

Environmental Biology

Student Handbook

A Guide to Undergraduate Majors
in
Environmental Biology

Autumn 2023

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Introduction

If you are, or plan to be, an undergraduate student in one of the six-degree programs (majors) offered by the Department of Environmental Biology (EB) at the SUNY College of Environmental Science and Forestry, this handbook can help you develop an academic experience that best prepares you for the next step in your career. For most students, this step will be employment or graduate school and the preparation for these two paths can be quite different.

Following a list of the EB faculty, with contact numbers, there is a section on general information relating to departmental academic policies. After that is some advice on choosing a major, followed by an explanation of the requirements of each degree program. Remember that the *official* requirements for the Bachelor of Science degree are those listed in the [ESF catalog](#) that pertains to the year in which you first enrolled. Throughout your program you will use [Degree Works](#) to guide you, but this handbook gives you an overview of all EB programs. The closing pages relate to preparing for life after your BS degree and include examples of job titles held by recent graduates.

Keep this handbook in a safe place and refer to it when you are planning your academic program, especially prior to each advising period. Don't wait to read and think about possible careers and graduate school; it might help you decide on an academic pathway to follow. Remember, while your advisor and other faculty members are anxious to help, the design of a good program is *your* responsibility. One part of all programs is often underappreciated: the open electives. Use these credits wisely, to expand your knowledge and experience beyond the requirements of the major.

If you have specific career goals, become familiar with any "professional requirements" that go beyond the requirements for graduation. For example, various types of certifications by professional societies or registries (e.g., state, and federal Civil Service registries, the National Registry of Microbiologists, the Ecological Society of America, The Wildlife Society, the American Fisheries Society) require completion of certain sets of courses that may be quite general or very specific. If graduate school is (or may be) in your future, you should closely follow recommendations that pertain to your field, or risk having to catch up after you graduate; such problems are particularly common with regard to mathematics and basic sciences such as physics and organic chemistry.

Finally, potential employers and graduate schools often favor students who have experienced more than the classroom. An internship (EFB 420) is an excellent way to prepare for employment, as well as helping you decide if your chosen field is right for you. With guidance of the advisor, a student arranges with an outside professional, an agency, or other institution to work while receiving college credit, either during the academic year or over the summer. Faculty and graduate students also frequently employ undergraduate students on hourly wages to help with research projects. If you are inclined toward graduate school yourself, talk to professors in your area of interest about opportunities for undergraduate research (EFB 498); the experience is invaluable - plus, you'll get academic credit.

Kit Sheehan, EB Undergraduate Advisor

Terrance Caviness, EB Undergraduate Advisor

Gregory G. McGee, EB Curriculum Director

Roy A. Norton, EFB Curriculum Director (ret.)

Faculty

Below are the EB faculty members having general administrative duties that pertain to undergraduate programs, along with a brief description of their duties. Following that is a table listing all faculty members who advise and teach in the EB undergraduate program, their office locations, and contact information. More information about each of our faculty can be found at the [EB web page](#).

Department Chair: Dr. Stephen Teale - the leader of faculty, administrative and technical staff, and head of both undergraduate and graduate programs in EB.

Undergraduate Curriculum Director: TBD - contact regarding general questions about EB undergraduate programs, requirements, degree certification, and petitions.

Curriculum Coordinators: - contact for degree requirements and major-related petitions.

Aquatic and Fisheries Science: Dr. John Farrell

Biotechnology: Dr. Christopher Whipps

Conservation Biology: Dr. Rebecca Rundell

Environmental Biology: Dr. Gregory McGee

Forest Health: Dr. Stephen Teale

Wildlife Science: Dr. Michael Schummer

Undergraduate Advisors: - advisors for first- and second-year students in the EB department; primary contact for course scheduling, petitions, general academic progress

Environmental Biology, Wildlife Science, and Forest Health: Terrance Caviness

Aquatic and Fisheries Science, Conservation Biology, and Biotechnology: Kit Sheehan

Cranberry Lake Biological Station (CLBS) Director: Dr. Emily Arsenaault

Resident Faculty and Advisors	Office (Rooms in Illick Hall)	Telephone (315-470-)	Email Address @esf.edu
Arsenaault, Emily	240	6805	emarsena
Artelle, Kyle	311		
Briggs, Christopher	135		cbrigg01
Caviness, Terrance	248	4939	tcaviness
Cohen, Jonathan	403	6737	jcohen14
Diemont, Stewart	460	4707	sdiemont
Dovciak, Martin	459	6749	mdovciak
Downs, Cynthia	345	6806	cjdowns
Drew, Joshua	343	6789	jadrew
Farrell, John	250	6990	jmfarrell
Fernando, Danilo	461	6746	dfernando
Fierke, Melissa	205	6809	mkfierke
Frair, Jacqueline	257	4905	jfrair
Gibbs, James	404	6764	jpgibbs
Green, Hyatt	201	6769	hgreen

Resident Faculty and Advisors	Office (Rooms in Illick Hall)	Telephone (315-470-)	Email Address @esf.edu
Gurarie, Eliezer	206	6806	egurarie
Horton, Thomas	426	6794	trhorton
Kimmerer, Robin	351	6785	rkimmer
Leopold, Donald	333	6784	djleopold
Leydet, Brian	110	6942	bfleydet
Limburg, Karin	249	6741	klimburg
Lynch, Shannon	458	4847	sclynch
McGee, Gregory	146	6792	gmggee
Millspaugh, Joshua	252		
Parry, Dylan	109	6753	dparry
Raza vi, Roxanne	207	6739	razavi
Reich, Hannah	426		
Rundell, Rebecca	457	6619	rundell
Schulz, Kimberly	456	6808	kschulz
Schummer, Michael	204	4855	mlschumm
Sheehan, Kit	256	4846	ksheeh02
Teale, Stephen	151	6758	sateale
Weir, Alex	353	6791	aweir
Whipps, Christopher	133	4762	cwhipps

General Information

I. Keeping Track of Degree Requirements

The ESF College Catalog - The official description of requirements for any of the six-degree programs (majors) offered by the Department of Environmental Biology (EB) can be found in the online [ESF Catalog](#). From time to time, the requirements of ESF's various majors are changed, so the ESF catalog is updated and published annually (the last time any of our programs changed was 2023). You can find a link for each major's current description at the ESF catalog web page. However, the official description of **YOUR** degree requirements is found in the catalog posted for **the year that you entered your degree program**. Similarly, if you change majors after matriculating, you must fulfill the degree program of the new major as it is described **at the time you entered the new degree program**. Also, become familiar with the general section on Academic Policies in that catalog; these relate to all ESF students.

Your Degree Works Audit- Requirements for the majors are summarized on the individualized Degree Works Audit. You are given access to the Degree Works Audit during orientation through the [ESF Student Portal, MyESF](#). The Audit is your most important working document, so become familiar with it. It shows what courses you have taken and what core requirements remain. It indicates your cumulative credit-hour totals and your grade-point average. It also tracks your progress toward meeting your General Education requirements and other elective distribution requirements. The real-time Audit reflects *your* official record in the Registrar's office, so if you think you have found an error bring it to the attention of your advisor.

This handbook serves as a guide to complement your Audit and help you project your course work in future semesters. A blank Degree Works Audit for each major is included, so you can easily compare the six EB programs.

*******It is important to remember to work with your own Degree Works Audit. Your friends' requirements may differ, even if in the same major, given different curricular requirements on different dates of matriculation.**

II. Transfer Courses

you are a transfer student planning to enter as a junior, we strongly recommend that lower division (first year, sophomore) deficiencies be satisfied during the summer before you matriculate at ESF to allow for flexibility in taking upper division biology electives and to prevent delay in graduation. The *Typical Schedules*, provided in the appendix, will help you identify these courses. Four-year students may also transfer credits from another institution. This is accomplished by petition – see your advisor about this process. To help in this process, the Admissions Office provides a list of courses at various [Cooperative Transfer Colleges](#) that have been predetermined to fulfill lower division requirements.

III. A Note about Prerequisites

Several EB courses have prerequisite requirements. It is your responsibility to know and complete all prerequisites before enrolling in a course. A list of prerequisites for EB core courses is listed below (this is not an exhaustive list – see the catalog course descriptions for other upper-division elective courses):

<u>Course</u>	<u>Prerequisite</u>
Principles of Evolution (EFB 311)	Genetics (EFB 307/308), General Ecology (EFB 320)
Cell Biology (EFB 325)	General Biology, Organic Chemistry, Genetics
Population Ecology & Management (EFB 370)	EFB 320
Wildlife Ecology & Management (EFB 390)	EFB 320
Applied Wildlife Science (EFB 491)	EFB 390

Wildlife Habitats & Populations (EFB 493)	EFB 491
Intro. to Conservation Biology (EFB 413)	EFB 320, EFB 307/308
Senior Synthesis Conservation Biology (EFB 414)	EFB 413
Organic Chemistry II (FCH223/224)	FCH221/222 (NOT Elements of Organic Chemistry FCH 210)
Physics II (PHY102)	PHY101 (NOT Environmental Physics, FOR 110)

IV. General Education Requirements

Any undergraduate degree from the State University of New York requires completing a suite of “general education” courses; for ESF students, this means one course from seven of ten “Knowledge and Skill Areas,” totaling 30 credit hours. The requirement is designed to give you the academic breadth necessary to become a well-rounded world citizen, in addition to becoming knowledgeable in your special area of study. Details of the requirement for each major are given on the respective Plan Sheet, but in all majors four subject areas are automatically satisfied by core courses:

Communication - Written and Oral (EWP 190)	Mathematics (APM105 or APM391)
Diversity: Equity, Inclusion, and Social Justice (choice)	Natural Sciences (EFB 101)

In most of our majors, **Social Science** is satisfied by EFB 120, and **Humanities** is satisfied by EWP 290.

US History and Civic Engagement, World History and Global Awareness, World Languages or **The Arts** need to be satisfied by electives in most majors. Students should plan to complete their General Education electives within their first 60 credit hours. For each [General Education area](#), the relevant elective courses are listed in the online [ESF catalog](#).

V. Field Experience

A hallmark of the EB curriculum is its emphasis on field study and training. All majors offered by the Department are intended to be hands-on programs that emphasize laboratory and field experience in addition to classroom studies. To this end, every student in each major, except Biotechnology, is required to complete **at least six** credit-hours of approved field-based instruction in biology. Three of these six credits are associated with a required core course, EFB 202 (Ecological Monitoring and Biodiversity Assessment), which is offered two to three times each summer at the Cranberry Lake Biological Station (CLBS) in the Adirondacks. *We recommend students enroll in EFB 202 during the summer between your first and sophomore year, or as early as possible for transfer students.*

The remaining credit hours of Field Experience are elective and can be obtained in one of the following ways. The following lists identify recent course offerings that satisfy the EB field elective requirement. Be aware that some courses are not offered every year.

- Courses offered at CLBS during summer session:
 - Field Ethnobotany (EFB 337)
 - Fungal Diversity and Ecology (EFB 342)
 - Field Herpetology (EFB 384)
 - Adirondack Fishes (EFB 388)
 - Wildlife Techniques (EFB 496)
 - Ecology of Adirondack Aquatic Ecosystems (EFB 496)
 - Wetland Plants and Communities of the Adirondacks (EFB 496)
 - Ecology of Adirondack Insects (EFB 496)
- Courses offered at the Adirondack Ecological Center and Ranger School:
 - Research Methods: Understanding the Adirondack Ecosystem (EFB 411)
 - Mammalian Winter Ecology (EFB 484)
- Courses offered during Maymester at the Syracuse or regional campuses:
 - Field Ornithology (EFB 496)

- Flora of Central New York (EFB 496)
- Forest Health Monitoring (EFB 439)
- Other courses offered by ESF faculty:
 - Forest Health Senior Synthesis (EFB 425)
 - Ecosystem Restoration Design (EFB 434, only if taken for 4 cr. with field trip)
 - Periodic field trip courses (EFB 500) to locations such as Costa Rica, Ireland, Russia, New Zealand, Australia
 - ADK Forest Ecology and Management (EFB/FOR 513, this course alone does not fulfill the 3-cr requirement)
 - Tropical Ecology (EFB 523)
 - Ecological Engineering in the Tropics (ERE 311)
 - Fisheries Science Practicum (EFB 488, 1 cr.; this course alone does not fulfill the 3-cr requirement)
 - Limnology Practicum (EFB 525, 2 cr.; note that this course alone does not fulfill the 3-cr requirement)
- Field courses, ***approved by petition***, from another accredited university, including but not limited to the following affiliated programs:
 - SEA Semester (through Boston University). Note: ‘Semester at Sea’ is different than ‘SEA Semester.’ EB WILL NOT ACCEPT any ‘Semester at Sea’ courses to fulfill core or directed elective requirements.
 - The School for Field Studies (through University of Minnesota)
 - Wildlands Studies (through California State University Monterey Bay)
- Acceptable courses will have at least 50% of instruction conducted in the field (out-of-classroom, out-of-laboratory, out-of-clinic, out-of-captivity); and include content focusing on organismal biology, ecology theory, and/or training in field methods for studying populations, ecological communities or ecosystem processes.
- An independent research project (EFB 498) or internship (EFB 420) ***that has received prior departmental approval via petition, and that meets the following departmental criteria:***
 - At least 50% of student effort (including contact time with instructor and self-directed study) must be conducted in the field (out-of-classroom, out-of-laboratory, out-of-clinic, out-of-captivity).
 - Student must demonstrate educational growth in organismal biology, ecological theory, and/or application of field methodologies.
 - Students must complete a research or professional product for evaluation.
 - 40 hours of effort will garner 1 academic credit-hour.

VI. Cranberry Lake Biological Station

The Cranberry Lake Biological Station (CLBS) is home to many field courses. CLBS sits on Cranberry Lake, the third largest body of water in the Adirondacks, and is surrounded by rolling hills, small ponds, bogs, and streams. Since 80 percent of the shoreline is state owned, the lake remains unspoiled by recreational developments. Much of the original forest cover in the region was harvested a century ago and has since reforested with a rich variety of community types. The remaining late-successional forests provide students with many examples of less disturbed ecosystems. From the CLBS, there is easy access to a wide range of additional ecosystems, ranging from wetlands to a alpine. This environment is ideally suited for a biology summer program.

The station is designed to support a variety of class types and research. Facilities include four classroom-laboratories, a computer lab, a dozen power boats, dining facilities for 120, faculty cabins, an administration building, 12 student cabins, and a recreation hall among others.

The program extends from late May through mid-August. Thanks to the natural assets of the station, a majority of class time is spent in the field.

Information about the program, including courses and fees, can be found on the [CLBS website](#).

VII. Internships and Independent Research

An internship is a valuable way to gain experience and to learn if a field of study is right for you. Also, good recommendations from your internship supervisor can be helpful when you seek future employment. Undergraduate students at ESF take advantage of a wide range of internships, generally during the summer or throughout the academic year. Internships are arranged in cooperation with the student's advisor and carry course credits under EFB 420, Internship in Environmental and Forest Biology. ***Internships must be completed at an outside institution (but BTC students, discuss options with your advisor)*** such as the U.S. Fish and Wildlife Service (USFWS), New York State Department of Environmental Conservation; NYS Parks, Recreation and Historic Preservation; Upstate Freshwater Institute, The Nature Conservancy, the National Park Service and the U.S. Geological Survey. Internships with the local zoo are also common. Several federal agencies (e.g., U.S. Fish & Wildlife Service and U.S. Forest Service) have Cooperative Aid agreements whereby students can receive a salary and preferential employment opportunities after graduation. Field-based internships can, with approval, count toward the field experience elective required by most EB majors. To develop ideas for an internship, speak with your advisor and visit the [Career Services website](#).

EB students may enroll in 1-5 credits of EFB 420 (graded on a Satisfactory/Unsatisfactory basis) for any given experience. Forty hours of effort will yield 1 hour of academic credit.

Students who are inclined toward graduate school should talk to professors in their area of interest about opportunities for undergraduate research (EFB 498) where they may conduct an independent research project. EB students may enroll in 1-5 credits of EFB 498 for any given experience. Forty hours of effort will yield 1 hour of academic credit.

EB also offers students opportunities to volunteer for credit in faculty labs and on field crews through Research Apprenticeship opportunities (EFB 298). These are low-stakes experiences that permit students to gain basic lab and field skills, and which often develop into independent research projects. EB students may enroll in 1-5 credits of EFB 298 (graded on a Satisfactory/Unsatisfactory basis) for any given experience. Forty hours of effort will yield 1 hour of academic credit.

******Internship, independent research, and apprenticeship credits completed during the fall or spring semester can be included in the regular full-time tuition. However, students are required to pay additional summer tuition for credits completed during the summer. ******

VIII. Taking a Minor

You can broaden your education and add to your credentials by electing an undergraduate minor. These are areas of study – usually involving 15-18 credit hours – that are outside the subject of your major, and can be either complementary to it, or entirely unrelated. ESF minors may require certain courses at Syracuse University (e.g., the various management minors), but ESF students can formally enroll in only a few SU minors. Students apply for a minor by completing a Minor Enrollment Form obtained at the web page below. Although minors are not formally available during the first semester at ESF this does not preclude electing courses that are required by the minor before you enroll in it. Information regarding [descriptions of minors and application procedures](#).

IX. Taking Syracuse University Courses

Syracuse University offers a rich variety of undergraduate courses and, in general, you have the same access to such courses as a student enrolled at S.U. However, there are certain restrictions that are closely enforced by the Registrar.

