

Ecology, Evolution and Behavior

Graduate Program Handbook

<http://www.cbs.umn.edu/eeb/graduateprogram/>

DIRECTOR OF GRADUATE STUDIES

Dr. Andrew Simons

asimons@umn.edu

116 Ecology Bldg.

DIRECTOR OF GRADUATE ADMISSIONS

Dr. Sharon Jansa

jansa003@umn.edu

114 Ecology Bldg.

GRADUATE PROGRAM OFFICE

Lisa Wiggins, Program Assistant

wiggins@umn.edu

100 Ecology Bldg.

1987 Upper Buford Circle

St. Paul, MN 55108

612/624-6770



UNIVERSITY OF MINNESOTA

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GENERAL INFORMATION

Graduate students are admitted to the Graduate School of the University of Minnesota after review of applications by the faculty of the major field named by applicants. Each major field in the Graduate School constitutes a Graduate Program, such as the Ecology, Evolution and Behavior (EEB) Graduate Program, and the faculty members of a Program are often drawn from more than one academic department. The Graduate School issues a Graduate School Catalogue (GSC) that lists the majors and degrees offered by the Graduate School. It is available online (<http://www.catalogs.umn.edu/grad>) and provides the following details of each of the graduate programs: the faculty members, degrees offered, prerequisites for admission, requirements for degrees, and the graduate courses offered. The graduate faculty of a program is responsible to the Dean of the Graduate School for the education and training of graduate students in the program. A Director of Graduate Study (DGS) for each program administers the program and is a liaison with appropriate departments and colleges.

Academic departments, such as the Department of Ecology, Evolution and Behavior (EEB), are administrative units of the University. Departments are organized into academic colleges; for example, EEB is one of the departments within the College of Biological Sciences. Colleges and their constituent departments are responsible for undergraduate education, for most of the instructional budget, and for the management of space and facilities. The University of Minnesota issues an Undergraduate Catalogue (<http://www.catalogs.umn.edu/ug/>) that gives details of its undergraduate programs.

The Graduate Student Handbook (issued by the Graduate School online at http://www.grad.umn.edu/current_students/handbook/) is a useful compilation of information and policies that affect all graduate students at the University. The Graduate School maintains an excellent web site (<http://www.grad.umn.edu/>) that explains the policies and the rules of the Graduate School. It has links to all the forms that need to be filed with the Graduate School for

Master's and Ph.D. degree programs. The EEB Graduate Student Handbook (issued by the EEB Graduate Program) is a compilation of information and policies that are specific to the EEB Graduate Program.

1. Office and Laboratory Space

Incoming graduate students in the EEB Program are assigned office and laboratory space, as required, by the head of the department in which the temporary advisor resides. Keys are issued by the department office responsible for the space. To foster a sense of community among EEB graduate students, the Department of EEB provides space if available for students whose advisors have offices and labs in the Ecology building. When ever possible, graduate students will be assigned offices close to their advisor's office or lab. Graduate student offices are intended to provide graduate students with a quiet place on campus where they can work, study, and meet with students from classes they teach. Most students share their offices with other students so it is important that all students be considerate and respectful of their officemates to maintain an effective working environment. Graduate students are not permitted to use graduate student offices as storage sites for personal possessions such as clothing, furniture, or other household items. Therefore, neither the department nor the graduate program is responsible for the security of items left in offices and neither the department nor the graduate program will secure, package, or ship any possessions left in an office after a graduate student has vacated the space, or the term of use has ended. Any items left in an office after a student moves away for research purposes, becomes inactive or on leave of absence, or graduates will be discarded or donated to charity, unless a prior agreement with the DGS/graduate program is made. Graduate students may be billed for expenses incurred clearing out personal possessions stored in graduate offices.

2. Orientation of New Students

The Graduate School offers a Graduate Student Orientation program before classes start (August 24 – August 25, 2009), and new students should take advantage of the program to learn about facilities throughout the University. Incoming students will receive a brochure from the Graduate School with the orientation schedule. For further information go to <http://www.ofyp.umn.edu/gradstudents/index.html>.

