Department of Biology

Undergraduate Advising Handbook

2023-2024

Biology website: http://bio.wcupa.edu/biology/
Department office: Schmucker Science Center North, Room 175
Phone: 610-436-2538; *Fax*: 610-436-2183

WCU
WEST CHESTER
UNIVERSITY

TABLE OF CONTENTS

BIOLOGY FACULTY

Phone # *Office*	*Credentials*	*Field of Expertise* *E-mail address*
610-430-4601 SSN 475	**BOETTGER**, Dr. Anne *Professor* Prediploma Biology, Osnabrück University (Germany) B.Sc., Hon., Zoology, Aberdeen University (Scotland) Ph.D., University of Alabama	Invertebrate Zoology Marine and Fisheries Biology Environmental Physiology Cancer Research **aboettger@wcupa.edu**
610-436-2389 SSN 290	**BUSKIRK**, Dr. Sean *Assistant Professor* B.S., Pennsylvania State University Ph.D., University of Georgia	Microbial Evolution Bacterial Virulence **sbuskirk@wcupa.edu**
610-436-2856 SSN 175A	**CASOTTI**, Dr. Giovanni *Professor* B.S., Hon., Murdoch University (Australia) Ph.D., Murdoch University (Australia)	**Assistant Chair** Functional Morphology Physiology Microscopy **gcasotti@wcupa.edu**
610-436-2327 MER 325A	**CHAMBERS**, Dr. Benjamin *Assistant Professor* B.S., Pennsylvania State University Ph.D., University of Pennsylvania	Virology Immunology **bchambers@wcupa.edu**
610-436-2751 SSN 281	**CHANDLER**, Dr. Jennifer *Associate Professor* B.A., Transylvania University B.S., Northern Kentucky University Ph.D., West Virginia University	**Department Chair** Plant Ecology Biostatistics Conservation Biology **jchandler@wcupa.edu**
610-436-2985 MER 301	**DONZE-REINER**, Dr. Teresa *Associate Professor* B.S., University of Nebraska Ph.D., University of Nebraska-Lincoln	Plant Molecular Biology Bioinformatics Genetics **tdonze-reiner@wcupa.edu**

610-436-2460	**FISH**, Dr. Frank E.	Zoology
SSL 058	*Professor*	Marine Biology
	B.A., State University College	Functional Morphology
	at Oswego, New York	Ecological Physiology
	M.S., Michigan State University	
	Ph.D., Michigan State University	**ffish@wcupa.edu**
610-436-2396	**FORK**, Dr. Megan	Freshwater Ecology
SSN 380	*Assistant Professor*	Ecosystem Science
	B.S., University of Wisconsin – Madison	
	M.S., Florida International University	
	Ph.D., Duke University	**mfork@wcupa.edu**
610-436-2520	**GARNER**, Dr. Yvette	General Biology
MER 133	*Instructor*	Ecology
	B.S., University of Scranton	
	Ph.D., University of New Hampshire	**ygarner@wcupa.edu**
610-436-2760	**GESTL**, Dr. Erin	Molecular Biology
SSN 282	*Assistant Professor*	
	B.S., Pennsylvania State University	
	Ph.D., Pennsylvania State University	**egestl@wcupa.edu**
	HURLEY, Dr. Karen Chava	Sensory Physiology
MER 129	*Instructor*	Molecular Biology
	B.A., Northwestern University	Electrophysiology
	Ph.D., University of Chicago	
610-436-2318	**MARESH**, Dr. Jen	Physiological Ecology
MER 317	*Associate Professor*	Animal Energetics
	B.S., West Chester University	
	M.E.M., Duke University	
	Ph.D., University of California–Santa Cruz	**jmaresh@wcupa.edu**
610-436-2165	**PAGÁN**, Dr. Oné	Pharmacology
MER 302	*Professor*	Neurobiology
	B.S., University of Puerto Rico	Physiology
	M.S., University of Puerto Rico MSC	
	Ph.D., Cornell University	**opagan@wcupa.edu**

610-738-0506	**PHARES**, Dr. Gregg	Neurobiology
SSL 146	*Instructor*	Physiology
	B.S., Willamette University	
	Ph.D., University of Chicago	**gphares@wcupa.edu**
610-738-0540	**PISCIOTTA,** Dr. John	Microbiology
SSN 376	*Associate Professor*	
	B.A., Eckerd College	
	M.S., University of South Florida	
	Ph.D., Johns Hopkins University	**jpisciotta@wcupa.edu**
610-436-2404	**RAMALHO**, Dr. Manuela Oliveira	Genomics
MER 313	*Assistant Professor*	Entomology
	B.S., Universidade Estadual Paulista	Molecular Ecology
	(UNESP), Brazil	
	M.S., UNESP, Brazil	
	Ph.D., UNESP, Brazil	
	& Field Museum, Chicago, IL	**mramalho@wcupa.edu**
610-436-2316	**ROSARIO**, Dr. Michael	Comparative Biomechanics
MER 323	*Associate Professor*	Functional Morphology
	B.A., University of California, Berkeley	Computational Biology
	M.S., University of Massachusetts, Amherst	
	Ph.D., Duke University	**mrosario@wcupa.edu**
610-436-3175	**SCHEDLBAUER,** Dr. Jessica	Plant Ecology
SSN 383	*Professor*	Ecosystem Ecology
	B.A., Hartwick College	
	M.S., University of Maine	
	Ph.D., University of Idaho / Centro Agronómico	
	Tropical de Investigación y Enseñanza	**jschedlbauer@wcupa.edu**
610-436-2319	**SOWA**, Dr. Jessica	Host-Pathogen Interactions
MER 321	*Assistant Professor*	Cell Biology
	B.S., University of Rochester	Genetics
	Ph.D., Baylor College of Medicine	**jsowa@wcupa.edu**
	STAMIS, Ms. Sarah	General Biology
MER 318A	*Instructor*	Cellular & Molecular Biology
	B.A., Mount Holyoke College	
	M.S., West Chester University	**sstamis@wcupa.edu**