1. Each ESF student is provided with an allocation of SU credit hours that will be covered by ESF tuition and fees.
2. ESF students may take SU courses beyond their allocation by paying a tuition supplement.
3. Some additional limitations may apply. [Taking Syracuse University Courses](#)

SU Credit Hour Limits for Entering First Year Students

Max. SU credits in 1st two full-time semesters	Max. SU credits in 1st four full-time semesters	Max. SU total credit hours earned
8	11	16

SU Credit Hour Limits for Entering Transfer Students

Number of Credits at Entry	Max. SU credits in 1st two full-time semesters	Max. SU credits in 1st four full-time semesters	Max. SU total credit hours earned
0-7	8	11	16
8-14	8	11	15
15-22	8	11	14
23-29	8	11	13
30-37	8		12
38-44	8		11
45-52	8		10
53-59	8		9
60-67			8
68-74			7
75-82			6
83-89			5
90+			4

X. Taking Graduate-level courses

As with undergraduate courses (100-400 level), there are different levels of graduate courses at ESF and Syracuse University. As an undergraduate, you need no special approval to register for 500-level courses but be aware that these courses will be more demanding. Registering for 600-level courses requires senior standing, a superior grade-point average (3.0 or higher), written permission from the course instructor and an approved (or at least pending) petition. Undergraduates cannot take courses at the 700, 800 or 900 levels.

XI. Your Academic Advisor

Each student is assigned an advisor who must approve course selections and who is the first to sign any petition. An advisor's role is to assist you in program development and decision-making, but they are not responsible for any failure to meet your degree requirements. It is *your* responsibility to know these requirements and to meet them.

The relationship with your advisor(s) is an important one, so learn to nurture it. Also, this relationship is going to change during your time at ESF – in your first year you will most likely be relying on input from your advisor for course selection and registration, and in some instances tips for academic success. As you learn the course registration process and master the skills and discipline of academic work, your relationship with your advisor will mature into one focused

on your professional development. You will begin with an undergraduate advisor, listed below, and then transition to a faculty advisor in your last four semesters as your area of focus becomes clear.

ENVIRONMENTAL BIOLOGY UNDERGRADUATE ADVISORS:

Terrance Caviness - 248 Illick Hall - 315-470-4939

Kit Sheehan - 256 Illick Hall - 315-470-4846

Whether you are working with Terrance or Kit, you will schedule your appointments through 'Handshake' which requires your ESF log-in credentials.

Before your Junior year you will be assigned to a faculty advisor who works in the same area of interest. If your academic direction is uncertain the advisor assignment will be random, but your advisor can be changed if your plans become more focused. This can be done by making a request to the EB Curriculum Director.

Although EB offers no specific academic program for students aspiring to careers in formal K-12 science education or in the medical/veterinary fields, we do have pathways to assist students in reaching these goals. If you have an interest in these fields, contact the EB Curriculum Director to request that a specialized academic advisor be assigned to you.

XII. Being a Good Advisee

Once you transition to your faculty advisor in your junior year, you may interact with your advisor in a variety of ways. Each advisor operates differently: some have an open door, some have posted office hours, and others may want you to make appointments. Some like to handle routine questions by email, but others prefer to interact face-to-face. All advisors have a telephone (see directory on page 3) with voice mail, and a mailbox in the department office (Room 241 Illick) - all these can help in establishing contact with your advisor. As with all mentors you can start off on the right foot by establishing a respectful relationship with these tips:

1. Keep your appointments. Your advisor meets with many people; if you can't make the appointment, let them know by phone or email, as far in advance as possible, so they can make schedule adjustments.
2. Be prepared. You are not expected to know everything; however, your advisor will expect that you are familiar with the general requirements of the degree. It might help to review the General Information section of this handbook.

If the meeting is about registration for courses -

- Review your course progress in Degree Works before arrival; know what the degree requirements are, and what remains to be completed. Your advisor can help you with any confusing points, but you should make an effort to learn the curriculum.
- Have a preliminary plan; have some options in mind and ask your advisor for recommendations or alternatives; pay attention to course restrictions and prerequisites. Advisors are there to guide you, not to make the schedule for you.
- Check the Registrar's website for course availability and times. The printed schedule from Syracuse University has ESF courses, but it goes to press months before it is used, and many things change in the interim. Don't depend on your advisor to notice such changes.

If the meeting is about a petition -

- Bring the appropriate petition form which can be obtained from the Registrar's office (online or in person) or the Curriculum Director. Fill out the personal information before coming but leave the "request" and "justification" sections blank.
- Have a clear idea of what you are asking for and bring some draft wording. Get approval of the draft text before copying it to the form.

- Bring any necessary information. If the petition is about transferring a course from another institution, be sure to bring the information in Section XII of this handbook, below.
3. Be respectful and take responsibility for your own academic program.

XIII. Petitions

Petitions are used to request a variance from established College or Faculty policy or procedure; in other words, this is how you ask for permission to do something out of the ordinary. You can obtain a petition form from the Registrar's office in Bray Hall, from the EB Curriculum Director, or on-line at the ESF Registrar's web page. With your advisor's guidance, fill it out and append any supporting documents or letters that pertain to your request.

Writing a Petition

- Be clear, concise, and neat - no one will approve an illegible petition.
- You must fill out all information requested on the petition. You will be contacted by email if there are any questions.
- **The Request:** Write this section as a specific instruction to the Registrar to apply a certain class, class sequence, or experience to a specific curricular requirement on your plan sheet. Remember, you and your advisor may know what you are asking, but this needs to be written so that your intentions are clear to the Curriculum Coordinator, Associate Provost, and Registrar. A couple examples are provided below.
 - “Apply BIO344 (4 credits) from State University to replace EFB 307/308 (Principles of Genetics lecture and lab).”
 - “Slot BIO275, ‘Coral Reef Ecology,’ (3 credits) from Hometown College to fulfill Field Experience Directed Elective requirement.”
- **The Justification:** Provide rationale for why you believe the course/experience/program you are proposing should fulfill a particular degree requirement.
 - Attach the course syllabus and catalog description to the petition and highlight the content in the course description that you believe makes it a candidate for fulfilling a requirement.
 - Sometimes the justification can be as simple as indicating that the course has already been determined to fulfill a particular degree requirement through an existing articulation agreement between ESF and one of several Cooperative Transfer Colleges (NYS community colleges and other local institutions). In such cases, no course description needs to be appended. These are usually referred to as TAG-courses (Transfer Articulation Guidelines) and can be found through the [Admissions Office webpage](#). If you want to make up a course deficiency over the summer, this webpage is the perfect place to preview which course from a college close to home will match our requirement.
 - If the petition involves a late drop/late add you must obtain the instructor's signature.
- **Signatures:**
 - Your advisor will sign, date, and add any necessary comments.
 - Obtain the signature of your major Curriculum Coordinator (see p. 3).
 - **Field Study Petitions:** **IF** you are petitioning to replace EFB 202 with an alternative experience **OR IF** you are proposing to apply an Internship (EFB 420) or Independent Research (EFB 498) experience for you Field Study Directed Elective requirement **THEN** you must submit your petition for review by the EB Curriculum Committee. Deliver the petition to the EB Curriculum Director (p. 3) for this review.
 - If your petition does not involve field study, then no other departmental signatures are necessary. After receiving the Curriculum Coordinator signature, deliver it to 227 Bray Hall for approval by the Associate Provost for Instruction.

- **Final action** should be completed within two or three weeks. A copy showing the College's action will be mailed to the address you indicate at the top of the petition form; **keep this copy in a safe place**, perhaps along with this handbook. Degree Works will reflect the outcome of your request after a decision is made. If you wish to appeal a rejected petition, arrange to meet with the Associate Provost for Instruction.

XIV. Getting Non-Departmental Academic Help

Your advisor, the relevant Curriculum Coordinator and the Curriculum Director can help you with many non-academic problems, but Student Success and Engagement provide abundant student services. Check the links to these important units:

- [Academic Success Center](#) (9 Moon Library) – Peer tutoring, drop-in math support, TA office hours, [ESOL](#) (English Speakers of Other Languages).
- [The Writing Resource Center](#) (13 Moon Library)
- [Public Speaking Lab](#) (14 Moon Library)
- [Digital Storytelling Studio](#) (14 Moon Library)
- [Career Services](#) (110 Bray) – Job postings, Career Resources, Internships.
- [Counseling and Disabilities Services](#) (110 Bray Hall).

Choosing a Major – What’s Best for Me?

A good descriptor of the undergraduate opportunities in the Department of Environmental Biology is that they cover the range from “*Molecules to Ecosystems*,” and this has become the banner-phrase for our offerings. Essentially, this means that you can get training and experience in virtually any major field of biology: all doors are open. The degree program (major) that retains this level of generality through all four years is Environmental Biology (EB). Most educators agree that an undergraduate experience should be broad, to give a foundation that is appropriate for a range of future life-choices.

If you choose, there are many opportunities to specialize within the department. There are five specialized majors to consider, which you can learn about by reading the introductory text for each one in the pages that follow. First, ask yourself how strong and certain that focus is. For example, if you have dreamed of a lifetime career in the study of fishes ever since you first held a fishing pole, you may want to start as a first year in the Aquatic and Fisheries Science major. But for most students such an early commitment is not recommended; there is plenty of time to think about it.

Whether you bring a subject-focus with you when you enroll or develop one after a year or two in the EB major, remember that you have two main choices. One is to use the many elective slots in the EB program to take the specialized courses that are attractive to you, i.e. you do not have to change from the broad EB major; or you can easily change into one of the specialized majors, with little paperwork and few adjustments in most cases. This is because the first year and sophomore years of most EB majors are quite similar, if not identical. By using the ‘What-if’ tool in Degree Works you can explore what adjustments, if any would be needed to change from EB to a different major. Courses that are unnecessary in your new major are simply moved to an “open elective”, so nothing is lost.

General or specialized degree: which is better for you? Unfortunately, there is no easy and general answer. Having a specialized degree in some subject areas may increase your employment options in that particular area and may be right for you if your level of commitment is high. If you want the broadest options for a career in biology after graduation, a general degree (EB) is probably better. Any questions or concerns can be answered by the Curriculum Coordinator for the major you are thinking about (see list on page 3).

Another possible consideration relates to the number of open elective credits, which ranges among majors from 15-28. If you are entering as a first year, these are the credits that allow you to sample other areas of academic enrichment, or to obtain a minor in another discipline if enough open elective credits are available. If you are entering as a transfer student,

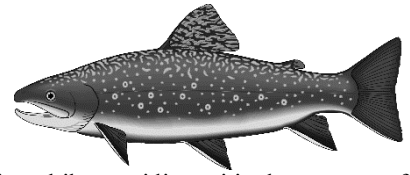
the open elective block in your Degree Works Audit is where your miscellaneous courses are slotted, and the number of open elective credits in your program determines how many can be transferred.

While some program changes are simple to make, others can be a little more difficult, especially if you had decided to specialize early and then changed your mind. Most difficulty arises from course selections made (or avoided) during the first year and sophomore years. For example, Biotechnology requires a two-course sequence of organic chemistry, calculus and physics, usually taken during the first year and sophomore years. No other major requires this full set, so moving from (for example) Wildlife Science to Biotechnology is harder than moving in the other direction.

Finally, students who envision a career in the health professions (pre-med, pre-vet, etc.) will be well served by either the Biotechnology or EB majors. Anyone interested in Pre-health studies should read the relevant section toward the end of this handbook.

Aquatics and Fisheries Science

Aquatic and Fisheries Science seeks to better understand aquatic ecosystems and apply this knowledge toward improved resource management and sustainability. Aquatic systems include wetlands, streams, rivers, lakes, estuaries and oceans in an interconnected global hydrosystem with complex biological, physical, and chemical properties. Aquatic science professionals conduct research and work to manage natural systems for biodiversity, trophic balance, and environmental quality while providing critical resources of food and drinking water, energy, transportation, recreation, and aesthetics for society. This field of study has a long history; for example, the American Fisheries Society is one of the oldest environmental organizations, founded in 1870 and the American Society of Limnology and Oceanography began in 1948. At ESF, Wilford E. Dence conducted pioneering studies on aquatic systems in New York in the early twentieth century.



The present Aquatic and Fisheries Science program (AFS) at ESF builds on its tradition with a wide array of aquatic courses and diverse opportunities for its students. Our AFS program has regional, national, and international recognition and includes a balance of applied and basic aquatic science. Students in AFS have the opportunity to interact with faculty and graduate students involved with diverse studies on aquatic systems. Undergraduate students considering a career in Aquatic and Fisheries Science need a solid foundation of basic sciences (math, chemistry, physics, statistics) combined with a broad training in organismal biology, ecology and evolution. Upper division courses focus on aquatic systems and fishes, including field experience, methods of assessment and principles for management. Students can broaden themselves with studies on the natural history and diversity of various animals, plants, and other taxa. Other recommended subjects include communications, social and economic principles, policy, hydrology, and ecosystem science. ESF's field stations provide important opportunities for additional field-oriented experiences, both for taking formal courses and for directed independent research. The AFS senior synthesis and internships are an important complement to formal courses and contribute to professional development. Career placement for students with a BS in Aquatic and Fisheries Science are in the areas of fisheries, wetland, limnology, marine biology, and oceanography. Jobs are with federal and state agencies, research institutions, private firms, and nongovernmental organizations, in local to international places and occur in a combination of field, lab, and office settings. Students may continue with graduate studies to develop further in the AFS and broaden career options. To pursue a career in research and teaching in a university, a Ph.D. is generally required.

Advising Faculty: J. Farrell (coordinator), E. Arsenault, H. Green, K. Limburg, R. Razavi, K. Schulz, C. Whipps

SUNY College of Environmental Science and Forestry

Student name

Student ID

Degree

Audit date

Level Undergraduate Classification Freshman Major Aquatic and Fisheries Science College SUNY ESF

Degree in Bachelor of Science INCOMPLETE

Credits required: 126 Credits applied: 0 Catalog year: 2023-2024 GPA: 0.000

24 of the last 30 credit hours must be taken at ESF.

- | | |
|--|---|
| <input type="radio"/> 126 Minimum Total Credits Required | Still needed: You currently have 0 credits including both earned and in-progress courses. To graduate, you need to successfully complete a minimum of 126 additional credits and all graduation requirements. |
| <input type="radio"/> 2.0 GPA Requirement | Still needed: When your first term is graded, your cumulative GPA will be calculated. If your cumulative GPA falls below 2.0 you will be placed on academic probation. Please contact the Academic Success Center. |
| <input type="radio"/> Major Requirements | Still needed: See Major in Aquatic and Fisheries Science section |
-

Major in Aquatic and Fisheries Science INCOMPLETE

Credits required: 126 Credits applied: 0 Catalog year: 2023-2024 GPA: 0.000

Unmet conditions for this set of requirements: 126 Credits needed

CORE COURSE REQUIREMENTS

- | | |
|---|---|
| <input type="radio"/> Writing and the Environment (F) | Still needed: 3 Credits in EWP 190 |
| <input type="radio"/> Research Writing and Humanities (S) | Still needed: 3 Credits in EWP 290 |
| <input type="radio"/> Diversity, Equity, Inclusion and Social Justice | Still needed: 3 Credits in EFB 305 or EST 135 or 140 or 204 or 205 or 366 or 405 or LSA 212 |
| <input type="radio"/> Survey of Calculus and Its Applications I (F,S) | Still needed: 4 Credits in APM 105 or 205 |
| <input type="radio"/> Introduction to Probability and Statistics (F,S) | Still needed: 3 Credits in APM 391 or 395 |
| <input type="radio"/> General Biology I: Organismal Biology and Ecology (F) | Still needed: 3 Credits in EFB 101 |
| <input type="radio"/> General Biology I Laboratory (F) | Still needed: 1 Credit in EFB 102 |
| <input type="radio"/> General Biology II: Cell Biology and Genetics (S) | Still needed: 3 Credits in EFB 103 |
-

SUNY College of Environmental Science and Forestry

<input type="radio"/> General Biology II Laboratory (S)	Still needed:	1 Credit in EFB 104
<input type="radio"/> The Global Environment and the Evolution of Human Society (F,S)	Still needed:	3 Credits in EFB 120
<input type="radio"/> Orientation Seminar: Environmental and Forest Biology (F)	Still needed:	1 Credit in EFB 132
<input type="radio"/> Ecological Monitoring and Biodiversity Assessment (CLBS)	Still needed:	3 Credits in EFB 202
<input type="radio"/> Diversity of Life I (F)	Still needed:	3 Credits in EFB 210
<input type="radio"/> Diversity of Life II (S)	Still needed:	3 Credits in EFB 211
<input type="radio"/> Principles of Genetics (S)	Still needed:	3 Credits in EFB 307
<input type="radio"/> Principles of Genetics Laboratory (S)	Still needed:	1 Credit in EFB 308
<input type="radio"/> Principles of Evolution (S)	Still needed:	3 Credits in EFB 311
<input type="radio"/> GENERAL ECOLOGY	Still needed:	
<input type="radio"/> General Ecology (F)		4 Credits in EFB 320
<input type="radio"/> Cell Biology (S)	Still needed:	3 Credits in EFB 325
<input type="radio"/> Limnology: Study of Inland Waters (F)	Still needed:	3 Credits in EFB 424
<input type="radio"/> Ichthyology (S)	Still needed:	3 Credits in EFB 486
<input type="radio"/> Senior Synthesis in Aquatic and Fisheries Science (S)	Still needed:	1 Class in EFB 492
<input type="radio"/> General Chemistry I (F)	Still needed:	3 Credits in FCH 150
<input type="radio"/> General Chemistry Laboratory I (F)	Still needed:	1 Class in FCH 151
<input type="radio"/> General Chemistry II (S)	Still needed:	3 Credits in FCH 152
<input type="radio"/> General Chemistry Laboratory II (S)	Still needed:	1 Credit in FCH 153
<input type="radio"/> Introduction to Economics (F,S)	Still needed:	3 Credits in FOR 207
<input type="radio"/> ORGANIC CHEMISTRY I	Still needed:	Choose from 1 of the following:
<input type="radio"/> Elements of Organic Chemistry (S)		4 Credits in FCH 210
<input type="radio"/> Organic Chemistry I and Laboratory (F)		4 Credits in FCH 221 and 222
<input type="radio"/> Environmental Physics	Still needed:	Choose from 1 of the following:
<input type="radio"/> Environmental Physics		3 Credits in FOR 110

