

Master of Science (M.S.) in Insect and Wildlife Environmental Education
Program Policy Statement

I. DESCRIPTION

The Master of Science Program in Insect and Wildlife Environmental Education is designed to prepare students to teach at nature centers, state parks, and other environmental education outlets. Our program is unique in that it equally combines a background in education and the environment with an emphasis on wild fauna. The educational goals for students completing the program will be:

1. Develop age appropriate curricula focused on various fauna
2. Determine how to engage both live and virtual audiences with scientific content
3. Learn how to design effective learning assessments
4. Develop organizational skills for designing and implementing curricula that builds on scientific concepts
5. Takes responsibility for their learners' learning and uses ongoing analysis and reflection using current research, education, and policy to improve his/her planning and practice.

The students will complete an intense 9 credit hour internship with a partner (e.g., a state park) and develop an education program for that partner. The program will be jointly offered by the Department of Entomology and Wildlife Ecology and the School of Education, and housed in the Department of Entomology and Wildlife Ecology.

II. RATIONALE AND DEMAND

A. Institutional factors.

The planning process began late in fall 2018 with a meeting of Drs. Debbie Delaney, Danielle Ford, and Jake Bowman. We outlined the basic idea and took it to the Director of the School of Education and the Dean of the College of Agriculture and Natural Resources. Both were supportive so we explored partners and identified three: Delaware State Parks, Longwood Gardens, and the Mt. Cuba Center. In Fall 2019, we organized a workshop to discuss the program and its associated internship. It was attended by representatives of each organization, the Director and Associate Directors of the School of Education, Chair of Entomology and Wildlife Ecology, and Drs. Delaney and Ford. After the meeting we developed an evaluation rubric for the internship, which was shared with our partners and modified based on their feedback. Unfortunately, COVID-19 stalled our progress until Fall 2020. We sought market research on our program in August 2020 from the Director of Marketing and Communications at the University of Delaware. We had an initial meeting in December 2020, and they completed their market research report in February 2021. We piloted two internships with Delaware State

Parks in summer 2021 and used the evaluation rubric to evaluate the education programs produced by the interns. Most of the required courses in this program are currently taught but have room for more students. The one new course will be team-taught with faculty from the Department of Entomology and Wildlife Ecology and the School of Education.

B. Student demand

We expect the proposed program to reach 50 majors within its time as a provisional program, which equates to 10-12 graduates each year. We will heavily market the program to the three foundation majors (Elementary Teacher Education, Insect Ecology and Conservation, Wildlife Ecology and Conservation). We expect this program will attract new students to the foundation majors and bring additional revenue to the University. Students matriculating into the program will come from current foundation majors; we will restrict applications to students enrolled as undergraduates at the University of Delaware during the provisional period. Students will enroll in the program full time, in order to complete the degree in the +1 year (4+1 option). The current target of 50 students during its provisional status was derived based on our capacity and on how many internship placements are available. We expect to expand internship placements as we demonstrate the success of the program.

C. Transferability

We do not have any unique agreements concerning the transfer of students or credits.

D. Demand and employment factors

Our market research found strong demand for environmental educators in the Mid-Atlantic region. In the past 10 years, 9,833 postings have been listed within the Mid-Atlantic region. In 2020, 1,370 job postings were reported within the region, which is a 578% increase from a total of 202 job postings reported in January 2010. The average salary of nature educators with master's degrees is \$70,420 in comparison to \$57,134, the average salary of nature educators with bachelor's degree. We have received strong interest from our regional state parks and NGOs.

F. Regional, state, and national factors

Five universities offer advanced degrees in Environmental Education or something similar. Hamline University, Southern Oregon University, and University of Minnesota Duluth require at least 2 years to complete their programs and are outside of the Mid-Atlantic region. Antioch University's program can be completed in as short as 18 months but lacks the faunal core of our program. Bard College is the only 4+1 in Environmental Education. None of these programs truly merge faunal courses with education courses focused on pedagogy and building curricula.

There is no professional accreditation for this program.

G. Describe other strengths

As described above, this program of study fills a national niche via its unique combination of Insect and Wildlife Ecology and Conservation, and Education. Additionally, students will be

required to complete a 9 credit hours internship, which is modeled after student teaching requirements in Education. These internships will be completed on the tutelage of UD faculty and environmental education partitioners at State Parks or other environmental education facilities. We have the commitment from Delaware State Parks and have already partnered on internships this year (see appended letter). We are in talks with Longwood Gardens, and the Mt. Cuba Center for them to participate, but also envision other partners as the program grows.

III. ENROLLMENT, ADMISSIONS AND FINANCIAL AID

A. Admission Requirements

Applications will be restricted to University of Delaware undergraduates. Undergraduate applicants will apply for undergraduate admissions through the Office of Admissions as is the case with other undergraduate programs. The University of Delaware's admissions requirements and selection criteria will be in force.

Admissions Requirements

1. A baccalaureate degree from an accredited college or university, or for 4+1 applicants, current enrollment in one of the following University of Delaware majors: BSED Elementary Teacher Education – Middle School Science Certification; BSED Elementary Teacher Education – Single Certification with Focus Area; BS Insect Ecology and Conservation and BS Wildlife Ecology and Conservation.

IN THE PROVISIONAL PERIOD FOR THE MS, ONLY APPLICATIONS FROM UD UNDERGRADUATE PROGRAMS LISTED ABOVE WILL BE ACCEPTED.

2. An undergraduate cumulative grade index of at least 3.0 on a 4.0 scale. Students applying to the 4+1 option must hold a GPA of 3.0 at the time of application and at the start of the +1 year.

Applications are to be submitted via the SLATE system (see graduate admissions website at: <http://grad.udel.edu/apply/>). Applicants applying for the 4+1 option must fill out the Graduate Course Approval Form for 4+1 Admission Application (available at the graduate admissions website identified above) and submit it to the Graduate College once they apply through SLATE. There is no application fee to apply to the +1 component of the program. GRE scores and letters of recommendation are not required. Students apply and are admitted to the 4+1 program as juniors (before they graduate) but cannot remain in the program unless they earn a BSED in Elementary Teacher Education, a BS in Insect Ecology and Conservation, or a BS in Wildlife Ecology and Conservation.

Admissions decisions will be made by an Admissions Committee, consisting of the Program Director (a faculty member in the Department of Entomology and Wildlife Ecology) and a faculty member from the School of Education that teaches in the program.

It is a Delaware State Board of Health Regulation and a University of Delaware mandate that all entering graduate students born after January 1, 1957 give proof of proper immunization for measles, mumps, and rubella. If immunization requirements are not met, the student will not be eligible to register. Specific information may be obtained from the Student Health Service at 302-831-2226.

C. Student Expenses and Financial Aid

The program is intended to be a revenue generating MS degree.

IV. CURRICULUM SPECIFICS

A. Institutional Factors

The degree offered is the Master of Science in Insect and Wildlife Environmental Education. The degree would be awarded through the College of Agriculture and Natural Resources.

B. Describe the curriculum

The M.S. in Insect and Wildlife Environmental Education requires 30 credits of graduate-level coursework, including 4 Core courses (18 credits) and 6 courses chosen from a set of restricted electives (18 credits).

Required Core Courses	18
EDUC 641 Teaching Science in the Middle School	3
ENWC 642 Insect and Wildlife Environmental Education Internship	9
ENWC 643/EDUC 643 Growing Young Naturalists	3
ENWC 656 Conservation Biology	3
Electives	
Education Group	
6 credits from the following:	6
EDUC 613 Adolescent Development and Educational Psychology	3
EDUC 614 Teaching Exceptional Adolescents	3
EDUC 619 Diversity in Secondary Education	3
EDUC 678 Special Topics in Education	3
SCEN 650 Scientific Inquiry for Current and Future Teachers	3
Taxonomy Group	
3 credits from the following:	3

ENWC 606 Insect Taxonomy	4
ENWC 618 Ornithology	3
ENWC 624 Herpetology	3
ENWC 625 Mammalogy	3

Ecology and Conservation Group

3 credits from the following: 3

ENWC 616 Wildlife Habitat Management	3
ENWC 620 Behavioral ecology	3
ENWC 622 Landscape ecology	3
ENWC 623 Pollination biology	3
ENWC 626 Aquatic entomology	3
ENWC 628 Disease Ecology	3
ENWC 635 Population ecology	3

Total credits: 30

Recommended Course Sequences

Semester 1 (Fall): 12 credits

ENWC 656 Conservation Biology	3
Or	
EDUC 641 Teaching Science in the Middle School	3
Education, Taxonomy, and Ecology and Conservation Electives	9

Semester 2 (Spring): 12 credits

ENWC 642 Insect and Wildlife Environmental Education Internship	9
ENWC643/EDUC 643 Growing Young Naturalists	3

UD students enrolling in the +1 component of the program from the BSED ETE – Middle School Science Concentration or the BSED ETE – Single Certification with Focus Area programs will have satisfied two course requirements through course taking in the BSED; students from the BS Insect Ecology and Conservation and BS Wildlife Ecology and Conservation programs will have satisfied two course requirements through course taking in the BS; these courses will be reflected on the required 4+1 application admission form.

