

BIOLOGY

Degrees: Bachelor of Science
 Specializations: General Biology, Microbiology,
 Molecular Biology, Plant Science,
 Pre-Dental, Pre-Professional, Fast Track
 Masters
 Minor: Biology
 Certificates: Aquaculture, Bio-Medical Sciences,
 Biotechnology, Ecology, Evolutionary
 Biology, Infectious Disease, Molecular
 Sciences, Physiology, Plant Science
 Department: Biology
 Building 58, Room 79
 (850) 474-2748
 biology@uwf.edu
 College: Arts and Sciences
 Semester Hours Required for Degree: 120

Faculty: G. Stewart (Chairperson), W. Bennett, K. Behan, S. Bonomelli, A.B. Chaet (Emeritus), S.B. Collard, C.N. D'Asaro, P. Darby, D. Davis, T.C. Fox, M.A. Hood (Emeritus), W.H. Jeffrey, S. Krothapalli, J.E. Lepo, C. Pomory, K.R. Rao, V. Sharma, M.S. Shields, S. Smith, R.A. Snyder, P.A. Winter, F. Wray. Faculty Associates: B. Brecke, J. Burkhalter, J.C. Cornette, J.A. Couch, L.C. Folmar, J. Lanza, R.L. Lavine, P. Linehan, C.L. McKinney, D. Miller, B. Ripps, M. Thetford, J.B. Unruh, J.T. Winstead

Technological breakthroughs in areas such as biochemistry, botany, ecology, genetics, microbiology, molecular biology, and physiology are being used to solve problems in agriculture, environmental toxicology, forestry, medicine, public health, and pharmaceutical industry. The Department of Biology focuses on areas of modern biology and biotechnology offering the degree in six specializations: General Biology, Microbiology, Molecular Biology, Pre-Professional, Pre-Dental, and Plant Science. The specializations include a series of five core courses fundamental to all areas of biology. A fast-track program leading to a BS and MS is available to highly qualified students who have earned an Associate of Arts degree from a Florida public institution. Students from other institutions may be required to take additional courses. Another fast-track program in Biological Chemistry is available. See the Undergraduate Chemistry and Graduate Biology sections of this catalog. Elective courses emphasize theoretical and practical aspects within the chosen specialty. Graduates are prepared to gain employment in industry, government, health professions, and research laboratories or to pursue advanced degrees in the biological sciences, professional schools (medicine, dentistry, optometry, pharmacy, veterinary), and public health. Prospective students need to be aware that some biology lab courses involve use of live animals. Students may wish to seek details from course instructors before enrolling.

Students interested in obtaining certification to teach this subject area in secondary education need to contact an advisor in this department to carefully plan the course work to satisfy degree and some teacher certification requirements. A degree in this major is required for participation in teacher education certification options.

Contact the department for information concerning certificates.

PROGRAM REQUIREMENTS

In addition to general University requirements, students seeking the B.S. in Biology must meet the requirements listed below.

A grade of "C" or better is required in each of the five biology core courses.

Consult with your academic advisor for courses which may satisfy both the General Studies requirements and common prerequisites.

Course descriptions are listed alphabetically by prefix in the back of this catalog.

General Studies (36 sh)

Biology majors should satisfy the mathematics (6 sh) and science (7 sh) components of General Studies with course work taken from the common prerequisites shown below.

Pre-Dental majors should take DEP 2004 to meet the social science/behavioral component of General Studies.

Other biology majors should take ANT 2000 or PSY 2012 to satisfy the social science/behavioral perspectives component of General Studies.

For additional information see the General Studies section of this catalog.

Common Prerequisites (31-32 sh)

State mandated common prerequisites must be completed prior to graduation, but are not required for admission to the program.

Graduation requirements for the B.S. degree in Biology include the successful completion of the following science/mathematics prerequisites: three foundation courses in biology (recommended: General Botany; General Zoology; Cell Biology); General Chemistry I & II; Organic Chemistry I & II; two courses in physics; Calculus I and either Calculus II or Statistics. Statistics is preferred.

