3)
_____	Diverse Communities Course (DIV) (3)	_____	PHY 140 (4)
_____	Directed Elective (WRT) (3)	_____	Interdisciplinary Course (INT) (3)
		_____	Speaking Emphasis Course (SPE) (3)
	Semester #7 (15 credits)		Semester #8 (12 credits)
_____	BIO ECOLOGY Elective (3)	_____	BIO ECOLOGY Elective (3)
_____	Ecology-Related Elective (3)	_____	Ecology-Related Elective (3)
_____	Directed Elective (3) (if needed)	_____	Directed Elective (3) (if needed)
_____	Upper-level Directed Elective (WRT)(3)	_____	BIO 490/491/492 (SPE) (3)
_____	Gen Ed Distributive: Humanities (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 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.

**ADVISING SHEET:
ACCELERATED PROGRAM
B. S. IN BIOLOGY: ECOLOGY AND CONSERVATION + M.S. IN BIOLOGY
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	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

One at 300/400-level:

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

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

One at 300/400-level:

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 – 13 credits (to reach 120 total credits for the B.S. degree)

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

IV. SUPPORTING COURSES (28 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 (42 credits; 30 credits taken at the undergraduate level, 12 credits taken at the graduate level are applied to the B.S.) Must have 3.00 GPA for graduate admission.

A. Required Core Courses (16 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	_____	_____	_____

B. Other Required Courses (6 credits)

General Ecology ***	BIO 270	3	_____	_____	_____
Biostatistical Applications	BIO 310	3	_____	_____	_____

C. Biology Electives (3 credits)

Select courses under advisement from the list below.

_____	_____	_____	_____	_____
-------	-------	-------	-------	-------

BIO 275	Field Botany	BIO 453	Marine Mammals
BIO 277	Vertebrate Ecology	BIO 454	Mycology
BIO 312	Marine Botany	BIO 466	Plant Physiology
BIO 313	Marine Biology	BIO 470	Population Biology
BIO 315	Terrestrial Ecosystem Ecology	BIO 471	Wetlands
BIO 377	Entomology	BIO 473	Conservation Biology
BIO 387	Invertebrate Zoology	BIO 474	Microbial Ecology
BIO 391	Research in Biology	BIO 475	Plant Communities
BIO 392	Internship in Biology	BIO 476	Freshwater Ecology
BIO 412	Organic Evolution	BIO 478	Plant Evolution
BIO 415	Tropical Ecology & Conservation	BIO 485	Systematic Botany

D. Ecology-Related Electives (6 credits; must be selected under advisement from list below)

Department of Biology		Department of Geology & Astronomy	
Any Biology Ecology Elective (above)		ESS 301	Environmental Geochemistry
BIO 214	General Microbiology	ESS 330	Introduction to Oceanography
BIO 457	Functional Animal Morphology	ESS 332	Advanced Oceanography
BIO 464	Microbial Physiology	ESS 336	Environmental Geology
BIO 468	Comparative Vertebrate Physiology	ESS 343	Geomorphology
		ESS 435	Remote Sensing
Department of Chemistry		ESS 439	Hydrogeology
CHE 232	Organic Chemistry II	ESS 490	Fundamentals of Soil
CHE 321	Analytical Chemistry I		
CHE 403	Chemistry of the Environment	Department of Geography & Planning	
CHE 424	Advanced Analytical Chemistry	GEO 225	Introduction to Maps & Remote Sensing
CRL 321	Experimental Analytical Chemistry I	GEO 316	Planning for Resilient Communities & Natural Disasters
CRL 424	Advanced Analytical Chemistry Lab	GEO 324	Introduction to GIS
		GEO 332	Environmental Crises
Department of Health		GEO 336	Environmental Planning
ENV 324	Environmental Sustainability	GEO 338	Environmental Applications of GIS
ENV 447	Environmental Regulations	GEO 341	Landscape Ecology
ENV 451	Environmental Toxicology	GEO 401	Internet Mapping
ENV 462	Water Quality and Health	GEO 402	Field Methods in Environmental Geography
		GEO 424	GIS Applications
Department of Psychology		PLN 320	Land Use Planning
PSY 335	Animal Behavior		
PSY 336	Animal Behavior Lab	Department of Political Science	
PSY 490	Course topics: Primate Behavior & Culture	PSC 354	Environmental Politics & Policy
ANT/PSY 230	Introduction to Primatology		
		Department of Economics	
		ECO 385	Environmental and Resource Economics

