

GRADUATE STUDENT REQUIREMENTS AND POLICIES  
DEPARTMENT OF ENTOMOLOGY AND WILDLIFE ECOLOGY  
UNIVERSITY OF DELAWARE  
NEWARK, DELAWARE  
Effective September 2006

(Approved by the University Faculty Senate Graduate Studies Committee Jan 10, 2006)

The Department offers programs leading to the Master of Science (M.S.) and the Doctorate of Philosophy (Ph.D.) in Entomology and Applied Ecology and the Master of Science (M.S.) in Wildlife Ecology. Graduate students in these fields couple a focus on insects or vertebrates with a broad knowledge of other related fields of biology, especially ecology. Students in the M.S. degree program leading to a degree in Entomology and Applied Ecology must choose one of two concentrations (Entomology or Applied Ecology), which differ in their requirements. Each candidate's program is planned with the help of the advisor and graduate committee. The M.S. degree programs prepare students for pursuit of the Ph.D. and careers in entomology, wildlife ecology, and other biological disciplines. The M.S. in Entomology, in place since 1949, was changed to M.S. in Entomology and Applied Ecology in 1999, and concentrations were added in 2001. The Ph.D. degree program received 4- year Provisional Status effective September 1, 1999. The department modified its name in 2003, replacing "Applied" with "Wildlife" to accommodate the undergraduate program in Wildlife Conservation. The M.S. in Wildlife Ecology was added in 2004.

## **ADMISSION REQUIREMENTS**

Minimum requirements for admission to the master's and doctoral degree programs are an undergraduate academic index of 2.8 overall and 3.0 in the major field of study and a combined score of 1050 on the verbal and quantitative portions of the GRE. Graduate GPA (if applicable) should be at least 3.2. A paper-based TOEFL score of at least 550 (or 213 computer-based) is required for international students. The Advanced GRE in Biology is required with a minimum score of 580 for Ph.D. applicants, and it is strongly recommended for M.S. applicants. Scores are used for making course program recommendations and as additional information for awarding graduate assistantships.

Applicants for either M.S. degree program must indicate choice of major and the concentration if they plan to major in Entomology and Applied Ecology. At any time before or after admission, an applicant or a student may request to change concentration or major. If the change is granted, all pertinent application and degree requirements of the new program will apply. An applicant should have passed courses in introductory biology and general ecology. Students lacking any of these courses must complete them within the first year of graduate study with a grade of B or better. Additionally, M.S. applicants for the Wildlife Ecology major should have made substantial progress towards completion of the educational requirements for certification as an Associate Wildlife Biologist with The Wildlife Society (refer to The Wildlife Society website for a complete listing of requirements <http://www.wildlife.org/>).

Applicants for all degree programs must submit one official transcript of all previous college records, provide a statement of objectives and interests, and have three recommendation forms completed by appropriate mentors and submitted to the University Office of Graduate Studies. At least two of these should be from faculty of the applicant's major department. The statement of interests should include the specialty area(s) within the program and possible faculty member(s) with which the

applicant would like to work. Applicants for the Ph.D. degree are strongly encouraged to submit additional evidential material that attests to the applicant's ability to carry out and benefit from doctoral work. This material can include Master's theses, term papers, research reports, grant proposals, publications, evidence of teaching or professional work experience, etc. Ph.D. applicants must also identify a faculty member with whom they would like to conduct their research, and that person must agree to act as the student's advisor before the applicant will be accepted into the program. For most applicants, completion of an M.S. degree is required before admission to the doctoral program. However, exceptionally well-qualified students may be admitted directly to the Ph.D. degree program.

Admission to the graduate program is selective and competitive based on the number of well-qualified applicants and the limits of available faculty and facilities. Those who meet stated minimum requirements are not guaranteed admission, nor are those who fail to meet all of the requirements necessarily precluded from admission if they offer other appropriate strengths. Application for fellowship, tuition scholarship, or assistantship financial aid is a part of the admission application form and is made at the time of application. Applications being considered for financial support should be completed by February 1 for summer or fall terms and November 1 for entering in spring term. For further details, contact the chairperson of the department's Graduate Admissions Committee.