The DGS of the EEB program will hold a general orientation before classes start to inform incoming students of program requirements and procedures. At this time, The DGS of the EEB program will also meet individually with all incoming graduate students before they first register for classes to inform each student of program requirements and procedures that are specific to the student, and to aid the student with choosing courses.

Incoming students will have an opportunity to meet faculty members and current graduate students of the EEB program and to become acquainted with their research interests during a retreat held early in the Fall semester. During the retreat, graduate students give brief reports on their research, and faculty and graduate students talk informally with new students about research and other aspects of graduate education.

As a new student, you should introduce yourself to faculty members and students you have not yet met and inquire about research and classroom opportunities. During your first year of study, you are encouraged to arrange with one or more faculty members for independent study. This might take the form of a tutorial in which you read and critique selected research papers, or it might involve experience in laboratory or field techniques or a short research problem. You may register for and obtain credit for these activities (through EEB 8991, or 8994) and become familiar with the way a faculty member approaches problems without commitment to pursue the research or the area further. Seminars provide another way to learn more about the interests of the faculty and their current students.

3. Seminars

The Department of EEB sponsors a weekly seminar series during the academic year, usually on Wednesday afternoons. These are on topics of general interest to faculty and students and often are presented by visiting scientists. All faculty and graduate students in residence are expected to attend these, except in cases of conflict with courses or teaching duties. EEB students will receive one credit per semester for attending the weekly EEB seminars by registering for the appropriate section of EEB 8990.

A second informal seminar series, which normally meets at noon on Fridays, is organized by graduate students in the department. It offers members of the department, especially current graduate students, an opportunity to present informally aspects of their work or relevant experiences. Seminars and colloquia also are offered regularly by other departments, and you should check bulletin boards and e-mail for seminar announcements of interest to you.

Study seminars for credit are offered by faculty members singly or jointly from semester to semester on special topics. These are an excellent way to explore a subject in depth or learn of current research in an area. You are encouraged to participate in these. You may obtain credit by registering for the appropriate EEB 8xxx number, with the instructor's permission. If you are interested in a particular topic, you may explore the possibility of organizing a seminar around it by consulting with faculty.

4. Committees

The Graduate and Professional Student Assembly (GAPSA, <http://www.gapsa.umn.edu/about/index.htm>) represents all graduate students. The GAPSA advocates for your interests, from curriculum changes to dining services. They organize activities and also run a grant program (<http://www.gapsa.umn.edu/grants/index.htm>). EEB graduate students are represented via the University Council of Graduate Students (COGS, <http://www.cogs.umn.edu/>).

Representatives for EEB are elected by all EEB graduate students in the Fall of each year for the following responsibilities:

- EEB faculty meetings: Two EEB graduate student representatives (plus one alternate)

- University Council of Graduate Students (COGS): One representative

In the beginning of each fall semester, all EEB graduate students meet to elect the EEB graduate student president and assign graduate students to serve on the following departmental committees:

- Policy and Review Council (two representatives)
- AV Crew for Seminar Speakers (4-5 representatives)
- TA Liaison (two representatives)
- Ethics and Aesthetics Committee (three representatives)
- Friday Noon Seminar (five representatives)
- Student Grievances (one representative)
- Social Committee (three representatives)

5. Grievance Procedures

Disputes and complaints about your academic life should be brought first to your faculty advisor, the DGS, or the Department Head. One of these people may be able to settle the grievance by informal arbitration. If not, it is their responsibility to direct you to sources of help within the University or to formal grievance procedures

(<http://www.catalogs.umn.edu/grad/gen/grievance.html>).

6. Safety Requirements

LIABILITY IN THE FIELD

Minnesota law requires that each boat carries one U.S. Coast Guard-approved life jacket per person. Persons working from open boats or rafts should wear life jackets at all times.

Private automobiles may not be used to transport groups of students on class field trips, as no insurance coverage is provided by the University. Students who own their own cars may provide their own transportation, with instructor approval, as they will be covered by their own insurance policies. University of Minnesota vehicles are covered by University insurance.

CBS ALL-COLLEGE SAFETY and HAZARDOUS CHEMICAL TRAINING

All persons working with hazardous chemicals are required to have initial training and annual retraining in their safe use and disposal.