VII. GRADUATE COURSES (30 credits)

A. Core Courses (12 credits)

Graduate Seminar in Biology	BIO 510	3	_____	_____	_____
Experimental Design & Analysis	BIO 511	3	_____	_____	_____
Topics & Methods in Cellular, Microbial, and Molecular Biology	BIO 520	3	_____	_____	_____
Topics & Methods in Ecology, Evolution, and Organismal Biology	BIO 521	3	_____	_____	_____

B. Electives ⁵ (9 credits)

C. *Research and Capstone* ^Σ (9 credits)

Thesis Proposal [△]	BIO 608	3	_____	_____	_____
Thesis Research	BIO 609	3	_____	_____	_____
Thesis and Defense	BIO 610	3	_____	_____	_____

Notes and Requirements

^Ω The Accelerated B.S. + M.S. program is only open to thesis students. Students should begin discussing topics with prospective faculty advisors during the 2nd year in preparation for the accelerated program during their 3rd year.

Credit requirements: B.S.: 120 credits; M.S.: 30 credits. Twelve credits taken at the graduate level are also applied to the B.S. degree. Therefore, the total for both degrees is 138 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.

ξ Any other 500-level BIO course except BIO 591. If a course is offered at both the 400 and 500 levels, the student must take the 500-level course. No more than 6 credits of 400-level courses may be counted toward the M.S. degree. With prior departmental approval, up to 6 credits of graduate course work from another department or university may be applied toward the M.S. degree. BIO 535, 536, and 537 may be repeated for credit provided the topic is different.

Σ A letter grade must be obtained for BIO 608 before the student can enroll in BIO 609. Likewise, a letter grade must be obtained for BIO 609 before the student can enroll in BIO 610.

♠ 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.

△ To be considered for the accelerated program and enroll in BIO 608 (Thesis Proposal), students must have attained (completed) 75 credits with a minimum of 18 biology credits. Students must have a minimum cumulative GPA of 3.00 including a minimum GPA of 3.00 for biology courses. BIO 608 requires departmental permission to enroll; students must arrange a committee meeting prior to enrolling in BIO 608 (*e.g.*, during their third year). The accelerated program is only open to thesis students. Any student wishing to switch out of the thesis option will be required to complete all requirements for the B.S. degree. Once admitted to the graduate program, graduate policies apply, including minimum GPA (3.00). See the [Graduate Catalog](#) for further details.

Σ A letter grade must be obtained for BIO 608 before the student can enroll in BIO 609. Likewise, a letter grade must be obtained for BIO 609 before the student can enroll in BIO 610.

Suggested Sequence for Accelerated B.S. + M.S. Biology Majors
Ecology & Conservation Concentration
 Fall 2024 – Spring 2025