### **M.S. STUDENTS WHO PLAN TO CONTINUE IN THE PH.D. PROGRAM**

While it is possible to go directly to the Ph.D. program, the Department Faculty prefers that students complete the M.S. degree before being admitted or reclassified into the doctoral degree program in Entomology and Applied Ecology. Students already matriculated in the M.S. Program in Entomology and Applied Ecology or Wildlife Ecology and who plan to go on for the doctoral degree may, at an appropriate time, request reclassification to the Ph.D. program as a pre-candidate in lieu of reapplying for graduate study. The department Graduate Admissions Committee will review the request using the same criteria applied to all applicants to the Ph.D. program. Materials to submit with the request should include score for Advanced GRE in Biology, any updated information since the M.S. application (such as new GRE general test scores), three new letters of recommendation (one should be from the M.S. major professor), and written material resulting from the M.S. research completed to date. Requests should be submitted to the department Graduate Program Director in one of the following ways: 1) if sought before completing the master's degree, submit a letter of request for reclassification to the Ph.D. program; 2) if sought at the time of submitting the Application for Advanced Degree for the master's degree (last semester of M.S. program), check the appropriate box on the form indicating that you plan to continue in the doctoral degree program and submit a letter of request for reclassification; 3) if sought after completing the M.S., submit a new application with fee to the Office of Graduate Studies. Requests under the conditions for items 1 and 2 should include a graduate studies change of classification form. If the department does not approve the request for reclassification from the M.S. program to the Ph.D. program, the M.S. degree will be considered the terminal degree for the candidate.

### **GRADUATE COMMITTEE**

Before an applicant is admitted to a program, a regular faculty member from the department must agree to serve as the major academic advisor for the student's committee. An adjunct faculty member or limited term researcher can serve as the major research co-advisor with the major academic advisor. The student (in consultation with the advisor) will form a graduate committee by the end of the

first term. The composition of the graduate committee must be approved by the Department Chair and should be confirmed by memo from the advisor to the student with copies to the student's file and to committee members. The student may request in writing to the Department Chair that changes be made in the graduate committee at a later date. A committee meeting should be held as soon as possible to help plan the student's programs of course work and research. Additionally, for the Wildlife Ecology major, the committee has responsibility to determine that the student has completed course requirements for certification as an Associate Wildlife Biologist with The Wildlife Society.

The graduate committee for the M.S. should consist of the student's advisor, one other faculty member from inside the Department, and one expert from outside the Department. The graduate committee for the Ph.D. should consist of the major advisor and one other faculty member representing the student's primary area of study; one faculty member from within the department but from an area outside of the student's primary area of study; and one external member. The three primary committee members from the department must be full-time members of the faculty. The external member can be from another academic unit at the University of Delaware or from outside the institution. The external member should have an established record of publication in the field of the dissertation. Other members may be included on committees for either degree, up to a maximum of six. The Department Chair is an *ex officio* member of all committees and must be notified of all committee meetings. The committee should represent the areas of emphasis of the student's intended program and research. All members of the Ph.D. committee should hold the doctorate or an equivalent terminal degree.

Maintenance of steady, reasonable progress toward the degree is the responsibility of the student and the advisor. Regular meetings with the graduate committee to discuss progress are strongly encouraged and are required at least once each year. The department maintains a checklist to record completion of individual requirements for graduate study. Each student is expected to see the graduate program secretary periodically to update his or her progress. Any shortcomings in progress will be communicated in writing by the major advisor to the student and to the Office of Graduate Studies.

## **MASTER OF SCIENCE REQUIREMENTS**

General requirements for both M.S. majors are: (1) completion of at least 30 graduate credit hours, including a thesis describing independent research (6 credit hours); (2) passing an oral, general knowledge examination centering on the student's program of study; (3) presenting the thesis research in a formal departmental seminar; and (4) passing a thesis defense. Students in the Entomology Concentration for the Entomology and Applied Ecology Major also must pass an Insect Family Recognition Test (see later section).