	STEVENSON, Ms. Natalie	Microbiologuy
MER 132	*Instructor*	
	B.A., University of Delaware	
	M.S., University of Delaware	**nstevenson@wcupa.edu**
610-436-2864	**SULLIVAN-BROWN**, Dr. Jessica	Molecular Biology
MER 319	*Associate Professor*	Developmental Biology
	B.S., James Madison University	
	Ph.D., Princeton University	**jsullivan-brown@wcupa.edu**
610-436-2249	**SWEET**, Dr. Eric	Molecular Biology
MER 322	*Assistant Professor*	Neurobiology
	B.S., Virginia Polytechnic Institute and State University	Neurodegenerative Disease
	Ph.D., Rutgers University	**esweet@wcupa.edu**
610-436-3009	**TURNER**, Dr. Gregory	**Graduate Coordinator**
SSN 377	*Professor*	Community Ecology
	B.S., Virginia Commonwealth University	
	M.A., Hunter College,	
	M.Ed., Columbia University	
	Ph.D., Fordham University	**gturner@wcupa.edu**
610-436-2457	**UEHLING**, Dr. Jennifer	
SSN 288	*Assistant Professor*	Animal Behavior
	B.A., University of Chicago	Ornithology
	B.S., University of Chicago	Foraging Ecology
	Ph.D., Cornell University	**juehling@wcupa.edu**
610-436-6936	**WALLACK**, Dr. Denise	Microbiology
MER 130	*Instructor*	Epidemiology
	B.A., Princeton University	
	M.S., Duke University	**dwallack@wcupa.edu**

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. Fish**.

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 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 377) 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 377), 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 409. A maximum of 8 credit hours may be used to satisfy Biology elective credit.

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. Casotti**.

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 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), Comparative Vertebrate Anatomy (BIO 357), Animal Histology (BIO 428), Animal Development (BIO 448) and Comparative Vertebrate Physiology (BIO 468), 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 Special Problems in Biology (BIO 491).

Other courses that are highly recommended include Biomedical Ethics (PHI 371), Business & Organizations Writing (ENG 368), Technical Writing (ENG 371), and Biochemistry I (CHE 476, required 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 general concentration in the BS in Biology. 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 particularly variable.

Students interested in pre-physical therapy in the College of Arts and Sciences should enter West Chester University as biology majors in the BS: General 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: General 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, 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 research opportunities should consult their 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 ("I") courses can **ONLY** be used to fulfill an interdisciplinary requirement, not a 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 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

NOTE: In order 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, the Mutter Museum and the 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 Schmucker Science 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 SHEETS:
B. S. IN BIOLOGY: INTEGRATIVE BIOLOGY CONCENTRATION
Fall 2023 – Spring 2024

I. ACADEMIC FOUNDATIONS & DEGREE REQUIREMENTS

Requirement	*Course*	*Credits*	*Term*	*Year*	*Grade*
First Year Experience	FYE 100	4	_____	_____	____
Effective Writing I	WRT 120	3	_____	_____	____
Effective Writing II	WRT 2__♠	3	_____	_____	____
Mathematics: Statistics	MAT 121+ or 125+	3	_____	_____	____
Interdisciplinary ("I")	_____	3	_____	_____	____
Diverse Communities ("J")	_____♥	3	_____	_____	____
Ethics ("ET")	_____♥	3	_____	_____	____

Writing Emphasis ("W") *Nine credits♣, integrated across General Education & Major courses.*

	BIO 211	___	_____	_____	____
	_____	___	_____	_____	____
One at 300/400-level:	_____	___	_____	_____	____

Speaking Emphasis ("SE") *Nine credits♣, integrated across General Education & Major courses.*

	_____	___	_____	_____	____
	_____	___	_____	_____	____
One at 300/400-level:	BIO 490	___	_____	_____	____

II. GENERAL EDUCATION DISTRIBUTIVE REQUIREMENTS

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

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	_____	_____	____

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	_____	_____	_____
Seminar or Internship or	BIO 490/491/492				
Independent Study***[△]		3	_____	_____	_____

B. *Other Required Courses* (3 credits)

General Ecology ***	BIO 270	3	_____	_____	_____

C. *Biology Electives*[△] (20 credits)

Select courses under advisement from BIO 214, BIO 215, BIO 217, 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 as an elective, but not both.

_____	___	_____	_____	_____	
_____	___	_____	_____	_____	
_____	___	_____	_____	_____	
_____	___	_____	_____	_____	
_____	___	_____	_____	_____	
_____	___	_____	_____	_____	
_____	___	_____	_____	_____	

Notes and Requirements

Total degree program: 120 credits.

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

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

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

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

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

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

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

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

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

Suggested Sequence for B.S. Biology Majors

Integrative Biology Concentration

Fall 2023 – Spring 2024

	Semester #1 (15 credits)		**Semester #2 (17 credits)**
____	FYE 100 (4)	____	WRT 2___ (3)
____	WRT 120 (3)	____	BIO 111 (4)
____	BIO 110 (4)	____	CHE 104 (3) & CRL 104 (1)
____	CHE 103 (3) & CRL 103 (1)	____	Gen Ed Distributive: Behavioral & Social Science (3)
		____	MAT 125 or MAT 121 (3)
	Semester #3 (16 credits)		**Semester #4 (16-17 credits)**
____	BIO 210 (3) & BIO 210L (1)	____	BIO 211(W) (4)
____	CHE 231 (4) & CRL 231 (2)	____	CHE 232 (3)
____	Diverse Communities Course (J) (3)	____	Gen Ed Distributive: Behavioral & Social Science (3)
____	Gen Ed Distributive: Humanities & Ethics Course (ET) (3)	____	Gen Ed Distributive: Arts (3)
		____	MAT 145 (3) or MAT 143 (3) /161 (4)
	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 (W) (3)	____	Interdisciplinary Course (I) (3)
____	Gen Ed Distributive: Humanities (3)	____	Speaking Emphasis Course (SE) (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 (W) (3)	____	Directed Elective (3) (if needed)
		____	BIO 490/491/492 (SE) (3)