____ ____ ____ ____	Semester #1 (15 credits)	____ ____ ____ ____	Semester #2 (17 credits)
	FYE 100 (4) WRT 120 (3) BIO 110 (4) CHE 103 (3) & CRL 103 (1)		WRT 200 (3) BIO 111 (4) CHE 104 (3) & CRL 104 (1) MAT 121 or MAT 125 (3) Gen Ed Distributive: Behavioral & Social Science (3)
____ ____ ____ ____	Semester #3 (16 credits)	____ ____ ____ ____	Semester #4 (16 credits)
	BIO 210 (3) & BIO 210L (1) CHE 231 (4) & CRL 231 (2) Diverse Communities Course (DIV) (3) Gen Ed Distributive: Humanities & Ethics Course (ETH) (3)		BIO 211 (WRT) (4) BIO 270 (3) CHE 232 (3) MAT 145 (3) or MAT 143 (3) /161 (4) Gen Ed Distributive: Arts (3)
____ ____ ____ ____	Semester #5 (16 credits)	____ ____ ____ ____	Semester #6 (16 credits)
	BIO ECOLOGY Elective (3) PHY 130 (4) Directed Elective (WRT) (3) Gen Ed Distributive: Humanities (3) Gen Ed Distributive: Behavioral & Social Science (3)		BIO 310 (3) Ecology-Related Elective (3) PHY 140 (4) Interdisciplinary Course (INT) (3) Speaking Emphasis Course (SPE) (3)
____ ____ ____ ____	Semester #7 [△] (14 credits)	____ ____ ____ ____	Semester #8 (15 credits)
	BIO 510 (3) BIO 520 (3) Directed Elective (2) Upper-level Directed Elective (WRT)(3) BIO 608 [△] (3)		Ecology-Related Elective (3) BIO 511 (3) BIO 521 (3) Directed Elective (3) Directed Elective (3)
____ ____ ____	Semester #9 (9 credits)	____ ____	Semester #10 (6 credits)
	Graduate-level BIO Elective (3) Graduate-level BIO Elective (3) BIO 609 (3)		Graduate-level BIO Elective (3) BIO 610 (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 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.

ADVISING SHEETS
B. S. IN BIOLOGY: INTEGRATIVE 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	_____	_____	_____
<i>One at 300/400-level:</i>	_____	_____	_____	_____	_____

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

	_____	_____	_____	_____	_____
<i>One at 300/400-level:</i>	BIO 490/491/492	3	_____	_____	_____

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 – 15 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 (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	_____	_____	_____
Biology Capstone *** [△]	BIO 490/491/492	3	_____	_____	_____

B. Other Required Courses (3 credits)

General Ecology ***	BIO 270	3	_____	_____	_____
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C. Biology Electives [△] (20 credits)

Select courses under advisement from BIO 214, BIO 275, BIO 277, or BIO courses at or above the 300 level (except BIO 307). Because of content overlap, students may take either BIO 468 or BIO 469 for Biology Elective credit, but not both.

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

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.

△ 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 from BIO 391 and BIO 392 may be applied to the total Biology Elective credits.

Suggested Sequence for B.S. Biology Majors

Integrative Biology 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 (16-17 credits)
_____	BIO 210 (3) & BIO 210L (1)	_____	BIO 211 (WRT) (4)
_____	CHE 231 (4) & CRL 231 (2)	_____	CHE 232 (3)
_____	Diverse Communities Course (DIV) (3)	_____	MAT 145 (3) or MAT 143 (3) /161 (4)
_____	Gen Ed Distributive: Humanities & Ethics Course (ETH) (3)	_____	Gen Ed Distributive: Arts (3)
		_____	Gen Ed Distributive: Behavioral & Social Science (3)
	Semester #5 (16 credits)		Semester #6 (16 credits)
_____	BIO 270 (3)	_____	BIO Elective (3)
_____	BIO Elective (3)	_____	BIO Elective (3)
_____	PHY 130 (4)	_____	PHY 140 (4)
_____	Directed Elective (3)	_____	Interdisciplinary Course (INT) (3)
_____	Gen Ed Distributive: Humanities (3)	_____	Speaking Emphasis Course (SPE) (3)
	Semester #7 (12 credits)		Semester #8 (15 credits)
_____	BIO Elective (3)	_____	BIO Elective (3)
_____	BIO Elective (3)	_____	BIO Elective (3)
_____	Directed Elective (3)	_____	Directed Elective (3)
_____	Upper-level Directed Elective (WRT)(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.

ADVISING SHEET:
ACCELERATED PROGRAM
B. S. IN BIOLOGY: INTEGRATIVE BIOLOGY + M.S. IN BIOLOGY
 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	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

One at 300/400-level:

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

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

One at 300/400-level:

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 – 15 credits (to reach 120 total credits for the B.S. degree)

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

IV. SUPPORTING COURSES (28 credits)

Calculus [▲] **	MAT 145	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 (42 credits; 30 credits taken at the undergraduate level, 12 credits taken at the graduate level are applied to the B.S.) Must have 3.00 GPA for graduate admission.