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<input type="radio"/> Major Concepts of Physics I (F)		4 Credits in PHY 101
<input type="radio"/> ORGANIC CHEMISTRY II, CALCULUS II OR PHYSICS II	Still needed:	Choose from 1 of the following:
<input type="radio"/> Organic Chemistry II with Laboratory(S)		4 Credits in FCH 223 and 224
<input type="radio"/> Survey of Calculus and Its Applications II (F,S)		4 Credits in APM 106 or 206
<input type="radio"/> Major Concepts of Physics II (S)		4 Credits in PHY 102
<input type="radio"/> General Physics II and Laboratory (F,S)		4 Credits in PHY 212 and 222
<input type="radio"/> DIRECTED ELECTIVES		
<input type="radio"/> Field Experience Elective	Still needed:	3 Credits in EFB 306 or 337 or 342 or 345 or 384 or 388 or 411 or 425 or 434 or 439 or 484 or 488 or 500 or 513 or 523 or 525 or FOR 513 or ERE 311 or EFB 496 Title = Flora of Central New York or 496 Title = Wildlife Techniques or 496 Title = Aquatic Ecosystems:Adirondacks or 496 Title = Wetland Plnts Communities/ADK or 496 Title = Ecology/Adirondack Insects or 496 Title = Field Ornithology or 496 Title = Field Herpetology or 496 Title = Integrating Conservtn/Agricultr or 496 Title = Ecology of Wetland Communities or 496 Title = Field Entomology or 496 Title = Field Mycology or 496 Title = Wetland Monitoring& Assessment or 496 Title = Field Exp Tropical Coast Eclgy or 496 Title = Bird Banding&Survey Techniques
<input type="radio"/> Structure and Function	Still needed:	3 Credits in BIO 447 or 503 or EFB 385 or 427 or 429 or 462
<input type="radio"/> Organismal Diversity: Plants and Microbes	Still needed:	3 Credits in EFB 303 or 326 or 327 or 336 or 340 or 350 or 435 or 440 or 446 or 496 Title = Flora of Central New York or 496 Title = Wetland Plnts Communities/ADK or 496 Title = Microbial Consortia
<input type="radio"/> Organismal Diversity: Invertebrate and Vertebrate Animals	Still needed:	3 Credits in EFB 351 or 352 or 355 or 388 or 453 or 482 or 483 or 485 or 554 or 566
<input type="radio"/> Physical and Chemical Environment	Still needed:	3 Credits in EAR 101 or 105 or EST 231 or FCH 510 or 515 or FOR 338 or 340 or 345
<input type="radio"/> Environmental Systems Science	Still needed:	3 Credits in EFB 423 or 523 or 542 or ERE 275
<input type="radio"/> Management	Still needed:	3 Credits in EFB 370 or 390 or 438 or 487 or FOR 360 or 372 or 442 or EFB 496 Title = Ecol And Mgt Of Waterfowl
<input type="radio"/> Analytical Tools	Still needed:	3 Credits in BTC 401 or EFB 488 or 519 or 525 or ERE 445 or ESF 300
<input type="radio"/> Communications	Still needed:	3 Credits in EST 370 or 471 or EWP 220 or 407
<input type="radio"/> Free Electives	Still needed:	16 Credits in @ 100:699
<input type="radio"/> GENERAL EDUCATION REQUIREMENT	Still needed:	Choose from 1 of the following:
<input type="radio"/> US History and Civil Engagement		3 Credits in EHS 150 or EST 201 or 202 or 361 or HST 101 or 102
<input type="radio"/> The Arts		3 Credits in APH 261 or ENG 215 or 217 or EWP 350 or HOA 105 or 106 or 201 or 276 or 377 or HOM 125 or 165 or 166 or MTC 125 or LSA 182 or 201 or 205 or 206 or 220 or 222 or PSE 201

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World History and Global Awareness

3 Credits in **AAS** 241 or **ANT** 121 or 185 or 324 or 326 or **EFB** 217 or 305 or 605 or **EST** 140 or 200 or 204 or **GEO** 272 or **HOA** 105 or 106 or **HST** 111 or 210 or 211 or 212 or 320 or 321 or **JSP** 114 or 215 or **LIT** 203 or 211 or **LSA** 205 or 206 or 305 or **PSC** 125 or **PSE** 201 or **REL** 101 or 114 or 185 or 186 or 205 or 206 or 215 or **SAS** 185 or 186 or 324 or **WGS** 324

World Languages

3 Credits in **ARB** 100:699 or **ASL** 100:699 or **CHI** 100:699 or **FRE** 100:699 or **GER** 100:699 or **GRE** 100:699 or **HEB** 100:699 or **HIN** 100:699 or **ITA** 100:699 or **JPS** 100:699 or **KOR** 100:699 or **LAT** 100:699 or **LIN** 100:699 or **POL** 100:699 or **POR** 100:699 or **RUS** 100:699 or **SPA** 100:699 or **TRK** 100:699

Legend

	Complete		Not complete
	Complete (with classes in-progress)		Nearly complete - see advisor
	Prerequisite		Any course number

Disclaimer

You are encouraged to use this degree audit report as a guide when planning your progress toward completion of the above requirements. Your academic advisor or the Registrar's Office may be contacted for assistance in interpreting this report. This audit is not your academic transcript and it is not official notification of completion of degree or certificate requirements. Please contact the Registrar's Office regarding this degree audit report, your official degree/certificate completion status, or to obtain a copy of your academic transcript.

Directed Electives – Aquatic & Fisheries Science

To ensure both strength and breadth of knowledge, 27 elective credit hours must be obtained through courses in the following subject areas.

A. Field Experience Elective

At least three elective credits must come from an approved field course in biology (this is in addition to the core field course, EFB 202). These credits may be obtained through an elective course at our Cranberry Lake Biological Station, an approved internship (EFB 420) or field trip course (EFB 500). Winter Mammalian Ecology (EFB 484) and Tropical Ecology (EFB 523) meet this requirement, as can approved field courses from other institutions.

B. Structure and Function

At least 3 credit hours must be in the subject area of organism-level physiology, anatomy, or development. The list of allowable courses below may vary slightly from year to year.

EFB 385	Comparative Vertebrate Anatomy (4 cr.) S
EFB 427	Plant Anatomy and Development (3 cr.) F
EFB 462	Animal Physiology: Environmental and Ecological (3 cr.) S
EFB 429	Plant Physiology (3 cr.) S
BIO 447	Immunology (3 cr.) S
BIO 503	Developmental Biology (3 cr.) S

C. Organismal Diversity

To encourage breadth in organism-level biology, students must complete (in addition to the core requirement of EFB 486 or EFB 388) at least 3 credit hours in each of the following two categories:

1. Plants and Microbes

EFB 303	Introductory Environmental Microbiology (4 cr.) F
EFB 326	Plant Evolution, Diversification and Conservation (3 cr.) S
EFB 327	Adirondack Flora (3 cr.) CLBS
EFB 336	Dendrology (3 cr.) F
EFB 340	Forest and Shade Tree Pathology (3 cr.) S
EFB 350	Microbial Consortium (3 cr.) S
EFB 428	Mycorrhizal Ecology (3 cr.) F even years
EFB 435	Flowering Plants: Diversity, Evolution, and Systematics (3 cr.) F
EFB 440	Mycology (3 cr.) F
EFB 446	Ecology of Mosses (3 cr.) S
EFB 496	Wetland Plants & Communities of Adirondacks (3 cr.) CLBS
EFB 496	Flora of Central NY (3 cr.) Maymester

2. Invertebrate and Vertebrate Animals

EFB 351	Forest Entomology (3 cr.) F, odd years
EFB 352	Entomology (3 cr.) F, even years
EFB 355	Invertebrate Zoology (4 cr.) S
EFB 388	Ecology of Adirondack Fishes (3 cr.) CLBS
EFB 453	Parasitology (3 cr.) F
EFB 482	Ornithology (4 cr.) S

EFB 483	Mammal Diversity (4 cr.) F
EFB 485	Herpetology (3 cr.) F
EFB 554	Aquatic Entomology (3 cr.) F
EFB 566	Systematic Entomology (3 cr.) S, even years

D. Physical/Chemical Environment

To encourage understanding and familiarity with the aquatic habit, students must complete at least 3 credit hours from one of the following courses:

EST 231	Environmental Geology (3 cr.) S
FCH 510	Environmental Chemistry I (3 cr.) S
FCH 515	Methods of Environmental Chemical Analysis (3 cr.) F
FOR 338	Meteorology (3 cr.) S
FOR 340	Watershed Hydrology (3 cr.) S
FOR 345	Introduction to Soils (3 cr.) F
EAR 101	Dynamic Earth (3 cr.) F
EAR 105	Earth Science (3 cr.) S

E. Environmental Systems Science

To further promote understanding of the systems approach to aquatic ecosystems and an integration of environmental and biological factors, students must complete at least 3 credit hours from one of the following courses.

EFB 423	Marine Ecology (4 cr.) S, even years
EFB 523	Tropical Ecology (3 cr.) S with 1-week field trip
EFB 542	Freshwater Wetland Ecosystems (3 cr.) S
ERE 275	Ecological Engineering I (3 cr.) S

F. Management

At least 3 credit hours in resource or ecosystem management must be obtained through a course in the following list.

EFB 370	Population Biology & Management (3 cr.) S
EFB 390	Wildlife Ecology and Management (4 cr.) F
EFB 438	Ecology & Management of Waterfowl (3 cr.) F
EFB 487	Fisheries Science and Management (3 cr.) F
FOR 360	Principles of Management (3 cr.) F
FOR 372	Fundamentals of Outdoor Rec. (3 cr.) F,S
FOR 442	Watershed Ecology & Management (3 cr.) F

G. Analytical Tools

To increase the breadth of practical skills and knowledge students must complete at least 3 credit hours, obtained through one of the following courses:

BTC 401	Molecular Biology Techniques (3 cr.) F
EFB 488	Fisheries Science Practicum (1 cr.) F
EFB 519	Geographic Modeling (3 cr.) S
EFB 525	Limnology Practicum (2 cr.) F
ERE 445	Hydrological Modeling (3 cr.) F
ESF 300	Introduction to Geospatial Information Technologies (3 cr.) F,S

H. Communications

Students must complete at least 3 credit hours from one of the following communication or interpretation courses.

EFB 312	Introduction to Personal Environmental Interpretation Methods (3 cr.) F
EFB 417	Non-Personal Environmental Interpretive Methods (3 cr.) S
EWP 220	Public Presentation Skills for Environmental Professionals (3 cr.) F,S
EWP 407	Writing for Environmental and Science Professionals (3 cr.) F

Typical Schedule - Aquatic & Fisheries Science

First Year

Fall

EFB 101 General Bio I: Organismal Bio & Ecol.	3
EFB 102 General Biology I Laboratory	1
FCH 150 General Chemistry Lec. I	3
FCH 151 General Chemistry Lab I	1
APM 105 Survey of Calculus I	4
EWP 190 Writing and the Environment	3
EFB 132 Orientation Seminar: EB	1
Total Credits	16

Spring

EFB 103 General Bio II: Cell Biology & Genetics	3
EFB 104 General Biology II Laboratory	1
FCH 152 General Chemistry Lec. II	3
FCH 153 General Chemistry Lab II	1
EFB 120 Global Environment	3
Electives ²	3
Total Credits	14

Summer

EFB 202 Ecological Monitoring & Bio Assessment	3
Field Elective	3
Total Credits	6

Sophomore year

Fall

PHY 101 Major Concepts of Physics I	4
FOR 207 Introduction to Economics	3
EFB 210 Diversity of Life I	3
EFB 320 General Ecology	4
Total Credits	14

Spring

EWP 290 Research Writing & Humanities	3
EFB 307 Principles of Genetics	3
EFB 308 Principles of Genetics Laboratory	1
EFB 211 Diversity of Life II	3
FCH 210 Elements of Organic Chemistry	4
Electives ¹	3
Total Credits	16

Junior year

Fall

Electives	15
Total Credits	15

Spring

APM 391 Introduction to Probability & Statistics	3
EFB 311 Principles of Evolution	3

	EFB 486 Ichthyology	3
	Electives	<u>6</u>
	Total Credits	15
Senior year		
Fall		
	EFB 424 Limnology	3
	Electives	<u>12</u>
	Total Credits	15
Spring		
	EFB 492 Senior Synthesis in Aquatic & Fisheries	1
	EFB 325 Cell Biology	3
	Electives	<u>11</u>
	Total Credits	15

¹Recall that a second semester of calculus, physics or organic chemistry is needed (see Degree Works)

Biotechnology

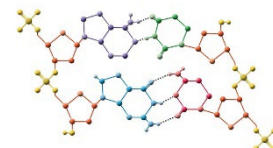
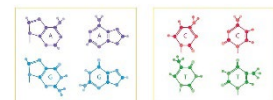
[Biotechnology](#) is an interdisciplinary major administered through the Department of Environmental Biology, but which involves faculty and courses in several other programs at ESF.

Biotechnology is the application of biological organisms, cells, or molecules to produce a product or service for the betterment of humankind. This area of study includes aspects of molecular biology, microbiology, cell biology, biochemistry, and genetic engineering, among other related disciplines.

The curriculum builds on introductory courses in the sciences including biology, chemistry, calculus, and physics, creating a strong foundation for more advanced upper-level courses.

This degree program prepares students to use molecular and biochemical approaches to tackle environmental, natural resource, agricultural, or medical questions, and provides sufficient breadth for students interested in careers veterinary and human medicine. Students who complete this major will be qualified to enter the growing biotechnology job market or continue their studies in graduate or professional school.

The Biotechnology curriculum requires a minimum of 126 total credits. The core requirements are listed in the typical schedule. There are 12 credits of directed electives that can be chosen from a list of approved courses. Twenty-three open elective credits can be selected depending on a student's individual interests. There are also many courses offered at Syracuse University or the SUNY Upstate Medical University that could be used to fulfill directed and open electives.



Advising Faculty, C. Whipps (coord.), D. Fernando, H. Green, B. Leydet.

SUNY College of Environmental Science and Forestry

Student name

Student ID

Degree

Audit date

Level Undergraduate Classification Freshman Major Biotechnology College SUNY ESF

Degree in Bachelor of Science INCOMPLETE

Credits required: 126 Credits applied: 0 Catalog year: 2023-2024 GPA: 0.000

24 of the last 30 credit hours must be taken at ESF.