ENWC 642 Insect and Wildlife Environmental Education Internship will provide students with real hands-on experience in the environmental education field by working with other

environmental education professionals. Projects will range from developing curricula to support and existing programs with a focus on local fauna, creating new programs and associated modules for the parks staff to incorporate in their existing programming, and to translate content to online platforms. Specific topic areas include local fauna, climate change, evolution and adaptation, biodiversity, conservation and sustainability.

This course will be a 9 credit hour internship with a partner institution such as directors from State Parks in Delaware, Pennsylvania and Maryland, botanical gardens and other educational facilities that provide environmental education programming. Twenty-five hours will be dedicated to working with the Parks educational team to develop teaching modules and support other educational programming. There will be a weekly check-ins with the Program Directors from the Entomology and Wildlife Ecology and Education Department. Each intern will be handpicked and paired with various partner institutions, because we envision that programmatic needs will vary across institutions.

Weekly Meetings/Check-ins:

During the semester long internship the intern will meet with the Program Director each week. The program director will go over the project and internship schedule and discuss the final program goals. Assessments from the various park staff will be gathered each month and discussed with the interns. All assessments and evaluations will become part of the interns unique portfolio.

Internship Tasks and Hours:

The intern will be placed with a particular institution based on their interests/skillsets and project availability. The intern will work with the internship director to develop a weekly/hourly plan for their project and teaching experience. The internship director will complete monthly evaluations that will track the intern's effectiveness and progress.

V. RESOURCES AVAILABLE

A. Learning Resources

The Entomology and Wildlife Ecology teaching laboratory will be available for students in the program. The adjacent prep room houses our faunal collections and field sample equipment, all of which will be available to students in the program. The library has excellent holdings (both books and periodicals) in insect ecology and conservation, wildlife ecology and conservation, and elementary education. The letter by Trevor Dawes, Vice Provost for Libraries and Museums and May Morris University Librarian, demonstrates that the library is well- positioned to service this proposed program (see attached).

B. Faculty/administrative resources

We have adequate faculty in the Department of Entomology and Wildlife Ecology and the School of Education to cover the course work and administer the program. Dr. Deborah Delaney

will be the Program Director. She, a faculty member from the Department of Entomology and Wildlife Ecology. Dr Delaney will oversee the program, organize and lead program-related meetings, and serve as the initial point of contact for program faculty and students. Dr. Danielle Ford, a faculty member for the School of Education, will be the point of contact for the School of Education. Programmatic meetings will be held at least semi-annually to discuss the curriculum, any course changes or other changes that might be needed to strengthen the program, review data, and establish a plan of action to address any plans for improvement and/or growth. The Program Director will report to the Chair of the Department of Entomology and Wildlife Ecology. Personnel and programmatic change decisions regarding the program will be made by the Program Director, Chair of the Department Entomology and Wildlife Ecology, and the faculty of the Department Entomology and Wildlife Ecology, and in consultation with the School of Education. Administrative support for the program will come from the Department of Entomology and Wildlife Ecology administrative assistants, business administrator, and the Assistant Dean of Undergraduate, and Associate Dean of Research and Graduate Education within the College of Agriculture and Natural Resources.

C. External funding

There is no initial external funding for the program, although the Chair of the Department of Entomology and Wildlife Ecology will work with the Dean and College development officers to endow the program.

VI. Resources Required

A. Learning resources

No additional learning resources are necessary to implement the program.

B. Personnel resources

No additional personnel resources are necessary to implement the program.

C. Budgetary Needs

No additional budgetary resources are necessary to implement the program.

Part VI. General Information

A. Advisement

Upon admission to the M.S. program, candidates will be advised by the Program Director. Candidates should meet with their faculty adviser prior to enrolling in courses to develop a program of study that meets all program requirements.

Candidates should consult with their faculty adviser to discuss any proposed changes to the planned program of study. Faculty advisers must approve or disapprove requests for course transfers, leaves of absence, graduation, and other requests related to a candidate's academic program.

B. Application for Advanced Degree

To initiate the process for degree conferral, candidates must submit an "Application for Advanced Degree" to the Office of Graduate and Professional Studies. The application deadlines are February 15 for Spring candidates, May 15 for Summer candidates, and September 15 for Winter candidates. The application must be signed by the candidate's adviser and by the Chair of the Department of Entomology and Wildlife Ecology or his/her designee. An application fee must be paid when the application is submitted. The application form and fee information may be found online at the UD Graduate College website.

Students must be registered in a course or for sustaining status in the semester of degree conferral.

C. Graduate Grade Point Average

Students must have a minimum overall cumulative grade point average of 3.0 to be eligible for the degree. In addition, the grades in courses applied toward the degree program must equal at least 3.0. All graduate-numbered courses taken with graduate student classification at the University of Delaware are applied to the cumulative index. Credit hours and courses for which the grade is below "C-" do not count toward the degree even though the grade is applied to the overall index. Candidates should see that their instructors have submitted all final grades.

D. Continuous Registration and Leaves of Absence

Once admitted to the M.S., students are expected to enroll in at least one course each Fall and Spring semester in accordance with the University's policy on Continuous Registration.

Students may request a leave of absence during a Fall or Spring semester for personal, medical or professional reasons by sending a written letter or an e-mail to their faculty adviser. The adviser will make a recommendation to the M.S. Program Director and Graduate College. For additional information, see <http://www.udel.edu/gradoffice/polproc/index.html>

E. Time Limits for the Completion of Degree Requirements.

Time limits for the completion of degree requirements begin with the date of matriculation and are specifically expressed in the student's letter of admission. Students are expected to enroll in the program full time, and complete the degree in one (4+1 option) or two years.

F. Extension of the Time Limit.

An extension of time limit may be granted for circumstances beyond the student's control. Requests for time extensions must be made in writing and approved by the student's faculty adviser and the Chair of the Department of Entomology and Wildlife Ecology or his/her designee. The Chair or his/her designee will forward the request to the Office of Graduate and Professional Studies. The Office of Graduate Studies will determine the student's eligibility for a time extension and will notify the student in writing of its decision to grant an extension of time.

G. Transfer of Credit Earned as a Continuing Education Student at the University of Delaware.

Students who complete graduate credits with the classification of CEND (Continuing Education Nondegree) at the University of Delaware may use a maximum of 9 graduate credits earned with this classification toward their graduate degree. The CEND credits, grades, and quality points become a part of the student's academic record and grade point average. CEND credit can be transferred provided that: (a) the course was at the 600 - 800 level, (b) the course was taken within the time limit appropriate for the degree, (c) the course was approved by the student's faculty adviser and the Director of the School of Education or his/her designee, and (d) the course was in accord with the requirements for the degree.

H. Transfer of Credit from Another Institution.

Graduate credit earned at another institution will be evaluated at the written request of the student. Such a request should be submitted first to his or her faculty adviser using a Request for Transfer of Graduate Credit form. A maximum of 9 credits required for the degree will be accepted provided that such credits: (a) were earned with a grade of no less than B-, (b) are approved by the student's faculty adviser and the Chair of the Department of Entomology and Wildlife Ecology or his/her designee, (c) are in accord with the requirements of the degree, (d) are not older than five years, and (e) were completed at an accredited college or university. The credits, but not the grades or quality points, are transferable to University of Delaware graduate records. Graduate courses counted toward a degree received elsewhere may not be used. Credits earned at another institution while the student was classified as a continuing education student at that institution are not eligible to be transferred to one's graduate degree at the University of Delaware. Credits from institutions outside of the United States are generally not transferable to the University of Delaware.

K. Transfer of Credit from the Undergraduate Division at the University of Delaware.

Students (except those in the 4+1 track) who wish to transfer credits from their undergraduate record to their graduate record may transfer a limited number by arranging with the department to have these courses approved by their instructors before the courses are taken. These courses

must be at the 600-level or higher, and the student must perform at the graduate level. They must be in excess of the total required for the baccalaureate degree, must have grades of no less than B-, and must not be older than five years. The credits, grades, and quality points will transfer.