A. Required Core Courses (16 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	_____	_____	_____

B. Other Required Courses (3 credits)

General Ecology ***	BIO 270	3	_____	_____	_____
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C. Biology Electives (11 credits)

Select courses under advisement from BIO 214, BIO 275, BIO 277, or BIO courses at or above the 300 level (except BIO 307). Because of content overlap, students may take either BIO 468 or BIO 469 for Biology Elective credit, but not both.

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

D. Graduate Biology Core Courses (12 graduate credits, see below)

VI. GRADUATE COURSES

A. Core Courses (12 credits)

Graduate Seminar in Biology	BIO 510	3	_____	_____	_____
Experimental Design & Analysis	BIO 511	3	_____	_____	_____
Topics & Methods in Cellular, Microbial, and Molecular Biology	BIO 520	3	_____	_____	_____
Topics & Methods in Ecology, Evolution, and Organismal Biology	BIO 521	3	_____	_____	_____

B. Electives [§] (15 credits)

Any other 500-level BIO course except BIO 591. If a course is offered at both the 400 and 500 levels, the student must take the 500-level course. No more than 6 credits of 400-level courses may be counted toward the M.S. degree. With prior departmental approval, up to 6 credits of graduate course work from another department or university may be applied toward the M.S. degree. BIO 535, 536, and 537 may be repeated for credit provided the topic is different.

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

C. Research and Capstone (3 credits)

Directed Research in Biology ^{ΩΔ}	BIO 591	3	_____	_____	_____
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Notes and Requirements

Credit requirements: B.S.: 120 credits; M.S.: 30 credits. Twelve credits taken at the graduate level are also applied to the B.S. degree. Therefore, the total for both degrees is 138 credits.

^Ω Students should begin discussing research topics with prospective faculty advisors during their 3rd year in preparation for graduate courses during their 4th year.

♥ 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.

△ To complete BIO 591 successfully, the student must present the results of the project in an open seminar. In addition, the student must pass a written comprehensive examination prepared by the student's advisory committee. Students who fail this examination will not receive a grade for this capstone course.

Suggested Sequence for Accelerated B.S. + M.S. Biology Majors

Integrative Biology 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 (16-17 credits)
_____	BIO 210 (3) & BIO 210L (1)	_____	BIO 211 (WRT) (4)
_____	CHE 231 (4) & CRL 231 (2)	_____	CHE 232 (3)
_____	Diverse Communities Course (DIV) (3)	_____	MAT 145 (3) or MAT 143 (3) /161 (4)
_____	Gen Ed Distributive: Humanities & Ethics Course (ETH) (3)	_____	Gen Ed Distributive: Arts (3)
		_____	Gen Ed Distributive: Behavioral & Social Science (3)
_____	Semester #5 ^Ω (16 credits)	_____	Semester #6 (16 credits)
_____	BIO 270 (3)	_____	BIO Elective (3)
_____	BIO Elective (3)	_____	BIO Elective (3)
_____	PHY 130 (4)	_____	PHY 140 (4)
_____	Directed Elective (3)	_____	Interdisciplinary Course (INT) (3)
_____	Gen Ed Distributive: Humanities (3)	_____	Speaking Emphasis Course (SPE) (3)
_____	Semester #7 (14 credits)	_____	Semester #8 (12 credits)
_____	BIO 510 (3)	_____	BIO 511 (3)
_____	BIO 520 (3)	_____	BIO 521 (3)
_____	Directed Elective (2)	_____	Directed Elective (3)
_____	Upper-level Directed Elective (WRT)(3)	_____	Directed Elective (3)
_____	Graduate-level BIO Elective (3)		
_____	Semester #9 (9 credits)	_____	Semester #10 (9 credits)
_____	BIO Elective (3)	_____	Graduate-level BIO Elective (3)
_____	Graduate-level BIO Elective (3)	_____	Graduate-level BIO Elective (3)
_____	Graduate-level BIO Elective (3)	_____	BIO 591 ^Δ (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 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.