Since it will be difficult to incorporate all prerequisites into the 60 sh Lower Division Curriculum, students are advised to complete the following common prerequisites. Courses in brackets indicate substitutes from Florida Public Community/Junior Colleges and Universities.

+ CHM	2045/L	General Chemistry I/Lab	4
		[CHM x045/L]	
+ CHM	2046/L	General Chemistry II/Lab	4
		[CHM x046/L]	
+ MAC	2311	Analytic Geometry & Calculus I	4
		[MAC x311, 2233, 2253, x281]	
		<i>Choose one:</i>	
+ BOT	2010/L	General Botany/Lab	4
		[BOT x010/L, x013/L]	
+ ZOO	1010/L	General Zoology/Lab	4
		[ZOO x010/L, BSC x041/L, 1011/L]	
		<i>Choose one:</i>	
+ BSC	1010/L	General Biology/Lab	4
		[BSC x040/L, 2012/L]	
+ PCB	2131/L	Cell Biology/Lab*	4
		[PCB x010/L, x011/L, x021/L, x131/L]	
		*Preferred Course	

Choose one:

+ MAC	2312	Analytic Geometry & Calculus II	4
		[MAC x312, 2234, 2254, x282]	
+ STA	2023	Elements of Statistics*	3
		[STA 2122, 2014, 2024, 2321]	
		*Preferred course	

Choose one (Option 1 is recommended):

Option 1

CHM	2210/L	Organic Chemistry I/Lab	4
CHM	2211/L	Organic Chemistry II/Lab	4

Option 2

+ PHY	2048/L	University Physics I/Lab	4
		[PHY x048/L]	
+ PHY	2049/L	University Physics II/Lab	4
		[PHY x049/L]	

*Option 3**

+ PHY	2053/L	General Physics I/Lab	4
		[PHY x053/L]	
+ PHY	2054/L	General Physics II/Lab	4
		[PHY x054/L]	
		*Preferred option	

+ Indicates common prerequisites which can be used to satisfy General Studies requirements.

Lower Division Electives (0-6 sh)

Sufficient 1000/2000 level electives to complete at least 60 semester hours in the lower division. Current UWF students may use elective courses at any level (1000-4999) to meet this elective requirement.

GENERAL BIOLOGY SPECIALIZATION**Biology Core (20 sh)**

BCH	3033/L	Biochemistry I/Lab	4
PCB	3063/L	Genetics/Lab	4
PCB	3253/L	Developmental Biology/Lab	4
PCB	4043/L	Ecology/Lab	4

Choose one:

BOT	4503/L	Plant Physiology/Lab	4
PCB	4723/L	Comparative Animal Physiology I/Lab	4

Specialization (22 sh)

3000/4000 level Biology electives	22
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May include any upper division course in biology except ZOO 3733. At least two upper division botany courses must be included in the program.

Major-Related (18 sh)

STA	4173	Biostatistics	3
3000/4000 level Computer Science elective	3		

If not completed at the Lower Division:

BOT	2010/L	General Botany/Lab	4
CHM	2210/L & CHM 2211/L	Organic Chemistry I & II	8
ZOO	1010/L	General Zoology/Lab	4

Choose One:

PHY	2048/L & PHY 2049/L	University Physics I & II	8
PHY	2053/L & PHY 2054/L	General Physics I & II *	8
		*Preferred Courses	

Upper Division Electives (0 sh)**MICROBIOLOGY SPECIALIZATION****Biology Core (20 sh)**

Same as General Biology Specialization.

Specialization (22 sh)

BCH	3034/L	Biochemistry II/Lab	4
MCB	3020/L	Microbiology/Lab	4
MCB	4653/L	Applied Microbiology/Lab	4
PCB	4233/L	Immunology/Lab	4

Electives, choose 6 sh from:

BOT	4404/L	Aquatic Botany/Lab	4
MCB	4274	Public Health Bacteriology	3
MCB	4603	Microbial Ecology	3
MCB	4710	Biology of the Protists	3
MCB	4733	Marine Microbiology	3
MLS	4460/L	Diagnostic Microbiology I/Lab	4
MLS	4462/L	Medical Microbiology/Lab	4
PCB	4xx5	Molecular Biology	3
PCB	4173C	Electron Microscopy	4
PCB	4522	Genetic Engineering	3
ZOO	3233/L	Parasitology/Lab	4
MCB	3905/4905	Directed Studies	V

Major-Related (18 sh)

Same as General Biology Specialization.