- | | |
|--|---|
| <input type="radio"/> 126 Minimum Total Credits Required | Still needed: You currently have 0 credits including both earned and in-progress courses. To graduate, you need to successfully complete a minimum of 126 additional credits and all graduation requirements. |
| <input type="radio"/> 2.0 GPA Requirement | Still needed: When your first term is graded, your cumulative GPA will be calculated. If your cumulative GPA falls below 2.0 you will be placed on academic probation. Please contact the Academic Success Center. |
| <input type="radio"/> Major Requirements | Still needed: See Major in Biotechnology section |
-

Major in Biotechnology INCOMPLETE

Catalog year: 2023-2024 GPA: 0.000

CORE COURSE REQUIREMENTS

- | | |
|---|---|
| <input type="radio"/> Writing and the Environment (F) | Still needed: 3 Credits in EWP 190 |
| <input type="radio"/> Research Writing and Humanities (S) | Still needed: 3 Credits in EWP 290 |
| <input type="radio"/> Diversity, Equity, Inclusion and Social Justice | Still needed: 3 Credits in EFB 305 or EST 135 or 140 or 204 or 205 or 366 or 405 or LSA 212 |
| <input type="radio"/> Survey of Calculus and Its Applications I (F,S) | Still needed: 4 Credits in APM 105 or 205 |
| <input type="radio"/> Survey of Calculus and Its Applications II (F,S) | Still needed: 4 Credits in APM 106 or 206 |
| <input type="radio"/> Introduction to Probability and Statistics (F,S) | Still needed: 3 Credits in APM 391 or 395 |
| <input type="radio"/> Orientation Seminar (F) | Still needed: 1 Credit in BTC 132 |
| <input type="radio"/> Molecular Biology Techniques (F) | Still needed: 3 Credits in BTC 401 |
| <input type="radio"/> Internship in Biotechnology or Research Problems in Biotechnology (F,S) | Still needed: 3 Credits in BTC 420 or 498 |



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<input type="radio"/> Research Design and Professional Development (S)	Still needed:	1 Credit in BTC 497
<input type="radio"/> Senior Project Synthesis (S)	Still needed:	1 Credit in BTC 499
<input type="radio"/> General Biology I: Organismal Biology and Ecology (F)	Still needed:	3 Credits in EFB 101
<input type="radio"/> General Biology I Laboratory (F)	Still needed:	1 Credit in EFB 102
<input type="radio"/> General Biology II: Cell Biology and Genetics (S)	Still needed:	3 Credits in EFB 103
<input type="radio"/> General Biology II Laboratory (S)	Still needed:	1 Credit in EFB 104
<input type="radio"/> Introductory Environmental Microbiology (F)	Still needed:	4 Credits in EFB 303
<input type="radio"/> Principles of Genetics (S)	Still needed:	3 Credits in EFB 307
<input type="radio"/> Principles of Genetics Laboratory (S)	Still needed:	1 Credit in EFB 308
<input type="radio"/> Principles of Evolution (S)	Still needed:	3 Credits in EFB 311
<input type="radio"/> GENERAL ECOLOGY	Still needed:	
<input type="radio"/> General Ecology (F)		4 Credits in EFB 320
<input type="radio"/> Cell Biology (S)	Still needed:	3 Credits in EFB 325
<input type="radio"/> General Chemistry I (F)	Still needed:	3 Credits in FCH 150
<input type="radio"/> General Chemistry Laboratory I (F)	Still needed:	1 Credit in FCH 151
<input type="radio"/> General Chemistry II (S)	Still needed:	3 Credits in FCH 152
<input type="radio"/> General Chemistry Laboratory II (S)	Still needed:	1 Credit in FCH 153
<input type="radio"/> Organic Chemistry I (F)	Still needed:	3 Credits in FCH 221
<input type="radio"/> Organic Chemistry Laboratory I (F)	Still needed:	1 Credit in FCH 222
<input type="radio"/> Organic Chemistry II (S)	Still needed:	3 Credits in FCH 223
<input type="radio"/> Organic Chemistry Laboratory II (S)	Still needed:	1 Credit in FCH 224
<input type="radio"/> Biochemistry I (F)	Still needed:	3 Credits in FCH 430 or 530
<input type="radio"/> Biochemistry II (S)	Still needed:	3 Credits in FCH 432 or 532
<input type="radio"/> PHYSICS I	Still needed:	Choose from 1 of the following:
<input type="radio"/> Major Concepts of Physics I (F)		4 Credits in PHY 101
<input type="radio"/> General Physics I and Laboratory (F,S)		4 Credits in PHY 211 and 221

SUNY College of Environmental Science and Forestry

<input type="radio"/> PHYSICS II	Still needed:	Choose from 1 of the following:
<input type="radio"/> Major Concepts of Physics II (S)		4 Credits in PHY 102
<input type="radio"/> General Physics II and Laboratory (F,S)		4 Credits in PHY 212 and 222
<input type="radio"/> Directed Electives	Still needed:	12 Credits in BIO 211 or 216 or 217 or 316 or 317 or 355 or 396 or 422 or 441 or 442 or 443 or 447 or 448 or 450 or 463 or 464 or 501 or 503 or 400 Title = Metabol Eng for Indust Biotech or BCM 477 or 484 or BEN 364 or 421 or 433 or 462 or 468 or 473 or 481 or 541 or 561 or 621 or 633 or 662 or 664 or 668 or 673 or BPE 300 or 310 or 420 or 438 or 510 or 536 or 620 or 638 or 658 or BTC 425 or 426 or EFB 340 or 360 or 385 or 400 or 427 or 440 or 453 or 462 or 505 or 429 or 629 or 496 Title = Phytoremediation or 496 Title = Cell Biology Recitation or 496 Title = Ecotoxicology or 496 Title = Ecoimmunological Concepts or 496 Title = Microbial Consortia or EHS 320 or FCH 380 or 381 or 390 or 510 or 531 or 630 or MCR 480 or 484 or 485 or PSE 200 or 202 or 223 or 361 or 350 or 370 or 371 or 438 or 450 or 465 or 550 or 570 or 638 or 650 or 665
<input type="radio"/> Open Electives	Still needed:	23 Credits in @ 100:699
<input type="radio"/> GENERAL EDUCATION	Still needed:	Choose from 2 of the following:
<input type="radio"/> US History and Civil Engagement		3 Credits in EHS 150 or EST 201 or 202 or 361 or HST 101 or 102
<input type="radio"/> The Arts		3 Credits in APH 261 or ENG 215 or 217 or EWP 350 or HOA 105 or 106 or 201 or 276 or 377 or HOM 125 or 165 or 166 or LSA 182 or 201 or 205 or 206 or 220 or 222 or MTC 125 or PSE 201
<input type="radio"/> World History and Global Awareness		3 Credits in AAS 241 or ANT 121 or 185 or 324 or 326 or EFB 217 or 305 or 605 or EST 140 or 200 or 204 or GEO 272 or HOA 105 or 106 or HST 111 or 210 or 211 or 212 or 320 or 321 or JSP 114 or 215 or LIT 203 or 211 or LSA 205 or 206 or 305 or PSC 125 or PSE 201 or REL 101 or 114 or 185 or 186 or 205 or 206 or 215 or SAS 185 or 186 or 324 or WGS 324
<input type="radio"/> World Languages		3 Credits in ARB 100:699 or ASL 100:699 or CHI 100:699 or FRE 100:699 or GER 100:699 or GRE 100:699 or HEB 100:699 or HIN 100:699 or ITA 100:699 or JPS 100:699 or KOR 100:699 or LAT 100:699 or LIN 100:699 or POL 100:699 or POR 100:699 or RUS 100:699 or SPA 100:699 or TRK 100:699
<input type="radio"/> Social Science		3 Credits in EFB 120 or EST 203 or 204 or 221 or 366 or 390 or FOR 207 or GEO 103 or MAX 132 or PAF 101 or PSC 123 or 124 or 125 or PSY 205 or SOC 248 or 281

Legend

 Complete	 Not complete
 Complete (with classes in-progress)	 Nearly complete - see advisor
 Prerequisite	 Any course number

Disclaimer

You are encouraged to use this degree audit report as a guide when planning your progress toward completion of the above requirements. Your academic advisor or the Registrar's Office may be contacted for assistance in interpreting this report. This audit is not your academic transcript and it is not official notification of completion of degree or certificate requirements. Please contact the Registrar's Office regarding this degree audit report, your official degree/certificate completion status, or to obtain a copy of your academic transcript.

Directed Electives – Biotechnology

A minimum of 12 credits of directed elective courses required. New biotechnology related courses not currently on the list may also fulfill this requirement with the permission of your advisor.

Although any combination of courses below may satisfy the minimum 12 credits required, the following list has been categorized into the most common subject areas of interest to BTC students, as well as those courses that would be suitable for multiple subject areas of interest. These groupings of elective courses are guidelines and is best to consult your advisor when selecting courses since students have unique career goals and interests.

Courses that fit multiple areas of interest

FCH 380	Analytical Chemistry I (3 cr.) F
FCH 381	Analytical Chemistry II (3 cr.) S
FCH 510	Environmental Chemistry (3 cr.) S
FCH 531	Biochemistry lab (3 cr.) F
MCR 480	Fundamentals of Microscopy (3 cr.) F
MCR 484	Scanning Electron Microscopy (3 cr.) F
MCR 485	Transmission Electron Microscopy (3 cr.) S
BIO 422	Bioinformatics for Life Scientists (3 cr.) – SU course
BIO 442	Seminar in Model Organism Genetics (3 cr.) – SU course
BIO 443	Seminar in Epigenetics (3 cr.) – SU course
BIO 450	Seminar in Evolutionary Genetics (3 cr.) – SU course
BIO 463	Molecular Biotechnology (4 cr.) – SU course
BIO 464	Applied Biotechnology (4 cr.) – SU course
BCM 477	Proteins and Nucleic Acids Lab (3 cr.) - SU course
BCM 484	Biomolecular Modeling (3 cr.) – SU course
BEN 541	Principles of Tissue Engineering (3 cr.) – SU course

Pre-health (Pre-Veterinary, Pre-Medical, etc.)

EFB 360	Epidemiology (3 cr.) F
EFB 385	Comparative Vertebrate Anatomy (4 cr.) S
EFB 400	Toxic Health Hazards (3 cr.) F
EFB 453	Parasitology (3 cr.) F
EFB 462	Animal Physiology: Environmental & Ecological (3 cr.) F
EHS 320	Disease Prevention (3 cr.) S
FCH 390	Drugs from the Wild (3 cr.) F
BIO 211	Introduction to Neuroscience (3 cr.) S – SU course
BIO 316	Anatomy & Physiology I for Biology Majors (4 cr.) – SU course
BIO 317	Anatomy & Physiology II for Biology Majors (4 cr.) – SU course
BIO 355	General Physiology (3 cr.) S – SU course [<i>caution: should take BIO 316 & 317 first</i>]
BIO 396	Stem Cells and Society (3 cr.) – SU course
BIO 441	Seminar in Infectious Diseases (3 cr.) S – SU course
BIO 447	Basic Immunology (3 cr.) – SU course
BIO 448	Evolutionary Medicine (3 cr.) – SU course
BIO 501	Biology of Cancer (3 cr.) – SU course
BIO 503	Developmental Biology (3 cr.) – SU course

Plant Biotechnology

BTC 425	Plant Biotechnology (3 cr.) S
BTC 426	Intro. Plant Tissue Culture (3 cr.) F
EFB 427	Plant Anatomy and Development (3 cr.) F
EFB 429	Plant Physiology (3 cr.) S
FCH 630	Plant Biochemistry (3 cr.) S

Microbial Biotechnology

EFB 340	Forest & Shade tree Pathology (3 cr.) S
EFB 428	Mycorrhizal Ecology (3 cr.) F
EFB 440	Mycology (3 cr.) F
EFB 505	Microbial Ecology (2 cr.) S

Bioprocess Engineering

PSE 200	Introduction to Papermaking (3 cr.)*
PSE 202	Pulp and Paper Laboratory Skills (1 cr.)*
PSE 223	Introduction to Lignocellulosics (4 cr.)*
PSE 361	Engineering Thermodynamics (3 cr.)*
PSE 370/570	Principles of Mass and Energy Balance (3 cr.)**
PSE 371	Fluid Mechanics (3 cr.)*
BPE 300	Introduction to Industrial Bioprocessing (3 cr.)*
PSE 350/550	Fiber Processing (3 cr.)**
PSE 450/650	Pulping and Bleaching Processes (3 cr.)**
PSE 465/665	Fiber and Paper Properties (3 cr.)**
PSE 438/638	Biorenewable Fibrous and Nonfibrous products (3 cr.)**
BPE 310	Colloid and Interface Science (3 cr.)*
BPE 420/620	Bioseparations (3 cr.)**
BPE 438/638	Introduction to Biorefinery Processes (3 cr.)**
BPE 510	Introduction to Polymer Coatings (3 cr.)
BPE 536	Radiation Curing of Polymer Technologies (3 cr.)
BPE 658	Advanced Biocatalysis (3 cr.)
BEN 364/664	Quantitative Physiology (4 cr.) – SU course**
BEN 421/621	Biochemical Engineering (3 cr.) – SU course**
BEN 433/633	Drug Delivery (3 cr.) – SU course**
BEN 462/662	Biofuels, Bioproducts, and Biorefining (3 cr.) – SU course**
BEN 468/668	Biomaterials & Medical Devices (3 cr.) – SU course**
BEN 473/673	Biomanufacturing (3 cr.) – SU course**
BEN 481	Bioinstrumentation (3 cr.) – SU course
BEN 561	Polymer Science & Engineering (3 cr.) – SU course

*Useful background and prerequisite courses if you are planning on entering the MPS program in Paper and Bioprocess Engineering.

**The graduate level course may be applicable to the MPS program in Paper and Bioprocess Engineering.

Typical Schedule - Biotechnology

First Year

Fall

EFB 101 General Bio I: Organismal Bio & Ecol	3
EFB 102 General Bio I Laboratory	1
FCH 150 General Chemistry Lec. I	3
FCH 151 General Chemistry Lab I	1
APM 105 Survey of Calculus I	4
EWP 190 Writing and the Environment	3
BTC 132 Orientation Seminar in Biotechnology	1
Total Credits	16

Spring

EFB 103 General Bio II: Cell Biology & Genetics	3
EFB 104 General Bio II Laboratory	1
FCH 152 General Chemistry Lec. II	3
FCH 153 General Chemistry Lab II	1
APM 106 Survey of Calculus II	4
EWP 290 Writing, Humanities & Environment	3
Total Credits	15

Sophomore year

Fall

FCH 221 Organic Chemistry I	3
FCH 222 Organic Chemistry Lab I	1
EFB 320 General Ecology	4
Electives	7
Total Credits	15

Spring

BTC 497 Research, Design & Professional Development	1
EFB 307 Principles of Genetics	3
EFB 308 Principles of Genetics Lab	1
FCH 223 Organic Chemistry II	3
FCH 224 Organic Chemistry Lab II	1
Electives	7
Total Credits	16

Junior year

Fall

EFB 303 Intro to Environmental Microbiology	4
BTC 401 Molecular Biology Techniques	4
PHY 101 Major Concepts of Physics I [1]	4
Elective	3
Total Credits	15

Spring

APM391 Intro/Probability & Stats	3
EFB 311 Principles of Evolution	3
EFB 325 Cell Biology	3

	PHY 102 Major Concepts of Physics II [1]	4
	Electives	<u>2</u>
	Total Credits	15
Summer		
	BTC 498 or 420 Research Problems in Biotech or Internship	<u>3</u>
	Total Credits	3
Senior year		
Fall		
	FCH 430 Biochemistry I	3
	Electives	<u>13</u>
	Total Credits	16
Spring		
	BTC 499 Senior Project Synthesis	1
	FCH 432 Biochemistry II	3
	Electives	<u>11</u>
	Total Credits	15

Conservation Biology

Conservation Biology is the application of science to conserve the earth's imperiled species and ecosystems. The field is a relatively young one that is growing rapidly in response to the biodiversity crisis, perhaps the most critical environmental issue of our time. Conservation biologists view all of nature's diversity as important and having inherent value. This diversity spans the biological hierarchy and includes variation at the level of genes, populations, communities, ecosystems, and biomes.

A focus on biological diversity and an intrinsic valuation of nature is what distinguishes conservation biology from wildlife management (with its somewhat more utilitarian perspective and a focus on populations of birds and large mammals) and from general environmental biology (with a broad focus on environmental issues). Conservation biologists seek ways to integrate biological perspectives with social, economic, legislative, and political ones to achieve conservation goals.



The courses associated with this major are indicative of the interdisciplinary and holistic nature of conservation biology. After obtaining a foundation in basic science communication, and general education subjects, students learn the evolutionary and ecological forces that have generated the patterns of biodiversity around us, through courses in organismal biology, evolutionary and systematic biology, population biology, ecology and ecosystem science.

An introductory course in Conservation Biology and one in Problem Solving in Conservation Biology familiarize students with the dimensions of the current biodiversity crisis and the management tools available to mitigate for it. These, in combination with a selection of advanced courses in conservation biology, a Senior Synthesis and an Internship or Research Experience in Conservation Biology, cover the breadth of biological, social, political, and economic aspects of the biodiversity crisis.

The program prepares students for employment in a variety of government agencies, at the municipal level (for example, as land use planner), state level (such as with the New York Department of Environmental Conservation; NYS Parks, Recreation, and Historic Preservation; or Natural Heritage Program), federal level (such as with the U.S. Fish and Wildlife Service, U.S. Geological Survey, U.S. Forest Service, or National Park Service), and occasionally at the international level (such as with the United Nations' Environmental Program). Many private conservation agencies such as The Nature Conservancy preferentially hire broadly trained conservation biologists. Ecological consulting firms are an increasingly important source of employment for conservation biologists. Training in conservation biology also provides a strong basis for postgraduate education and rewarding careers in research, teaching and environmental education.

Advising Faculty: D. Leopold (coordinator), J. Gibbs, S. Diemont, M. Dovciak, J. Drew, M. Fierke, T. Horton, R. Kimmerer, G. McGee, D. Parry, R. Rundell, K. Schulz, A. Weir

SUNY College of Environmental Science and Forestry

Student name

Student ID

Degree

Audit date

Level Undergraduate Classification Freshman Major Conservation Biology College SUNY ESF

Degree in Bachelor of Science INCOMPLETE

Credits required: 126 Credits applied: 0 Catalog year: 2023-2024 GPA: 0.000

24 of the last 30 credit hours must be taken at ESF.