**ADVISING SHEET:
ACCELERATED PROGRAM**

B. S. IN BIOLOGY: INTEGRATIVE BIOLOGY + M.S. IN BIOLOGY – THESIS OPTION

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

One at 300/400-level:

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

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

One at 300/400-level:

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 – 15 credits (to reach 120 total credits for the B.S. degree)

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

IV. SUPPORTING COURSES (28 credits)

Calculus ^{▲*}	MAT 145	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 (42 credits; 30 credits taken at the undergraduate level, 12 credits taken at the graduate level are applied to the B.S.) Must have 3.00 GPA for graduate admission.

A. Required Core Courses (16 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	_____	_____	_____

B. Other Required Courses (3 credits)

General Ecology ^{***}	BIO 270	3	_____	_____	_____
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C. Biology Electives (11 credits)

Select courses under advisement from BIO 214, BIO 275, BIO 277, or BIO courses at or above the 300 level (except BIO 307). Because of content overlap, students may take either BIO 468 or BIO 469 for Biology Elective credit, but not both.

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

D. Graduate Biology Core Courses (12 graduate credits, see below)

VI. GRADUATE COURSES

A. Core Courses (12 credits)

Graduate Seminar in Biology	BIO 510	3	_____	_____	_____
Experimental Design & Analysis	BIO 511	3	_____	_____	_____
Topics & Methods in Cellular, Microbial, and Molecular Biology	BIO 520	3	_____	_____	_____
Topics & Methods in Ecology, Evolution, and Organismal Biology	BIO 521	3	_____	_____	_____

B. Electives (9 credits)

Any other 500-level BIO course except BIO 591. If a course is offered at both the 400 and 500 levels, the student must take the 500-level course. No more than 6 credits of 400-level courses may be counted toward the M.S. degree. With prior departmental approval, up to 6 credits of graduate course work from another department or university may be applied toward the M.S. degree. BIO 535, 536, and 537 may be repeated for credit provided the topic is different.

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

C. Research and Capstone ^Σ (9 credits)

Thesis Proposal ^Δ	BIO 608	3	_____	_____	_____
Thesis Research	BIO 609	3	_____	_____	_____
Thesis and Defense	BIO 610	3	_____	_____	_____

Notes and Requirements

Credit requirements: B.S.: 120 credits; M.S.: 30 credits. Twelve credits taken at the graduate level are also applied to the B.S. degree. Therefore, the total for both degrees is 138 credits.

^Ω Students should begin discussing research topics with prospective faculty advisors during their 3rd year in preparation for graduate courses during their 4th year.

♥ 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.

△ To enroll in BIO 608 (Thesis Proposal), students must have attained (completed) 75 credits with a minimum of 18 biology credits. Students must have a minimum cumulative GPA of 3.00 including a minimum GPA of 3.00 for biology courses. BIO 608 requires departmental permission to enroll; students must arrange a committee meeting prior to enrolling in BIO 608 (*e.g.*, during their third year). Once admitted to the graduate program, graduate policies apply, including minimum GPA (3.00). See the [Graduate Catalog](#) for further details.

Σ A letter grade must be obtained for BIO 608 before the student can enroll in BIO 609. Likewise, a letter grade must be obtained for BIO 609 before the student can enroll in BIO 610.

Suggested Sequence for Accelerated B.S. + M.S. Biology Majors

Integrative Biology Concentration – Thesis Option

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 (16-17 credits)
_____	BIO 210 (3) & BIO 210L (1)	_____	BIO 211 (WRT) (4)
_____	CHE 231 (4) & CRL 231 (2)	_____	CHE 232 (3)
_____	Diverse Communities Course (DIV) (3)	_____	MAT 145 (3) or MAT 143 (3) /161 (4)
_____	Gen Ed Distributive: Humanities & Ethics Course (ETH) (3)	_____	Gen Ed Distributive: Arts (3)
		_____	Gen Ed Distributive: Behavioral & Social Science (3)
	Semester #5 ^Ω (16 credits)		Semester #6 (16 credits)
_____	BIO 270 (3)	_____	BIO Elective (3)
_____	BIO Elective (3)	_____	BIO Elective (3)
_____	PHY 130 (4)	_____	PHY 140 (4)
_____	Directed Elective (3)	_____	Interdisciplinary Course (INT) (3)
_____	Gen Ed Distributive: Humanities (3)	_____	Speaking Emphasis Course (SPE) (3)
	Semester #7 (14 credits)		Semester #8 (12 credits)
_____	BIO 510 (3)	_____	BIO 511 (3)
_____	BIO 520 (3)	_____	BIO 521 (3)
_____	Directed Elective (2)	_____	Directed Elective (3)
_____	Upper-level Directed Elective (WRT)(3)	_____	Directed Elective (3)
_____	BIO 608 ^Δ (3)		
	Semester #9 (9 credits)		Semester #10 (9 credits)
_____	BIO Elective (3)	_____	Graduate-level BIO Elective (3)
_____	Graduate-level BIO Elective (3)	_____	Graduate-level BIO Elective (3)
_____	BIO 609 ^Σ (3)	_____	BIO 610 ^Σ (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 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.