VII. Program Educational Goals

A. Assessment plan

The program will follow the policies and procedures and academic program review schedule as established by the Office of the Provost and Faculty Senate. The faculty in the 4+1 program will assess student's performance on meeting the program's educational goals. The assessment plan for the student learning outcomes are as follows:

Educational Goals:

1. Develop age appropriate curricula focused on various fauna
2. Determine how to engage both live and virtual audiences with scientific content
3. Learn how to design effective learning assessments
4. Develop organizational skills for designing and implementing curricula that builds on scientific concepts
5. Takes responsibility for their learners' learning and uses ongoing analysis and reflection using current research, education, and policy to improve his/her planning and practice

Measures:

Direct (for all 5): in ENWC 642 Insect and Wildlife Environmental Education Internship (course taken by all student in the final semester of the program), student will intern at an environmental education facility (e.g., a state park) and develop an educational program related to insect and wildlife ecology and conservation. The student will present the written curriculum for evaluation by the program director. The student will present the program to the intended audience and the program director will evaluate their performance. All components of the program will be graded using a rubric developed by the Program Director in consultation with the School of Education representative, and all evaluations and assessments will become part of the students portfolio.

Indirect (for all 5): A reflective survey will be given to all graduating students (see Assessment Questionnaire). The survey will be administered at the end of the internship.

Along with the questionnaire, all graduates will be given a separate sheet asking about their plans following graduation, which may be anonymous if they so desire (see Post-graduation Plans).

Rubric for Insect and Wildlife Education Interns:

Professional Evaluation of Masters In Insect and Wildlife Education Interns– Evaluator Form

The University of Delaware (UD) professional education and entomology and wildlife ecology faculty and their organization-based partners have the responsibility of evaluating UD Masters in Insect and Wildlife Education interns’ effectiveness. We use a variety of instruments and methods to ensure our interns acquire the knowledge, skills necessary to be effective educators in indoor and outdoor classrooms.

Please complete all sections of the table below. Provide specific examples that support the evaluation. If there are areas in which the intern needs to improve, then describe specific details and outline the improvement plan.

Interns name: _____ Major: _____ Date of Meeting: _____

Name of individual completing the form: _____ Role (e.g., instructor, supervisor): _____

Intern’s advisor: _____ Credits completed: _____ Overall GPA: _____ (if applicable)

UD Dispositions

As an effective educator, the intern:	Rating:		Comments
	Rarely	1	
	Sometimes, but Not Consistently	2	
	Consistently	3	
	No behaviors related to this indicator observed	N/A	
1. Demonstrates commitment to the belief that all learners can achieve by persisting in helping each learner reach his/her full potential.			
2. Exhibits enthusiasm, initiative, and a positive attitude.			
3. Respects and considers the input and contributions of families, colleagues, and other professionals in understanding and supporting each learner’s development.			
4. Respects learners as individuals with differing personal and family backgrounds, and with varying skills, abilities, perspectives, talents, and interests; he/she is committed to using this information to plan effective instruction.			

5. Takes responsibility for his/her learners' learning and uses ongoing analysis and reflection using current research, education, and policy to improve his/her planning and practice.		
6. Reflects on constructive criticism and guidance, and appropriately modifies his/her behavior or practice.		
7. Demonstrates the ethical use of assessment and assessment data to identify learners' strengths and needs (e.g., shares learner data appropriately).		
8. Demonstrates professionalism by being on time; representing him/herself appropriately through dress, language and communications, including social media; and meeting deadlines.		
9. Uses correct-up-to-date scientific content that has been gleaned from reputed peer-reviewed sources.		
10. Does not show bias and presents scientific material objectively. Encourages students to critically engage in the material being presented.		

1. Area(s) for Improvement

2. Improvement Plan

3. If an evaluation meeting is held, indicate the outcome below.

- Intern does not need an improvement plan.
- Intern needs to fulfill an improvement plan.
- The program coordinator will consult with the department chair on the interns status in the program.

Signature, Evaluator

Date

Signature, Intern

Date

The interns signature indicates only that s/he has read the form, not that s/he agrees with the assessment of his/her performance. The interns signature does indicate a willingness to fulfill the improvement plan.

Senior Assessment Questionnaire

Department of Entomology and Wildlife Ecology

We ask that graduates in our programs take a few moments to answer the following questions, which will help us to assess whether we need to make adjustments in our course offerings and requirements in the future. Please circle the number that corresponds to your response to each of the statements below, and then answer the open-ended questions that follow.

Thanks very much for your help!

1. I am capable of synthesizing information about insect and wildlife into educational programs.

Strongly Agree

Strongly Disagree

1

2

3

4

5

What courses and/or other experiences during your time at UD helped the most in developing these capabilities?

Are there additional courses or experiences that would have been helpful?

2. I am capable of writing curricula for an education program.

Strongly Agree

Strongly Disagree

1

2

3

4

5

What courses and/or other experiences during your time at UD helped the most in developing your communication skills?

Are there additional courses or experiences that would have been helpful?

3. I am capable of orally presenting an educational program.

Strongly Agree

Strongly Disagree

1

2

3

4

5

What courses and/or other experiences during your time at UD helped the most in developing your knowledge in relevant areas?

Are there additional courses or experiences that would have been helpful?

Post-graduation Plans

Department of Entomology and Wildlife Ecology

Name (optional): _____

What are your plans following graduation?

Please keep us up to date in the future! Send an e-mail to any faculty or staff person in the department whenever you change jobs or receive a significant promotion or other recognition. We want to be able to brag about your accomplishments!

Master of Science Insect and Wildlife Environmental Education
4+1 Option

I. DESCRIPTION

The Master of Science 4+1 Program in Insect and Wildlife Environmental Education is designed to prepare students to teach at nature centers, state parks, and other environmental education outlets. Our program is unique in that it equally combines a background in education and the environment with an emphasis on wild fauna. The learning outcomes for students completing the program will be: (1) synthesize information about insect and wildlife into educational programs, (2) ability to write curricula for education programs, and (3) ability to orally present an educational program. The students will complete an intense 9 credit hour internship with a partner (e.g., a state park) and develop an education program for that partner. The program will be jointly offered by the Department of Entomology and Wildlife Ecology and the School of Education, and housed in the Department of Entomology and Wildlife Ecology.

II. RATIONALE AND DEMAND

A. Institutional factors.

The learning outcomes for this program support the General Education Objectives:

- 2.1 1b. Analyze Arguments and Information
- 2.2 1c. Engage in Constructive Ideation
- 2.3 2a. Communicate Effectively in Writing
- 2.4 2b. Communicate Orally
- 2.6 3a. Work Collaboratively across a Variety of Cultural Contexts and a Spectrum of Differences
- 2.7 3b. Work Independently Across a Variety of Cultural Contexts and a Spectrum of Differences
- 2.8 4. Critically Evaluate the Ethical Implications of What They Say and Do
- 2.11 5c. Reason Scientifically

The planning process began late in fall 2018 with a meeting of Drs. Debbie Delaney, Danielle Ford, and Jake Bowman. We outlined the basic idea and took it to the Director of the School of Education and the Dean of the College of Agriculture and Natural Resources. Both were supportive so we explored partners and identified three: Delaware State Parks, Longwood Gardens, and the Mt. Cuba Center. In Fall 2019, we organized a workshop to discuss the program and its associated internship. It was attended by representatives of each organization,

the Director and Associate Directors of the School of Education, Chair of Entomology and Wildlife Ecology, and Drs. Delaney and Ford. After the meeting we developed an evaluation rubric for the internship, which was shared with our partners and modified based on their feedback. Unfortunately, COVID-19 stalled our progress until Fall 2020. We sought market research on our program in August 2020 from the Director of Marketing and Communications at the University of Delaware. We had an initial meeting in December 2020, and they completed their market research report in February 2021. We piloted two internships with Delaware State Parks in summer 2021 and used the evaluation rubric to evaluate the education programs produced by the interns. We expect this program to be a recruitment tool for the Elementary Teacher Education – Middle School Science Concentration, Elementary Teacher Education – Single Certification Focus Area Concentration, Insect Ecology and Conservation, and Wildlife Ecology and Conservation majors. Most of the required courses in this program are currently taught but have room for more students. The one new course will be team-taught with faculty from the Department of Entomology and Wildlife Ecology and the School of Education.

B. Student demand.

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C. Transferability

We do not have any unique agreements concerning the transfer of students or credits.

D. Access to graduate and profession programs

Application and transfer into the +1 component of the program can occur after meeting with the Program director for course review, earning 60 credits, (i.e., Junior standing) and a minimum cumulative GPA of 3.0. To matriculate into the +1 MS program, students must also earn a minimum of 3.0 GPA in MS courses (600 level) taken during the BS/BSED portion of the program. Applications are to be submitted via the SLATE system (see graduate admissions website at: <http://grad.udel.edu/apply/>). Applicants must fill out the Graduate Course Approval Form for 4+1 Admission Application (available at the graduate admissions website identified above) and submit it to the Graduate College once they apply through SLATE. There is no application fee to apply to the +1 component of the program. GRE scores and letters of recommendation are not required. Admissions decisions will be made by an Admissions Committee, consisting of the Program Director (a faculty member in the Department of

Entomology and Wildlife Ecology) and a faculty member from the School of Education that teaches in the program.