- | | |
|--|---|
| <input type="radio"/> 126 Minimum Total Credits Required | Still needed: You currently have 0 credits including both earned and in-progress courses. To graduate, you need to successfully complete a minimum of 126 additional credits and all graduation requirements. |
| <input type="radio"/> 2.0 GPA Requirement | Still needed: When your first term is graded, your cumulative GPA will be calculated. If your cumulative GPA falls below 2.0 you will be placed on academic probation. Please contact the Academic Success Center. |
| <input type="radio"/> Major Requirements | Still needed: See Major in Conservation Biology section |
-

Major in Conservation Biology INCOMPLETE

Catalog year: 2023-2024 GPA: 0.000

CORE COURSE REQUIREMENTS

- | | |
|---|---|
| <input type="radio"/> Survey of Calculus and Its Applications I (F,S) | Still needed: 4 Credits in APM 105 or 205 |
| <input type="radio"/> Introduction to Probability and Statistics (F,S) | Still needed: 3 Credits in APM 391 or 395 |
| <input type="radio"/> General Biology I: Organismal Biology and Ecology (F) | Still needed: 3 Credits in EFB 101 |
| <input type="radio"/> General Biology I Laboratory (F) | Still needed: 1 Credit in EFB 102 |
| <input type="radio"/> General Biology II: Cell Biology and Genetics (S) | Still needed: 3 Credits in EFB 103 |
| <input type="radio"/> General Biology II Laboratory (S) | Still needed: 1 Credit in EFB 104 |
| <input type="radio"/> The Global Environment and the Evolution of Human Society (F,S) | Still needed: 3 Credits in EFB 120 |
| <input type="radio"/> Writing and the Environment (F) | Still needed: 3 Credits in EWP 190 |
| <input type="radio"/> Research Writing and Humanities (S) | Still needed: 3 Credits in EWP 290 |
-

SUNY College of Environmental Science and Forestry

<input type="radio"/> Diversity, Equity, Inclusion and Social Justice	Still needed:	3 Credits in EFB 305 or EST 135 or 140 or 204 or 205 or 366 or 405 or LSA 212
<input type="radio"/> General Chemistry I (F)	Still needed:	3 Credits in FCH 150
<input type="radio"/> General Chemistry Laboratory I (F)	Still needed:	1 Credit in FCH 151
<input type="radio"/> General Chemistry II (S)	Still needed:	3 Credits in FCH 152
<input type="radio"/> General Chemistry Laboratory II (S)	Still needed:	1 Credit in FCH 153
<input type="radio"/> Orientation Seminar: Environmental and Forest Biology (F)	Still needed:	1 Credit in EFB 132
<input type="radio"/> Environmental Physics	Still needed:	Choose from 1 of the following:
<input type="radio"/> Environmental Physics		3 Credits in FOR 110
<input type="radio"/> Major Concepts of Physics I (F)		4 Credits in PHY 101
<input type="radio"/> Ecological Monitoring and Biodiversity Assessment (CLBS)	Still needed:	3 Credits in EFB 202
<input type="radio"/> Diversity of Life I (F)	Still needed:	3 Credits in EFB 210
<input type="radio"/> Diversity of Life II (S)	Still needed:	3 Credits in EFB 211
<input type="radio"/> Principles of Genetics (S)	Still needed:	3 Credits in EFB 307
<input type="radio"/> Principles of Genetics Laboratory (S)	Still needed:	1 Credit in EFB 308
<input type="radio"/> Principles of Evolution (S)	Still needed:	3 Credits in EFB 311
<input type="radio"/> GENERAL ECOLOGY	Still needed:	
<input type="radio"/> General Ecology (F)		4 Credits in EFB 320
<input type="radio"/> Population Ecology Management (S)	Still needed:	3 Credits in EFB 370
<input type="radio"/> Introduction to Conservation Biology (F)	Still needed:	3 Credits in EFB 413
<input type="radio"/> Senior Synthesis in Conservation Biology (F)	Still needed:	3 Credits in EFB 414
<input type="radio"/> Internship in Environmental and Forest Biology or Research Problems in Environmental and Forest Biology (F,S)	Still needed:	3 Credits in EFB 420 or 498
<input type="radio"/> Open Electives	Still needed:	22 Credits in @ 100:699
<input type="radio"/> GENERAL EDUCATION ELECTIVE	Still needed:	Choose from 1 of the following:
<input type="radio"/> US History and Civil Engagement		3 Credits in EHS 150 or EST 201 or 202 or 361 or HST 101 or 102
<input type="radio"/> The Arts		3 Credits in APH 261 or ENG 215 or 217 or EWP 350 or HOA 105 or 106 or 201 or 276 or 377 or HOM 125 or 165 or 166 or LSA 182 or 201 or 205 or 206 or 220 or 222 or MTC 125 or PSE 201

- 3 Credits in **AAS** 241 or **ANT** 121 or 185 or 324 or 326 or **EFB** 217 or 305 or 605 or **EST** 140 or 200 or 204 or **GEO** 272 or **HOA** 105 or 106 or **HST** 111 or 210 or 211 or 212 or 320 or 321 or **JSP** 114 or 215 or **LIT** 203 or 211 or **LSA** 205 or 206 or 305 or **PSC** 125 or **PSE** 201 or **REL** 101 or 114 or 185 or 186 or 205 or 206 or 215 or **SAS** 185 or 186 or 324 or **WGS** 324
- 3 Credits in **ARB** 100:699 or **ASL** 100:699 or **CHI** 100:699 or **FRE** 100:699 or **GER** 100:699 or **HEB** 100:699 or **HIN** 100:699 or **ITA** 100:699 or **JPS** 100:699 or **KOR** 100:699 or **LAT** 100:699 or **LIN** 100:699 or **POL** 100:699 or **POR** 100:699 or **RUS** 100:699 or **SPA** 100:699 or **TRK** 100:699
- Still needed:** See [Directed Electives, Conservation Biology](#) section

Directed Electives, Conservation Biology

INCOMPLETE

Credits required: 30 Credits applied: 0 Catalog year: 2023-2024 GPA: 0.000

- Still needed:** You currently have 0 credit hours including both earned and in-progress courses. To complete your directed electives, you need to successfully complete a minimum of 30 additional credit hours.
- Still needed:** 3 Credits in **EFB** 306 or 337 or 342 or 345 or 384 or 388 or 411 or 425 or 434 or 439 or 484 or 488 or 500 or 513 or 523 or 525 or **FOR** 513 or **ERE** 311 or **EFB** 496 Title = Flora of Central New York or 496 Title = Wildlife Techniques or 496 Title = Aquatic Ecosystems:Adirondacks or 496 Title = Wetland Plnts Communities/ADK or 496 Title = Ecology/Adirondack Insects or 496 Title = Field Ornithology or 496 Title = Field Herpetology or 496 Title = Integrating Consvrtn/Agricultr or 496 Title = Ecology of Wetland Communities or 496 Title = Field Entomology or 496 Title = Field Mycology or 496 Title = Wetland Monitoring& Assessment or 496 Title = Field Exp Tropical Coast Eclyg or 496 Title = Bird Banding&Survey Techniques
- Still needed:** 9 Credits in **EFB** 303 or 326 or 327 or 336 or 340 or 342 or 350 or 351 or 352 or 355 or 388 or 435 or 440 or 446 or 453 or 479 or 482 or 483 or 485 or 486 or 554 or 566 or 496 Title = Flora of Central New York or 496 Title = Field Ornithology or 496 Title = Wetland Plnts Communties/ADK
- Still needed:** 6 Credits in **EFB** 305 or 390 or 423 or 424 or 438 or 444 or 449 or 463 or 480 or 487 or 493 or 502 or 504 or 542 or 496 Title = Ecol And Mgt Of Waterfowl or 496 Title = Integrating Consvrtn/Agricultr or 496 Title = Bio,Eco&Cnsrvtn of Coral Reefs or 496 Title = Principles of Animal Behavior or 496 Title = Wetlands Cons&Mgmt for Wldlfe or 496 Title = Tropical Conservation Biology or **FOR** 496 Title = Forest Management & Wildlife or 332 or 442
- Still needed:** 3 Credits in **EFB** 404 or **EST** 353 or 366 or 390 or 460 or **EWP** 390 or **FOR** 312 or 360 or 465 or 487 or 489 or **EFB** 496 Title = Corals, Conservatn&Colonialism
- Still needed:** 3 Credits in **EST** 370 or 471 or **EWP** 220 or 407 or **EST** 496 Title = Adv Interpretation Certificatn
- Still needed:** 3 Credits in **BTC** 401 or 425 or 426 or **EFB** 518 or **ERE** 445 or 563 or **ESF** 300 or **MCR** 484 or 485 or 585 or **SUS** 350
- Still needed:** 1 Class in **BTC** 401 or 425 or 426 or **EFB** 303 or 305 or 326 or 336 or 337 or 340 or 342 or 345 or 350 or 351 or 352 or 355 or 384 or 388 or 390 or 404 or 411 or 417 or 423 or 424 or 428 or 434 or 435 or 439 or 440 or 441 or 444 or 446 or 453 or 479 or 480 or 482 or 483 or 484 or 485 or 486 or 487 or 488 or 493 or 500 or 502 or 513 or 518 or 522 or 523 or 525 or 542 or 554 or 566 or 693 or 496 Title = Flora of Central New York or 496 Title = Wildlife Techniques or 496 Title = Aquatic Ecosystems:Adirondacks or 496 Title = Wetland Plnts Communities/ADK or

Directed Electives – Conservation Biology

To ensure that Conservation Biology undergraduates obtain both strength and breadth of knowledge, **30 elective credit hours** must be distributed in a way that satisfies six requirements (A-F, below).

A. Field Experience Elective

At least three elective credits from an approved field course in biology (in addition to the core field course, EFB 202). These credits are typically obtained through an elective course at our Cranberry Lake Biological Station, an approved internship (EFB 420) or field trip course (EFB 500). Approved field courses from other institutions can also fulfill this requirement.

B. Biodiversity Specialization (at least three courses from the following list)

The availability of courses that satisfy this requirement varies. The suggestions below are pre-approved courses that are typically taken - consult with your advisor or the curriculum coordinator about other possibilities. Many other courses can potentially substitute (by petition) for those listed.

EFB 303	Introductory Environmental Microbiology (4 cr.) F
EFB 326	Plant Evolution, Diversification and Conservation (3 cr.) S
EFB 327	Adirondack Flora (3 cr.) CLBS
EFB 336	Dendrology (3 cr.) F
EFB 340	Forest and Shade Tree Pathology (3 cr.) F
EFB 342	Fungal Diversity and Ecology (3 cr.) CLBS
EFB 350	Microbial Consortia (3 cr.) S
EFB 351	Forest Entomology (3 cr.) F, odd years
EFB 352	Entomology (3 cr.) F, even years
EFB 355	Invertebrate Zoology (4 cr.) S
EFB 388	Ecology of Adirondack Fisheries (3 cr.) CLBS
EFB 428	Mycorrhizal Ecology (3 cr.) F, even years
EFB 435	Flowering Plants: Diversity, Evolution, and Systematics (3 cr.) F
EFB 440	Mycology (3 cr.) F
EFB 446	Ecology of Mosses (3 cr.) S
EFB 453	Parasitology (3 cr.) F
EFB 482	Ornithology (4 cr.) S
EFB 483	Mammal Diversity (4 cr.) F
EFB 485	Herpetology (3 cr.) F
EFB 486	Ichthyology (3 cr.) S
EFB 496	Field Ornithology (3 cr.) CLBS
EFB 496	Wetland Plants & Communities of Adirondacks (3 cr.) CLBS
EFB 496	Flora of Central NY (3 cr.) Maymester
EFB 554	Aquatic Entomology (3 cr.) F
EFB 566	Systematic Entomology (3 cr.) S, even years

C. Applied Conservation Biology (at least 6 credits)

EFB 305	Indigenous Issues in the Environment (3 cr.) S
EFB 390	Wildlife Ecology and Management (4 cr.) F
EFB 423	Marine Ecology (4 cr.) S, even years
EFB 424	Limnology (3 cr.) F

EFB 438	Ecology and Management of Waterfowl (3 cr.) F
EFB 444	Biodiversity and Geography of Nature (3 cr.) F even years
EFB 480	Animal Behavior (4 cr.) F
EFB 487	Fisheries Science & Management (3 cr.) F
EFB 493	Management of Wildlife Habitats & Populations (3 cr.) F
EFB 502	Ecology and Management of Invasive Species (3 cr.) S
EFB 504	Plant-Herbivore Interactions (3 cr.) F, odd years
EFB 522	Ecology, Resources and Development (2 cr.) S
EFB 542	Freshwater Wetland Ecosystems (3 cr.) S
FOR 332	Forest Ecology (3 cr.) F
FOR 442	Watershed Ecology & Management (3 cr.) F

D. Human Dimensions (at least 3 credits)

EFB 404	Nat Hist Museums of Modern Sci (3 cr.) Maymester
EST 353	Environ Psychology (3 cr.) F, odd years
EST 366	Attitudes, Values, & Env. (3 cr.) S
EST 390	Social Processes and Environment (3 cr.) S
EST 460	Land Use Law (3 cr.) S
EWP 390	Intro to Literature of Nature (3 cr.) F
FOR 312	Sociology/Natural Resources (3 cr.) S
FOR 360	Principles of Management (3 cr.) F
FOR 465	Natural Resources Policy (3 cr.) F
FOR 487	Environmental Law and Policy (3 cr.) F
FOR 489	Natural Resources Law and Policy (3 cr.) S

E. Communications and Interpretation (at least 3 credits)

EFB 312	Introduction to Personal Environmental Interpretation Methods (3 cr.) F
EFB 417	Non-Personal Environmental Interpretive Methods (3 cr.) S
EWP 220	Public Presentation Skills (3 cr.) F,S
EWP 407	Writing for Environmental and Science Professionals (3 cr.) F
EST 496	Advanced Interpretation & Certification (3 cr.) S, even years

F. Technical Skills (at least 3 credits)

BTC 401	Molecular Biol. Techniques (3 cr.) F
BTC 425	Plant Biotechnology (3 cr.) S
BTC 426	Plant Tissue Culture Methods (3 cr.) F
ERE 445	Hydrological Modeling (3 cr.) F
ESF 300	Introduction to Geospatial Information Technologies (3 cr.) F,S
ERE 563	Photogrammetry (3 cr.) S
MCR 484	Scanning Electron Microscopy (3 cr.) F
MCR 485	Transmission Electron Microscopy (3 cr.) S
MCR 585	Light Microscopy for Research Applications (3 cr.) S

Typical Schedule - Conservation Biology

First Year

Fall

EFB 101 General Bio I: Organismal Bio & Ecology	3
EFB 102 General Biology I Laboratory	1
FCH 150 General Chemistry Lec. I	3
FCH 151 General Chemistry Lab I	1
APM 105 Survey of Calculus I	4
EWP 190 Writing and the Environment	3
EFB 132 Orientation Seminar: EB	1
Total Credits	16

Spring

EFB 103 General Bio II: Cell Biology & Genetics	3
EFB 104 General Biology II Laboratory	1
FCH 152 General Chemistry Lec. II	3
FCH 153 General Chemistry Lab II	1
EFB 120 Global Environment	3
DEISJ General Education Requirement	3
Total Credits	14

Summer

EFB 202 Ecological Monitoring & Bio Assessment	3
Field Experience Elective	3
Total Credits	6

Sophomore year

Fall

FOR 110 Environmental Physics (or PHY101)	3
EFB 210 Diversity of Life I	3
EFB 320 General Ecology ¹	4
Electives	5
Total Credits	15

Spring

EFB 307 Principles of Genetics ¹	3
EFB 308 Principles of Genetics Laboratory ¹	1
EFB 211 Diversity of Life II	3
APM 391 Introduction to Probability and Statistics	3
EWP 290 Research Writing & Humanities	3
Elective	3
Total Credits	16

Junior year

Fall

EFB 413 Introduction to Conservation Biology ¹	3
Electives	12
Total Credits	15

Spring

EFB 370 Population Ecology & Management ¹	3
--	---

	EFB 311 Principles of Evolution	3
	Electives	<u>8</u>
	Total Credits	14
Senior year		
Fall		
	EFB 414 Senior Synthesis in Conservation Bio ¹	3
	Electives	<u>12</u>
	Total Credits	15
Spring	Electives	<u>15</u>
	Total Credits	15

¹ Note the fall-spring-fall Conservation Biology sequence in the junior-senior years. Each course in this sequence is a pre-requisite for the next. Also note that Genetics and Ecology are both prerequisites for EFB 413. Variations should be discussed with your advisor.

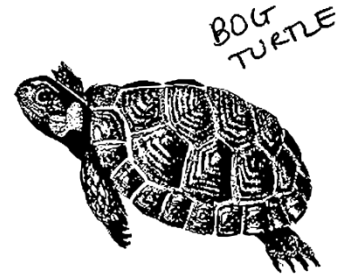
Environmental Biology

The curriculum for the Bachelor of Science degree in Environmental Biology (EB) is built around a core of required courses that provides a general education, a background in the principles of biological and physical science, and an orientation to natural resources and other environmental concerns. From this common foundation, the large number of elective credits allows each student to develop a unique plan of study, with the help of an assigned advisor who is expert in the student's general area of interest. In keeping with the hands-on, field orientation of our curriculum, students also must complete six credit hours of field experience.

With appropriate electives, students who complete the degree program will meet requirements for a wide range of federal, state, municipal and private-sector positions that call for training in biological sciences. (Students interested in federal and state positions should review civil service publications and become familiar with specific course requirements early enough to make timely elective choices.) General subject requirements for graduate study in virtually any area of biology also will be met.

Environmental Biology is the broadest of the six biology majors at ESF, and we describe it as covering topics from "molecules to ecosystems." Sufficient elective space exists to allow completion of a minor during the four-year program. In choosing electives, some students sample from the widest spectrum of classes in environmental biology; this is common for those wishing to enter graduate school for further, career-oriented education. Other students focus their electives to some extent, depending on their interests and their educational and career goals.

Advising Faculty: All



SUNY College of Environmental Science and Forestry

Student name

Student ID

Degree

Audit date

Level Undergraduate Classification Freshman Major Environmental Biology College SUNY ESF

Degree in Bachelor of Science INCOMPLETE

Credits required: 126 Credits applied: 0 Catalog year: 2023-2024 GPA: 0.000

24 of the last 30 credit hours must be taken at ESF.