ADVISING SHEET:
B. S. IN BIOLOGY: MARINE SCIENCE 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	_____	_____	_____
<i>One at 300/400-level:</i>	_____	_____	_____	_____	_____

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

	_____	_____	_____	_____	_____
<i>One at 300/400-level:</i>	BIO 490/491/492	3	_____	_____	_____

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 – 16 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	_____	_____	_____
General Physics I ^{**}	PHY 130	4	_____	_____	_____
General Physics II	PHY 140	4	_____	_____	_____
Intro Oceanography ^{***ΦΩ}	ESS 330	3	_____	_____	_____

V. BIOLOGY COURSES (40 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 ^{***Δ}	BIO 490/491/492	3	_____	_____	_____

B. Other Required Courses (12 credits)

General Ecology ^{***}	BIO 270	3	_____	_____	_____
Biostatistical Applications	BIO 310	3	_____	_____	_____
Marine Botany	BIO 312	3	_____	_____	_____
Marine Biology	BIO 313	3	_____	_____	_____

C. Marine Science Electives ^Δ (9 credits)

Select courses under advisement from the Biology Department’s approved list below. 6 credits are to be chosen at the 300 to 400-level. Student-originated requests to use a course not on the list to fulfill this requirement must be approved by their Advisor, then by the Department Chair.

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

West Chester Courses:

BIO 387 Invertebrate Zoology
BIO 453 Marine Mammals
ESS 332 Advanced Oceanography
GEO 324 Introduction to GIS

Cheyney Courses:

SLF 330 Marine Invertebrates
SLF 332 Ichthyology

Wallops Island/Marine Field Station Courses (all 3-credit courses):

- Courses are to be chosen from two or more topics including but not limited to: marine or wetlands ecology, ichthyology, invertebrate zoology, marine mammals, ornithology, marine molecular biology, and biotechnology
- Courses to be completed at the Wallops Island Marine Science Consortium and other marine field stations (summer and winter sessions) will be approved on an individual basis and will require Advisor and Department approval.

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.

△ 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 from BIO 391 and BIO 392 may be applied to the total Biology Elective credits.

Φ Core Courses of the Marine Science concentration.

Ω Marine Science majors are exempt from the pre-requisites of ESS 101 for ESS 330 (Introduction to Oceanography).

Suggested Sequence for B.S. Biology Majors Marine Science 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 (16-17 credits)
_____	BIO 210 (3) & BIO 210L (1)	_____	BIO 211 (WRT) (4)
_____	CHE 231 (4) & CRL 231 (2)	_____	CHE 232 (3)
_____	Gen Ed Distributive: Arts (3)	_____	BIO 313 (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 (16 credits)
_____	BIO 270 (3)	_____	BIO 310 (3)
_____	PHY 130 (4)	_____	BIO 312 (3)
_____	ESS 330 (3)	_____	PHY 140 (4)
_____	Diverse Communities Course (DIV) (3)	_____	Interdisciplinary Course (INT) (3)
_____	Directed Elective (3)	_____	Speaking Emphasis Course (SPE) (3)
	Semester #7 (12 credits)		Semester #8 (12 credits)
_____	Marine Science Elective (3)	_____	Marine Science Elective (3)
_____	Marine Science Elective (3)	_____	Directed Elective (3)
_____	Upper-level Directed Elective (WRT)(3)	_____	Directed Elective (3) (if needed)
_____	Gen Ed Distributive: Humanities (3)	_____	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.