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

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

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

ACCELERATED PROGRAM - B. S. IN BIOLOGY: INTEGRATIVE BIOLOGY + M. S. IN BIOLOGY

Fall 2023 – Spring 2024

I. ACADEMIC FOUNDATIONS & DEGREE REQUIREMENTS

Requirement	*Course*	*Credits*	*Term*	*Year*	*Grade*
First Year Experience	FYE 100	4	_____	_____	____
Effective Writing I	WRT 120	3	_____	_____	____
Effective Writing II	WRT 2__♠	3	_____	_____	____
Mathematics: Statistics	MAT 121+ or 125+	3	_____	_____	____
Interdisciplinary ("I")	_____	3	_____	_____	____
Diverse Communities ("J")	_____♥	3	_____	_____	____
Ethics ("ET")	_____♥	3	_____	_____	____

Writing Emphasis ("W") *Nine credits♣, integrated across General Education & Major courses.*

	BIO 211	___	_____	_____	____
	_____	___	_____	_____	____
One at 300/400-level:	_____	___	_____	_____	____

Speaking Emphasis ("SE") *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 ("I") courses cannot also be a General Education distributive course.*
- *Biology majors fulfill their science requirements with CHE 103 and PHY 130/170.*
- *Distributive requirements can be simultaneously satisfied with other degree requirements, see some examples♦.*

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	_____	_____	____

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 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	_____	_____	_____

C. *Biology Electives* [Ω] (11 credits)

_____	___	_____	_____	_____	
_____	___	_____	_____	_____	
_____	___	_____	_____	_____	
_____	___	_____	_____	_____	

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

VI. GRADUATE COURSES

A. *Core courses* (12 credits)

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

B. *Electives* [ξ] (15 credits)

_____	___	_____	_____	_____	
_____	___	_____	_____	_____	

_____	___	_____	_____	____
_____	___	_____	_____	____
_____	___	_____	_____	____

C. *Research and Capstone* (3 credits)

Directed Research in Biology	BIO 591 $^{\Delta}$	3	_____	_____	____

Notes and Requirements

Students should begin discussing research topics with prospective faculty advisors during the 3rd year in preparation for graduate courses in during their 4th 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 second (200-level) WRT course is chosen from WRT 200, 204, 205, 206, 208, or 220.

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

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

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

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

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

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

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

Ω - Biology electives are 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 as an elective, but not both.

Δ - 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.

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.

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

Integrative Biology Concentration

Fall 2023 – Spring 2024

	Semester #1 (15 credits)		**Semester #2 (17 credits)**
____	FYE 100 (4)	____	WRT 2___ (3)
____	WRT 120 (3)	____	BIO 111 (4)
____	BIO 110 (4)	____	CHE 104 (3) & CRL 104 (1)
____	CHE 103 (3) & CRL 103 (1)	____	MAT 125 or MAT 121 (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 (4)
____	CHE 231 (4) & CRL 231 (2)	____	CHE 232 (3)
____	Gen Ed Distributive: Humanities & Ethics Course (ET) (3)	____	Gen Ed Distributive: Arts (3)
		____	Gen Ed Distributive: Behavioral & Social Science (3)
____	Diverse Communities Course (J) (3)	____	MAT 145 (3) or MAT 143 (3) /161 (4)
	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)
____	Gen Ed Distributive: Humanities (3)	____	Interdisciplinary Course (I) (3)
____	Directed Elective (W) (3)	____	Speaking Emphasis Course (SE) (3)
	Semester #7 $^{\Delta}$ (14 credits)		**Semester #8 (12 credits)**
____	BIO 510 (3)	____	BIO 511 (3)
____	BIO 520 (3)	____	BIO 521 (3)
____	Upper-level Directed Elective (W) (3)	____	Directed Elective (3)
____	Directed Elective (2)	____	Directed Elective (3)
____	BIO Elective (3) (Graduate)		
	Semester #9 (9 credits)		**Semester #10 (9 credits)**
____	BIO Elective (3)	____	BIO Elective (3) (Graduate)
____	BIO Elective (3) (Graduate)	____	BIO Elective (3) (Graduate)
____	BIO Elective (3) (Graduate)	____	BIO 591 $^{\Delta}$ (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.

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

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

Fall 2023 – Spring 2024

I. ACADEMIC FOUNDATIONS & DEGREE REQUIREMENTS

Requirement	*Course*	*Credits*	*Term*	*Year*	*Grade*
First Year Experience	FYE 100	4	_____	_____	____
Effective Writing I	WRT 120	3	_____	_____	____
Effective Writing II	WRT 2__♠	3	_____	_____	____
Mathematics: Statistics	MAT 121+ or 125+	3	_____	_____	____
Interdisciplinary ("I")	_____	3	_____	_____	____
Diverse Communities ("J")	_____♥	3	_____	_____	____
Ethics ("ET")	_____♥	3	_____	_____	____

Writing Emphasis ("W") *Nine credits♣, integrated across General Education & Major courses.*

	BIO 211	___	_____	_____	____
	_____	___	_____	_____	____
One at 300/400-level:	_____	___	_____	_____	____

Speaking Emphasis ("SE") *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 ("I") courses cannot also be a General Education distributive course.*
- *Biology majors fulfill their science requirements with CHE 103 and PHY 130/170.*
- *Distributive requirements can be simultaneously satisfied with other degree requirements, see some examples♦.*

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	_____	_____	____

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 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	_____	_____	_____

C. *Biology Electives* [Ω] (11 credits)

_____	___	_____	_____	_____	
_____	___	_____	_____	_____	
_____	___	_____	_____	_____	
_____	___	_____	_____	_____	

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

VI. GRADUATE COURSES [Δ]

A. *Core courses* (12 credits)

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

B. *Electives* [ξ] (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

Students should begin discussing research topics with prospective faculty advisors during the 3rd year in preparation for graduate courses in during their 4th 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 second (200-level) WRT course is chosen from WRT 200, 204, 205, 206, 208, or 220.