Initial training can be completed online at:

http://www.dehs.umn.edu/training_newlabsafety.htm Complete all three modules. These sessions are comprehensive but must be followed by a training session on the specific hazards used in each individual lab. Lab-specific information that each laboratory worker needs to know

includes which chemicals are used in that lab, where the fire extinguishers are kept, what the standard operating procedures are, and who is responsible for hazardous waste disposal.

To help ensure compliance with annual retraining, the College of Biological Sciences offers college-wide training sessions each fall semester. The sessions will review all safety aspects but will concentrate on changes in policies and procedures. Alternatively, annual retraining can occur in the regular, scheduled meetings of lab groups but it is suggested that the person doing the training attend the College's training first to hear about the new issues and policies. The trainer can then pass on this information in annual retraining sessions to others in the lab.

The college-sponsored training does not substitute for laboratory-specific training which should also occur on a regular basis. This college-wide training does not cover specific training for use of radioisotopes, infectious agents, or blood-borne pathogens.

For questions on the the College-wide training, contact David Okita, College Safety Officer, at 624-7107 or okita001@umn.edu

Additional safety training specifically for teaching assistants who have responsibility for teaching laboratories is also offered at the beginning of each semester. For questions call Jane Phillips, Coordinator of CBS Instructional Labs, at 624-2789 or janep@umn.edu

TRANSITION TO SEMESTERS

In Fall 1999 the University switched from the quarter to the semester system. Graduate students who registered in the Graduate School for the first time prior to Fall 1999 and did not complete their degree prior to Fall 1999 ("transition students") may choose to complete their degree program under either quarter- or semester-based requirements. All transition students in the program are urged to review their current degree program, and to determine what changes, if any, are necessary to fulfill the program. If you listed a course on your program that was offered under quarters and you have not taken the course already, make sure that the course is still offered under semesters. Semester hours are converted to quarter hours by multiplying by 3/2. If you already filed your degree program and changes are necessary, you must file a Graduate School Petition form available online at http://www.grad.umn.edu/current_students/forms/g59.pdf

This Guide only lists requirements under the semester system.

REGISTRATION INFORMATION

1. Class schedules are available online at <http://onestop.umn.edu/> under Quick Links. If you are registering for the first time in the Graduate School, see your temporary advisor and the DGS before classes start. Returning graduate students should meet with their advisory committee to discuss the schedule for the upcoming semester. Registration is available either online (<http://onestop.umn.edu/onestop/registration.html>) or in person at the One Stop Student Services Center (130 Coffey or 200 Fraser). Instructions are in the class schedule and a tutorial is available online. Courses open to undergraduates (primarily at the 4000 level or below) that require departmental or instructor approval must be processed through CBS Student Services, 223 Snyder Hall. Graduate level seminars (EEB 8980, EEB 8990) and Directed Studies/Research (EEB 8991, EEB 8994) are processed by the EEB Graduate Program Secretary in 100 Ecology.

If you failed to file your degree program or Thesis Proposal with the Graduate School on time, or if you have too many incomplete courses on your record, or if your progress is unsatisfactory, a hold may be placed on your registration, and you must take the appropriate action to clear it. See the class schedule for further information and contact the DGS.

2. You are required to register *every* Fall and Spring semester to maintain active status. If you do not, you are considered to have withdrawn, and you must seek re-admission to the Graduate School in order to resume work toward a degree, or take examinations, or file for graduation (see http://www.grad.umn.edu/current_students/registration/readmission.html). To get re-admitted, you need to pay a re-application fee to the Graduate School (currently \$75).