ADVISING SHEET:
B. S. IN BIOLOGY: MEDICAL LABORATORY SCIENCE 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	_____	_____	_____
<i>One at 300/400-level:</i>	_____	_____	_____	_____	_____

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

	_____	_____	_____	_____	_____
<i>One at 300/400-level:</i>	BIO 490/491/492	3	_____	_____	_____

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 – 6 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 (53 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 (34 credits)

General Microbiology ^{***}	BIO 214	4	_____	_____	_____
Immunology ^{***}	BIO 465	4	_____	_____	_____

❖ Internship in Medical Laboratory Science ^{***}

BIO 407-408	26	_____	_____	_____
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Notes and Requirements

Total degree program: 120 credits.

Some Medical Laboratory Science programs require a course in computer science. Consult with **Dr. Pisciotta**.

♥ 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.

❖ To qualify for the internship, students must have a minimum 2.75 GPA and be accepted by an accredited hospital Medical Laboratory Science program. Applications should be submitted by the summer of the junior year (60 credits completed). Internships are very competitive and acceptance depends on the cumulative GPA, excellent letters of recommendation and successful completion of an on site interview. Please note that some programs require computer science or Anatomy and Physiology courses. Please see **Dr. Pisciotta** for any questions about applying for this internship.

△ 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 elective credits. A maximum of 3 combined credits from BIO 391 and BIO 392 may be applied to the total Directed Elective credits for the Medical Laboratory Sciences concentration.

Suggested Sequence for B.S. Biology Majors Medical Laboratory Science 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 (17 credits)		Semester #6 (16 credits)
_____	BIO 465 (4)	_____	BIO 490/491/492 (SPE) (3)
_____	PHY 130 (4)	_____	PHY 140 (4)
_____	Diverse Communities Course (DIV) (3)	_____	Directed Elective (3)
_____	Interdisciplinary Course (INT) (3)	_____	Speaking Emphasis Course (SPE) (3)
_____	Upper-level Directed Elective (WRT)(3)	_____	Gen Ed Distributive: Humanities (3)
	Semester #7 (13 credits)		Semester #8 (13 credits)
_____	BIO 407	_____	BIO 408

- An average of 16 credits per semester must be completed to enter the Medical Laboratory Science training in the 4th year. If a student follows the proposed outline of courses, a total of 94 credits will be earned at WCU. The additional 26 credits necessary for graduation will be earned at the affiliated hospital.
- All required 200 level Biology courses should be completed by the end of Semester #4.
- 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.

**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:

_____	_____	_____	_____	_____	_____
-------	-------	-------	-------	-------	-------

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

_____	_____	_____	_____	_____	_____
-------	-------	-------	-------	-------	-------

One at 300/400-level:

_____	BIO 490/491/492	3	_____	_____	_____
-------	-----------------	---	-------	-------	-------

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.

MINOR IN BIOLOGY

Student _____

WCU ID: _____

Major: _____

Major Advisor: _____

REQUIREMENTS:

BIO 110 (4) _____ (requires C- or better)

or

BIO 100 (3) _____ (requires A- or better)

- Students must complete a minimum of 21 total credits of Biology courses (BIO). Therefore, up to 18 additional credits of Biology courses are required for the minor in addition to BIO 100 / BIO 110. A student can take either BIO 100 or BIO 110, not both.
- Students must complete a minimum of 6 credits of advanced standing coursework in their minor. Advanced Standing coursework is defined as any 300-level course or above and specific 200-level courses. In Biology, 200-level Advanced Standing courses include Human Anatomy and Physiology II (BIO 269) and Vertebrate Ecology (BIO 277).
- Prerequisites for all courses need to be satisfied. An A- or better in BIO 100 will count when BIO 110 is needed as a pre-requisite. Please contact the Biology office to add a course if this applies to you.
- Courses must be completed with C- or better AND at least 3 credits must be in addition to BIO courses required for student's major AND, for a student's first minor, at least 50% of these credits MUST be taken at a PASSHE institution.
- Students must complete 6 credits in addition to those required by their major to achieve the minor. This is a University requirement.

