

BIOLOGY

Degrees: Master of Science, Master of Science in Teaching
 Department: Biology
 Building 58, Room 79
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<http://uwf.edu/biology/biology@uwf.edu>
 College: Arts and Sciences

The Department of Biology offers the traditional M.S. degree program with three areas of specialization. The first is Biology which requires a research thesis, and includes three fast tracks; Biological Chemistry, Biotech and one for students who hold an Associate of Arts degree from a Florida public institution (additional information in the biology undergraduate section of the *Catalog*). The second is a non-thesis specialization in Coastal Zone Studies. The third is a non-thesis specialization in Environmental Biology. The department also offers a program leading to the M.S.T. Post Secondary degree.

ADMISSION REQUIREMENTS

In addition to the general University requirements, students seeking the M.S. Degree in Biology must meet the following departmental requirements:

- A. Hold a Bachelor of Science (B.S.) Degree in Biology or a related field from an accredited college or university. 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. Applicants for the Environmental Biology (EVB) Specialization with a B.S. or B.A. in another discipline are required to complete General Zoology or General Botany, Cell Biology, Genetics, and an additional 8 semester hours of upper division biology-related courses.
- B. 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.
- C. 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. Prior to registration students must consult with the faculty advisor assigned to oversee the program into which the student has been accepted. Applicants for the EVB Specialization must select a faculty advisor and two committee members. The advisor may be from either Biology or Environmental Studies, but both departments must be represented on the committee.
- D. Individual faculty members may request exemptions from some of the requirements listed above for specific students.
- E. Students desiring to transfer from a non-thesis to a thesis specialization must fulfill all requirements for admission to that specialization.

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. To be considered for financial aid within the Department, all prospective students for each academic year must also submit these materials by the first Monday in March.

- A. Three letters of recommendation from individuals who can evaluate the student's academic ability.
- B. Official GRE scores.
- C. Official transcripts from all undergraduate institutions attended.
- D. A letter describing the student's area of interest within biology, relevant past experience, future objectives, and the names of UWF faculty with whom they have spoken regarding the M.S. program.
- E. 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. Only complete applications will be reviewed. Students must also complete a departmental data sheet as part of the admission process. Students will be notified of the final decision on their admission to the program.

BIOLOGY, M.S.

BIOLOGY SPECIALIZATION (THESIS)

The thesis program is designed for students seeking advanced studies in areas of modern biology and biotechnology with training in the fields of aquaculture, biochemistry, ecology, environmental studies, fisheries biology, genetics, immunology, marine biology, microbiology, molecular biology, plant science, and physiology.

In addition to the general University academic requirements, 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.
- B. Meet with the thesis advisory committee and complete a written plan of study that specifies courses and other work necessary for the program.
- C. Submit a written research proposal 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. Fifteen of these hours must be at the 6000 level and must include the three graduate core courses (BSC 6002L, BSC 6840, and PCB 6074) and may include six semester hours of thesis. Six semester hours or two courses of upper

division of credit in undergraduate courses in biology may be approved as part of the program. One hour of Biology Seminar (PCB5924) is also required.

- E. Submit an acceptable thesis and successfully defend it in an oral public presentation.

BIOLOGICAL CHEMISTRY FAST TRACK BACHELORS/MASTERS SPECIALIZATION

This specialization is available as a stand-alone master's degree or as part of a fast track degree program that includes both the bachelor's and master's degrees. Students who already hold a bachelor's degree in biology or chemistry must complete the admission requirements previously listed for the Master's in Biology. Students currently enrolled in the fast track Biological Chemistry Specialization must complete the admission requirements previously listed for the Master's in Biology with the exception of having earned a baccalaureate degree.

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, at least one of whom is on the faculty of the Department of Chemistry. Chemistry faculty may serve as chairperson of the thesis advisory committee if their research is the primary site for the conduct of the thesis research.
- B. Meet with the thesis advisory committee and complete a written plan of study that specifies courses and other work necessary for the program.
- C. Submit a written research proposal acceptable to the thesis committee and demonstrate by oral examination that the proposed research is feasible.
- D. Complete a minimum of 34 semester hours of credit.

Biological Chemistry Course Requirements (34sh):

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

Choose 18 semester hours from:

BSC	5459	Introduction to Bioinformatics	3
CHM	5XX0C	Instrumental Analysis	4
CHM	5XX1	Seminar: Special Topics in Advanced Chemistry	3
PCB	5235/L	Immunology/Lab.....	4
PCB	5525	Genetic Engineering.....	3
PCB	5527/L	Molecular Biology/Lab	4

Choose one (6 sh):

CHM	6XXX	Thesis.....	6
PCB	6971	Thesis.....	6

- E. Submit an acceptable thesis and successfully defend it in an oral public presentation.

Total semester hours for completion of the entire Fast Track Bachelor's/Master's Program is 139 (compared to 152 by normal route). The Chairs of Biology and Chemistry are liaison officers for the program - jointly in charge of changes in the program and in course requirements.