### *A. Credit, Course, and Grade Requirements*

If a student has satisfactorily completed any of the required courses or an equivalent, the requirement may be waived.

#### Core M.S. Degree Courses

ENWC 814 – Advanced Ecology	(3 CH)
ENWC 870 – Graduate Research Seminar	(0 CH)*

ENWC 888 - Topics in Entomology & Applied Ecology	(0 CH)*
ENWC 869 - Master's Thesis	(6 CH)**
A graduate-level statistics course (Excluding data management courses such as FREC 674)	(3 CH)

\* Students are expected to attend all department seminars and graduate student presentations throughout their period of graduate study.

\*\* See sect. B, below

### Additional Courses required by the Programs

#### Entomology and Applied Ecology Major

##### Entomology Concentration

ENWC 605 - Insect Structure & Function	(4 CH)
ENWC 606 – Insect ID – Taxonomy	(3 CH)

##### Applied Ecology Concentration

BISC 637 – Population Ecology	(3 CH)
One of the following:	
ENWC 620 – Behavioral Ecology	(3 CH)
ENWC 655 – Conservation Genetics	(3 CH)
ENWC 615 – Wildlife Research Techniques	(3 CH)
Two of the following:	
ENWC 606 – Insect ID – Taxonomy	(3 CH)
OR	
ENWC 608 – Insect Field Taxonomy	(3 CH)
ENWC 618 – Avian Biology	(3 CH)
ENWC 624 – Herpetology	(3 CH)
ENWC 625 – Mammalogy	(3 CH)
BISC 630 – Ichthyology	(3 CH)
OR	
MAST 629 – Topics in Marine Ecology: Ichthyology	(3 CH)

#### Wildlife Ecology Major

Graduate-level ENWC courses	(7 CH)*
Coursework sufficient to meet the educational requirements for certification as an Associate Wildlife Biologist with The Wildlife Society (refer to The Wildlife Society website for a complete listing of requirements <a href="http://www.wildlife.org/">http://www.wildlife.org/</a> )**	

\* Courses taken for graduate credit to complete the educational requirements for certification by the Wildlife Society may count toward the 30 graduate credit hours necessary for graduation. If these courses are from courses offered by the Department of Entomology and Wildlife Ecology, they may also count toward the additional 7 credit hours.

*\*\* Determination of completion of sufficient coursework is made by the graduate committee (See Graduate Committee above)*

Additional Coursework (all M.S. programs) – Students must earn additional graduate credit hours appropriate to the major or concentration to bring the total earned to at least 30 hours. A maximum of 3 credits in ENWC 666, 668, 866, and 868 and 6 credits of 869 can be applied to the degree. A list of the additional credit hours should be developed at the first committee meeting and confirmed in writing to the student by the advisor. Students may also be required by their committee to take coursework to make up a deficiency or to meet a prerequisite for a graduate level course. Any such requirements will be stated in writing by the student's advisor following the first committee meeting. If the course can be taken for graduate credit, it will count toward the additional credits. Students in the Entomology Concentration lacking an undergraduate entomology course should register as a listener in ENWC 205 and/or 305 as needed and may earn one graduate credit to the satisfaction of the instructor(s) of the course(s).

Grade Requirements - Graduate students must maintain a minimum GPA of 3.00 to remain in good academic standing. GPA requirements are monitored by the Office of Graduate Studies according to the Graduate Studies Academic Probation Policy.

#### *B. Thesis Requirement*

By the end of the first year (preferably within the first 6 months) of graduate study, candidates must submit to their committee for review and approval, a written research proposal describing the intended thesis research, a detailed review of pertinent literature, the methods and procedures to be used, and a timetable for completion. The proposal may be reviewed and refined as necessary. If major emphasis is shifted in the research, the proposal should be amended with the advice and consent of the committee. Students are required to present their proposal in ENWC 870 (Graduate Research Seminar) to the department.