- | | |
|--|---|
| <input type="radio"/> 126 Minimum Total Credits Required | Still needed: You currently have 0 credits including both earned and in-progress courses. To graduate, you need to successfully complete a minimum of 126 additional credits and all graduation requirements. |
| <input type="radio"/> 2.0 GPA Requirement | Still needed: When your first term is graded, your cumulative GPA will be calculated. If your cumulative GPA falls below 2.0 you will be placed on academic probation. Please contact the Academic Success Center. |
| <input type="radio"/> Major Requirements | Still needed: See Major in Environmental Biology section |
-

Major in Environmental Biology INCOMPLETE

Catalog year: 2023-2024 GPA: 0.000

CORE COURSE REQUIREMENTS

- | | |
|---|---|
| <input type="radio"/> Writing and the Environment (F) | Still needed: 3 Credits in EWP 190 |
| <input type="radio"/> Research Writing and Humanities (S) | Still needed: 3 Credits in EWP 290 |
| <input type="radio"/> Diversity, Equity, Inclusion and Social Justice | Still needed: 3 Credits in EFB 305 or EST 135 or 140 or 204 or 205 or 366 or 405 or LSA 212 |
| <input type="radio"/> Survey of Calculus and Its Applications I (F,S) | Still needed: 4 Credits in APM 105 or 205 |
| <input type="radio"/> Introduction to Probability and Statistics (F,S) | Still needed: 3 Credits in APM 391 or 395 |
| <input type="radio"/> General Biology I: Organismal Biology and Ecology (F) | Still needed: 3 Credits in EFB 101 |
| <input type="radio"/> General Biology I Laboratory (F) | Still needed: 1 Credit in EFB 102 |
| <input type="radio"/> General Biology II: Cell Biology and Genetics (S) | Still needed: 3 Credits in EFB 103 |
| <input type="radio"/> General Biology II Laboratory (S) | Still needed: 1 Credit in EFB 104 |
-

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<input type="radio"/> The Global Environment and the Evolution of Human Society (F,S)	Still needed:	3 Credits in EFB 120
<input type="radio"/> Orientation Seminar: Environmental and Forest Biology (F)	Still needed:	1 Credit in EFB 132
<input type="radio"/> Environmental Physics	Still needed:	Choose from 1 of the following:
<input type="radio"/> Environmental Physics		3 Credits in FOR 110
<input type="radio"/> Major Concepts of Physics I (F)		4 Credits in PHY 101
<input type="radio"/> Ecological Monitoring and Biodiversity Assessment (CLBS)	Still needed:	3 Credits in EFB 202
<input type="radio"/> Diversity of Life I (F)	Still needed:	3 Credits in EFB 210
<input type="radio"/> Diversity of Life II (S)	Still needed:	3 Credits in EFB 211
<input type="radio"/> Principles of Genetics (S)	Still needed:	3 Credits in EFB 307
<input type="radio"/> Principles of Genetics Laboratory (S)	Still needed:	1 Credit in EFB 308
<input type="radio"/> Principles of Evolution (S)	Still needed:	3 Credits in EFB 311
<input type="radio"/> GENERAL ECOLOGY	Still needed:	
<input type="radio"/> General Ecology (F)		4 Credits in EFB 320
<input type="radio"/> Cell Biology (S)	Still needed:	3 Credits in EFB 325
<input type="radio"/> General Chemistry I (F)	Still needed:	3 Credits in FCH 150
<input type="radio"/> General Chemistry Laboratory I (F)	Still needed:	1 Credit in FCH 151
<input type="radio"/> General Chemistry II (S)	Still needed:	3 Credits in FCH 152
<input type="radio"/> General Chemistry Laboratory II (S)	Still needed:	1 Credit in FCH 153
<input type="radio"/> ORGANIC CHEMISTRY	Still needed:	Choose from 1 of the following:
<input type="radio"/> Elements of Organic Chemistry (S)		4 Credits in FCH 210
<input type="radio"/> Organic Chemistry I with Laboratory (F)		4 Credits in FCH 221 and 222
<input type="radio"/> ORGANIC CHEMISTRY II, CALCULUS II OR PHYSICS II	Still needed:	Choose from 1 of the following:
<input type="radio"/> Organic Chemistry II and Laboratory (S)		4 Credits in FCH 223 and 224
<input type="radio"/> Survey of Calculus and Its Applications II (F,S)		4 Credits in APM 106 or 206
<input type="radio"/> Major Concepts of Physics II (S)		4 Credits in PHY 102

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<input type="radio"/> General Physics II and Laboratory (F,S)	4 Credits in PHY 212 and 222
<input type="radio"/> Open Electives	Still needed: 28 Credits in @ 100:699
<input type="radio"/> GENERAL EDUCATION	Still needed: Choose from 1 of the following:
<input type="radio"/> US History and Civil Engagement	3 Credits in EHS 150 or EST 201 or 202 or 361 or HST 101 or 102
<input type="radio"/> The Arts	3 Credits in APH 261 or ENG 215 or 217 or EWP 350 or HOA 105 or 106 or 201 or 276 or 377 or HOM 125 or 165 or 166 or LSA 182 or 201 or 205 or 206 or 220 or 222 or MTC 125 or PSE 201
<input type="radio"/> World History and Global Awareness	3 Credits in AAS 241 or ANT 121 or 185 or 324 or 326 or EFB 217 or 305 or 605 or EST 140 or 200 or 204 or GEO 272 or HOA 105 or 106 or HST 111 or 210 or 211 or 212 or 320 or 321 or JSP 114 or 215 or LIT 203 or 211 or LSA 205 or 206 or 305 or PSC 125 or PSE 201 or REL 101 or 114 or 185 or 186 or 205 or 206 or 215 or SAS 185 or 186 or 324 or WGS 324
<input type="radio"/> World Languages	3 Credits in ARB 100:699 or ASL 100:699 or CHI 100:699 or FRE 100:699 or GER 100:699 or GRE 100:699 or HEB 100:699 or HIN 100:699 or ITA 100:699 or JPS 100:699 or KOR 100:699 or LAT 100:699 or LIN 100:699 or POL 100:699 or POR 100:699 or RUS 100:699 or SPA 100:699 or TRK 100:699
<input type="radio"/> Directed Electives - 25 Credit Hours	Still needed: See Directed Electives , Environmental Biology section

Directed Electives, Environmental Biology

INCOMPLETE

Credits required: 25 Credits applied: 0 Catalog year: 2023-2024 GPA: 0.000

<input type="radio"/> Directed Electives Credits Hours	Still needed: You currently have 0 credit hours including both earned and in-progress courses. To complete your directed electives, you need to successfully complete a minimum of 25 additional credit hours.
<input type="radio"/> Field Experience Elective	Still needed: 3 Credits in EFB 306 or 337 or 342 or 345 or 384 or 388 or 411 or 439 or 484 or 488 or 500 or 523 or 525 or ERE 311 or EFB 496 Title = Flora of Central New York or 496 Title = Wildlife Techniques or 496 Title = Aquatic Ecosystems:Adirondacks or 496 Title = Wetland Plnts Communities/ADK or 496 Title = Ecology/Adirondack Insects or 496 Title = Field Ornithology or 496 Title = Field Herpetology or 496 Title = Integrating Consrvtn/Agricultur or 496 Title = Ecology of Wetland Communities or 496 Title = Field Entomology or 496 Title = Field Mycology or 496 Title = Wetland Monitoring& Assessment or 496 Title = Field Exp Tropical Coast Eclogy or 496 Title = Bird Banding&Survey Techniques
<input type="radio"/> Structure and Function	Still needed: 3 Credits in BIO 316 or 355 or 447 or 503 or EFB 385 or 427 or 429 or 462
<input type="radio"/> ORGANISMAL DIVERSITY	Still needed: Choose from 2 of the following:
<input type="radio"/> Diversity of Microorganisms	3 Credits in EFB 303 or 340 or 342 or 350 or 440
<input type="radio"/> Diversity of Plants	3 Credits in EFB 326 or 327 or 336 or 435 or 446 or 496 Title = Flora of Central New York or 496 Title = Wetland Plnts Communities/ADK
<input type="radio"/> Diversity of Invertebrate Animals	3 Credits in EFB 351 or 352 or 355 or 453 or 554 or 566
<input type="radio"/> Diversity of Vertebrate Animals	3 Credits in EFB 388 or 479 or 482 or 483 or 485 or 486

Directed Electives—Environmental Biology

To ensure that ENB undergraduates obtain both strength and breadth of knowledge, **25 elective credit** hours in biology must be obtained through courses designed for juniors or seniors (i.e., courses numbered 300 or higher). Among them must be courses that satisfy requirements A-C (below).

A. Field Experience Elective¹ At least 3 elective credits must come from an approved field biology course (in addition to EFB 202). These credits may be obtained through an elective course at Cranberry Lake; an approved field course from another accredited institution; an approved internship (EFB 420) or independent research project (EFB 498); or a field trip course (EFB 500). Some courses at CLBS (underlined) meet **both** requirement A and a diversity requirement.

B. Structure and Function. At least 3 credit hours must be in the subject area of organism-level physiology, anatomy, or development. The list of allowable courses below may vary slightly from year to year.

EFB 385	Comparative Vertebrate Anatomy (4 cr.)	S
EFB 427	Plant Anatomy and Development (3 cr.)	F
EFB 429	Plant Physiology (3 cr.)	S
EFB 462	Animal Physiology: Environmental and Ecological (3 cr.)	S
BIO 316	Anatomy & Physiology for Biology Majors (4 cr.)	F, S <i>BIO 216 is not acceptable</i>
BIO 355	General Physiology (3 cr.)	F <i>BIO 316 is strongly recommended first</i>
BIO 447	Basic Immunology (3 cr.)	F
BIO 503	Developmental Biology (3 cr.)	S

C. Organismal Diversity (two of the four categories). To encourage breadth in organism-level biology, students must complete at least one course from two of the four groups listed below (a course from each of the groups is strongly recommended).

1. Diversity of Microorganisms

EFB 303	Introductory Environmental Microbiology (4 cr.)	F
EFB 340	Forest and Shade Tree Pathology (3 cr.)	F
EFB 342	Fungal Diversity and Ecology (3 cr.)	CLBS
EFB 350	Microbial Consortia (3 cr.)	S
EFB 440	Mycology (3 cr.)	F

2. Diversity of Plants

EFB 326	Plant Evolution, Diversification and Conservation (3 cr.)	S
EFB 327	Adirondack Flora (3 cr.)	CLBS
EFB 336	Dendrology (3 cr.)	F
EFB 435	Flowering Plants: Diversity, Evolution and Systematics (3 cr.)	F
EFB 446	Ecology of Mosses (3 cr.)	S
EFB 496	Flora of Central NY (3 cr.)	Maymester
EFB 496	Wetland Plants & Communities of Adirondacks (3 cr.)	CLBS

3. Diversity of Invertebrate Animals

EFB 351	Forest Entomology (3 cr.)	F, odd years
EFB 352	Entomology (3 cr.)	F, even years
EFB 355	Invertebrate Zoology (4 cr.)	S
EFB 453	Parasitology (3 cr.)	F

EFB 554 Aquatic Entomology (3 cr.) **F**
EFB 566 Systematic Entomology (3 cr.) **S, even years**

4. Diversity of Vertebrate Animals

EFB 388 Ecology of Adirondack Fishes (3 cr.) **CLBS**
EFB 482 Ornithology (4 cr.) **S**
EFB 483 Mammal Diversity (4 cr.) **F**
EFB 485 Herpetology (3 cr.) **F**
EFB 486 Ichthyology (3 cr.) **S**

Typical Schedule - Environmental Biology

First Year

Fall

EFB 101	General Bio I: Organismal Bio & Ecology	3
EFB 102	General Biology I Laboratory	1
FCH 150	General Chemistry Lec. I	3
FCH 151	General Chemistry Lab I	1
APM 105	Survey of Calculus I	4
EWP 190	Writing and the Environment	3
EFB 132	Orientation Seminar: EB	1

Total Credits **16**

Spring

EFB 103	General Bio II: Cell Biology & Genetics	3
EFB 104	General Biology II Laboratory	1
FCH 152	General Chemistry Lec. II	3
FCH 153	General Chemistry Lab II	1
Diversity, Equity, Inclusion and Social Justice	Gen Ed.	3
EWP 290 Writing, Humanities & Environment		3

Total Credits **14**

Summer

EFB 202	Ecological Monitoring & Bio Assessment	3
Field Experience Elective		3

Total Credits **6**

Sophomore year

Fall

EFB 120	Global Environment	3
APM 391	Introduction to Probability & Statistics	3
EFB 210	Diversity of Life I	3
EFB 320	General Ecology	4
Electives ¹		3

Total Credits **16**

Spring

EFB 307	Principles of Genetics	3
EFB 308	Principles of Genetics Laboratory	1
EFB 211	Diversity of Life II	3
FCH 210	Elements of Organic Chemistry	4
Electives ¹		3

Total Credits **14**

Junior year

Fall

FOR 110 Environmental Physics (or PHY101)		3
Electives		12

Total Credits **15**

Spring

	EFB 311 Principles of Evolution	3
	EFB 325 Cell Biology	3
	Electives	<u>9</u>
	Total Credits	15
Senior year		
Fall		
	Electives	<u>15</u>
	Total Credits	15
Spring		
	Electives	<u>15</u>
	Total Credits	15

¹Recall that a second semester of calculus, physics or organic chemistry is needed (see Degree Works)

Forest Health

Forest Health is a multidisciplinary and collaborative field of study that involves the understanding, monitoring, and protection of the world's forest resources. A solid foundation in Forest Health requires expertise in many disciplines including, but not limited to, plant pathology, entomology, ecology, dendrology, mycology, silviculture, and forest management. At ESF, we have provided expertise in these areas for decades, but they had not been merged into an academic major until recently.



The Forest Health major prepares biology-oriented students for employment in positions that deal with maintaining the health of forest resources. The major is distinct from those in Sustainable Resource Management such as Forest Ecosystem Science, which provides skills and preparation in forest management. Employers today have expressed a need for a deeper understanding of the science behind the trees. Positions requiring a Forest Health background are found in federal and state agencies, nonprofit organizations, and the private sector. The Forest Health major prepares students for graduate study to pursue higher-level positions, such as forest pathologist, entomologist, or mycologist.

The curriculum provides a solid foundation in mathematics and the physical sciences followed by courses focusing on forest trees and their requirements, the basic ecological principles that shape forest ecosystems, and the management of those ecosystems. Other required courses introduce students to the identification and impact of biological agents of disease and physical damage and to the methods by which these are monitored. The flexibility of the major will permit students to pursue more intensive training in integral forest health specialties, such as forest pathology and forest entomology, or to obtain even broader knowledge in related fields such as forestry, microbiology, mycology, and ecology. Field experience is an important element of the program and is integral to several required courses and many of the directed electives. Two of the requirements are field courses at our Cranberry Lake Biological Station.

Advising Faculty: S. Teale (coordinator), S. Lynch

SUNY College of Environmental Science and Forestry

Student name

Student ID

Degree

Audit date

Level Undergraduate Classification Freshman Major Forest Health College SUNY ESF

Degree in Bachelor of Science INCOMPLETE

Credits required: 126 Credits applied: 0 Catalog year: 2023-2024 GPA: 0.000

24 of the last 30 credit hours must be taken at ESF.

<input type="radio"/> 126 Minimum Total Credits Required	Still needed: You currently have 0 credits including both earned and in-progress courses. To graduate, you need to successfully complete a minimum of 126 additional credits and all graduation requirements.
<input type="radio"/> 2.0 GPA Requirement	Still needed: When your first term is graded, your cumulative GPA will be calculated. If your cumulative GPA falls below 2.0 you will be placed on academic probation. Please contact the Academic Success Center.
<input type="radio"/> Major Requirements	Still needed: See Major in Forest Health section

Major in Forest Health INCOMPLETE

Catalog year: 2023-2024 GPA: 0.000

CORE COURSE REQUIREMENTS

<input type="radio"/> Writing and the Environment (F)	Still needed: 3 Credits in EWP 190
<input type="radio"/> Research Writing and Humanities (S)	Still needed: 3 Credits in EWP 290
<input type="radio"/> Diversity, Equity, Inclusion and Social Justice	Still needed: 3 Credits in EFB 305 or EST 135 or 140 or 204 or 205 or 366 or 405 or LSA 212
<input type="radio"/> Introduction to Probability and Statistics (F,S)	Still needed: 3 Credits in APM 391 or 395
<input type="radio"/> General Biology I: Organismal Biology and Ecology (F)	Still needed: 3 Credits in EFB 101
<input type="radio"/> General Biology I Laboratory (F)	Still needed: 1 Credit in EFB 102
<input type="radio"/> General Biology II: Cell Biology and Genetics (S)	Still needed: 3 Credits in EFB 103
<input type="radio"/> General Biology II Laboratory (S)	Still needed: 1 Credit in EFB 104
<input type="radio"/> General Chemistry I (F)	Still needed: 3 Credits in FCH 150