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

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

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

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

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

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

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

Ω - Biology electives are 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 as an elective, but not both.

Δ - 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.*

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.

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

Integrative Biology Concentration

Fall 2023 – Spring 2024

	Semester #1 (15 credits)		**Semester #2 (17 credits)**
____	FYE 100 (4)	____	WRT 2___ (3)
____	WRT 120 (3)	____	BIO 111 (4)
____	BIO 110 (4)	____	CHE 104 (3) & CRL 104 (1)
____	CHE 103 (3) & CRL 103 (1)	____	MAT 125 or MAT 121 (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 (4)
____	CHE 231 (4) & CRL 231 (2)	____	CHE 232 (3)
____	Gen Ed Distributive: Humanities & Ethics Course (ET) (3)	____	Gen Ed Distributive: Arts (3)
		____	Gen Ed Distributive: Behavioral & Social Science (3)
____	Diverse Communities Course (J) (3)	____	MAT 145 (3) or MAT 143 (3) /161 (4)
	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)
____	Gen Ed Distributive: Humanities (3)	____	Interdisciplinary Course (I) (3)
____	Directed Elective (W) (3)	____	Speaking Emphasis Course (SE) (3)
	Semester #7 Δ (14 credits)		**Semester #8 (12 credits)**
____	BIO 510 (3)	____	BIO 511 (3)
____	BIO 520 (3)	____	BIO 521 (3)
____	Upper-level Directed Elective (W) (3)	____	Directed Elective (3)
____	Directed Elective (2)	____	Directed Elective (3)
____	BIO 608 Δ (3)		
	Semester #9 (9 credits)		**Semester #10 (9 credits)**
____	BIO Elective (3)	____	BIO Elective (3) (Graduate)
____	BIO Elective (3) (Graduate)	____	BIO Elective (3) (Graduate)
____	BIO 609 (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.

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

B. S. IN BIOLOGY: CELL AND MOLECULAR CONCENTRATION

Fall 2023 – Spring 2024

I. ACADEMIC FOUNDATIONS & DEGREE REQUIREMENTS

Requirement	*Course*	*Credits*	*Term*	*Year*	*Grade*
First Year Experience	FYE 100	4	_____	_____	_____
Effective Writing I	WRT 120	3	_____	_____	_____
Effective Writing II	WRT 2__♠	3	_____	_____	_____
Mathematics: Statistics	MAT 121+ or 125+	3	_____	_____	_____
Interdisciplinary ("I")	_____	3	_____	_____	_____
Diverse Communities ("J")	_____♥	3	_____	_____	_____
Ethics ("ET")	_____♥	3	_____	_____	_____

Writing Emphasis ("W") *Nine credits♣, integrated across General Education & Major courses.*

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

Speaking Emphasis ("SE") *Nine credits♣, integrated across General Education & Major courses.*

	_____	___	_____	_____	_____
	_____	___	_____	_____	_____
One at 300/400-level:	BIO 490	___	_____	_____	_____

II. GENERAL EDUCATION DISTRIBUTIVE REQUIREMENTS

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

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	_____	_____	_____

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

_____	___	_____	_____	____	
_____	___	_____	_____	____	
_____	___	_____	_____	____	
_____	___	_____	_____	____	
_____	___	_____	_____	____	

IV. SUPPORTING COURSES (31-32 credits)

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

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

A. *Required Core Courses* (19 credits)

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

B. *Other Required Courses* (13 credits)

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

C. *Biology or Chemistry electives*[△] (10 credits)

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

_____	___	_____	_____	____	
_____	___	_____	_____	____	
_____	___	_____	_____	____	
_____	___	_____	_____	____	
_____	___	_____	_____	____	

Notes and Requirements

Total degree program: 120 credits.

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

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

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

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

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

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

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

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

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

Suggested Sequence for B.S. Biology Majors

Cell & Molecular Concentration

Fall 2023 – Spring 2024

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

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

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

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

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

B. S. IN BIOLOGY: MICROBIOLOGY CONCENTRATION

Fall 2023 – Spring 2024

I. ACADEMIC FOUNDATIONS & DEGREE REQUIREMENTS

Requirement	*Course*	*Credits*	*Term*	*Year*	*Grade*
First Year Experience	FYE 100	4	_____	_____	____
Effective Writing I	WRT 120	3	_____	_____	____
Effective Writing II	WRT 2__♠	3	_____	_____	____
Mathematics: Statistics	MAT 121+ or 125+	3	_____	_____	____
Interdisciplinary ("I")	_____	3	_____	_____	____
Diverse Communities ("J")	_____♥	3	_____	_____	____
Ethics ("ET")	_____♥	3	_____	_____	____

Writing Emphasis ("W") *Nine credits♣, integrated across General Education & Major courses.*

	BIO 211	___	_____	_____	____
	_____	___	_____	_____	____
One at 300/400-level:	_____	___	_____	_____	____

Speaking Emphasis ("SE") *Nine credits♣, integrated across General Education & Major courses.*

	_____	___	_____	_____	____
	_____	___	_____	_____	____
One at 300/400-level:	BIO 490	___	_____	_____	____

II. GENERAL EDUCATION DISTRIBUTIVE REQUIREMENTS

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

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	_____	_____	____

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

_____	___	_____	_____	_____	
_____	___	_____	_____	_____	
_____	___	_____	_____	_____	
_____	___	_____	_____	_____	
_____	___	_____	_____	_____	

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 (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	_____	_____	_____
Seminar or Internship or	BIO 490/491/492				
Independent Study***△		3	_____	_____	_____

B. *Other Required Courses* (15 credits)

General Microbiology ***	BIO 214	4	_____	_____	_____
General Ecology ***	BIO 270	3	_____	_____	_____
Microbial Physiology***	BIO 464	4	_____	_____	_____
Immunology***	BIO 465	4	_____	_____	_____

C. *Biology Electives* (11 credits) to be chosen 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	_____	_____	_____
Epidemiology	BIO 484	3	_____	_____	_____
Light Microscopy	BIO 480	3	_____	_____	_____

Notes and Requirements

Total degree program: 120 credits.