The thesis should reflect the student's ability to conduct independent scholarly research and to report the results in a manner worthy of publication. It must conform to the University's Thesis and Dissertation Manual (available on the University web site under graduate student academic policies) as to format and other mechanics. Students may write the thesis in a style suitable for a manuscript(s) ready for submission to a journal in consultation with their advisor.

The student may register for Master's Thesis (ENWC 869) during any term or terms to accumulate the required minimum of 6 credit hours. The student will receive a temporary grade of S or U until successful completion of the thesis, when the advisor will record a letter grade.

#### *C. Insect Recognition Test (Required for Entomology Concentration only)*

The Insect Recognition Test examines the student's ability to recognize the insect orders and 150 common insect families without the use of keys. A list of the families, which may be included on the test, is available in the department office. Students also must demonstrate an ability to use a taxonomic key. A faculty member appointed by the Department Chair administers the test, which

is scheduled at the request of the student. A score of 85% is the minimum passing score. The test may be taken three times. The Insect Recognition requirement will be waived for any student who receives an A in ENWC 406/606, Insect ID -Taxonomy.

#### *D. General Knowledge Examination*

The General Knowledge Examination should be taken during the semester prior to the expected date of completing other requirements for the degree. The exam focuses on the student's training in his or her concentration and related areas. The principal examiners will be the student's graduate committee. Any University of Delaware faculty may attend and ask questions if time permits. No other student may attend the examination. Decisions concerning passage of the examination and recommendations stemming from it are decided by the committee based on a simple majority vote. If the first attempt results in failure, the second examination cannot be taken earlier than 90 days nor later than 365 days following the first examination. The examination may be taken only twice. A second failure results in dismissal from the program. The examination shall be announced by the student's advisor at least one week in advance by memorandum to department faculty.

#### *E. Department Seminar*

A formal, public seminar detailing the student's research effort is required. The seminar should be of standard format and should utilize appropriate visual aids. Most seminars run 30-45 minutes with time for questions following the presentation. The student and advisor are responsible for arranging the details of the seminar presentation, including its announcement by the usual seminar notices at least one week in advance.

#### *F. Thesis Defense*

The Thesis Defense is conducted by the student's committee using the same procedures as the General Knowledge Examination. The student must provide each graduate committee member with a refined (but not final) draft of the thesis at least two weeks before the thesis defense. The date of the thesis defense should precede the University deadline for thesis submission by at least two weeks to allow sufficient time for any necessary changes. The Thesis Defense is usually scheduled directly after the student's Department Seminar (see 5). The Seminar, including audience questions, will not constitute a thesis defense. The Thesis Defense is open to all University of Delaware faculty members. No other students may attend the Thesis Defense.

The defense shall be announced at least one week in advance by the distribution of a seminar notice (see 5), which shall indicate that the defense will follow the seminar, or by memorandum to department faculty and by the posting of a notice in the Department.

### **DOCTOR OF PHILOSOPHY REQUIREMENTS**

#### *A. Course Requirements*

The degree of Doctor of Philosophy is conferred in recognition of breadth of scholarly attainment and of demonstrated power to investigate problems independently and effectively, rather than for the completion of definite courses of study through a stated period of time. Doctoral students in Entomology and Applied Ecology must complete the following courses or their equivalent, either before or during their program at Delaware: ENWC 605 (Structure and Function), ENWC 606 (Insect ID-Taxonomy), ENWC 814 (Advanced Ecology), ENWC 870 (Graduate Research Seminar), ENWC 888 (Topics in Entomology and Applied Ecology), 6 credits of graduate statistics (600-level or above) and 9 credits of Doctoral Dissertation (ENWC 969). Doctoral students entering the program with an M.S. must complete a total of at least 30 graduate credits, and students entering with a B.S. must complete a total of at least 60 graduate credits while enrolled in the program.

Through their course of study, doctoral students should develop significant expertise in one major area and in at least one ancillary area. During the first semester of study, students should develop a proposed list of courses that they will complete while at Delaware. This course program should then be discussed, modified, and approved by the student's graduate committee.