E. Demand and employment factors

Our market research found strong demand for environmental educators in the Mid-Atlantic region. In the past 10 years, 9,833 postings have been listed within the Mid-Atlantic region. In 2020, 1,370 job postings were reported within the region, which is a 578% increase from a total of 202 job postings reported in January 2010. The average salary of nature educators with master's degrees is \$70,420 in comparison to \$57,134, the average salary of nature educators with bachelor's degree. We have received strong interest from our regional state parks and NGOs.

F. Regional, state, and national factors

Only Bard College offers a 4+1 program in Environmental Education, and the market research found strong demand for Environmental Education graduates beyond what the current program can satisfy. Bard College program is focused on environmental policy instead of the faunal focus of our program. Four other universities offer advanced degrees in Environmental Education or something similar. Hamline University, Southern Oregon University, and University of Minnesota Duluth require at least 2 years to complete their programs and are outside of the Mid-Atlantic region. Antioch University's program can be completed in as short as 18 months but lacks the faunal core of our program. None of these programs truly merge faunal courses with education courses focused on pedagogy and building curricula.

There is no professional accreditation in for this program.

G. Describe other strengths

As described above, this program of study fills a national niche via its unique combination of Insect and Wildlife Ecology and Conservation, and Education. Additionally, students will be required during their +1 year to complete a 9 credit hours internship, which is modeled after student teaching requirements in Elementary Education. These internships will be completed on the tutelage of UD faculty and environmental education partitioners at State Parks or other environmental education facilities. We have the commitment from Delaware State Parks and have already partnered on internships this year (see appended letter). We are in talks with Longwood Gardens, and the Mt. Cuba Center for them to participate, but also envision other partners as the program grows.

III. ENROLLMENT, ADMISSIONS AND FINANCIAL AID

A. Enrollment

Enrollment into the MS portion of the program will be restricted to students with a cumulative GPA of 3.0 or higher from their BS coursework. This requirement is to ensure that only the best students are admitted to the +1 portion of the program, like many other graduate programs across campus.

B. Admission Requirements

Undergraduate applicants will apply for undergraduate admissions through the Office of Admissions as is the case with other undergraduate programs. The University of Delaware's admissions requirements and selection criteria will be in force. Application and transfer into the +1 component of the program can occur after earning 60 credits (i.e., Junior standing) and a minimum cumulative GPA of 3.0. Applications are to be submitted via the SLATE system (see graduate admissions website at: <http://grad.udel.edu/apply/>). Applicants must fill out the Graduate Course Approval Form for 4+1 Admission Application (available at the graduate admissions website identified above) and submit it to the Graduate College once they apply through SLATE. There is no application fee to apply to the +1 component of the program. GRE scores and letters or recommendation are not required. Admissions decisions will be made by an Admissions Committee, consisting of the Program Director (a faculty member in the Department of Entomology and Wildlife Ecology) and a faculty member from the School of Education that teaches in the program.

C. Student Expenses and Financial Aid

The program is intended to be a revenue generating +1 MS degree. Thus, we expect that students will pay for the fifth year. The Office of Financial Aid will handle needs assessment and financial aid packages for BS students as they do for all other undergraduate programs.

IV. CURRICULUM SPECIFICS

A. Institutional Factors

The degree offered for completion of the first part of program is a Bachelor of Science with a major in either Elementary Teacher Education – Middle School Science Concentration, Elementary Teacher Education – Single Certification Focus Area Concentration, Insect Ecology and Conservation, or Wildlife Ecology and Conservation. Those completing the +1 component of the program, would earn a Master of Science in Insect and Wildlife Environmental Education. The degrees would be awarded through the College of Agriculture and Natural Resources. Given the +1 is a BS program, the MS degree is appropriate.

B. Describe the curriculum

MAJORS FOR THE SCHOOL OF EDUCATION IN THIS 4+1 PROGRAM

BSED Elementary Teacher Education – Middle School Science Concentration/MS Insect and Wildlife Environmental Education

BSED Elementary Teacher Education – Single Certification Focus Area Concentration/MS Insect and Wildlife Environmental Education

The 4+1 program is available to UD undergraduate students from two of the concentrations in the Elementary Teacher Education major: the BSEd Elementary Teacher Education - Middle School Science Concentration and the BSEd Elementary Teacher Education – Single Certification Focus Area Concentration. Students in the Single Certification ETE Concentration

will be considered for admission if they have substantive science coursework (e.g., a minor in a STEM or related discipline). Students from both programs should consult with their advisor early in the program to ensure they choose appropriate science electives to meet the prerequisite requirements for subsequent graduate coursework. Students apply and are admitted to the 4+1 program as juniors (before they graduate) but cannot remain in the program unless they earn a BS in Elementary Teacher Education.

4+1 BSED Elementary Teacher Education - Middle School Science Concentration/M.S. Insect and Wildlife Environmental Education

BSED requirements:

University Requirements:

- ENGL 110 - Seminar in Composition (C- minimum)
- First Year Seminar (FYS) (0-4 credits)
- Discovery Learning Experience (DLE) (three credits)
- Multicultural Requirement (three credits)
- University Breadth Requirements (C- minimum):
 - Creative Arts and Humanities (three credits)
 - History and Cultural Change (three credits)
 - Social and Behavioral Sciences (three credits)
 - Mathematics, Natural Sciences, and Technology (three credits)
 - Capstone Experience

ETE Major Requirements:

All students must complete the General Studies and Professional Studies courses and a concentration. Many of the University Requirements can be satisfied by the Major Requirements. Students must earn a grade of C- or higher in all coursework for the major.

General Studies:

- | | |
|--|---|
| GEOL 113 Earth Science | 4 |
| SCEN 101 Physical Science | 4 |
| BISC 104 Principles of Biology with Laboratory | 4 |
| or | |
| BISC 207 Introductory Biology I | 4 |
| MATH 251 Mathematics for K-8 Teachers: Number and Operations | 3 |
| MATH 252 Mathematics for K-8 Teachers: Rational Numbers and Probability | 3 |
| MATH 253 Mathematics for K-8 Teachers: Geometry, Algebra and Measurement | 3 |
| UAPP 102 Civics and Economics for Teachers | 3 |
| History: | |
| One of the following: | |
| HIST 103 World History to 1400 | 3 |

HIST 104 World History since 1400	3
HIST 105 U.S. History to 1865	3
HIST 106 U.S. History Since 1865	3
Geography:	
One of the following:	
GEOG 101 Physical Geography	3
GEOG 102 Human Geography	3
GEOG 120 World Regional Geography	3
GEOG 152 Climate and Life	4
GEOG 203 Introduction to Cultural Geography	3
GEOG 235 Conservation of Natural Resources	3
GEOG 236 Humans and Environmental Sustainability	3
GEOG 310 Social Geography	3
GEOG 311 Economic Geography & Uneven Development	3
GEOG 315 People, Politics and Place	3
GEOG 320 Water and Society	3
GEOG 346 Urban Cultural Geography	3
GEOG 352 Refugees and Forced Migration	3
POSC 329 International Migration	3
English:	
ENGL 2xx or higher elective	3
Creative Arts:	
Art, Art History, Dance, Music, Music Education, or Theater course (three credits)	
This course must satisfy the Creative Arts and Humanities University Breadth Requirement unless this requirement is satisfied by another course.	
Professional Studies:	
EDUC 100 Introduction to Elementary and Middle School Education	2
EDUC 205 Human Development: Grades K-8	3
EDUC 210 Beginning Literacy Instruction	3
EDUC 230 Introduction to Exceptional Children	3
EDUC 240 Legal and Ethical Issues in American Education	3
or	
EDUC 247 The History of Education in America	3
EDUC 258 Cultural Diversity, Schooling and the Teacher	3
EDUC 310 Reading and Writing in Elementary School	3
EDUC 335 Elementary Curriculum: Mathematics	3
EDUC 341 Elementary Curriculum: Science	3
EDUC 346 Elementary Curriculum: Social Studies	3
EDUC 387 Integrating Technology in Education	3
EDUC 390 Classroom Management for Social and Emotional Learning	3
EDUC 400 Student Teaching	3-12
EDUC 428 Critical Reflection of Teacher Decision Making	2
EDUC 433 Student Teaching Seminar: Elementary Ed	1-2
EDUC 436 Differentiated Literacy Instruction	3
EDUC 440 Literacy Instruction for English Language Learners	3

EDUC 451 Educational Assessment for Classroom Teachers

3

Upper Division Clearance

Students must complete Upper Division Clearance requirements in order to take upper-level education courses in their junior year. These requirements are described [online](#), including passing the Praxis Core Academic Skills for Educators tests in reading, writing, and mathematics according to the State of Delaware guidelines.