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

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

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

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

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

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

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

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

**** Only one of BIO 334 (Microbial Genetics) or BIO 431 (Molecular Genetics) can be used as an elective.

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

Suggested Sequence for B.S. Biology Majors

Microbiology Concentration

Fall 2023 – Spring 2024

	Semester #1 (15 credits)		**Semester #2 (17 credits)**
____	FYE 100 (4)	____	WRT 2___ (3)
____	WRT 120 (3)	____	BIO 111 (4)
____	BIO 110 (4)	____	CHE 104 (3) & CRL 104 (1)
____	CHE 103 (3) & CRL 103 (1)	____	Gen Ed Distributive: Behavioral & Social Science (3)
		____	MAT 125 or MAT 121 (3)
	Semester #3 (16 credits)		**Semester #4 (17-18 credits)**
____	BIO 210 (3) & BIO 210L (1)	____	BIO 211 (W) (4)
____	CHE 231 (4) & CRL 231 (2)	____	BIO 214 (4)
____	Gen Ed Distributive: Humanities & Ethics Course (ET) (3)	____	CHE 232 (3)
		____	MAT 145 (3) or MAT 143 (3) /161 (4)
____	Gen Ed Distributive: Arts (3)	____	Gen Ed Distributive: Behavioral & Social Science (3)
	Semester #5 (16 credits)		**Semester #6 (13 credits)**
____	BIO 270 (3)	____	BIO Elective (3)
____	PHY 130 (4)	____	PHY 140 (4)
____	Diverse Communities Course (J) (3)	____	Interdisciplinary Course (I) (3)
____	Directed Elective (W) (3)	____	Speaking Emphasis Course (SE) (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 (W) (3)	____	Directed Elective (3) (if needed)
____	Gen Ed Distributive: Humanities (3)	____	Directed Elective (3) (if needed)
		____	BIO 490/491/492 (SE) (3)

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

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

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

B. S. IN BIOLOGY: ECOLOGY AND CONSERVATION CONCENTRATION

Fall 2023 – Spring 2024

I. ACADEMIC FOUNDATIONS & DEGREE REQUIREMENTS

Requirement	*Course*	*Credits*	*Term*	*Year*	*Grade*
First Year Experience	FYE 100	4	_____	_____	____
Effective Writing I	WRT 120	3	_____	_____	____
Effective Writing II	WRT 2__♠	3	_____	_____	____
Mathematics: Statistics	MAT 121+ or 125+	3	_____	_____	____
Interdisciplinary ("I")	_____	3	_____	_____	____
Diverse Communities ("J")	_____♥	3	_____	_____	____
Ethics ("ET")	_____♥	3	_____	_____	____

Writing Emphasis ("W") *Nine credits♣, integrated across General Education & Major courses.*

	BIO 211	___	_____	_____	____
	_____	___	_____	_____	____
One at 300/400-level:	_____	___	_____	_____	____

Speaking Emphasis ("SE") *Nine credits♣, integrated across General Education & Major courses.*

	_____	___	_____	_____	____
	_____	___	_____	_____	____
One at 300/400-level:	BIO 490	___	_____	_____	____

II. GENERAL EDUCATION DISTRIBUTIVE REQUIREMENTS

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

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	_____	_____	____

III. DIRECTED ELECTIVES – 13 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 (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	_____	_____	_____
Seminar or Internship or Independent Study***△	BIO 490/491/492	3	_____	_____	_____

B. *Other Required Courses* (6 credits)

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

C. *Biology Electives*△ (15 credits)

_____	___	_____	_____	_____	
_____	___	_____	_____	_____	
_____	___	_____	_____	_____	
_____	___	_____	_____	_____	
_____	___	_____	_____	_____	

Biology Electives to be selected from

BIO 275	Field Botany	BIO 466	Plant Physiology
BIO 277	Vertebrate Ecology	BIO 470	Population Biology
BIO 312	Marine Botany	BIO 471	Wetlands
BIO 313	Marine Biology	BIO 473	Conservation Biology
BIO 315	Terrestrial Ecosystem Ecology	BIO 474	Microbial Ecology
BIO 377	Entomology	BIO 475	Plant Communities
BIO 387	Invertebrate Zoology	BIO 476	Freshwater Ecology
BIO 412	Organic Evolution	BIO 478	Plant Evolution
BIO 415	Tropical Ecology & Conservation	BIO 485	Systematic Botany
BIO 453	Marine Mammals	BIO 491	Research in Biology
BIO 454	Mycology	BIO 492	Internship in Biology

VI. OTHER 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 Earth & Space Science**	
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 321	Analytical Chemistry I	ESS 490	Fundamentals of Soil
CHE 403	Chemistry of the Environment		
CHE 424	Advanced Analytical Chemistry	**Department of Geography & Planning**	
CRL 321	Analytical Chemistry I Lab	GEO 214	Introduction to Planning
CRL 424	Analytical Chemistry II Lab	GEO 225	Introduction to Maps & Remote Sensing
		GEO 230	Environmental Conservation & Sustainability
Department of Health		GEO 324	Introduction to GIS
ENV 447	Environmental Regulations	GEO 332	Environmental Crises
ENV 451	Environmental Toxicology	GEO 336	Environmental Planning
ENV 462	Water Quality and Health	GEO 338	Environmental Applications of GIS
		GEO 341	Landscape Analysis
Department of Psychology		GEO 401	Internet Mapping
PSY 335	Animal Behavior	GEO 402	Field Methods in Environmental Geography
PSY 336	Animal Behavior Lab	GEO 424	GIS Applications
PSY 490	Course Topics: Primate Behavior & Culture	PLN 320	Land Use Planning
ANT/PSY 230	Introduction to Primatology		
		Department of Political Science	
		PSC 354	Environmental Politics & Policy

Notes and Requirements

Total degree program: 120 credits.