### *B. Research Proposal*

By the end of the first year of graduate study, candidates must develop a preliminary research proposal describing the intended dissertation research. This preliminary proposal must be presented orally in a forum open to all members of the department. The student must complete ENWC 870, Graduate Research Seminar, to satisfy this requirement.

Doctoral students must also submit a written research proposal and have it accepted by their graduate committee. This proposal should include a detailed review of pertinent literature, justification for conducting the research, methods and procedures to be used, and a timetable for completion. Preliminary research results may also be included. The proposal should be submitted within 3 months of the oral proposal, and must be presented at a meeting of the student's graduate committee. The proposal will be reviewed and refined as necessary, based on the committee's input. If major emphasis is shifted during the course of the research, the proposal should be amended with the advice and consent of the committee.

### *C. Qualifying Examination*

Doctoral students must prove to their graduate committee that they have acquired a comprehensive grasp of their field of study through a qualifying examination (written and oral) before they are admitted to formal Ph.D. candidacy. This examination should generally occur by the end of the second year of study. The examination shall include questions to evaluate basic competence in biology, ecology, and statistics as well as advanced knowledge in the designated major and ancillary areas. The examination areas, examiners for each of the areas, and pertinent review materials will be identified by the committee and communicated in writing by the major advisor to the student no later than the end of the second semester. In administering the examination, each member of the student's committee will submit written questions to be answered by the student in writing, under conditions to be established by the committee. Each committee member will read and grade the student's responses to their own written questions, prior to the oral portion of the exam. The oral portion will follow approximately 2 weeks after the end of the written portion, and will be conducted by the student's graduate committee.

Decisions concerning passage of the examination and recommendations stemming from it are decided by the committee based on a simple majority vote. If the first attempt results in failure, the second examination cannot be taken earlier than 90 days nor later than 365 days following the first examination. The examination may be taken only twice. A second failure results in dismissal from the program. In the case of a second failure, a student has the option of completing all requirements for the Master of Science degree in either concentration provided that he or she does not already have that degree.

#### *D. Admission to Candidacy*

When they begin their program, all Ph.D. students are classified as pre-candidates (G1 status). The requirements for admission to doctoral candidacy (G2 status) are that the student has (1) had a program of study approved, (2) completed at least one academic year of full-time graduate study in residence at the University, (3) had a research project accepted by the graduate committee, and (4) passed the program's qualifying examination. The advisor must submit the recommendation for candidacy form to the Office of Graduate Studies.

#### *E. Teaching Requirement*

Doctoral candidates must provide evidence of a significant teaching experience during their program, for example by acting as a TA in charge of a laboratory section during an entire semester, by developing and delivering lectures and/or preparing laboratories for one module in an established course, or by developing and presenting a series of Extension workshops. This experience should be developed by the candidate in conjunction with the committee and its completion verified by a letter from the instructor of the course to the advisor with a copy to the Department Chair. The advisor should notify the Graduate Office when this requirement has been satisfied.

#### *F. Conference Presentation*

Doctoral candidates must make at least one presentation of a research paper at a regional or national conference during their program. Verification should be by letter from the advisor to the Department Chair, with a copy to the Graduate Office.

#### *G. Dissertation and Final Oral Examination*

After they have been formally admitted to candidacy, students must register for and complete nine credit hours of ENWC 969 (Doctoral Dissertation). Note that at this point the composition of the committee may be changed to more closely reflect the specific subject matter of the dissertation, as long as the committee still consists of four to six members with a minimum of two from within and one from outside the Department. The dissertation must present original research and must meet the generally accepted professional and literary standards for scholarship in the student's field. It must also adhere to the style requirements of the University of Delaware. Students are encouraged to write the dissertation in a style suitable for one or more (usually 2-3) manuscripts ready for submission to an appropriate journal. Upon completion, the dissertation must be presented in a formal, public seminar, followed by a final oral examination, consisting of a defense of the dissertation and a test of the candidate's mastery of the fields covered in the program. The final oral examination is conducted by the student's graduate committee, and is open to all University of Delaware faculty members. To permit adequate time for the



committee to review the dissertation, all copies of the tentatively completed dissertation (subject to revisions required by the committee) must be delivered to committee members at least two weeks before the date of the final oral examination. The advisor must submit certification of a successful defense to the Office of Graduate Studies.