Praxis Subject Assessments and EdTPA for Certification

Students must take the Praxis Subject Assessments (previously Praxis II tests) that are required for State of Delaware teacher certification in elementary education and in the area of their concentration (e.g., special education) prior to graduation. Students must also complete the edTPA for elementary education. Students must pass these assessments according to the State of Delaware guidelines in order to earn institutional recommendation for teacher certification. This institutional recommendation is noted on students' transcripts and is needed to apply for teacher certification in Delaware and other states. Passing scores are listed [online](#). To meet certification requirements, students should check state requirements for passing scores.

Concentration Requirements:

Six credits of Biology courses from the approved list of courses.	6
Six credits of Physical science courses from the approved list of courses.	6
Earth science course from the approved list of courses.	3
Environmental science course from the approved list of courses.	3
SCEN 650 - Scientific Inquiry for Current and Future Teachers	3
EDUC 641 – Teaching Science in the Middle School	3
EDUC 400 Student Teaching	3-12

Electives:

After required courses are completed, sufficient elective credits must be taken to meet the minimum credit requirement for the degree.

Credits to total a minimum of 123

**4+1 BSED Elementary Teacher Education – Single Certification Focus Area
Concentration/M.S. Insect and Wildlife Environmental Education**

Students from the Single Certification Focus Area Concentration of the Elementary Teacher Education major may apply to the 4+1 program if they have taken sufficient science coursework (e.g., chosen a minor in a science or related field).

BSED requirements:

University Requirements:

ENGL 110 - Seminar in Composition (C- minimum)
 First Year Seminar (FYS) (0-4 credits)
 Discovery Learning Experience (DLE) (three credits)
 Multicultural Requirement (three credits)
 University Breadth Requirements (C- minimum):
 Creative Arts and Humanities (three credits)
 History and Cultural Change (three credits)
 Social and Behavioral Sciences (three credits)
 Mathematics, Natural Sciences, and Technology (three credits)
 Capstone Experience

ETE Major Requirements:

All students must complete the General Studies and Professional Studies courses and a concentration. Many of the University Requirements can be satisfied by the Major Requirements. Students must earn a grade of C- or higher in all coursework for the major.

General Studies:

GEOL 113 Earth Science	4
SCEN 101 Physical Science	4
BISC 104 Principles of Biology with Laboratory	4
or	
BISC 207 Introductory Biology I	4
MATH 251 Mathematics for K-8 Teachers: Number and Operations	3
MATH 252 Mathematics for K-8 Teachers: Rational Numbers and Probability	3
MATH 253 Mathematics for K-8 Teachers: Geometry, Algebra and Measurement	3
UAPP 102 Civics and Economics for Teachers	3
History:	
One of the following:	
HIST 103 World History to 1400	3
HIST 104 World History since 1400	3
HIST 105 U.S. History to 1865	3
HIST 106 U.S. History Since 1865	3
Geography:	
One of the following:	
GEOG 101 Physical Geography	3
GEOG 102 Human Geography	3
GEOG 120 World Regional Geography	3
GEOG 152 Climate and Life	4
GEOG 203 Introduction to Cultural Geography	3
GEOG 235 Conservation of Natural Resources	3
GEOG 236 Humans and Environmental Sustainability	3
GEOG 310 Social Geography	3

GEOG 311 Economic Geography & Uneven Development	3
GEOG 315 People, Politics and Place	3
GEOG 320 Water and Society	3
GEOG 346 Urban Cultural Geography	3
GEOG 352 Refugees and Forced Migration	3
POSC 329 International Migration	3
English:	
ENGL 2xx or higher elective	3

Creative Arts:

Art, Art History, Dance, Music, Music Education, or Theater course (three credits)

This course must satisfy the Creative Arts and Humanities University Breadth Requirement unless this requirement is satisfied by another course.

Professional Studies:

EDUC 100 Introduction to Elementary and Middle School Education	2
EDUC 205 Human Development: Grades K-8	3
EDUC 210 Beginning Literacy Instruction	3
EDUC 230 Introduction to Exceptional Children	3
EDUC 240 Legal and Ethical Issues in American Education	3
or	
EDUC 247 The History of Education in America	3
EDUC 258 Cultural Diversity, Schooling and the Teacher	3
EDUC 310 Reading and Writing in Elementary School	3
EDUC 335 Elementary Curriculum: Mathematics	3
EDUC 341 Elementary Curriculum: Science	3
EDUC 346 Elementary Curriculum: Social Studies	3
EDUC 387 Integrating Technology in Education	3
EDUC 390 Classroom Management for Social and Emotional Learning	3
EDUC 400 Student Teaching	3-12
EDUC 428 Critical Reflection of Teacher Decision Making	2
EDUC 433 Student Teaching Seminar: Elementary Ed	1-2
EDUC 436 Differentiated Literacy Instruction	3
EDUC 440 Literacy Instruction for English Language Learners	3
EDUC 451 Educational Assessment for Classroom Teachers	3

Upper Division Clearance

Students must complete Upper Division Clearance requirements in order to take upper-level education courses in their junior year. These requirements are described [online](#), including passing the Praxis Core Academic Skills for Educators tests in reading, writing, and mathematics according to the State of Delaware guidelines.

Praxis Subject Assessments and EdTPA for Certification

Students must take the Praxis Subject Assessments (previously Praxis II tests) that are required for State of Delaware teacher certification in elementary education and in the area of their

concentration (e.g., special education) prior to graduation. Students must also complete the edTPA for elementary education. Students must pass these assessments according to the State of Delaware guidelines in order to earn institutional recommendation for teacher certification. This institutional recommendation is noted on students' transcripts and is needed to apply for teacher certification in Delaware and other states. Passing scores are listed [online](#). To meet certification requirements, students should check state requirements for passing scores.

Concentration Requirements:

Students must complete a minor. Any minor listed in the UD catalog is acceptable. However, the School of Education suggests choosing a related minor such as Educational Technology, Urban Education, Disabilities Studies or Entrepreneurial Studies.

Electives:

After required courses are completed, sufficient elective credits must be taken to meet the minimum credit requirement for the degree.

Total credits:

123

MS+1 portion for both BSED programs:

MAJOR: Insect and Wildlife Environmental Education

Undergraduate applicants will apply for undergraduate admissions through the Office of Admissions as is the case with other undergraduate programs. The University of Delaware's admissions requirements and selection criteria will be in force. Application and transfer into the +1 component of the program can occur after earning 60 credits (i.e., Junior standing) and a minimum cumulative GPA of 3.0. Applications are to be submitted via the SLATE system (see graduate admissions website at: <http://grad.udel.edu/apply/>). Applicants must fill out the Graduate Course Approval Form for 4+1 Admission Application (available at the graduate admissions website identified above) and submit it to the Graduate College once they apply through SLATE. There is no application fee to apply to the +1 component of the program. GRE scores and letters or recommendation are not required. Admissions decisions will be made by an Admissions Committee, consisting of the Program Director (a faculty member in the Department of Entomology and Wildlife Ecology) and a faculty member from the School of Education that teaches in the program.

Required Core Courses

EDUC 641 Science and Environmental Education Methods	3
ENWC 642 Insect and Wildlife Environmental Education Internship	9
ENWC/EDUC 643 Growing Young Naturalists	3
ENWC 656 Conservation Biology	3

Electives

Education Group

6 credits from the following: 6

EDUC 613	Adolescent Development and Educational Psychology	3
EDUC 614	Teaching Exceptional Adolescents	3
EDUC 619	Diversity in Secondary Education	3
EDUC 678	Special Topics in Education	3
SCEN 650	Scientific Inquiry for Current and Future Teachers	3

Taxonomy Group

3 credits from the following: 3

ENWC 606	Insect Taxonomy	4
ENWC 618	Ornithology	3
ENWC 624	Herpetology	3
ENWC 625	Mammalogy	3

Ecology and Conservation Group

3 credits from the following (Group 2 elective): 3

ENWC 616	Wildlife Habitat Management	3
ENWC 620	Behavioral ecology	3
ENWC 622	Landscape ecology	3
ENWC 623	Pollination biology	3
ENWC 626	Aquatic entomology	3
ENWC 628	Disease Ecology	3
ENWC 635	Population ecology	3

Total credits: 30

For BSED/MS: Credits to total a minimum of 153

BSED ETE students enrolling in the +1 component of the program will have satisfied two course requirements through course taking in the BSED: SCEN 650 and EDUC 641 (Science Teaching in the Middle School); these courses will be reflected on the required 4+1 application admission form.