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<input type="radio"/> General Chemistry Laboratory I (F)	Still needed:	1 Credit in FCH 151
<input type="radio"/> General Chemistry II (S)	Still needed:	3 Credits in FCH 152
<input type="radio"/> General Chemistry Laboratory II (S)	Still needed:	1 Credit in FCH 153
<input type="radio"/> The Global Environment and the Evolution of Human Society (F,S)	Still needed:	3 Credits in EFB 120
<input type="radio"/> Orientation Seminar: Environmental and Forest Biology (F)	Still needed:	1 Credit in EFB 132
<input type="radio"/> Environmental Physics	Still needed:	Choose from 1 of the following:
<input type="radio"/> Environmental Physics		3 Credits in FOR 110
<input type="radio"/> Major Concepts of Physics I (F)		4 Credits in PHY 101
<input type="radio"/> Ecological Monitoring and Biodiversity Assessment (CLBS)	Still needed:	3 Credits in EFB 202
<input type="radio"/> Diversity of Life I (F)	Still needed:	3 Credits in EFB 210
<input type="radio"/> Diversity of Life II (S)	Still needed:	3 Credits in EFB 211
<input type="radio"/> Forest Health Colloquium or Seminar	Still needed:	Choose from 1 of the following:
<input type="radio"/> Forest Health Colloquium		1 Credit in EFB 245
<input type="radio"/> Forest Health Seminar		1 Credit in EFB 344
<input type="radio"/> Introductory Environmental Microbiology (F)	Still needed:	3 Credits in EFB 303
<input type="radio"/> Principles of Genetics (S)	Still needed:	3 Credits in EFB 307
<input type="radio"/> Principles of Genetics Laboratory (S)	Still needed:	1 Credit in EFB 308
<input type="radio"/> Principles of Evolution (S)	Still needed:	3 Credits in EFB 311
<input type="radio"/> GENERAL ECOLOGY	Still needed:	
<input type="radio"/> General Ecology (F)		4 Credits in EFB 320
<input type="radio"/> Dendrology (F)	Still needed:	3 Credits in EFB 336
<input type="radio"/> Forest and Shade Tree Pathology (S)	Still needed:	3 Credits in EFB 340
<input type="radio"/> Forest Health Senior Synthesis (F)	Still needed:	3 Credits in EFB 425
<input type="radio"/> Forest Entomology or Entomology (F)	Still needed:	3 Credits in EFB 351 or 352
<input type="radio"/> Internship in Environmental and Forest Biology or Research Problems in Environmental and Forest Biology (F,S)	Still needed:	3 Credits in EFB 420 or 498

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<input type="radio"/> Forest Health Monitoring (May)	Still needed:	3 Credits in EFB 439
<input type="radio"/> Forest Health Capstone (F,S)	Still needed:	1 Credit in EFB 494
<input type="radio"/> ORGANIC CHEMISTRY	Still needed:	Choose from 1 of the following:
<input type="radio"/> Elements of Organic Chemistry (S)		4 Credits in FCH 210
<input type="radio"/> Organic Chemistry I and Laboratory (F)		4 Credits in FCH 221 and 222
<input type="radio"/> Silviculture (F)	Still needed:	4 Credits in FOR 334
<input type="radio"/> Introduction to Soils (F)	Still needed:	3 Credits in FOR 345
<input type="radio"/> DIRECTED ELECTIVES	Still needed:	Choose from 5 of the following:
<input type="radio"/> Forest Protection and Conservation Biology		3 Credits in EFB 390 or 413 or 502
<input type="radio"/> Forestry and Wood Products		3 Credits in CME 376 or FOR 322 or 360 or 465 or 480 or 496 Title = Forest Management & Wildlife or RMS 376
<input type="radio"/> Technology		3 Credits in BTC 496 or 401 or 425 or 426 or ESF 300
<input type="radio"/> Ecology and Environmental Science		3 Credits in EFB 428 or 445 or 505 or EST 370 or FOR 338
<input type="radio"/> Biodiversity		3 Credits in EFB 326 or 342 or 351 or 352 or 355 or 428 or 435 or 440 or 453 or 482 or 483 or 485 or 486 or 566 or 496 Title = Microbial Consortia
<input type="radio"/> Mathematics and Physical Science		3 Credits in APM 105 or 106 or 510 or FOR 323 or PHY 102
<input type="radio"/> Anatomy and Physiology		3 Credits in EFB 325 or 427 or 462 or 530 or 531 or 570
<input type="radio"/> Open Electives	Still needed:	19 Credits in @ 100:699
<input type="radio"/> GENERAL EDUCATION REQUIREMENTS	Still needed:	Choose from 1 of the following:
<input type="radio"/> US History and Civil Engagement		3 Credits in EHS 150 or EST 201 or 202 or 361 or HST 101 or 102
<input type="radio"/> The Arts		3 Credits in APH 261 or ENG 215 or 217 or EWP 350 or HOA 105 or 106 or 201 or 276 or 377 or HOM 125 or 165 or 166 or LSA 182 or 201 or 205 or 206 or 220 or 222 or MTC 125 or PSE 201
<input type="radio"/> World History and Global Awareness		3 Credits in AAS 241 or ANT 121 or 185 or 324 or 326 or EFB 217 or 305 or 605 or EST 140 or 200 or 204 or GEO 272 or HOA 105 or 106 or HST 111 or 210 or 211 or 212 or 320 or 321 or JSP 114 or 215 or LIT 203 or 211 or LSA 205 or 206 or 305 or PSC 125 or PSE 201 or REL 101 or 114 or 185 or 186 or 205 or 206 or 215 or SAS 185 or 186 or 324 or WGS 324
<input type="radio"/> World Languages		3 Credits in ARB 100:699 or ASL 100:699 or CHI 100:699 or FRE 100:699 or GER 100:699 or GRE 100:699 or HEB 100:699 or HIN 100:699 or ITA 100:699 or JPS 100:699 or KOR 100:699 or LAT 100:699 or LIN 100:699 or POL 100:699 or POR 100:699 or RUS 100:699 or SPA 100:699 or TRK 100:699

Directed Electives—Forest Health

To ensure that Forest Health majors obtain both strength and breadth of knowledge, 15 elective credit hours must be selected from the following list, including at least one course from *five* of the seven categories.

A. Forest Protection and Conservation Biology

EFB 390	Wildlife Ecology & Management (4 cr.)	F
EFB 413	Intro Conservation Biology (3 cr.)	S
EFB 502	Ecology and Management of Invasive Species (3 cr.)	S

B. Forestry and Wood Products

FOR 322	Natural Resources Measurements and Sampling (3 cr.)	F
FOR 360	Principles of Management (3 cr.)	F, S
FOR 465	Natural Resources and Policy (3 cr.)	S
FOR 480	Urban Forestry (3 cr.)	S
FOR 496	Forest Management & Wildlife (3 cr.)	
RMS 376	Decay of Wood Products (3 cr.)	

C. Technology

BTC 401	Molecular Biology Techniques (3 cr.)	F
BTC 425	Plant Biotechnology (3 cr.)	S
BTC 426	Plant Tissue Culture Methods (3 cr.)	F
BTC 496	Topics in Biotechnology (3 cr.)	F, S
ESF 300	Introduction to Geospatial Information Technologies (3 cr.)	F, S

D. Ecology and Environmental Science

EST 370	Introduction to Personal Environmental Interpretation Methods (3 cr.)	
EFB 428	Mycorrhizal Ecology (3 cr.)	F
EFB 445	Plant Ecology and Global Change (3 cr.)	S
EFB 505	Microbial Ecology (3 cr.)	S
FOR 338	Meteorology (3 cr.)	F

E. Biodiversity

EFB 326	Plant Evolution, Diversification and Conservation (3 cr.)	S
EFB 342	Fungal Ecology and Diversity (3 cr.)	CLBS
EFB 351	Forest Entomology (3 cr.)	F, odd years
EFB 352	Entomology (3 cr.)	F, even years
EFB 355	Invertebrate Zoology (4 cr.)	S
EFB 428	Mycorrhizal Ecology (3 cr.)	F, even years
EFB 435	Flowering Plants: Diversity, Evolution, and Systematics (3 cr.)	F
EFB 440	Mycology (A) (3 cr.)	F
EFB 453	Parasitology (3 cr.)	F
EFB 482	Ornithology (4 cr.)	
EFB 485	Herpetology (3 cr.)	
EFB 483	Mammal Diversity (4 cr.)	F
EFB 486	Ichthyology (3 cr.)	S
EFB 566	Systematic Entomology (3 cr.)	S, even years

F. Mathematics and Physical Science

APM 105	Survey of Calculus and Application I (4 cr.) F,S
APM 106	Calculus and its Applications II (A) (4 cr.) F,S
APM 510	Statistical Analysis (3 cr.) F
FOR 323	Forest Biometrics (3 cr.) S
PHY 102	General Physics II (A) (4 cr.) S

G. Anatomy and Physiology

EFB 325	Cell Biology (3 cr.) S
EFB 427	Plant Anatomy and Development (3 cr.) F
EFB 429	Plant Physiology (3 cr.) S
EFB 462	Animal Physiology: Environmental & Ecological (3 cr.) S
EFB 570	Insect Physiology (3 cr.) S

Typical Schedule - Forest Health

First Year

Fall

EFB 101 General Bio I: Organismal Bio & Ecology	3
EFB 102 General Biology I Laboratory	1
FCH 150 General Chemistry Lec. I	3
FCH 151 General Chemistry Lab I	1
EWP 190 Writing and the Environment	3
EFB 132 Orientation Seminar: EB	1
Elective	3
Total Credits	15

Spring

EFB 103 General Bio II: Cell Biology & Genetics	3
EFB 104 General Biology II Laboratory	1
FCH 152 General Chemistry Lec. II	3
FCH 153 General Chemistry Lab II	1
#EFB 245 Forest Health Colloquium (odd years)	1
Diversity, Equity, Inclusion and Social Justice	3
EWP 290 Research Writing & Humanities	3
Total Credits	15

Summer

EFB 202 Ecological Monitoring & Bio Assessment	3
Total Credits	3

Sophomore year

Fall

FOR 110 Environmental Physics (or PHY101)	3
EFB 210 Diversity of Life I	3
EFB 320 General Ecology	4
EFB 303 Intro Environmental Microbiology	4
Total Credits	14

Spring

EFB 120 Global Environment	3
EFB 211 Diversity of Life II	3
EWP 290 Research Writing & Humanities	3
APM 391 Introduction to Probability and Statistics	3
FCH 210 Elements of Organic Chemistry	4
Total Credits	16

Junior year

Fall

EFB 336 Dendrology	3
EFB 340 Forest & Shade Tree Pathology	3
EFB 351 or 352 (Forest) Entomology	3
*Note scheduling conflict with FOR334, another core course	
#EFB 344 Forest Health Seminar (odd years)	1

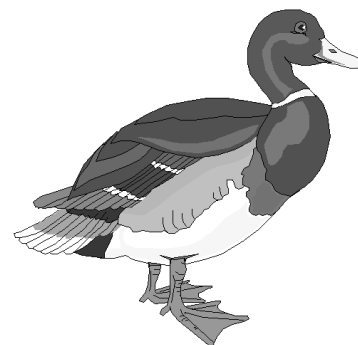
	Electives	6
	Total Credits	16
Spring		
	EFB 307 Principles of Genetics	3
	EFB 308 Principles of Genetics Laboratory	1
	Electives	12
	Total Credits	16
Senior year		
Fall		
	##EFB 425 Forest Health Senior Synthesis (odd years)	3
	FOR 345 Introductory Soils	3
	FOR 334 Silviculture	3
	*Note scheduling conflict with EFB 351/352	
	EFB 420 Internship in Env & Forest Biology	3
	Electives	4
	Total Credits	16
Spring		
	EFB 494 Forest Health Capstone	1
	EFB 311 Principles of Evolution	3
	Electives	11
	Total Credits	15

#Forest Health majors will enroll either in EFB 245 as freshmen/sophomores, or in EFB 344 as juniors/seniors

##Forest Health Senior Synthesis is offered only during odd years and may be taken in either the junior or senior year.

Wildlife Science

Wildlife Science is the application of ecological knowledge in a manner that strikes a balance between the needs of wildlife populations and the needs of people. Research and teaching in wildlife science began at ESF in 1914, one of the first such programs in the United States, and was quickly followed by establishment of the Roosevelt Wild Life Station in 1919. Today, our program is recognized nationally and internationally, and our graduates are employed worldwide. The focus is applied ecology, and students engage the environmental challenges associated with managing wildlife, ranging from endangered species to overabundant populations. The program recognizes and accommodates the fact that wildlife scientists today work with all forms of wildlife, including plants and invertebrates, and the scope is becoming more international.



The wildlife science degree prepares students for careers with state and federal agencies as well as an array of domestic and international private organizations. Diverse job functions include management of wildlife on state and federal lands such as federal national wildlife refuges and state wildlife management areas, which includes inventory and assessment of wildlife populations and associated habitats, and interaction with the public to convey the value and rationale of wildlife conservation programs and initiatives. Students who excel academically will also be prepared to continue toward a graduate degree, which can greatly expand employment opportunities and is often necessary for even entry-level, career-track positions.

Students obtain background in the basic sciences (math, chemistry, physics), and then learn the basic ecological principles and evolutionary forces that affect wildlife and their habitats. Specialized coursework then addresses the assessment and management of wildlife resources as well as the biology and natural history of various taxonomic groups such as plants, birds, mammals, fish, and invertebrates. Students are advised to enhance career opportunities via taxonomic proficiency with one or more plant or animal groups, special skills such as GIS, and practical working experience as an intern, volunteer, or paid employee of a conservation agency. Such opportunities abound during summer as well as other times of the year, and students can receive academic credit for these experiences.

Undergraduates also take advantage of ESF's field stations, which provide myriad opportunities. Many courses taken by Wildlife Science undergraduates include field exercises at these facilities, and the properties are also used for undergraduate research and other projects in which undergraduate students can become involved. In addition to coursework outlined in the Curriculum Plan Sheet, highly recommended courses include Microbial Diseases of Fish and Wildlife, and Emerging Diseases of Fish and Wildlife.

Advising faculty: J. Frair (coord.), J. Cohen, E. Gurarie, M. Schummer, C. Downs

NOTE: The ESF curriculum in wildlife science does not automatically meet the requirements for certification as a wildlife biologist so as not to be overly restrictive in choices of electives by undergraduates. To obtain certification as a wildlife biologist by The Wildlife Society, students must meet further requirements and should consult with their advisor for details (available via the Internet from The Wildlife Society).

SUNY College of Environmental Science and Forestry

Student name

Student ID

Degree

Audit date

Level Undergraduate Classification Freshman Major Wildlife Science College SUNY ESF

Degree in Bachelor of Science INCOMPLETE

Credits required: 126 Credits applied: 0 Catalog year: 2023-2024 GPA: 0.000

24 of the last 30 credit hours must be taken at ESF.

<input type="radio"/> 126 Minimum Total Credits Required	Still needed: You currently have 0 credits including both earned and in-progress courses. To graduate, you need to successfully complete a minimum of 126 additional credits and all graduation requirements.
<input type="radio"/> 2.0 GPA Requirement	Still needed: When your first term is graded, your cumulative GPA will be calculated. If your cumulative GPA falls below 2.0 you will be placed on academic probation. Please contact the Academic Success Center.
<input type="radio"/> Major Requirements	Still needed: See Major in Wildlife Science section

Major in Wildlife Science INCOMPLETE

Catalog year: 2023-2024 GPA: 0.000

CORE COURSE REQUIREMENTS

<input type="radio"/> Writing and the Environment (F)	Still needed: 3 Credits in EWP 190
<input type="radio"/> Public Presentation Skills	Still needed: 3 Credits in EWP 220
<input type="radio"/> Diversity, Equity, Inclusion and Social Justice	Still needed: 3 Credits in EFB 305 or EST 135 or 140 or 204 or 205 or 366 or 405 or LSA 212
<input type="radio"/> Survey of Calculus and Its Applications I (F,S)	Still needed: 4 Credits in APM 105 or 205
<input type="radio"/> Introduction to Probability and Statistics (F,S)	Still needed: 3 Credits in APM 391 or 395
<input type="radio"/> General Biology I: Organismal Biology and Ecology (F)	Still needed: 3 Credits in EFB 101
<input type="radio"/> General Biology I Laboratory (F)	Still needed: 1 Credit in EFB 102
<input type="radio"/> General Biology II: Cell Biology and Genetics (S)	Still needed: 3 Credits in EFB 103
<input type="radio"/> General Biology II Laboratory (S)	Still needed: 1 Credit in EFB 104

SUNY College of Environmental Science and Forestry

<input type="radio"/> The Global Environment and the Evolution of Human Society (F,S)	Still needed:	3 Credits in EFB 120
<input type="radio"/> Orientation Seminar: Environmental and Forest Biology (F)	Still needed:	1 Credit in EFB 132
<input type="radio"/> Ecological Monitoring and Biodiversity Assessment (CLBS)	Still needed:	3 Credits in EFB 202
<input type="radio"/> Diversity of Life I (F)	Still needed:	3 Credits in EFB 210
<input type="radio"/> Diversity of Life II (S)	Still needed:	3 Credits in EFB 211
<input type="radio"/> Principles of Genetics (S)	Still needed:	3 Credits in EFB 307
<input type="radio"/> Principles of Genetics Laboratory (S)	Still needed:	1 Credit in EFB 308
<input type="radio"/> Principles of Evolution (S)	Still needed:	3 Credits in EFB 311
<input type="radio"/> GENERAL ECOLOGY	Still needed:	
<input type="radio"/> General Ecology (F)		4 Credits in EFB 320
<input type="radio"/> Wildlife Ecology and Management (F)	Still needed:	
<input type="radio"/> Wildlife Ecology and Management (F)		4 Credits in EFB 390
<input type="radio"/> Applied Wildlife Science (S)	Still needed:	3 Credits in EFB 491
<input type="radio"/> Wildlife Habitats and Populations (F)	Still needed:	4 Credits in EFB 493
<input type="radio"/> Intro to Geospatial Information Technology	Still needed:	3 Credits in ESF 300 or SUS 350
<input type="radio"/> General Chemistry I (F)	Still needed:	3 Credits in FCH 150
<input type="radio"/> General Chemistry Laboratory I (F)	Still needed:	1 Credit in FCH 151
<input type="radio"/> General Chemistry II (S)	Still needed:	1 Class in FCH 152
<input type="radio"/> General Chemistry Laboratory II (S)	Still needed:	1 Credit in FCH 153
<input type="radio"/> Physics or Organic Chemistry I or Soils	Still needed:	Choose from 1 of the following:
<input type="radio"/> Elements of Organic Chemistry (S)		4 Credits in FCH 210
<input type="radio"/> Organic Chemistry I and Laboratory (F)		4 Credits in FCH 221 and 222
<input type="radio"/> Environmental Physics		3 Credits in FOR 110
<input type="radio"/> Major Concepts of Physics I (F)		4 Credits in PHY 101
<input type="radio"/> Introduction to Soils		3 Credits in FOR 345
<input type="radio"/> Natural Resources Policy	Still needed:	3 Credits in FOR 465 or 489