The Graduate School has three registration options: active, full-time, or full-time equivalent. Full-time status is defined as 6 or more credits per semester. Students who are either Teaching or Research Assistants, or have loans to defer, or are on a foreign visa, or live in student housing must maintain full-time status (some fellowships also require full-time status). Full-time equivalent status (FTE) is designed for Advanced Master's and Doctoral candidates who have completed all their program coursework and required thesis credits (normally by the end of the Fall semester of their fourth year for Ph.D. students and by the end of their second year for Master's students), but are working full-time on the research or writing of their thesis. This option provides one-credit and is a cost savings for departments. Under special circumstances, Master's and Doctoral candidates who are not advanced students can register for fewer than six credits and be considered full-time status if "Special Graduate Assistant Registration" has been approved by the DGS. If a student solely needs to register to meet the Graduate School registration requirements and does not plan on taking any courses, a student can register for GRAD 0999 to maintain active status. This option provides a zero-credit, no-tuition registration mechanism and students in this category do not pay student services fees. This option is not available to international students who must be registered full-time every semester, or for students who are funded by the University

The EEB Department requires advanced Master's and Doctoral students whose tuition is paid through EEB departmental sources to register for the FTE one-credit option. Students in this category do not have to pay student services fees. However, they cannot take courses for credit during a semester where they register using the FTE options. If a student in this category still needs to take courses for credit, the student cannot register for this one-credit FTE option and must obtain prior approval of the DGS to register as a full time student (6-14 credits). Master's students should register for EEB 8333 and Ph.D. students for EEB 8444. You need to complete

an application form each term you register for EEB 8333 or EEB 8444 (see: http://www.grad.umn.edu/current_students/registration/FTE_procedures.html).

3. The University creates Internet accounts for all incoming students. Your account will not be usable until you "initiate" it by defining a password. Your Internet account gives you 50 hours per month of modem access, as well as 50MB of file space on a University server and 20MB which can be used for a personal Web Page (see: <http://www1.umn.edu/adcs/info/accounts.html>). Current students may download and use Symantec Antivirus on one personal computer. CD's of Symantec Antivirus are also available for \$6.00, but again, can only be used on one personal computer per current student (see: <http://www1.umn.edu/adcs/software/security>).

4. Your e-mail inbox will remain active for a minimum of three semesters after the last term you were registered. See <http://www1.umn.edu/adcs/info/graduate.html> for more information.

PROGRAM PROCEDURES

1. Advising

On arrival, all new students must meet individually with the Director of Graduate Studies (DGS), who will review the general requirements of the program with you, help you choose a temporary advisor (if you have not identified one already), and help you plan registration for the first term. This meeting will take place during the new student orientation. All new students must meet with their temporary advisor before classes start to decide on the course work (including prerequisites) for the first semester. After the first few weeks, but not later than one month after your first term started, you and your temporary advisor should choose two other faculty members to make up your three-person temporary advisory committee. Two members of your advisory committee should be in fields related to your primary interest. The third member's research interests should differ somewhat from yours, in order to add some breadth to your committee. Your temporary advisor is the chair of this committee.

Students must arrange a meeting of their temporary advisory committee early during their first term to help develop a plan of study for the first year. This meeting must occur no later than the end of the second month of the term, i.e., October 31 for those starting in the fall. You must initiate this meeting, contact the members of the committee, and find a time when they can get together. A report detailing the discussed topics and recommendations must be written, reviewed by you and your advisor, and placed in your file not later than one week after the meeting (obtain the Student Advisory Committee form from the EEB Graduate Program Secretary or go to Appendix 6). You should meet with your temporary advisor regularly during the first year to ensure progress in both your course work and your research. Whenever problems or questions arise during the year, you should feel free to consult with your temporary advisor and the

members of your advisory committee individually. You must meet with your temporary advisory committee at least once more during the first year to discuss your progress, your research plan (if you are a Ph.D. student or a Master's degree Plan A student) or project plan (if you are a Master's degree Plan B student), and any changes in your proposed course work. Beginning students are particularly encouraged to interact with other students and faculty outside of their committee to discuss research/project plans.

After you are acquainted with the graduate faculty and with research opportunities in the program, but no later than the end of your second semester, you should select a degree advisor. Your degree advisor may or may not be the same person as your temporary advisor, and you should not feel uncomfortable about changing advisors during your first year. Your degree advisor takes over the tasks of the temporary advisor. In addition, the degree advisor helps you shape your research project (for a Master's Plan A or Ph.D. degree), helps you find funds to support your research, and is your primary source of guidance during the remainder of your progress toward the degree. Most students arrange weekly meetings with their degree advisor.