Recommended Course Sequence:

Undergraduate coursework: 6 credits

SCEN 650 Scientific Inquiry for Current and Future Teachers 3

EDUC 641 Science Teaching in the Middle School	3
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Fall +1 – 12 credits

ENWC Conservation Biology	3
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EDUC 678- Topics in Education	3
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Group 1 Elective	3
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Group 2 Elective	3
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Spring +1 – 12 credits

ENWC 642 Insect and Wildlife Environmental Education Internship	9
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ENWC/EDUC 643 Growing Young Naturalists	3
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MAJORS FOR THE DEPARTMENT OF ENTOMOLOGY AND WILDLIFE ECOLOGY IN THIS 4+1 PROGRAM

BS Insect Ecology and Conservation/MS Insect and Wildlife Environmental Education

BS Wildlife Ecology and Conservation/MS Insect and Wildlife Environmental Education

The 4+1 program is available to UD undergraduate students from two majors: the BS Insect Ecology and Conservation and the BS Wildlife Ecology and Conservation. Students from both programs should consult with their advisor early in the program to ensure they choose appropriate coursework. Students apply and are admitted to the 4+1 program as juniors (before they graduate) but cannot remain in the program unless they earn a BS in Insect Ecology and Conservation or Wildlife Ecology and Conservation.

4+1 BS Insect Ecology and Conservation /M.S. Insect and Wildlife Environmental Education

Insect Ecology and Conservation is the study of the most abundant creatures on Earth— insects—and their interactions with other wildlife, humans, and the environment. The Insect Ecology and Conservation major is designed to provide students with an understanding of the complexity of the insect world. Insects are becoming extinct faster than any other group of species. The Insect Ecology and Conservation curriculum focuses on the diverse morphology and physiology of insects and the function and ecology of insects and their impacts on other trophic levels. This is the only Insect Ecology and Conservation undergraduate program in the nation.

Students are required to complete the university and college level and breadth requirements for Bachelor of Science degrees in the College of Agriculture and Natural Resources.

University Requirements

ENGL 110 Seminar in Composition (minimum grade C-)	3
Multicultural Requirement	3
First Year Seminar	1
Discovery Learning Experience	3
Capstone	3

University Breadth Requirements

Creative Arts and Humanities	3
History and Cultural Change	3
Social and Behavioral Science	3
Math, Natural Science and Tech	3

Major Requirements

Insect Ecology and Conservation emphasizes the structure, physiology, behavior, development, ecology, classification, and management of insects.

In the Insect Ecology and Conservation (BS) major, students can focus their biological interest on insects. This program requires basic sciences as well as specialty courses on insects, plants, other animals and conservation. Flexibility in course selection permits students to emphasize insect biology, insect ecology, insect conservation or pest management. The curriculum includes extensive hands-on, discovery-based learning opportunities.

Core Requirements

APEC 150-	3
PLSC 101/104 or BISC 207-Botany I or Intro Biology I	4
PLSC 201 or BISC 208-Botany II or Intro Biology II	4
ENWC 165- Insect and Wildlife Field Studies	1
ENWC 201- Wildlife Ecology and Conservation	3
ENWC 205- Insects and Society	3
ENWC 215- Insects and Society Laboratory	1
ENWC 280- GIS for Wildlife Conservation	3
ENWC 311- Insects in Agricultural and Urban Environments	3
ENWC 346- Insect Ecology	3
ENWC 405- Insect Anatomy and Physiology	3
ENWC 406- Insect Taxonomy	4
ENWC 409- Insect Research Methods	3
ENWC 417-Intro to Quantitative Ecology	3
ENWC 435-Population Ecology	3
ENWC 456-Conservation Biology	3
ENWC 465 or UNIV 402-Capstone or Senior Thesis	1 - 4
MATH 115- Pre-Calculus	3
STAT 200-Basic Statistical Practice	3

Group Requirements

Group I: Insects 9 credits with at least 6 credits in ENWC from the following:

ANFS 300- Principles of Animal and Plant Genetics.....	3
BISC 302- General Ecology.....	3
BISC 312- Field Ecology.....	3
BISC 321- Environmental Policy.....	3
BISC 403-Genetics.....	3
BISC 495- Evolution.....	3
ENWC 214- Apiculture.....	2
ENWC 224- Beekeeping Laboratory.....	1
ENWC 215- Insects and Society Laboratory.....	1
ENWC 411- Insect Pest Management.....	3
ENWC 419- Biological Control.....	3
ENWC 422-Landscape Ecology.....	3
ENWC 423- Pollination Ecology.....	3
ENWC 424- Herpetology.....	3
ENWC 426- Aquatic Entomology.....	3
ENWC 428- Disease Ecology.....	3
ENWC 620- Behavioral Ecology.....	3

Group II: Plants 9 credits from the following:

PLSC 101/104- Botany I/ Lab.....	4
PLSC 151- Introduction to Crop Science.....	3
PLSC 170- Soils and Sustainability.....	3
PLSC 201- Botany II.....	4
PLSC 204- Introduction to Soil Science.....	3
PLSC 211-Herbaceous Landscape Plants.....	3
PLSC 212-Woody Landscape Plants.....	4
PLSC 214-Indigenous Woody Plants of the Eastern United States.....	4
PLSC 225-Wetlands.....	3
PLSC 302- Vegetables, Herbs, and Natural Plant Products.....	3
PLSC 303- Introductory Plant Pathology.....	4
PLSC 334-Urban Forestry.....	3
PLSC 354-Plant Ecology.....	3
PLSC 404- Plant Taxonomy.....	3
PLSC 419- Soil Microbiology.....	4

Group III: Written and Oral Communication 9 credits required from the following two requirements:

Oral Communication

COMM 212-Public Speaking and Professional Presentation.....	3
COMM 350-Public Speaking.....	3
LEAD 209-Presentation Strategies-	3
THEA 204- Intro to Voice and Speech.....	3

Written Communication

ENGL 301-Advanced Writing.....	3
ENGL 307-News Writing and Editing.....	3
ENGL 309-Feature and Magazine Writing.....	3
ENGL 312-Written Communications in Business.....	3
ENGL 410-Technical Writing.....	3
ENGL 413-Topics in Professional Writing.....	3
UNIV 402- Senior Thesis.....	2 - 4

Group IV: Policy and Culture 3 credits from the following list:

APEC 100-Sustainable Development.....	3
APEC 406-Agricultural and Natural Resource Policy.....	3
APEC 444-Economics of Environmental Management.....	3
APEC 450-Topics in Environmental Law.....	3
ENEP 250-Intro to Energy and Environmental Policy.....	3
ENEP 410-Political Economy of the Environment.....	3
ENEP 420-Water Resources Management.....	3
ENEP 426-Climate Change Policy.....	3
ENWC 413- Wildlife Policy and Society.....	3
ENWC 450-Debates in Conservation Biology.....	3
ENWC 453-Community-Based Conservation.....	3
GEOG 230- Human Impact on the Environment.....	3
GEOG 235-Conservation of Natural Resources.....	3
GEOG 236-Humans and Environmental Sustainability.....	3
GEOG 341- Climate and Climate Change.....	3
GEOG 342- Bioclimatology.....	3
GEOG 419-Climate Change Adaptation Policy and Practice.....	3
GEOG 449-Environment and Society.....	3
MAST 439-Renewable Energy and Climate: Law, Regulation and Environment.....	1 - 3
MAST 462-Climate Change: Policy, Equity and Mitigation.....	3
PHIL 448- Environmental Ethics.....	3
PLSC 270- Biotechnology: Science and Socioeconomic Issues.....	3
POSC 350-Politics and the Environment.....	3

GROUP V: Physical Sciences 10 credits required and must come from a minimum of two different disciplines:

CHEM 103/133- General Chemistry I/Lab.....	4
CHEM 104/134- General Chemistry II/Lab.....	4
GEOG 220/221- Meteorology/Meteorology Lab.....	4
GEOL 107- Geology of Dynamic Earth.....	3
GEOL 113-Earth Science.....	3
PHYS 133- Intro to Astronomy.....	3
PHYS 201/221-Intro Physics I/Lab.....	4
PHYS 202/222-Intro Physics II/Lab.....	4

Electives:

Once required course are completed electives courses can be filled in to meet the minimum credit requirement for the degree.