Upper Division Electives (0 sh)**MOLECULAR BIOLOGY SPECIALIZATION****Biology Core (20 sh)**

Same as General Biology Specialization.

Specialization (22 sh)

MCB	3020/L	Microbiology/Lab	4
PCB	4xx5	Molecular Biology	3
PCB	4233/L	Immunology/Lab	4
PCB	4522	Genetic Engineering	3

Choose 8 sh:

BCH	3034/L	Biochemistry II/Lab	4
MCB	4653/L	Applied Microbiology/Lab	4
MLS	4305/L	Hematology I/Lab	4
MLS	4462/L	Medical Microbiology/Lab	4
PCB	4173C	Electron Microscopy	4
ZOO	3233/L	Parasitology/Lab	4
3000/4000 level Biology course except ZOO 3733	3		
Biology Directed Studies	V		

Major-Related (18 sh)

Same as General Biology Specialization.

Upper Division Electives (0 sh)**PLANT SCIENCE SPECIALIZATION****Biology Core (20 sh)**

Same as General Biology Specialization.

Specialization (22 sh)*18 sh must be in area of plant science*

BOT 3601/L Plant Ecology/Lab	4
BOT 4404/L Aquatic Botany/Lab	4
BOT 4503/L Plant Physiology/Lab	4
BOT 4712/L Plant Taxonomy & Evolution/Lab	4
If BOT 4503 is selected as part of the biology core, an additional 4 sh must be taken from electives.	

Choose 6 sh:

MCB 3020/L Microbiology/Lab	4
MCB 4710 Biology of the Protists	3
PCB 4173C Electron Microscopy	4

Major-Related (18 sh)

Same as General Biology Specialization.

Upper Division Electives (0 sh)

PRE-PROFESSIONAL BIOLOGY SPECIALIZATION

See also the Professional Program-Medical Sciences in this catalog.

Biology Core (20 sh)

Same as General Biology Specialization.

Specialization (22 sh)

BCH 3034/L Biochemistry II/Lab	4
MCB 3020/L Microbiology/Lab	4
PCB 4703 Human Physiology	3
ZOO 4753/L Histology/Lab	4

Choose 7 sh:

HSC 3550 Pathophysiology	3
MCB 4653/L Applied Microbiology/Lab	4
MLS 4462/L Medical Microbiology/Lab	4
PCB 4xx5 Molecular Biology	3
PCB 4233/L Immunology/Lab	4
PCB 4522 Genetic Engineering	3
ZOO 3233/L Parasitology/Lab	4
3000/4000 level Biology course except ZOO 3733	3
Biology Directed Studies	V

Major-Related (18 sh)

Same as General Biology Specialization.

Upper Division Electives (0 sh)**BIOLOGY PRE-DENTAL SPECIALIZATION**

Students must comply with the admission requirements to this specialization discussed in the pre-dental program description in the Undergraduate Degree Programs section of the Catalog.

Biology Core (20 sh)

Same as General Biology Specialization except that pre-dental students must take PCB 4723/L.

Specialization (24 sh)

*DEN 5100C Human Anatomy	6
*DEN 5120 Principles of Physiology	6
*DEN 5121C Biochemistry & Molecular Biology/Lab	4
MCB 3020/L Microbiology/Lab	4

PCB 4233/L Immunology/Lab	4
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* Indicates courses taken at UF College of Dentistry that apply to degree.

Major-Related (11-14 sh)

STA 4173 Biostatistics	3
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*Choose one option not previously completed:**Option 1*

CHM 2210/L Organic Chemistry I/Lab	4
CHM 2211/L Organic Chemistry II/Lab	4

Option 2

PHY 2048/L University Physics I/Lab	4
PHY 2049/L University Physics II/Lab	4

*Option 3**

PHY 2053/L General Physics I/Lab	4
PHY 2054/L General Physics II/Lab	4

*Preferred Option

If not completed at the Lower Division:

DEP 2004 Human Development Across the Lifespan	3
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Upper Division Electives (2-5 sh)

Sufficient 3000/4000 level electives to meet UWF's requirement of 48 semester hours in the upper division or completion of all departmental requirements at the 3000/4000 level, whichever is greater.