Together with your degree advisor, you should choose a new advisory committee, if changes from your temporary advisory committee seem desirable. The advisory committee for Ph.D. students consists of four members, three representing the major (EEB) and one representing the minor or supporting field. The advisory committee for M.S. students consists of three members, two representing the major (EEB) and one representing the minor or supporting field. The member representing the minor or supporting program needs to be from a budgetary unit other than EEB. Your advisor must represent the major and must be a member of the EEB graduate faculty. All other members must hold graduate faculty status in a program at the University of Minnesota or special permission must be sought from the Graduate School (ask the DGS how to do this). You should first determine the willingness of each member to serve on your committee before you make any changes or additions and discuss with them their advising philosophy and determine whether theirs matches yours. You should meet with your committee to review your degree program and your research/project plans including funding, no later than the beginning of your second year to ensure satisfactory progress on the preliminary written exam (for Ph.D. students), or thesis (for Master's degree Plan A students), or projects (for Master's degree Plan B students). You can change members of your advisory committee, including your degree advisor, at any time to reflect, for instance, significant changes in research direction. After you submit your degree program, however, any changes must be communicated to the DGS who will contact the Graduate School.

Returning students must arrange a meeting of their advisory committee at least once a year. It is important that you inform your advisory committee of your research or project plans in these meetings. Ph.D. students who have not passed their preliminary oral examination and Master's students must submit a report on their progress written by their committee no later than one week after each meeting (obtain the Student Advisory Committee form from the EEB Graduate Program Secretary or go to Appendix 6).

Ph.D. students interested in an academic career are expected to have published scientific papers by the time they graduate. Often, your first papers are written jointly with your degree advisor while you are a graduate student. To avoid misunderstandings, you should discuss with your

degree advisor what role you are expected to play in any studies that might result in scientific publications, including authorship of scientific papers based on your thesis or dissertation and any other research in which you participate. Another issue is ownership of, and access to, data that you produce during your research. Many of our graduate students contribute to and/or use existing data sets. Clarify ownership of the data you produce with your advisor. This is particularly important if your research is sponsored by extramural grants or if you contribute data to an existing data set. If you use someone else's data for your data, obtain prior written permission for the intended use and make sure you keep the person whose data you use informed about the progress of your research, in particular if there are any changes in research objectives.

2. Prerequisites

Students entering the EEB program have diverse academic backgrounds, as admission to the program is based more on evidence of the originality and scholarship of applicants than on their specific coursework. However, competence in certain foundation disciplines—chemistry, physics, mathematics, and biology—is considered necessary for significant contributions to fields as complex as ecology, behavior, evolution, and organismal biology. Students should review their undergraduate training critically with their temporary advisory committee in the first meeting in the beginning of their first semester (bring copies of academic transcripts to the first advisory committee meeting), and they should plan to gain competence in any of the areas they are lacking. Ordinarily, students become competent in foundation areas by taking courses either before entering the program or during the first year of graduate study. It is strongly recommended (though not required) that incoming graduate students have completed undergraduate-level course work in inorganic chemistry, organic chemistry, general physics (to include at least knowledge of Newtonian mechanics, sound, light, thermal physics, and electricity), a year of calculus, courses that cover at least two of the areas of plant, animal, and microbial biology (beyond an introductory biology course), biochemistry, genetics, and physiology (microbial, plant, or animal). Before the beginning of the first term, the temporary advisor and the DGS will determine in which areas the student is lacking and devise a preliminary plan of action for the first semester to fill any gaps. The final decision of which gaps a student needs to fill should be based on the student's research interest and is made by the advisory committee in consultation with the DGS. Gaps can be filled by taking the appropriate undergraduate level courses, or by doing independent reading of material supervised by an appropriate faculty member, or other ways deemed appropriate by the advisory committee. (It is not required by the program that the student fills all gaps.) The final plan of action must be put in place during the first advisory committee meeting. Students must complete any prerequisites needed for their research by the end of their first year. The final plan must be submitted to the DGS on the Student Advisory Committee form. Revisions to this plan must be agreed upon by the advisory committee of the student and submitted in writing to the DGS.