Credits to total a minimum of.....120

4+1 BS Insect Ecology and Conservation /M.S. Insect and Wildlife Environmental Education

The Wildlife Ecology and Conservation major is designed to meet the educational requirements to be a certified wildlife biologist by the Wildlife Society. It is through a strong core of physiology and taxonomy blended with ecology conservation and ecology courses that our students will graduate with a holistic degree that covers all dimensions of Wildlife Ecology and Conservation. The capstone course for this major focuses on topics and skills important for the next phase of our student’s career path and or academic journey.

Students are required to complete the university and college level and breadth requirements for Bachelor of Science degrees in the College of Agriculture and Natural Resources.

University Requirements

ENGL 110 Seminar in Composition (minimum grade C-)	3
Multicultural Requirement	3
First Year Seminar	1
Discovery Learning Experience	3
Capstone	3

University Breadth Requirements

Creative Arts and Humanities	3
History and Cultural Change	3
Social and Behavioral Science	3
Math, Natural Science and Tech	3

Major Requirements

Wildlife Ecology and Conservation emphasizes the biology and ecology of all non-domesticated species and the perpetuation of free-living populations in their native habitats.

The Wildlife Ecology and Conservation (BS) major is for students with interests in the biological aspects of environmental science, e.g., species conservation, wildlife biology, or ecology. It requires basic sciences, specialty courses in vertebrates, insects, plants, conservation, and other supporting areas. The curriculum’s flexibility accommodates career goals ranging from wildlife biologist to nature education, conservation advocacy, research, and wildlife management. Meeting the requirements for the Wildlife Ecology and Conservation major should provide the student with the minimum educational requirements

for certification as an Associate Wildlife Biologist by The Wildlife Society, the professional society for wildlife biologists. Students will be exposed to a wide array of hands-on, discovery-based learning opportunities.

Core Requirements

APEC 150

or

ECON 101- Economics of Agriculture and Natural Resources or Intro to Microeconomics...3

ENWC 165- Insect and Wildlife Field Studies.....1

ENWC 201- Wildlife Ecology and Conservation.....3

ENWC 205- Insects and Society.....3

ENWC 280 or GEOG 372 or APEC 480- GIS for Wildlife Conservation or Intro to GIS or GIS in Natural Resource Management.....3 - 4

ENWC 413- Wildlife Policy.....3

ENWC 415-Wildlife Techniques.....3

ENWC 416-Wildlife Habitat Management.....3

ENWC 417-Intro to Quantitative Ecology.....3

ENWC 418-Ornithology.....3

ENWC 425-Mammology.....3

ENWC 435-Population Ecology.....3

ENWC 456-Conservation Biology.....3

ENWC 465 or UNIV 402-Capstone or Senior Thesis.....1 - 4

MATH 115

or 221

or 241-Pre-Calculus or Calculus I or Analytic Geometry and Calculus A.....3

PLSC 101/104 or BISC 207-Botany I or Intro Biology I.....4

PLSC 201 or BISC 208-Botany II or Intro Biology II.....4

STAT 200-Basic Statistical Practice.....3

Group Requirements

Group I: Zoology 6 credits from the following list:

BISC 302- General Ecology.....3

BISC 312- Field Ecology.....3

BISC 442- Vertebrate Morphology.....4

BISC 480- Vertebrate Natural History.....3

BISC 495- Evolution.....3

ENWC 214- Apiculture.....2

ENWC 224- Beekeeping Laboratory.....1

ENWC 215- Insects and Society Laboratory.....1

ENWC 314- Comparative Terrestrial and Marine Ecology.....3

ENWC 405- Insect Anatomy and Physiology.....3

ENWC 406- Insect Taxonomy.....4

ENWC 411- Insect Pest Management.....3

ENWC 422-Landscape Ecology.....3

ENWC 423- Pollination Ecology.....3

ENWC 424- Mammology.....3

ENWC 426- Aquatic Entomology.....	3
ENWC 428- Disease Ecology.....	3
ENWC 444-Conservation of Tropical Biodiversity.....	3
ENWC 452-Conservation of African Wildlife.....	3
ENWC 620- Behavioral Ecology.....	3
MAST 430-Ichthyology.....	3
MAST 451-Marine Invertebrate Biodiversity.....	3

Group II: Written and Oral Communication 9 credits required from the following two requirements:

Oral Communication

COMM 212-Public Speaking and Professional Presentation.....	3
COMM 350-Public Speaking.....	3
LEAD 209-Presentation Strategies-	3
THEA 204- Intro to Voice and Speech.....	3

Written Communication

ENGL 301-Advanced Writing.....	3
ENGL 307-News Writing and Editing.....	3
ENGL 309-Feature and Magazine Writing.....	3
ENGL 312-Written Communications in Business.....	3
ENGL 410-Technical Writing.....	3
ENGL 413-Topics in Professional Writing.....	3
UNIV 402.....	2 - 4

Group III: Human Dimensions and Wildlife Conservation 3 credits from the following list:

APEC 100-Sustainable Development.....	3
APEC 406-Agricultural and Natural Resource Policy.....	3
APEC 444-Economics of Environmental Management.....	3
APEC 450-Topics in Environmental Law.....	3
ENEP 250-Intro to Energy and Environmental Policy.....	3
ENEP 410-Political Economy of the Environment.....	3
ENEP 420-Water Resources Management.....	3
ENEP 426-Climate Change Policy.....	3
ENWC 450-Debates in Conservation Biology.....	3
ENWC 453-Community-Based Conservation.....	3
GEOG 235-Conservation of Natural Resources.....	3
GEOG 236-Humans and Environmental Sustainability.....	3
GEOG 419-Climate Change Adaptation Policy and Practice.....	3
GEOG 449-Environment and Society.....	3
MAST 439-Renewable Energy and Climate: Law, Regulation and Environment.....	1 - 3
MAST 462-Climate Change: Policy, Equity and Mitigation.....	3
PHIL 448- Environmental Ethics.....	3
POSC 350-Politics and the Environment.....	3

GROUP VI: Physical Sciences Complete 10 credits from the following list:

CHEM 103/133- General Chemistry I/Lab.....	4
CHEM 104/134- General Chemistry II/Lab.....	4
GEOG 220/221- Meteorology/Meteorology Lab.....	4
GEOL 107- Geology of Dynamic Earth.....	3
GEOL 113-Earth Science.....	3
PHYS 133- Intro to Astronomy.....	3
PHYS 201/221-Intro Physics I/Lab.....	4
PHYS 202/222-Intro Physics II/Lab.....	4
PLSC 170-Soils and Sustainability.....	3
PLSC 204-Intro to Soil Science.....	3

Group V: Botany 7 credits between two electives

Elective I:

PLSC 101/104- Botany I/ Lab.....	4
PLSC 201- Botany II.....	4
PLSC 225-Wetlands.....	3
PLSC 334-Urban Forestry.....	3
PLSC 354-Plant Ecology.....	3

Elective II:

PLSC 211-Herbaceous Landscape Plants.....	3
PLSC 212-Woody Landscape Plants.....	4
PLSC 214-Indigenous Woody Plants of the Eastern United States.....	4

Electives:

Once required courses are completed additional credits must be taken to meet the minimum credit requirement for the degree.

Total credits.....120

MS+1 portion for both BS programs:

MAJOR: Insect and Wildlife Environmental Education

Undergraduate applicants will apply for undergraduate admissions through the Office of Admissions as is the case with other undergraduate programs. The University of Delaware's admissions requirements and selection criteria will be in force. Application and transfer into the +1 component of the program can occur after earning 60 credits (i.e., Junior standing) and a minimum cumulative GPA of 3.0. Applications are to be submitted via the SLATE system (see graduate admissions website at: <http://grad.udel.edu/apply/>). Applicants must fill out the Graduate Course Approval Form for 4+1 Admission Application (available at the graduate admissions website identified above) and submit it to the Graduate College once they apply through SLATE. There is no application fee to apply to the +1 component of the program. GRE scores and letters or recommendation are not required. Admissions decisions will be made by an

Admissions Committee, consisting of the Program Director (a faculty member in the Department of Entomology and Wildlife Ecology) and a faculty member from the School of Education that teaches in the program.