FAST TRACK BACHELORS/MASTERS SPECIALIZATION

The Fast Track Bachelors/Masters Specialization is designed for students who have already earned an Associate of Arts (AA) degree from a public institution in Florida. If students did not complete the admission requirement for foreign language in high school or at the community college, then they must complete it before receiving the bachelor's degree. The following lower division courses offered by local community colleges, which may be part of the AA, must be included in the program:

BOT 1010/L General Botany/Lab	4
BSC 1930 Special Topics in Biology	1
BSC 2010/L Integrated Principles of Biology/Lab	4
CGS 1050 Electronic Access to Information	1
CHM 1045/L General Chemistry I/Lab	4
CHM 1046/L General Chemistry II/Lab	4
CHM 2210/L Organic Chemistry I/Lab	4
CHM 2211/L Organic Chemistry II/Lab	4
ENC 1101 English Composition I	3
ENC 1102 English Composition II	3
MAC 2311 Analytic Geometry and Calculus I	4
PHY 1053/L General Physics I/Lab	4
PHY 1054/L General Physics II/Lab	4
SPC 1006C Basic Speaking & Listening Skills	1
STA 2023 Elementary Statistics	3
ZOO 1010/L General Zoology/Lab	4
Hist/Behav/Hum general education courses	6
Lit/Behav/Hum general education courses	6

PCB 2905 Directed Study in either Marine Biology or Biotechnology at UWF*	3
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* The directed study course will include a survey of research labs within the area of the student's interest and an assessment of

opportunities for possible thesis projects. Students will work with graduate students in the labs in which they are interested to identify an area and a professor for their graduate work.

Prior to taking this directed study course, a student must have selected a professor in marine biology or biotechnology with whom they will conduct their graduate work. All subsequent courses will be taken at UWF.

Core Courses (25 sh)

MCB 3020/L	Microbiology/Lab	4
PCB 2905	Directed Study (Thesis Development)	2
PCB 3063/L	Genetics/Lab	4
PCB 3253/L	Developmental Biology/Lab	4
PCB 4043/L	Ecology/Lab	4
STA 4173	Biostatistics	3

Choose one:

BOT 4503/L	Plant Physiology/Lab	4
PCB 4723/L	Comparative Animal Physiology/Lab	4

Specialization (28-29 sh)

Choose one track:

Biotechnology Track (29 sh)

BCH 3033/L	Biochemistry I/Lab	4
BCH 3034/L	Biochemistry II/Lab	4
MCB 4653/L	Applied Microbiology/Lab	4
PCB 2131/L	Cell Biology	4
PCB 4xx5	Molecular Biology	3
PCB 4233/L	Immunology/Lab	4
3000-4000 level	Computer Science Elective	3

Choose one:

MCB 4905	Directed Study	3
PCB 4905	Directed Study	3

Marine Biology Track (28 sh)

BOT 4404/L	Aquatic Botany/Lab	4
MCB 4710	Biology of the Protists	3
OCE 3001	Oceanography	3
PCB 4364/L	Marine Ecological Physiology/Lab	4
PCB 4673	Principles of Evolution	3
ZOO 4254/L	Marine Invertebrate Zoology/Lab	4
ZOO 4304/L	Marine Vertebrate Zoology/Lab	4
ZOO 4xx2	Marine Mammalogy	3

ADMISSION REQUIREMENTS

Since this program encompasses a Masters Degree in Biology, students are required to be admitted to the program during the summer of the third year in the program.

In addition to the general university academic requirements, students seeking the MS degree in Biology must submit the following materials and meet the following departmental requirements:

- Three letters of recommendation from individuals who can evaluate the student's academic ability.