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<input type="radio"/> Ornithology or Mammal Diversity	Still needed:	3 Credits in EFB 482 or 485
<hr/>		
<input type="radio"/> DIRECTED ELECTIVE COURSES		
<hr/>		
<input type="radio"/> Field Experience Elective	Still needed:	3 Credits in EFB 306 or 337 or 342 or 345 or 384 or 388 or 411 or 425 or 439 or 484 or 488 or 500 or 523 or 525 or ERE 311 or EFB 496 Title = Flora of Central New York or 496 Title = Wildlife Techniques or 496 Title = Aquatic Ecosystems:Adirondacks or 496 Title = Wetland Plnts Communities/ADK or 496 Title = Ecology/Adirondack Insects or 496 Title = Field Ornithology or 496 Title = Field Herpetology or 496 Title = Integrating Consrvtn/Agricultur or 496 Title = Ecology of Wetland Communities or 496 Title = Field Entomology or 496 Title = Field Mycology or 496 Title = Wetland Monitoring& Assessment or 496 Title = Field Exp Tropical Coast Eclgy or 496 Title = Bird Banding&Survey Techniques
<hr/>		
<input type="radio"/> Vertebrate Structure and Funtion	Still needed:	3 Credits in EFB 385 or 462 or 480
<hr/>		
<input type="radio"/> Botany and Plant Science	Still needed:	6 Credits in EFB 326 or 336 or 337 or 340 or 427 or 429 or 435 or 440 or 445 or 446 or 496 Title = Flora of Central New York or 496 Title = Wetland Plnts Communities/ADK
<hr/>		
<input type="radio"/> Wildlife Specialization	Still needed:	Choose from 2 of the following:
<hr/>		
<input type="radio"/> Population and Habitat Management		3 Credits in EFB 370 or 438 or 449 or 487 or 502 or 518 or FOR 232 or 442 or 496 Title = Forest Management & Wildlife
<hr/>		
<input type="radio"/> Wildlife Health		3 Credits in EFB 360 or 400 or 453 or 462
<hr/>		
<input type="radio"/> Biodiversity		3 Credits in EFB 352 or 355 or 413 or 485 or 486
<hr/>		
<input type="radio"/> Human Dimensions of Conservation		3 Credits in EFB 305 or EST 312 or 353 or 366 or 390 or 460 or 493
<hr/>		
<input type="radio"/> Open Electives	Still needed:	22 Credits in @ 100:699
<hr/>		
<input type="radio"/> GENERAL EDUCATION REQUIREMENT	Still needed:	Choose from 2 of the following:
<hr/>		
<input type="radio"/> US History and Civil Engagement		3 Credits in EHS 150 or EST 201 or 202 or 361 or HST 101 or 102
<hr/>		
<input type="radio"/> The Arts		3 Credits in APH 261 or ENG 215 or 217 or EWP 350 or HOA 105 or 106 or 201 or 276 or 377 or HOM 125 or 165 or 166 or LSA 182 or 201 or 205 or 206 or 220 or 222 or MTC 125 or PSE 201
<hr/>		
<input type="radio"/> World History and Global Awareness		3 Credits in AAS 241 or ANT 121 or 185 or 324 or 326 or EFB 217 or 305 or 605 or EST 140 or 200 or 204 or GEO 272 or HOA 105 or 106 or HST 111 or 210 or 211 or 212 or 320 or 321 or JSP 114 or 215 or LIT 203 or 211 or LSA 205 or 206 or 305 or PSC 125 or PSE 201 or REL 101 or 114 or 185 or 186 or 205 or 206 or 215 or SAS 185 or 186 or 324 or WGS 324
<hr/>		
<input type="radio"/> Humanities		3 Credits in AAS 231 or 235 or ENG 107 or 151 or 153 or 192 or 245 or EWP 290 or LIN 201 or LIT 203 or PHI 107 or 111 or REL 135 or 156 or 217 or 231 or 252
<hr/>		
<input type="radio"/> World Languages		3 Credits in ARB 100:699 or ASL 100:699 or CHI 100:699 or FRE 100:699 or GER 100:699 or GRE 100:699 or HEB 100:699 or HIN 100:699 or ITA 100:699 or JPS 100:699 or KOR 100:699 or LAT 100:699 or LIN 100:699 or POL 100:699 or POR 100:699 or RUS 100:699 or SPA 100:699 or TRK 100:699

Directed Electives – Wildlife Science

To ensure that Wildlife Science undergraduates obtain both strength and breadth of knowledge, and position themselves for professional certification by The Wildlife Society, 24 elective credits must be obtained in the following subject areas (A-G), through specific courses that are designed for juniors or seniors (i.e. courses numbered 300 or higher)

1. Field Experience Elective (3 credits):

This requirement can be satisfied during any year and is normally done via coursework at Cranberry Lake Biological Station, <http://www.esf.edu/clbs/courses.htm>, ESF field courses offered during semester break, field courses offered by other institutions or organizations (e.g., School for Field Studies), independent research projects, or job-related internships during the summer session.

2. Vertebrate Structure and Function (3 credits): choose at least one course from the following:

- EFB 385 Comparative Vertebrate Anatomy (4 cr.) **S**
- EFB 462 Animal Physiology: Environmental and Ecological (3 cr.) **S**
- EFB 480 Principles of Animal Behavior (4 cr.) **F**

3. Botany and Plant Science (3 credits): choose at least one course from the following:

- EFB 326 Plant Evolution, Diversification and Conservation (3 cr.) **S**
- EFB 336 Dendrology (3 cr.) **F**
- EFB 337 Field Ethnobotany (3 cr.) **CLBS**
- EFB 340 Forest and Shade Tree Pathology (3 cr.) **S**
- EFB 427 Plant Anatomy and Development (3 cr.) **F**
- EFB 429 Plant Physiology (3 cr.) **S**
- EFB 435 Flowering Plants: Diversity, Evolution, and Systematics (3 cr.) **F**
- EFB 440 Mycology (3 cr.) **F**
- EFB 445 Plant Ecology and Global Change (3 cr.) **S**
- EFB 446 Ecology of Mosses (3 cr.) **S**
- EFB 496 Wetland Plants & Communities of Adirondacks (3 cr.) **CLBS**
- EFB 496 Flora of Central NY (3 cr.) **Maymester**

4. Wildlife Specialization

1. Population and Habitat Management

- EFB 370 Population Ecology and Management (3 cr.) **S**
- EFB 438 Ecology and Management of Waterfowl (3 cr.)
- EFB 449 Wetlands Conservation and Management (3 cr.) **S, even years**
- EFB 487 Fisheries Science and Management (3 cr.) **F**
- EFB 502 Ecology and Management of Invasive Species (3 cr.) **S**
- EFB 518 Systems Ecology: Ecological Modelling and Design
- FOR 232 Natural Resources Ecology (3 cr.) **S**
- FOR 442 Watershed Ecology and Management (3 cr.) **F**
- FOR 496 Forest Management and Wildlife (3 cr.) **S**

2. Wildlife Health

- EFB 360 Epidemiology (3 cr.) **F**
- EFB 400 Toxic Health Hazards (3 cr.) **S**
- EFB 453 Parasitology (3 cr.) **F**
- EFB 462 Animal Physiology: Environmental and Ecological (4 cr.) **S**

3. Biodiversity

- EFB 352 Entomology (3 cr.) **F, even years**
- EFB 355 Invertebrate Zoology (4 cr.) **S**
- EFB 413 Introduction to Conservation Biology (3 cr.) **F**
- EFB 485 Herpetology (3 cr.) **F**

EFB 486 Ichthyology (3 cr.) **S**

4. Human Dimensions of Conservation

EFB 305 Indigenous Issues and the Environment (3 cr.) **S**

EST 353 Behavior Change and the Environment (3 cr.) **F**

EST 390 Social Processes and the Environment (3 cr.) **S**

EST 366 Attitudes, Values and the Environment (3 cr.) **S, even years**

EST 460 Land Use Law (3 cr.) **S**

EST 312 Sociology of Natural Resources (3 cr.) **S**

EST 493 Environmental Communication Workshop (3 cr.) **S**

Typical Schedule - Wildlife Science

First Year

Fall

EFB 101 General Bio I: Organismal Bio & Ecology	3
EFB 102 General Biology I Laboratory	1
APM 105 Survey of Calculus I	4
EPW 190 Writing and the Environment	3
EFB 132 Orientation Seminar: EB	1
DEI or EFB 120 Global Environment	<u>3</u>

Total Credits 15

Spring

EFB 103 General Bio II: Cell Biology & Genetics	3
EFB 104 General Biology II Laboratory	1
EWP 220 Public Presentation Skills	3
FOR 110 Environmental Physics (or other options later)	3
DEI or EFB 120 Global Environment	3
Electives	<u>3</u>

Total Credits 16

Summer

EFB 202 Ecological Monitoring & Bio Assessment	3
Field Experience Elective	<u>3</u>

Total Credits 6

Sophomore year

Fall

FCH 150 General Chemistry I	3
FCH 151 General Chemistry Lab I	1
EFB 210 Diversity of Life I	3
EFB 320 General Ecology	4
Electives	<u>3</u>

Total Credits 14

Spring

FCH 152 General Chemistry Lec. II	3
FCH 153 General Chemistry Lab II	1
EFB 211 Diversity of Life II	3
ESF 300 Intro to GIT	3
APM 391 Introduction to Probability and Statistics	3
Elective	<u>3</u>

Total Credits 16

Junior year

Fall

EFB 390 Wildlife Ecology and Management	4
FOR 465 Natural Resources Policy (of FOR 489 in Spring)	3
EFB 493 Mammal Diversity (or Ornithology in the Spring)	3
Elective	<u>3</u>

Total Credits 13

Spring

EFB 307 Principles of Genetics	3
EFB 308 Principles of Genetics Laboratory	1

EFB 491 Applied Wildlife Science	3
EFB 482 Ornithology (or Mammal Diversity in the Fall)	3
Electives	<u>6</u>
Total Credits	16

Senior year
Fall

EFB 493 Wildlife Habitats and Populations	4
Electives	<u>11</u>
Total Credits	15

Spring

EFB 311 Principles of Evolution	3
Electives	<u>12</u>
Total Credits	15

Pre-Health Track

Many students enroll in an EB degree program with the ultimate goal of a career in medicine, veterinary science, or other health profession. Since ESF has no formal undergraduate program in pre-health studies, students with these professional interests must take a more active role in planning their course selections. With the following guidelines, and the help of a specialized faculty advisor, this is simple to do.

Either the Environmental Biology or Biotechnology majors will prepare students for admission to a variety of professional schools in health-related areas, including human and veterinary medicine. A rigorous foundation in the basic biological sciences, calculus, physics and organic chemistry is provided by the core requirements of these majors. Potential electives include certain benchmark courses that admissions committees of professional schools frequently look for, such as comparative vertebrate anatomy and animal physiology. Pre-veterinary students will find strong supporting courses and faculty interest in vertebrate biology, and pre-medical students can pursue such relevant elective subjects as microbiology and environmental toxicology. In addition, our students take advantage of Syracuse University's broad array of relevant courses. Students can earn credit for a variety of internships, such as paid or volunteer work in clinics and other professional settings. You can find additional information on [ESF's pre-health website](#).

Faculty Advisors in EB: C. Whipps, B. Leydet.

Course suggestions: Students pursuing pre-health studies via the Environmental Biology major should enroll in two semesters organic chemistry, calculus, and physics. With the help of an advisor, students should carefully consider their elective choices, ensuring they are tailored to their post-graduation needs.

What's Next? Life After ESF

(Some words of wisdom from a past Curriculum Director, the late Dr. Larry VanDruff)

Employment

Students with the BS degree may find employment in governmental agencies, initially performing technical services. To qualify for Civil Service registry, an examination is mandatory; and specific course work is required. In addition, some of the more practical-oriented career paths may lead to positions with commercial institutions or in self-employment. Here are some steps to take.

1. Begin by visiting 105 Bray Hall - Career Services. Seek help in preparing your resume, a letter of inquiry, and narrowing your search. Look through posted notices, newsletters and other job listings as well as employment directories. The "Environmental Opportunities" and "Job Scan" periodicals are especially useful. Ask to be placed on Career Service's email list when you leave ESF, to keep in touch with current listings in the office. They can show you the following helpful documents:
 - [ESF Career Services](#)
 - Annual Placement Surveys (tells you what past grads are doing)
2. Review this Handbook again. The introductions to the degree programs and options give employment suggestions. Discuss your availability and job aspirations with faculty associated with your concentration - occasionally employers call us with immediate needs.
3. Read newsletters from the professional societies in your career area. For example, The eWildlifer is the newsletter from The Wildlife Society that includes job notices, as well as announcements of graduate (research) assistantships. Web sites of professional societies usually have a jobs listing.
4. Consult both state and federal Civil Service announcements (e.g., federal Life Sciences Announcement No. 421) which list the educational requirements, including specific subject matter, for numerous job titles. The New York State Employment Office is [CNY Works](#). Federal job listings can be found at <https://www.usajobs.gov/> and [New York State jobs](#).
5. Don't overlook contacts with anyone you know in agencies, consulting firms, and private business. Call or visit ESF alumni who usually are sympathetic and able to help you.
6. Be patient and PERSISTENT. It will take time and work to get established in a career as it did to get the B.S. degree.

Graduate School

Graduate degrees (M.S., Ph.D.) are often required for positions in research, consulting, management, and teaching. Generally, the degree of responsibility achievable is commensurate with the highest post-graduate degree obtained. Preparation for graduate study demands dedication and high academic proficiency. The sooner you identify this goal, the more time you will have to develop an appropriate course background. Do this with the help of your advisor, but also in consultation with other faculty members who work in your desired field. Seek advice on potential graduate programs and faculty advisors at other institutions, and on opportunities for financial support.

Most students are unfamiliar with the correct way to select - and gain entrance into - a graduate program appropriate to their needs and interests. Begin by studying guides available from room 110 Bray Hall. Here are some additional guidelines.

1. Register for and take the GRE (Graduate Record Exam) (www.gre.org) and/or LSAT, MCAT, GMAT, etc. I recommend taking the GRE general (Verbal, Quantitative, Analytical) in November and the advanced (Biology) in December. Many colleges look carefully at GRE scores to decide on admissions, assistantships, and even awards during your graduate program. Some institutions also require a specialty examination (e.g., Biology).
2. Use EB faculty from your concentration area, graduate school websites, and graduate school guides to identify a school, researcher, or topic of interest for graduate study. The stronger your interest is in a particular university, certain researcher, given taxon, biological concept or process, or geographic area, the better your chances of conveying that interest and focus to the application review committee.
3. Write specific professors inquiring about their current research and anticipated assistantships for the semester or summer when you would like to matriculate. A departmental representative or a selection committee chairperson may answer you instead. Follow this correspondence with a request to visit the department, preferably a potential faculty advisor ("major professor"), at the 2-4 programs in which you are most interested. Above all, do not submit a single generic application to one department and expect it to gain you acceptance and support at a graduate school, unless your credentials are truly outstanding.
4. Financial support for graduate-level work and study are of three types: fellowships (the graduate version of scholarships), teaching assistantships, and research assistantships. If you want to do research, you'll need a stipend (living allowance) and possibly money for equipment, supplies, travel, and publication. Awards may or may not include full tuition costs. You should know what funds will be available to you and compare offers from graduate schools accordingly.

Example Careers of EB Graduates

Below are some examples of job titles held by EB graduates (B.S., M.S., or Ph.D.)

Animal Ecologist	Fish Pathologist	Plant Propagator
Animal Scientist	Foreign Fisherman Observer	Preserve Manager
Aquatic Biologist	Game Biologist	Public Health Specialist
Aquatic Ecologist	Greenhouse Manager	Research Biologist
Electron Microscope Operator	Ichthyologist	Research Geneticist
Biometrician	Invertebrate Ecologist	Research Plant Pathologist
Botanist	Laboratory Animal Supervisor	Sanctuary Manager
Coastal Zone Resources Specialist	Mammologist	Sea Lion Trainer
Conservation Biologist	Marine Resources Specialist	Seed Orchard Researcher
Conservation Exhibit Specialist	Medical Technologist	Soil Conservationist
Cooperative Extension Agent	Microbiologist	Technical Writer
Cytologist	Mycologist	Toxicologist
Ecological Modeler	Naturalist	Vegetation Specialist
Entomologist	Nursery Operations Manager	Veterinary Assistant
Enviro. Assessment Specialist	Ornamental Horticulturist	Water Quality Planner
Enviro. Conservation Officer	Ornithologist	Weed Control Supervisor
Enviro. Education Specialist	Park Ranger	Wildlife Conservation Specialist
Environmental Impact Analyst	Pest Control Supervisor	Wildlife Researcher
Extension Wildlife Specialist	Pesticide Investigator	Zoologist
Fish Farmer	Plant Ecologist	Animal Physiologist