Required Core Courses

EDUC 641 Teaching Science in the Middle School	3
ENWC 642/EDUC 642 Insect and Wildlife Environmental Education Internship	9
ENWC 643/EDUC 643 Growing Young Naturalists	3
ENWC 656 Conservation Biology	3

Electives

Education Group

6 credits from the following: 6

EDUC 613 Adolescent Development and Educational Psychology	3
EDUC 614 Teaching Exceptional Adolescents	3
EDUC 619 Diversity in Secondary Education	3
EDUC 678 Special Topics in Education	3
SCEN 650 Scientific Inquiry for Current and Future Teachers	3

Taxonomy Group

3 credits from the following: 3

ENWC 606 Insect Taxonomy	4
ENWC 618 Ornithology	3
ENWC 624 Herpetology	3
ENWC 625 Mammalogy	3

Ecology and Conservation Group

3 credits from the following (Group 2 elective): 3

ENWC 616 Wildlife Habitat Management	3
ENWC 620 Behavioral ecology	3
ENWC 622 Landscape ecology	3
ENWC 623 Pollination biology	3
ENWC 626 Aquatic entomology	3
ENWC 628 Disease Ecology	3
ENWC 635 Population ecology	3

Total credits: 30

For BS/MS: Credits to total a minimum of 150

Recommended Course Sequence:

Undergraduate coursework: 6 credits

Taxonomy Group	3
Ecology and Conservation Group	3

Fall +1 – 12 credits

ENWC Conservation Biology	3
EDUC 641 Science Teaching in the Middle School Education Group	3 6

Spring +1 – 12 credits

ENWC 642 Insect and Wildlife Environmental Education Internship	9
ENWC/EDUC 643 Growing Young Naturalists	3

V. RESOURCES AVAILABLE

A. Learning Resources

The Entomology and Wildlife Ecology teaching laboratory will be available for students in the program. The adjacent prep room houses our faunal collections and field sample equipment, all of which will be available to students in the program. The library has excellent holdings (both books and periodicals) in insect ecology and conservation, wildlife ecology and conservation, and elementary education. The letter by Trevor Dawes, Vice Provost for Libraries and Museums and May Morris University Librarian, demonstrates that the library is well- positioned to service this proposed program (see Appendix B).

B. Faculty/administrative resources

We have adequate faculty in the Department of Entomology and Wildlife Ecology and the School of Education to cover the course work and administer the program. Dr. Deborah Delaney will be the Program Director. She, a faculty member from the Department of Entomology and Wildlife Ecology. Dr Delaney will oversee the program, organize and lead program-related meetings, and serve as the initial point of contact for program faculty and students. Dr. Danielle Ford, a faculty member for the School of Education, will be the point of contact for the School of Education. Programmatic meetings will be held at least semi-annually to discuss the curriculum, any course changes or other changes that might be needed to strengthen the program, review data, and establish a plan of action to address any plans for improvement and/or growth. The Program Director will report to the Chair of the Department of Entomology and Wildlife

Ecology. Personnel and programmatic change decisions regarding the program will be made by the Program Director, Chair of the Department Entomology and Wildlife Ecology, and the faculty of the Department Entomology and Wildlife Ecology, and in consultation with the School of Education. Administrative support for the program will come from the Department of Entomology and Wildlife Ecology administrative assistants, business administrator, and the Assistant Dean of Undergraduate, and Associate Dean of Research and Graduate Education within the College of Agriculture and Natural Resources.

C. External funding

There is no initial external funding for the program, although the Chair of the Department of Entomology and Wildlife Ecology will work with the Dean and College development officers to endow the program.

VI. Resources Required

A. Learning resources

No additional learning resources are necessary to implement the program.

B. Personnel resources

No additional personnel resources are necessary to implement the program.

C. Budgetary Needs

No additional budgetary resources are necessary to implement the program.

VII. Assessment

A. Assessment plan

The program will follow the policies and procedures and academic program review schedule as established by the Office of the Provost and Faculty Senate.

Educational Goals:

1. Develop age appropriate curricula focused on various fauna
2. Determine how to engage both live and virtual audiences with scientific content
3. Learn how to design effective learning assessments
4. Develop organizational skills for designing and implementing curricula that builds on scientific concepts
5. Takes responsibility for their learners' learning and uses ongoing analysis and reflection using current research, education, and policy to improve his/her planning and practice.

The students will complete an intense 9 credit hour internship with a partner (e.g., a state park) and develop an education program for that partner. The program will be jointly offered by the Department of Entomology and Wildlife Ecology and the School of Education, and housed in the Department of Entomology and Wildlife Ecology.

Measures:

Direct (for all 5): in ENWC 642 Insect and Wildlife Environmental Education Internship (course taken by all student in the final semester of the program), student will intern at an environmental education facility (e.g., a state park) and develop an educational program related to insect and wildlife ecology and conservation. The student will present the written curriculum for evaluation by the program director. The student will present the program to the intended audience and the program director will evaluate their performance. All components of the program will be graded using a rubric developed by the Program Director in consultation with the School of Education representative.

Indirect (for all 5): A reflective survey will be given to all graduating students (see Assessment Questionnaire). The survey will be administered at the end of the internship.

Along with the questionnaire, all graduates will be given a separate sheet asking about their plans following graduation, which may be anonymous if they so desire (see Post-graduation Plans).

Rubric for Insect and Wildlife Education Interns:

Professional Evaluation of Masters In Insect and Wildlife Education Interns– Evaluator Form

The University of Delaware (UD) professional education and entomology and wildlife ecology faculty and their organization-based partners have the responsibility of evaluating UD Masters in Insect and Wildlife Education interns’ effectiveness. We use a variety of instruments and methods to ensure our interns acquire the knowledge, skills necessary to be effective educators in indoor and outdoor classrooms.

Please complete all sections of the table below. Provide specific examples that support the evaluation. If there are areas in which the intern needs to improve, then describe specific details and outline the improvement plan.

Interns name: _____ Major: _____ Date of Meeting: _____

Name of individual completing the form: _____ Role (e.g., instructor, supervisor): _____

Intern’s advisor: _____ Credits completed: _____ Overall GPA: _____ (if applicable)

UD Dispositions

As an effective educator, the intern:	Rating:		Comments
	Rarely	1	
	Sometimes, but Not Consistently	2	
	Consistently	3	
	No behaviors related to this indicator observed	N/A	
1. Demonstrates commitment to the belief that all learners can achieve by persisting in helping each learner reach his/her full potential.			
2. Exhibits enthusiasm, initiative, and a positive attitude.			
3. Respects and considers the input and contributions of families, colleagues, and other professionals in understanding and supporting each learner’s development.			

4. Respects learners as individuals with differing personal and family backgrounds, and with varying skills, abilities, perspectives, talents, and interests; he/she is committed to using this information to plan effective instruction.		
5. Takes responsibility for his/her learners' learning and uses ongoing analysis and reflection using current research, education, and policy to improve his/her planning and practice.		
6. Reflects on constructive criticism and guidance, and appropriately modifies his/her behavior or practice.		
7. Demonstrates the ethical use of assessment and assessment data to identify learners' strengths and needs (e.g., shares learner data appropriately).		
8. Demonstrates professionalism by being on time; representing him/herself appropriately through dress, language and communications, including social media; and meeting deadlines.		
9. Uses correct-up-to-date scientific content that has been gleaned from reputed peer-reviewed sources.		
10. Does not show bias and presents scientific material objectively. Encourages students to critically engage in the material being presented.		

4. Area(s) for Improvement

5. Improvement Plan

6. If an evaluation meeting is held, indicate the outcome below.

- Intern does not need an improvement plan.
- Intern needs to fulfill an improvement plan.
- The program coordinator will consult with the department chair on the interns status in the program.

Signature, Evaluator

Date

Signature, Intern

Date

The interns signature indicates only that s/he has read the form, not that s/he agrees with the assessment of his/her performance. The interns signature does indicate a willingness to fulfill the improvement plan.

Senior Assessment Questionnaire

Department of Entomology and Wildlife Ecology

We ask that graduates in our programs take a few moments to answer the following questions, which will help us to assess whether we need to make adjustments in our course offerings and requirements in the future. Please circle the number that corresponds to your response to each of the statements below, and then answer the open-ended questions that follow.

Thanks very much for your help!

1. I am capable of synthesizing information about insect and wildlife into educational programs.

Strongly Agree

Strongly Disagree

1

2

3

4

5

What courses and/or other experiences during your time at UD helped the most in developing these capabilities?

Are there additional courses or experiences that would have been helpful?

2. I am capable of writing curricula for an education program.

Strongly Agree

Strongly Disagree

1

2

3

4

5

What courses and/or other experiences during your time at UD helped the most in developing your communication skills?

Are there additional courses or experiences that would have been helpful?

3. I am capable of orally presenting an educational program.

Strongly Agree

Strongly Disagree

1

2

3

4

5

What courses and/or other experiences during your time at UD helped the most in developing your knowledge in relevant areas?

Are there additional courses or experiences that would have been helpful?

Post-graduation Plans

Department of Entomology and Wildlife Ecology

Name (optional): _____

What are your plans following graduation?

VIII. APPENDICES (as appropriate and if not attached in Curriculog)

A. Accreditation Criteria (if appropriate)

B. Letters of Collaborative Agreement

C. Transfer / Retention Policy

D. Letters of Support from other Departments

E. Other Pertinent Documents