3. Graduate Coursework

The EEB Graduate Faculty wishes to maximize time available for creative, independent research and for an individualized course program by minimizing course requirements for all graduate students. Together with their advisory committees, students should design their program of

research, tutorials, and formal courses to meet their present and anticipated needs. The faculty expects competence beyond the typical undergraduate level in the following areas:

1) *Quantitative skills*. The continuing development of quantitative methods of data analysis and of mathematical theory and modeling in ecology, evolution, and behavior necessitates a strong background in mathematics and statistics for all scientists in those fields. All students are expected to have competence in basic statistics, to include hypothesis testing, regression, and correlation. An advanced course in statistics relevant to a student's thesis is required for the Ph.D., such as STAT 5021 (for students with little statistical experience), STAT 5302 (for students who need regression tools for large observational data sets), or STAT 5303 (for students who need to learn about experimental design). The School of Statistics maintains a web page (<http://www.stat.umn.edu/Courses/RelatedCourses.html>) of courses with statistical content or related to statistics.

Familiarity with some mathematical modeling to be able to read more theoretical papers and the use of computers to be able to perform data analysis or simulations is expected of all students, though no formal courses are required.

2) *Field or laboratory experience*¹. Students need to acquire experience in collecting and analyzing data for studies in ecology, evolution, or behavior. This requirement can be fulfilled, for instance, by taking a field course at a field station, such as the Lake Itasca Forestry and Biological Station or the Organization for Tropical Studies in Costa Rica, or by an independent field or laboratory research experience of equivalent effort and duration. Students whose thesis research project has a significant field or laboratory component automatically satisfy this requirement.

3) *History and philosophy of science*. Ph.D. students should gain an appreciation of these areas through a course, seminar, or independent study. Courses or seminars that can fulfill this requirement are, for instance, EEB 3361, Phil 3601W, Phil 4105W, Phil 4607, HSci 3242, HSci 3244, HSci 3815, HSci 5211, HSci 5242, HSci 5244, Rhet 8520 (The Rhetoric of Biodiversity; Worldviews and Ecology). If you wish to take courses not listed here, obtain permission from the DGS. An appropriate course taken in a different degree program (for instance, an undergraduate degree program) can be used to satisfy this requirement (obtain approval from the DGS). If a course or seminar is audited to fulfill the requirement, a written statement of the instructor of the course is required to testify that the student attended and participated in the course or seminar. Instead of taking a course or a seminar, a student can design an independent study consisting of appropriate readings guided by an EEB faculty member; a written report should be submitted to the supervising faculty member and the DGS in the form of a review paper on a topic related to the readings. Books that are recommended include "Scientific Method for Ecological Research"

¹ For students who entered before Fall 2002, requirement (2) reads: "Field experience. At least one field course at a field station is required of all students. Courses at the Lake Itasca Forestry and Biological Station offer training in field research and bring students into contact with graduate students from other universities as well as with visiting faculty from leading graduate programs in ecology and behavior. Field courses offered by the Organization for Tropical Studies in Costa Rica are also highly recommended. A student who has had extensive field experience may petition, with the recommendation of the student's advisory committee, for waiver of the field course requirement."

by David Ford or “Modeling Nature – Episodes in the History of Population Ecology” by Sharon E. Kingsland. If a student plans to do an independent study, the study should talk to the DGS and have the reading list approved prior to undertaking the study.

4) *EEB courses*. Ph.D. students, as preparation for their preliminary examinations, are expected to acquire basic knowledge in ecology, evolution, behavior, and organismal biology (see Appendix 1 for a list of current courses to satisfy this requirement). Students who entered in Fall 1998 or later are required to take at least one course in each of these areas with any one of them done at the advanced undergraduate level. One of the four areas can be covered by a graduate seminar or reading course of equivalent effort and duration. At most one of the four courses/seminars can be substituted by a course taken prior to entering the EEB Graduate Program (obtain approval from the DGS). The Graduate School does differentiate between 4000 and 5000 level courses. 4000 level courses may be applied to a Graduate School degree under special circumstances and with approval of the student's major field. Consult your advisory committee for recommendations of specific courses that will best meet your needs in these areas. Courses that are not listed in Appendix 1 need to be approved by the DGS.

