

BIOLOGY

Degrees: Bachelor of Science
 Specializations: General Biology, Microbiology,
 Molecular Biology, Pre-Dental,
 Pre-Professional, Fast Track Master's
 Minor: Biology
 Certificates: Aquaculture, Bio-Medical Sciences,
 Biotechnology, Ecology, Evolutionary
 Biology, Health Care Ethics, 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), B. Arnold, K. Behan, W. Bennett, S. Bonomelli, A.B. Chaet (Emeritus), H. Chung, C.N. D'Asaro (Emeritus), P. Darby, D. Davis, T.C. Fox, M.A. Hood (Emerita), W.H. Jeffrey, S. Krothapalli, J.E. Lepo, W. Patterson, C. Pomory, K.R. Rao, P. Ryals, B. Sharak-Genthner, V. Sharma, S. Smith, R.A. Snyder, M. Sutton, P.A. Winter. 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 five specializations: General Biology, Microbiology, Molecular Biology, Pre-Professional, and Pre-Dental. The specializations include a series of five core courses fundamental to all areas of biology. A fast-track program leading to a B.S. and M.S. 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 also 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.

Contact the department for additional information concerning certificates. Courses used for certificates must be taken during or after Fall 2002.

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 PSY 2012 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 common prerequisites.

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]	
+ PCB	2131/L	Cell Biology/Lab	4
		[PCB x010/L, x011/L, x021/L, x131/L BSC x010/L, BSC x040/L, 2012/L]	
+ STA	2023	Elements of Statistics	3-4
		[MAC x312, 2234, 2254, x282 STA 2122, 2014, 2024, 2321]	

Choose one:

+ 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]	

Choose one:

Option 1

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

Option 2 (Preferred Option)

+ PHY	2053/L	General Physics I/Lab	4
		[PHY x048/L, PHY x053/L]	
+ PHY	2054/L	General Physics II/Lab	4
		[PHY x049/L, PHY x054/L]	

+ 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
BCH	3034/L	Biochemistry II/Lab	4
MCB	3020/L	Microbiology/Lab	4
PCB	3063/L	Genetics/Lab	4
PCB	4043/L	Ecology/Lab	4

General Biology Specialization (12 sh)

Choose one:

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

Choose one:

BOT	4xx1/L	Plant Development/Lab	4
PCB	3253/L	Developmental Biology/Lab	4

Choose one:

BOT	4734/L	Plant Biotechnology/Lab	4
PCB	4524/L	Molecular Biology/Lab	4

General Biology Subcore (14 sh)

3000/4000 level Biology electives	14
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Up to 2 sh of Directed Study credit may be applied to electives. Students must confer with advisor in selecting electives.

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 (14 sh)

STA	4173	Biostatistics	3
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Choose one:

BSC	4434	Introduction to Bioinformatics	3
CGS	3464	Programming Using Visual Basic for Non-Majors	3

Students must take 8 sh of the following that were not completed as part of the Common Prerequisites in the lower division:

BOT	2010/L	General Botany/Lab	4
CHM	2210/L	Organic Chemistry I/Lab	4
PHY	2053/L	General Physics I/Lab	4
ZOO	1010/L	General Zoology/Lab	4

Choose one*:

CHM	2211/L	Organic Chemistry II/Lab	4
PHY	2054/L	General Physics II/Lab	4

*General Physics II/Lab is preferred over Organic Chemistry II/Lab

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

Same as General Biology Specialization.

Microbiology Specialization (12 sh)

Same as General Biology Specialization.

Microbiology Subcore (14 sh)

PCB	4233/L	Immunology with lab	4
Electives chosen with advisor	10		

Choices from the following are recommended:

MCB	4274	Public Health Bacteriology	3
MCB	4276	Epidemiology of Infectious Diseases	3
MCB	4603	Microbial Ecology	3
MCB	4653/L	Applied Microbiology/Lab	4
MCB	4710	Biology of the Protists	3
MCB	4733/L	Marine Microbiology/Lab	4
MLS	4460/L	Diagnostic Microbiology I/Lab	4
MLS	4462/L	Medical Microbiology/Lab	4
ZOO	3233/L	Parasitology/Lab	4
MCB	3/4905	Directed Study (maximum of 2 hrs allowable)	2

Major-Related (14 sh)

Same as General Biology Specialization.