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

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

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

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

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

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

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

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

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

Suggested Sequence for B.S. Biology Majors

Ecology and Conservation Concentration

Fall 2023 – Spring 2024

	Semester #1 (15 credits)		**Semester #2 (17 credits)**
____	FYE 100 (4)	____	WRT 2___ (3)
____	WRT 120 (3)	____	BIO 111 (4)
____	BIO 110 (4)	____	CHE 104 (3) & CRL 104 (1)
____	CHE 103 (3) & CRL 103 (1)	____	MAT 125 or MAT 121 (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 (W) (4)
____	CHE 231 (4) & CRL 231 (2)	____	BIO 270 (3)
____	Gen Ed Distributive: Humanities & Ethics (ET) course (3)	____	CHE 232 (3)
		____	MAT 145 (3) or MAT 143 (3) /161 (4)
____	Gen Ed Distributive: Arts (3)	____	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 (J) (3)	____	PHY 140 (4)
____	Directed Elective (W) (3)	____	Interdisciplinary Course (I) (3)
		____	Speaking Emphasis Course (SE) (3)
	Semester #7 (15 credits)		**Semester #8 (12 credits)**
____	BIO ECOLOGY Elective (3)	____	BIO ECOLOGY Elective (3)
____	BIO ECOLOGY Elective (3)	____	Ecology-related Elective (3)
____	Ecology-related Elective (3)	____	Directed Elective (3) (if needed)
____	Upper-level Directed Elective (W) (3)	____	BIO 490/491/492 (SE) (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.

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

ACCELERATED PROGRAM - B. S. IN BIOLOGY: ECOLOGY AND CONSERVATION CONCENTRATION + M. S. IN BIOLOGY

Fall 2023 – Spring 2024

I. ACADEMIC FOUNDATIONS & DEGREE REQUIREMENTS

Requirement	*Course*	*Credits*	*Term*	*Year*	*Grade*
First Year Experience	FYE 100	4	_____	_____	_____
Effective Writing I	WRT 120	3	_____	_____	_____
Effective Writing II	WRT 2__♠	3	_____	_____	_____
Mathematics: Statistics	MAT 121+ or 125+	3	_____	_____	_____
Interdisciplinary ("I")	_____	3	_____	_____	_____
Diverse Communities ("J")	_____♥	3	_____	_____	_____
Ethics ("ET")	_____♥	3	_____	_____	_____

Writing Emphasis ("W") *Nine credits♣, integrated across General Education & Major courses.*

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

Speaking Emphasis ("SE") *Nine credits♣, integrated across General Education & Major courses.*

	_____	___	_____	_____	_____
	_____	___	_____	_____	_____
One at 300/400-level:	BIO 490	___	_____	_____	_____

II. GENERAL EDUCATION DISTRIBUTIVE REQUIREMENTS

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

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	_____	_____	_____

III. DIRCTED 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 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 Ecology Electives* (3 credits; must be selected from list below)

_____	___	_____	_____	_____	

BIO 275	Field Botany	BIO 466	Plant Physiology
BIO 277	Vertebrate Ecology	BIO 470	Population Biology
BIO 312	Marine Botany	BIO 471	Wetlands
BIO 313	Marine Biology	BIO 473	Conservation Biology
BIO 315	Terrestrial Ecosystem Ecology	BIO 474	Microbial Ecology
BIO 377	Entomology	BIO 475	Plant Communities
BIO 387	Invertebrate Zoology	BIO 476	Freshwater Ecology
BIO 412	Organic Evolution	BIO 478	Plant Evolution
BIO 415	Tropical Ecology & Conservation	BIO 485	Systematic Botany
BIO 453	Marine Mammals	BIO 491	Research in Biology
BIO 454	Mycology	BIO 492	Internship in Biology

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

_____ ___ _____ _____ _____
_____ ___ _____ _____ _____

Department of Biology		**Department of Earth & Space Science**	
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 321	Analytical Chemistry I	ESS 490	Fundamentals of Soil
CHE 403	Chemistry of the Environment		
CHE 424	Advanced Analytical Chemistry	**Department of Geography & Planning**	
CRL 321	Analytical Chemistry I Lab	GEO 214	Introduction to Planning
CRL 424	Analytical Chemistry II Lab	GEO 225	Introduction to Maps & Remote Sensing
		GEO 230	Environmental Conservation & Sustainability
Department of Health		GEO 324	Introduction to GIS
ENV 447	Environmental Regulations	GEO 332	Environmental Crises
ENV 451	Environmental Toxicology	GEO 336	Environmental Planning
ENV 462	Water Quality and Health	GEO 338	Environmental Applications of GIS
		GEO 341	Landscape Analysis
Department of Psychology		GEO 401	Internet Mapping
PSY 335	Animal Behavior	GEO 402	Field Methods in Environmental Geography
PSY 336	Animal Behavior Lab	GEO 424	GIS Applications
PSY 490	Course Topics: Primate Behavior & Culture	PLN 320	Land Use Planning
ANT/PSY 230	Introduction to Primatology		
		Department of Political Science	
		PSC 354	Environmental Politics & Policy

VI. GRADUATE COURSES [Δ]

A. *Core courses* (12 credits)

Graduate Seminar in Biology BIO 510 3 _____ _____ _____
Experimental Design and 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* [ξ] (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

The Accelerated B.S. + M.S. program is only open to thesis students. Students should begin discussing research topics with prospective faculty advisors during the 2nd year in preparation for application to 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 second (200-level) WRT course is chosen from WRT 200, 204, 205, 206, 208, or 220.