- Successful completion of the following five biology courses for admission into the track in Biotechnology - Biochemistry I (BCH 3033/L), Biochemistry II (BCH 3034/L), Microbiology (MCB 3020/L), Genetics (PCB 3063/L) and Developmental Biology (PCB 3253); or completion of the following five biology courses for admission into the track in Marine Biology - Ecology (PCB 4043/L), Genetics (PCB3063/L), Microbiology (MCB 3020/L), Developmental Biology (PCB 3253/L), and Principles of Evolution (PCB 4673).
- Official scores from the academic section of the GRE in the student's discipline. These scores will be used, in part, for diagnostic purposes.
- A letter describing the student's area of interest in research.

Following acceptance into the program, students seeking the M.S. degree in biology must meet the following departmental requirements:

- Select a thesis advisory committee composed of a chairperson and at least two additional faculty members, including the major professor selected prior to the initial directed study course at UWF.
- Meet with the thesis advisory committee and complete a written plan of study that specifies courses and other work necessary for the program. Fifteen hours must be at the 6000 level and may include 6 hours of thesis.
- Submit the written research proposal (completed in the directed study course in which the student was enrolled) acceptable to the thesis supervisory committee and demonstrate by oral examination that the proposed research is feasible.
- Complete a minimum of 33 semester hours of credit approved by the thesis committee.

The Masters Program in Biology at UWF

The student must complete 33 semester hours of credit, including 18-19 sh from among the courses listed below. Fifteen of these hours must be at the 6000 level and may include 6 semester hours of thesis. Eight sh of credit in undergraduate courses may be approved as part of the program.

Graduate electives and thesis 14-15

Choose one specialization:

Biotechnology Specialization (18 sh)

Choose 18 sh from among the following courses. Six of these 18 sh may be chosen from among the courses listed under the Marine Biology Specialization.

BSC 5475	Scientific Illustration	2
BSC 5xx7	Bioinformatics	3
MCB 5275	Public Health Bacteriology	3
MCB 5273	Epidemiology of Infectious Disease	3
PCB 5176C	Electron Microscopy	4
PCB 5525	Genetic Engineering	3
PCB 5xxx	Experimental Design in Biology	3
PCB 5xx1	Molecular Genetics	3
PCB 5xx2/L	Immunology/Lab	4
PCB 5xx6	Virology	3

Marine Biology Specialization (19 sh)

Choose 19 sh from the following upper division aquatic/marine electives, including at least one upper division botany course (3-4 sh) with aquatic/marine emphasis. Six sh of these 19 may be chosen from among the courses listed under the Biotechnology Specialization.

BOT 4404/L	Aquatic Botany/Lab	4
BOT 5xxx/L	Marine Algae/Lab	4
BSC 5475	Scientific Illustration	2
FAS 6406/L	Aquaculture/Lab	4
MCB 5735	Marine Microbiology	3
PCB 5480C	Quantitative Ecology	4
PCB 5xxx	Experimental Design in Biology	3
ZOO 5514	Animal Behavior	3
ZOO 5xxx	Fish Physiology	3
ZOO 5xx1	Elasmobranch Biology	3
ZOO 6881C	Fisheries Biology	4

MINOR

A 20 sh minor in biology is available for students in a wide variety of majors. It provides the opportunity to add value to the major degree and to expand their opportunities for employment. It is especially appropriate for students who plan to work in administrative or other nonresearch-related areas of the biomedical, environmental, pharmaceutical, and other biological science-related industries.

A minimum of 14 sh must be taken at UWF including at least 9 sh of 3000/4000 course work taken in residence at UWF. A minimum grade of "C" is required in all courses used to satisfy the minor. Neither directed study nor credit by exam (AP, CLEP, etc.) may be applied toward the minor. Contact the Department of Biology Academic Advisor for assistance in choosing courses to meet specific needs. Biology majors may not earn this minor

PCB 2131/L	Cell Biology/Lab	4
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Choose one:

BOT 2010/L	General Botany/Lab	4
ZOO 1010/L	General Zoology/Lab	4

(Students should assess the prerequisites for upper division courses they wish to take to complete the minor.)

3000/4000 level Biology (BCH, BOT, BSC, MCB, MLS, OCE, PCB, and ZOO) courses which includes at least one 4 sh lab course	12
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