#### H. *Annual Evaluations*

Each doctoral student will be formally evaluated at the end of each academic year by the student's graduate committee. This written evaluation will provide students with detailed feedback on their progress toward the degree. The written evaluation will be part of the student's official record, and a copy must be submitted to the Department Chair.

### **FINANCIAL SUPPORT**

#### A. *Assistantships and Fellowships*

Graduate students in good standing may receive financial support from a research assistantship, teaching assistantship or fellowship. Graduate students on an assistantship or fellowship are expected to give their full-time attention to graduate study and may not engage in any remunerative employment while holding the assistantship or fellowship.

1. Research Assistantships – Students work on faculty projects for 20 hours per week. An attempt is made to match faculty and student interests, but students should consider this an opportunity to develop competencies in new areas, if interests do not match. Assignments are made by the Chair, subject to the approval of the faculty member(s) directing the research project.
2. Teaching Assistantships – Students assist in teaching undergraduate and/or graduate courses. Students may be expected to prepare and grade examinations under the supervision of the instructor, handle routine class administrative procedures, counsel and tutor individual students where necessary, and possibly conduct classes. In some cases, time is split between two or more courses, but in no case will the total workload exceed 20 hours per week. Students should view this as an opportunity to enhance their knowledge and to develop teaching skills at the college level. Assignments are made by the Chair, after consultation with faculty member(s) in charge of the course(s). Teaching Assistantships may be available in the Department of Entomology & Wildlife Ecology and in the Department of Biological Sciences.
3. Fellowships – Department, College, or University Fellowships are usually reserved for students in the advanced stages of their graduate careers to support thesis and dissertation research and writing. Awards are recommended by the faculty and the Department Graduate Studies Committee and are made by the Chair.

#### B. *Procedure for Nominating and Awarding Assistantships*

1. Application for fellowships, assistantships and scholarships – Students wishing to be considered for nomination for a fellowship or assistantship should so indicate on their application form for admission. Nominees must have a cumulative grade index of at least 2.8 (in undergraduate courses) for incoming

students, or 3.0(in graduate courses) for continuing students. Fellowships, assistantships, and scholarships become available at various times during the year. Students should inquire of the Department Chair concerning their availability.

2. Award of assistantships -- Graduate research assistantships, teaching assistantships and fellowships are awarded to qualified students by the Department. When possible, announcement of graduate research assistantship awards will be made by April 1 for fall semester and by November 1 for the spring semester. Students entering in the fall may begin working and receiving research assistantships in summer months. Other awards will be made by June 1 for the fall semester and Dec. 1 for the spring semester, when possible.

3. Retention of assistantships -- Awardees hold assistantships for one year. Assistantships will be reviewed by the end of April of the first year and evaluated for renewal. The review and evaluation for renewal of assistantships will be conducted by the Department Chair and the student's advisor. Review and evaluation of teaching assistantships should include input from the entire teaching staff. The Department Chair will initiate the review.

## **RESIDENCY AND TIME LIMITS**

The University requires that the master's degree be completed within ten consecutive semesters. The doctoral degree must be completed within ten consecutive semesters for students admitted with a Master's degree and within fourteen consecutive semesters for students admitted without it. Full-time study is strongly encouraged. Students who can devote full time to their program should earn the master's degree within two to two and a half years, and the doctorate within three to four years. Students in the doctoral degree program must spend at least one continuous academic year in full-time study in the program.

## **EFFECTIVE DATE AND NOTIFICATION OF STUDENTS**

The requirements and guidelines stated herein are in effect for students entering graduate status as of September 1, 2006. They shall apply to current students to the extent that they do not cause undue hardship.

All students applying for admission should receive this set of guidelines and information. Faculty advisors should be sure that each of their graduate student advisees has a copy of and is aware of these requirements. Copies are available in the department office. Students are responsible for being familiar with the University of Delaware Academic Regulations for Graduate Students published in the Graduate Catalog.

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