Exceptions to the requirements stated above may be permitted by the DGS in special cases. A petition should be submitted to the DGS, stating the reasons for the exception and approved by all members of the student's advisory committee.

4. Foreign Language

Proficiency in a foreign language is not required of graduate students for admission to the graduate program in EEB. However, students who expect to do research in a country, where English is not the native language are strongly advised and may be required by their advisory committee to acquire proficiency in the language of that country. Fellowships for learning a foreign language are available (see <http://igs.cla.umn.edu/grad/fundflas.html>)

5. Teaching

As a minimum, Ph.D. students are required to teach the equivalent of two semesters (at 1/2 time) during their course of study. Many students serve as a teaching assistant in General Biology (commonly Biol 1001 or 1009) during their second year. General Biology provides excellent training for Teaching Assistants. For those who anticipate teaching at the college or university level, additional teaching experience is recommended, and several courses in teaching methods are available. For Ph.D. students who plan a career as a faculty in a college or university, the Center for Teaching and Learning Services offers courses on “Preparing Future Faculty” (PFF). These courses will assist you in developing your teaching skills and inform you about the role of faculty in colleges and universities. These courses are not required by the EEB program, but many students have found them useful. For further information, visit the web site at <http://www1.umn.edu/ohr/teachlearn/pff/>.

6. Research

Research experience at some time during the first year is expected of all graduate students working for the Plan A Master's or the Ph.D. degree. Students working for the Plan B Master's degree are encouraged but not required to participate in independent research.

Ph.D. students must begin their own research early in their program. It is strongly recommended to lay the preliminary groundwork during the first year and to initiate some research during the first summer after admission to the program (or, if feasible, during the summer before the first year in graduate school). Research plans usually begin to crystallize during the second year, and research must be well under way by the end of the second year.

7. Ethics in Research

In response to the requirements of federal granting agencies, the Graduate School requires that all graduate students receive training in ethics. To meet this requirement, the program has developed a four-session ethics seminar that is offered during the Friday noon seminar series. Students should complete all four sessions before the end of their second year. Attendance at the seminars will be taken, and the DGS must certify that a student has met the requirement before graduation.

8. Annual Review of Graduate Students

Each year during Spring semester, the graduate faculty reviews the progress of each of its graduate students. The DGS will solicit input and comments from both students and the students' advisors, summarize the progress of each student in the program during the meeting, and point out places where improvement is desirable, including the timely completion of requirements. Each student will be informed by the DGS in writing after the meeting about the discussion and the student's progress. If a student's progress is considered unsatisfactory by the faculty, the student will be given encouragement and opportunity to improve and be informed about potential consequences if progress continues to be unsatisfactory.

REQUIREMENTS FOR THE MASTER'S DEGREE

If you are working toward a Master's degree, you should decide on an area of research or concentration during your first year and choose a degree advisor ("permanent" advisor) suitable to that area. You should take time to become well acquainted with the faculty and to explore potential research opportunities before selecting an advisor. When you have selected a degree advisor and confirmed that person's willingness to advise you, inform both the chairperson of your temporary advisory committee and the Director of Graduate Studies. Your degree advisor now becomes the chair of your advisory committee. You must have a degree advisor and an advisory committee by the end of your first year.

1. The Master's Degree Program

An official degree program is a list of the coursework that you submit to the Graduate School as the basis for your degree. The **Degree Program Form** is available online at http://www.grad.umn.edu/current_students/forms/g89a.pdf. By the time you have completed approximately 10 credits (and no later than by the end of your second semester), you need to file with the Graduate School an official degree program. On the program form, list only graduate courses (4000, 5000 and 8000-level courses) that you have taken or intend to take to complete your degree. Consult <http://www.catalogs.umn.edu/grad/gen/masters.html>, for details, including the transfer of courses from other graduate schools. Briefly, a minimum of 30 semester credits of graduate courses (4000, 5000, and 8000-level) is required for a Master's degree. At least six of these must be in related fields outside the EEB major (for example, courses in statistics). Alternatively, if you choose to specialize in a minor field outside of EEB, at least six semester credits in that field are required. Note that at least two-thirds of the course credits included on your degree program must be taken A-F and at least 60% of the coursework must be taken while registered as a University of Minnesota graduate student, transfer coursework may make up the remaining 40%. Once approved by the Graduate School, you must fulfill the degree program in every detail. Changes to the degree program can be made at any time with approval of your advisor, your advisory committee, and the DGS. Changes need to be petitioned to the Graduate School by submitting a petition form to the Graduate School available at http://www.grad.umn.edu/current_students/forms/g59.pdf.