Students with a four-year degree in chemistry who wish to enter the Biological Chemistry Master's Program may enter the program as a non-degree student and must have had or must take all of the following courses prior to full acceptance into the Master's Program in Biological Chemistry:

BCH	3033/L	Biochemistry I/Lab	4
BCH	3034/L	General Biochemistry:Metabolism/Lab	4
BOT	2010/L	General Botany/Lab.....	4
MCB	3020/L	Microbiology/Lab.....	4
PCB	3063/L	Genetics/Lab.....	4
ZOO	1010/L	General Zoology/Lab	4

BIOTECH FAST TRACK BACHELORS/MASTERS SPECIALIZATION

In addition to general University requirements, students seeking the Fast-Track B.S./M.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.

Since this program encompasses a Master's Degree in Biology, students must be accepted into the master's program during the summer of the third year in the program. In addition to the general University requirements, students seeking the M.S. degree in Biology must meet the following departmental requirements:

1. Have earned a GPA of 3.0 in the last 60 hrs of upper division course work in their major;
2. Must have earned a combined quantitative and verbal score of 1000 on the general Graduate Record Examination (GRE). The subject test in an appropriate field is required;
3. Applicants entering the thesis track must have a faculty member who has agreed to provide laboratory space and serve as the applicant's major advisor. Applicants entering the non-thesis track must have conferred with the non-thesis track advisor prior to admission;
4. Individual faculty members may request exemptions from some of the requirements listed above for specific students;

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.

Students eligible for Express Admission must only comply with Nos. 2 and 4 below:

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 past experience, future objectives, and the names of UWF faculty with whom they have spoken regarding the M.S. program at UWF; and
5. UWF Graduate Admission Application (GAA) (or Express Admission application).

The completed GAA will be reviewed by the faculty and by Biology's Graduate Admissions Committee. Conditional admission may require the student to complete the appropriate foundation courses with a grade of "B" or better. Designated University deadlines for admission will apply for consideration for financial assistance from the department. Only complete applications will be reviewed. Students must also complete a departmental data sheet as part of their admissions process. Students will be notified on 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. Students enrolled in the thesis option must select an advisory committee composed of a chairperson and at least two additional faculty members, including the major professor selected early in the application process.
- B. Thesis option students must meet with their thesis advisory committee and complete a written plan of study that specifies courses and other work necessary for the program. Students in the non-thesis option must meet with the non-thesis advisor and create a plan of course work, directed studies, and internship. Among the graduate course requirements (see below under), 15 hours must be at the 6000-level and may include 6 hours of thesis for thesis option students, or for non-thesis option students, 3 hours of 6000-level Directed Studies, and 3 hours of 6000-level internship in biotechnology or related industry or 6 hours of internship in Biotechnology or related industry.
- C. Students in the thesis option must submit the written research proposal acceptable to the thesis supervisory committee and demonstrate by oral exam before the thesis advisory committee that the proposed research is feasible. Students in the non-thesis option must complete, with a score of "S" (Satisfactory), during the final semester in the M.S. program a comprehensive exam that tests the students' ability to synthesize information gained in the courses in which they were enrolled in the graduate program.

- D. Students in both options must complete a minimum of 33 semester hours of credit approved by their thesis committee or the non-thesis advisor.

Lower division courses in undergraduate degree as established in *Catalog*. (60 HRS)

UPPER DIVISION Undergraduate

BCH	3033/L	Biochem I	4
BCH	3034/L	Biochem II	4
MCB	3020/L	Microbiology	4
PCB	3063/L	Genetics.....	4
PCB	4043/L	Ecology	4
PCB	3253/L	Developmental Biology	
		or	
BOT	4374/L	Plant Development.....	4
CGS	3464	Programming Using Visual Basic for Non-Majors	3
PCB	4524/L	Molecular Biology.....	4
BOT	4734/L	Plant Biotech.....	4
BOT	4503/L	Plant Physiology	
		or	
PCB	4723/L	Animal Physiology.....	4
		Upper division electives (may include 2 hrs of Directed Studies)	5

44 HRS UPPER DIVISION- 104 total hrs for the B.S. M.S., and B.S. will be conferred simultaneously. If the student does not complete the M.S. they will have to complete all 120 hrs for the B.S. to earn that degree alone.

Graduate level courses (33 hr).

PCB	5235/L	Immunology.....	4*
STA	5XXX	Advanced Statistics.....	3*
PCB	5525	Genetic Engineering	3*
PCB	5526/L	Molecular Genetics	4*
BSC	5459	Introduction to Bioinformatics.....	3*
PCB	6074	Experimental Design in Biology	3
BSC	6002L	Contemporary Methods in Biology.....	4
BSC	6840	Professional Development	3

Thesis Option: 6 hrs of Thesis = 33 hrs. Total for both degrees: 137 hrs

Non-Thesis Option: 3 hrs of 6000-level Directed Study and 3 hrs of 6000-level Internship at a biotech company or related business, or 6 hrs of 6000-level internship at a biotech company or related business.