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

Same as General Biology Specialization.

Molecular Biology Specialization (12 sh)

Same as General Biology Specialization.

Molecular Biology Subcore (14 sh)

PCB	4233/L	Immunology/Lab	4
3000/4000 level Biology course or Directed Study	2-3		

Choose one course not taken under Specialization:

BOT	4734/L	Plant Biotechnology/Lab	4
PCB	4524/L	Molecular Biology/Lab	4

Choose one of the following courses
(the other course may be an elective):

PCB	4521	Molecular Genetics	4
PCB	4522	Genetic Engineering	3

Major-Related (14 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.

**Pre-Professional Biology Specialization
(12 sh)**

PCB 3253/L	Developmental Biology/Lab	4
PCB 4723/L	Comparative Animal Physiology I/Lab	4

Choose one:

BOT 4734/L	Plant Biotechnology/Lab	4
PCB 4524/L	Molecular Biology/Lab	4

Pre-Professional Biology Subcore (14 sh)

Electives chosen with advisor 10

Choices from the following are recommended:

HSC 3550	Pathophysiology	3
MCB 4274	Public Health Bacteriology	3
MCB 4276	Epidemiology of Infectious Disease	3
MLS 4305/L	Hematology I/Lab	4
MLS 4462/L	Medical Microbiology/Lab	4
MLS 4625/L	Clinical Chemistry I/Lab	4
MLS 4630/L	Clinical Chemistry II/Lab	4
PCB 4233/L	Immunology/Lab	4
PCB 4503	Virology	3
ZOO 3233/L	Parasitology/Lab	4
ZOO 4753/L	Histology/Lab	4
Directed Study (2 hours maximum allowable)		2

Choose the course not selected as part of the Common Prerequisites or Major-Related:

PHY 2054/L	General Physics II/Lab	4
or		
*CHM 2211/L	Organic Chemistry II/Lab	4

*Organic Chemistry II/Lab (Required for Pre-Vet and Pre-Dental students; may be required for some Pre-Med students - See Advisor)

Major-Related (14 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*. That section also explains the use of University of Florida dental (DEN) courses in the 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
PCB 4723/L	Comparative Animal Physiology I/Lab	4

Pre-Dental Specialization (26 sh)

* DEN 5100C	Head, Neck & Oral Structures and Functions	8
* DEN 5120C	Structures & Functions of Body Systems I	6
* DEN 5121	Biochemical, Molecular & Cellular Biology	4
MCB 3020/L	Microbiology/Lab	4
PCB 4233/L	Immunology/Lab	4

* Indicates courses taken at University of Florida 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 2053/L	General Physics I/Lab	4
	[PHY x048/L, PHY x053/L]	
+ PHY 2054/L	General Physics II/Lab	4
	[PHY x049/L, PHY x054/L]	

If not completed at the Lower Division:

PSY 2012	General Psychology	3
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Upper Division Electives (0-3 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/MASTER'S
SPECIALIZATION**

The Fast Track Bachelors/Master's 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 and include the statewide common prerequisites:

BOT 1010/L	General Botany/Lab	4
BSC 1931	Special Topics in Biology	2
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/Hum	general education courses	9

PCB 2905	Directed Study in either Marine Biology or Biotechnology at UWF* (Thesis Assessment)	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 I/Lab	4

* PCB 4723 preferred for Marine Biology Track.