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

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

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

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

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

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

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

Δ - 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 in biology is only open to thesis students. 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). *See the Graduate Catalog for further details.*

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.

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

Ecology & Conservation Concentration

Fall 2023 – Spring 2024

	Semester #1 (15 credits)		**Semester #2 (17 credits)**
____	FYE 100 (4)	____	WRT 2___ (3)
____	WRT 120 (3)	____	BIO 111 (4)
____	BIO 110 (4)	____	CHE 104 (3) & CRL 104 (1)
____	CHE 103 (3) & CRL 103 (1)	____	MAT 125 or MAT 121 (3)
		____	Gen Ed Distributive: Behavioral & Social Science (3)
	Semester #3 (16 credits)		**Semester #4 (16 credits)**
____	BIO 210 (3) & BIO 210L (1)	____	BIO 211 (W) (4)
____	CHE 231 (4) & CRL 231 (2)	____	BIO 270 (3)
____	Gen Ed Distributive: Humanities & Ethics (ET) course (3)	____	CHE 232 (3)
		____	Gen Ed Distributive: Arts (3)
____	Diverse Communities Course (J) (3)	____	MAT 145 (3) or MAT 143 (3) /161 (4)
	Semester #5 (16 credits)		**Semester #6 (16 credits)**
____	BIO Ecology elective (3)	____	BIO 310 (3)
____	PHY 130 (4)	____	Ecology-related elective (3)
____	Gen Ed Distributive: Humanities (3)	____	PHY 140 (4)
____	Directed Elective (W) (3)	____	Interdisciplinary Course (I) (3)
____	Gen Ed Distributive: Behavioral & Social Science (3)	____	Speaking Emphasis Course (SE) (3)
	Semester #7 Δ (14 credits)		**Semester #8 (15 credits)**
____	BIO 510 (3)	____	Ecology-related elective (3)
____	BIO 520 (3)	____	BIO 511 (3)
____	Upper-level Directed Elective (W) (3)	____	BIO 521 (3)
____	Directed Elective (2)	____	Directed Elective (3)
____	BIO 608 Δ (3)	____	Directed Elective (3)
	Semester #9 (9 credits)		**Semester #10 (6 credits)**
____	BIO elective (Graduate) (3)	____	BIO elective (Graduate) (3)
____	BIO elective (Graduate) (3)	____	BIO 610 (3)
____	BIO 609 (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.

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

B. S. IN BIOLOGY: MARINE SCIENCE CONCENTRATION

Fall 2023 – Spring 2024

I. ACADEMIC FOUNDATIONS & DEGREE REQUIREMENTS

Requirement	*Course*	*Credits*	*Term*	*Year*	*Grade*
First Year Experience	FYE 100	4	_____	_____	____
Effective Writing I	WRT 120	3	_____	_____	____
Effective Writing II	WRT 2__♠	3	_____	_____	____
Mathematics: Statistics	MAT 121+ or 125+	3	_____	_____	____
Interdisciplinary ("I")	_____	3	_____	_____	____
Diverse Communities ("J")	_____♥	3	_____	_____	____
Ethics ("ET")	_____♥	3	_____	_____	____

Writing Emphasis ("W") *Nine credits♣, integrated across General Education & Major courses.*

	BIO 211	___	_____	_____	____
	_____	___	_____	_____	____
One at 300/400-level:	_____	___	_____	_____	____

Speaking Emphasis ("SE") *Nine credits♣, integrated across General Education & Major courses.*

	_____	___	_____	_____	____
	_____	___	_____	_____	____
One at 300/400-level:	BIO 490	___	_____	_____	____

II. GENERAL EDUCATION DISTRIBUTIVE REQUIREMENTS

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

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	_____	_____	____

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 to 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	_____	_____	_____
Seminar or Internship or Independent Study***△	BIO 490/491/492	3	_____	_____	_____

B. *Other Required Courses* (12 credits)

General Ecology ***	BIO 270	3	_____	_____	_____
Biostatistical Applications	BIO 310	3	_____	_____	_____
Marine Biology*** Φ	BIO 313	3	_____	_____	_____
Marine Botany*** Φ	BIO 312	3	_____	_____	_____

C. *Marine Science Electives* (9 credits) – 6 credits are to be chosen at the 300 or 400 level from the Biology Department approved list.

_____	___	_____	_____	_____
_____	___	_____	_____	_____
_____	___	_____	_____	_____

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

Cheyney Courses:
Marine Invertebrates SLF330
Ichthyology SLF332

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 semesters) will be approved on an individual basis and will require advisor and departmental approval.

Notes and Requirements

Total degree program: 120 credits.

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

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

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

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

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

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

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

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

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

Φ Core Courses of the Marine Science Program Concentration.

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

Suggested Sequence for B.S. Biology Majors

Marine Science Concentration

Fall 2023 – Spring 2024

	Semester #1 (15 credits)		**Semester #2 (17 credits)**
____	FYE 100 (4)	____	WRT 2___ (3)
____	WRT 120 (3)	____	BIO 111 (4)
____	BIO 110 (4)	____	CHE 104 (3) & CRL 104 (1)
____	CHE 103 (3) & CRL 103 (1)	____	MAT 125 or MAT 121 (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 (W) (4)
____	CHE 231 (4) & CRL 231 (2)	____	CHE 232 (3)
____	Gen Ed Distributive: Arts (3)	____	BIO 313 (3)
____	Gen Ed Distributive: Humanities & Ethics (ET) course (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)
____	Diverse Communities Course (J) (3)	____	PHY 140 (4)
____	ESS 330 (3)	____	Interdisciplinary Course (I) (3)
____	Directed Elective (W) (3)	____	Speaking Emphasis Course (SE) (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 (W) (3)	____	Directed Elective (3)
____	Gen Ed Distributive: Humanities (3)	____	BIO 490/491/492 (SE) (3)

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

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

Marine Science relevant electives (noted in semesters 7&8) may need to be taken during the summer or winter terms, when taken off campus, i.e. at a Marine Science Field Station.