COASTAL ZONE STUDIES SPECIALIZATION (NON-THESIS)

In this non-thesis specialization, students will learn methods to identify and solve problems, management practices, and procedures for policy-making as they pertain to a coastal zone. Students with bachelor's degrees in the physical sciences, geography, and resource management are encouraged to apply. Departmental requirements are:

- A. Prior to registration, and in consultation with the department chairperson, select a faculty advisor and form a supervisory committee.
- B. Meet with the committee and complete a plan of study that specifies courses and practical experience necessary for the program. The plan must be approved by the supervisory committee.

C. Complete 36 semester hours composed of the required selections from the course groups specified below and from graduate electives in biology.

BSC	5905	Directed Study*.....	3
		Course offered 1-3 sh per semester	
BSC	6002L	Contemporary Laboratory Skills	4
BSC	6329	Coastal Studies Seminar	1
BSC	6840	Professional Development in Biology	3
GEO	5225/L	Coastal Morphology and Processes/Lab.....	4
PCB	5446/L	Wetlands Ecology/Lab.....	4
PCB	6074	Experimental Design in Biology.....	3
		5000/6000 level advisor approved courses	2
		6000 level advisor approved courses	5

* A committee approved 3 sh directed study must be taken, involving exposure to experimental or sampling design, data collection, and analysis, and presentation of results to the supervisory committee.

Choose one:

GIS	4035/L	Photo Interpretation & Remote Sensing/Lab.....	4
GIS	4043/L	Geographic Information Systems/Lab.....	3

Choose one:

EVR	4023	Coastal & Marine Environments.....	3
EVR	4035	Environmental Law	3

ENVIRONMENTAL BIOLOGY SPECIALIZATION (NON-THESIS)

There is a great demand from local, state, and federal government, as well as from industry, for students with a strong background in environmental biology. The Departments of Biology and Environmental Studies have collaborated to create a non-thesis specialization in Environmental Biology.

FOUNDATIONAL PROFICIENCIES

Undergraduate courses in biology including:

PCB	2131/L	Cell Biology/Lab	4
PCB	3063/L	Genetics/Lab	4
		Upper division Biology (BSC, BCH, OCE, PCB, MCB,ZOO, BOT or MLS) courses	8

Choose either:

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

Statistics courses including:

STA	2023	Elements of Statistics	3
STA	4173	Biostatistics.....	3

Geographic Skills classes including:

GIS	3015/L	Cartographic Skills/Lab	4
GIS	4043/L	Geographic Information Systems/Lab.....	4

Students with undergraduate courses from other institutions may provide evidence of equivalent courses or skills.

DEGREE REQUIREMENTS

- Prior to registration the student will meet with the program advisor and discuss a plan for completing the required course work.
- The student must complete 36 semester hours of course work composed of the required selections

from the list below and from graduate electives as indicated:

BSC	5305	Biogeography.....	3
BSC	6002L	Contemporary Laboratory	4
BSC	6329	Coastal Studies Seminar	1
BSC	6840	Professional Development in Biology	3
BSC	6905	Directed Study	4
GIS	5100	Applications in Geographic Information Systems	3
PCB	5446	Wetlands Ecology	4
PCB	6074	Experimental Design in Biology	3
PHC	6310	Environmental Toxicology.....	3
		5000/6000 level advisor approved biology courses	8

BIOLOGY, M.S.T.

POST-SECONDARY TEACHING

This non-thesis track in the M.S.T. program is designed to prepare students to teach in the biological sciences at the post-secondary level. Applicants should have a bachelor's degree in some discipline of biological science from an accredited institution. Applicants holding the bachelor's degree in some other discipline will be considered using criteria appropriate to their backgrounds. Completion of Florida teacher certification is not an exit requirement for this track in the MST program.

Departmental requirements are as follows:

- Form and meet with a supervisory committee within one semester after matriculation in the M.S.T. program. The committee will be composed of a major advisor and one additional faculty member, both from biology.
- Complete a minimum of 36 semester hours of credit approved by the supervisory committee. Fifteen of these hours must be at the 6000 level.
- Complete at least 21 semester hours of graduate credit in formal courses, including at least 8 semester hours in each of two broad areas, such as, botany, ecology, molecular biology, microbiology, physiology, and zoology. Completion of a formal college-level course in evolution is required. A committee-approved 3 sh directed study (6000-level) must be taken involving exposure to experimental or sampling design, data collection and analysis, and presentation of results to the supervisory committee.
- Complete: EDF 6602 and EDF 6218 or supervisory committee approved substitutes.
- Complete two semesters of BSC 6018 (3 sh each semester) which includes participation in biology laboratory instruction. As part of this course, the student will serve as a teaching assistant during the first semester, and as instructor of record during the second semester in a lower or upper division undergraduate course to be determined by the supervisory committee in conjunction with the Chairperson of Biology. In addition, students will participate in the design and presentation of laboratories and will be graded on both their presentation and design by the faculty member in

charge of the course in which they are serving as
teaching assistant or instructor of record.