Course	Credits	Semester earned	Letter grade	Numerical value of grade	Numerical value X credits
BIO					
BIO					
BIO					
BIO					
BIO					
BIO					
Total # of credits earned					
				Minor GPA	

For the minor to be earned, a total of 21 credits of Biology courses (BIO) are needed regardless of whether BIO 100 or BIO 110 is taken, and the minor GPA must be 2.00 or better.

To calculate your minor GPA, use the chart above to fill in the Numerical value of grades column. Each letter grade corresponds to a number. Multiply this number by the number of credits earned for that grade and enter it in the last column. Add the column on the right together then divide that total by the total number of credits you have earned toward the major. This number will be your minor GPA.

B+	3.33	A	4	A-	3.67
C+	2.33	B	3	B-	2.67
D+	1.33	C	2	C-	1.67
		D	1	D-	0.67
		F	0		

Pre-MBA Guidance Sheet

Suggested Sequence for B.S. Biology Majors, Integrative Biology Concentration

	Semester #1 (18 credits)		Semester #2 (17 credits)
_____	FYE 100 (4)	_____	WRT 200 (3)
_____	WRT 120 (3)	_____	BIO 111 ¹ (4)
_____	BIO 110 ¹ (4)	_____	CHE 104 (3) & CRL 104 (1)
_____	CHE 103 (3) & CRL 103 (1)	_____	MAT 121 ² (3)
_____	Gen Ed Distributive ⁴ (3)	_____	Gen Ed Distributive ⁴ (3)
	Semester #3 (16 credits)		Semester #4 (13-14 credits)
_____	BIO 210 ¹ (3) & BIO 210L ¹ (1)	_____	BIO 211 ¹ (WRT) (4)
_____	CHE 231 (4) & CRL 231 (2)	_____	CHE 232 (3)
_____	Gen Ed Distributive ⁴ (ETH) (3)	_____	SPK 208 or SPK 230 (SPE) (3)
_____	ECO 111 or ECO 112 ² (3)	_____	Calculus ³ (3-4)
	Semester #5 (16 credits)		Semester #6 (16 credits)
_____	BIO 270 ¹ (3)	_____	BIO Elective ⁵ (3)
_____	BIO Elective ⁵ (3)	_____	BIO Elective ⁵ (3)
_____	PHY 130 (4)	_____	PHY 140 (4)
_____	ACC Elective ² (3)	_____	MGT Elective ² (3)
_____	FIN Elective ² (3)	_____	MKT Elective ² (3)
	Semester #7 (15 credits)		Semester #8 (12-15 credits)
_____	BIO Elective ⁵ (3)	_____	BIO Elective ⁵ (3)
_____	BIO Elective ⁵ (3)	_____	BIO Elective ⁵ (3)
_____	Interdisciplinary Course (INT) (3)	_____	Diverse Communities Course (DIV) (3)
_____	Upper-level Directed Elective (WRT)(3)	_____	Directed Elective (if needed) (3)
_____	Gen Ed Distributive ⁴ (3) (WRT) (3)	_____	BIO 490/491/492 ^{1,6} (SPE) (3)

- A GMAT score of 460 (or its equivalent GRE score) is required for admission to the M.B.A. program. The GMAT requirement will be waived if your overall GPA is 3.3 (or higher), and you earn a B or better in each of the following courses²: Management, Accounting, Marketing, Economics, Finance, and Statistics.
- 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.

1. Course must be passed with a "C-" or better. All required 200 level Biology courses should be completed by the end of Semester #5.
2. Course must be passed with a "B" or better. Students should take MAT 121 in the first year.
3. 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.
4. Choose courses from the approved list: 2 from the Humanities, 1 from the Behavioral and Social Sciences, and 1 from the Arts.
5. Selected from BIO 214, 275, 277, or BIO courses at or above the 300 level (except BIO 307). Because of content overlap, students may take either BIO 468 or BIO 469 for Biology Elective credit, but not both.
6. 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 from BIO 391 and BIO 392 may be applied to the total Biology Elective credits.