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

B. S. IN BIOLOGY: MEDICAL LABORATORY SCIENCE CONCENTRATION

Fall 2023 – Spring 2024

I. ACADEMIC FOUNDATIONS & DEGREE REQUIREMENTS

Requirement	*Course*	*Credits*	*Term*	*Year*	*Grade*
First Year Experience	FYE 100	4	_____	_____	_____
Effective Writing I	WRT 120	3	_____	_____	_____
Effective Writing II	WRT 2__♠	3	_____	_____	_____
Mathematics: Statistics	MAT 121+ or 125+	3	_____	_____	_____
Interdisciplinary ("I")	_____	3	_____	_____	_____
Diverse Communities ("J")	_____♥	3	_____	_____	_____
Ethics ("ET")	_____♥	3	_____	_____	_____

Writing Emphasis ("W") *Nine credits♣, integrated across General Education & Major courses.*

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

Speaking Emphasis ("SE") *Nine credits♣, integrated across General Education & Major courses.*

	_____	___	_____	_____	_____
	_____	___	_____	_____	_____
One at 300/400-level:	BIO 490	___	_____	_____	_____

II. GENERAL EDUCATION DISTRIBUTIVE REQUIREMENTS

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

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	_____	_____	_____

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	_____	_____	_____
Seminar ***	BIO 490	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	_____	_____	_____

Notes and Requirements

Total degree program: 120 credits.

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

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

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

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

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

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

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

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

❖ 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.

A maximum of 8 combined credits from BIO 409 & 491 may be applied to total Biology credits.

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

Suggested Sequence for B.S. Biology Majors

Medical Laboratory Science Concentration

Fall 2023 – Spring 2024

	Semester #1 (15 credits)		**Semester #2 (17 credits)**
____	FYE 100 (4)	____	WRT 2___ (3)
____	WRT 120 (3)	____	BIO 111 (4)
____	BIO 110 (4)	____	CHE 104 (3) & CRL 104 (1)
____	CHE 103 (3) & CRL 103 (1)	____	MAT 125 or MAT 121 (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 (W) (4)
____	CHE 231 (4) & CRL 231 (2)	____	BIO 214 (4)
____	Gen Ed Distributive: Arts (3)	____	CHE 232 (3)
____	Gen Ed Distributive: Humanities & Ethics (ET) course (3)	____	Gen Ed Distributive: Humanities (3)
		____	MAT 145 (3) or MAT 143 (3) /161 (4)
	Semester #5 (17 credits)		**Semester #6 (16 credits)**
____	PHY 130 (4)	____	PHY 140 (4)
____	BIO 465 (4)	____	BIO 490 (SE) (3)
____	Diverse Communities Course (J) (3)	____	Directed Elective (3)
____	Interdisciplinary Course (I) (3)	____	Speaking Emphasis Course (SE) (3)
____	Upper-level Directed Elective (W) (3)	____	Gen Ed Distributive: Behavioral & Social Science (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.

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

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.

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

Pre-MBA Guidance sheet

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

	Semester #1 (18 credits)		Semester #2 (17 credits)
____	FYE 100 (4)	____	WRT 2___[5] (3)
____	WRT 120 (3)	____	BIO 111[1] (SE) (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] (W) (4)
____	CHE 231 (4) & CRL 231 (2)	____	CHE 232 (3)
____	Gen Ed Distributive[4] (ET) (3)	____	SPK 208 or 230 (SE) (3)
____	ECO 111 or 112[2] (3)	____	Calculus[3] (3-4)
	Semester #5 (16 credits)		**Semester #6 (16 credits)**
____	BIO 270[1] (3)	____	BIO elective[6] (3)
____	BIO elective[6] (3)	____	BIO elective[6] (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[6] (3)	____	BIO elective[6] (3)
____	BIO elective[6] (3)	____	BIO elective[6] (3)
____	Interdisciplinary Course (I) (3)	____	Diverse Communities Course (J) (3)
____	Upper-level Directed elective (W) (3)	____	Directed elective (if needed) (3)
____	Gen Ed Distributive[4] (W) (3)	____	BIO 490/409/491[1,7] (SE) (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 courses[2]: Management, Accounting, Marketing, Economics, Finance, and Statistics.
- Students must take at least 9 credits of approved Writing Emphasis courses. Students with 40-70 transfer credits need a minimum of 6 credits; students with >70 transfer credits need a minimum of 3 credits. **At least 1 Writing Emphasis course must be taken at the 300 or 400 level for all students.**

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 3 or lower on the placement exam, you must take MAT 115 (Algebra, Functions, and Trigonometry) or MAT 131 (Precalculus) as preparation for Calculus (MAT 143 or MAT 145). If you receive a score of 4 or above, you can enroll directly into MAT 143 or MAT 145. You must score a 5 to enroll into MAT 161 or take the pre-requisite of MAT 131.
4. Choose courses from the approved list: 2 from the Humanities, 1 from the Behavioral and Social Sciences, and 1 from the Arts.
5. Approved WRT courses are 200, 204, 205, 206, 208, or 220.
6. Selected from BIO 214, 275, 277, or BIO courses at or above the 300 level except BIO 307 and BIO 469.
7. A maximum of 8 combined credits from BIO 409 & BIO 491 may be applied to total BIO credits.