Specialization (25-28 sh)

Choose one track:

Biotechnology Track (26 sh)

BCH	3033/L	Biochemistry I/Lab	4
BCH	3034/L	Biochemistry II/Lab	4
MCB	4653/L	Applied Microbiology/Lab	4
PCB	4233/L	Immunology/Lab	4
PCB	4524/L	Molecular Biology/Lab	4

Choose one:

BSC	4434	Introduction to Bioinformatics	3
CGS	3464	Programming Using Visual Basic for Non-Majors	3

Choose one:

MCB	4905	Directed Study	3
PCB	4905	Directed Study	3

Marine Biology Track (32 sh)

BCH	3033/L	Biochemistry I/Lab	4
BOT	4404/L	Aquatic Botany/Lab	4
MCB	4710	Biology of the Protists	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	4485	Marine Mammalogy	3
		Advisor-approved Marine elective	3

ADMISSION REQUIREMENTS

Since this program encompasses a Master's 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 M.S. degree in Biology must meet the following departmental requirements:

1. Hold a Bachelor of Science (B.S.) Degree in Biology or a related field from an accredited College or University;
2. Applicants applying with a Bachelor of Arts (B.A.) in Biology, or a B.S. degree in another area must have satisfactorily completed all upper and lower division core classes (or equivalents) required of UWF biology undergraduates;
3. Applicants must have a cumulative total undergraduate GPA of 3.0 and a combined quantitative and verbal score of 1000 on the General Graduate Record Examination (GRE). The subject test in an appropriate field is required;
4. Applicants must have a faculty member who has agreed to provide laboratory space and serve as the applicant's major advisor. Applicants are urged to speak with prospective faculty advisors prior to the application deadline date;
5. Individual faculty members may request exemptions from some of the requirements listed above for specific students; and
6. 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/L); 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).

Prospective students must submit the following materials by the first Monday in March to be considered for admission in the fall semester or by the first Monday in September to be considered for spring admission.

1. Three letters of recommendation from individuals who can evaluate the student's academic ability;
2. Official GRE scores;
3. Official transcripts from all undergraduate institutions attended;
4. A letter describing the student's area of interest within biology, relevant to past experience, future objectives, and the names of UWF faculty with whom they have spoken regarding the MS program; and
5. UWF Graduate Admission Application.

The completed application will be reviewed by the faculty and by the graduate program committee. Conditional admission may require the student to complete the appropriate foundation courses with grades of "B" or better. Designated University deadlines for admission will apply (refer to the *UWF Catalog*) for consideration for departmental financial assistance. Only complete applications will be reviewed. Students must also complete a departmental data sheet as part of their admission process. Students will be notified of the final decision on their admission to the program.

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

- A. 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 (thesis assessment) course at UWF.
- B. 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.
- C. Submit the written research proposal (completed in the directed study course - thesis development - in which the student was enrolled) acceptable to the thesis supervisory committee and demonstrate by oral examination that the proposed research is feasible.

D. Complete a minimum of 33 semester hours of credit approved by the thesis committee.

The Master's Program in Biology at UWF

The student must complete 33 sh 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 sh of thesis. Eight sh of credit in undergraduate courses may be approved as part of the program.

Graduate core and thesis (16 sh)

BSC 6002L	Contemporary Laboratory Skills	4
BSC 6840	Professional Development in Biology	3
PCB 6074	Experimental Design in Biology	3
PCB 6971	Thesis	6

Course offered 1-6 sh per semester

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 5459	Introduction to Bioinformatics	3
BSC 5475	Scientific Illustration	2
MCB 5273	Epidemiology of Infectious Disease	3
MCB 5275	Public Health Bacteriology	3
PCB 5176C	Electron Microscopy	4
PCB 5235/L	Immunology/Lab	4
PCB 5505	Virology	3
PCB 5525	Genetic Engineering	3
PCB 5526	Molecular Genetics	4
PCB 6074	Experimental Design in Biology	3

Marine Biology Specialization (19 sh)

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

BOT 5407/L	Marine Algae/Lab	4
BSC 5475	Scientific Illustration	2
FAS 5406/L	Aquaculture/Lab	4
MCB 5735/L	Marine Microbiology	4
PCB 5480C	Quantitative Ecology	4
PCB 6074	Experimental Design in Biology	3
ZOO 5452	Elasmobranch Biology	3
ZOO 5458	Fish Physiology	3
ZOO 5514	Animal Behavior	3

PCB 2131/L Cell Biology/Lab 4

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

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, Marine Biology, and Zoo Science majors may not earn this minor.