When you file your Master's degree program with the Graduate School your final examining committee will be appointed. This ordinarily will consist of your degree advisor, one of the other members of your advisory committee, and a third faculty member from your minor or related fields as specified on your degree program. Consult with your advisor to decide on the members of the examining committee, and consult with the potential members beforehand to gain their consent and to acquaint them with your program and research plans. The members of your examining committee now serve as your advisory committee until you have completed your degree.

Submit the completed program with recommendations for the examining committee (see the back of the program form for detailed instructions) to the DGS, together with a current transcript. If you are taking a minor, the DGS of the minor field must also approve the program. The DGS of EEB will check to be sure you are meeting all requirements of the program. Then, forward your program to the Graduate School.

2. Master's Plan A

The Plan A Master's degree program includes the writing of a research thesis. At least 14 credits of courses in your major and 6 credits of courses in a supporting field or minor must be included in the 30-credit minimum; 10 thesis credits (EEB 8777) compose the remainder of the 30-credit minimum. Courses with substantial EEB content offered in other departments may be used with the approval of your advisory committee and the DGS to satisfy course requirements in your major.

Students submitting a Master's degree program under Plan A must present a public pre-thesis seminar to the faculty and graduate students of the program. The pre-thesis seminar is intended to inform others of your research interests and to elicit constructive suggestions and advice that may help you carry out the research for the Master's thesis. You must present this seminar no later than the end of your second semester so that you can incorporate worthwhile suggestions into your research plan. The seminar must be presented on campus during normal working hours. In particular, the members of your advisory committee must attend. It is your responsibility to find a time satisfactory to your advisory committee. Please give an announcement of title, time, and place to the department office one week in advance for distribution to faculty and students. Your presentation should be planned for no more than one-half hour to allow time for discussion and questions. After successful completion of the pre-thesis seminar, submit the pre-thesis seminar form (available from the EEB Graduate Program Secretary or go to Appendix 7) to the DGS.

Consult <http://www.catalogs.umn.edu/grad/gen/masters.html> for information about preparing the thesis, having it reviewed and approved by your examining committee, and scheduling your final oral examination. Students in the EEB Program are expected to present the results of their thesis in a public seminar of not more than 45 minutes. Ordinarily the public presentation is followed immediately by the oral examination, in private with your examining committee. Please inform the department office of the time, place, and title of your presentation one week in advance.

Once the degree program has been approved by the Graduate School and the thesis is ready to go to the reviewers, you can request a **Graduation Packet** from the Graduate School (online at http://www.grad.umn.edu/current_students/forms/grad_packet/masters/confirm.html or in person at 316 Johnston Hall). Submit the **Application for Degree Form** (included in the Graduation Packet) to the Registrar's office by the first working day of the intended month of graduation. You will receive a **Thesis Reviewer's Report Form** that needs to be signed and submitted prior to the final examination. This form generates the **Final Examination Report Form** (sent to your committee chair by the Graduate School after the Graduate School received the signed Thesis Reviewer's Report form). Remember to leave your committee enough time to read your thesis (at least two weeks). After your thesis defense and the final oral examination, submit the signed Final Examination Report form and two unbound copies of your thesis to the Graduate School (they must be submitted no later than by the last working day of the intended month of graduation).

3. Master's Plan B

The Plan B Master's degree program requires at least 14 credits of courses in your major in the 30-credit minimum, plus the minimum six credits of related fields for a minor. The remainder of the 30 credits is chosen by agreement between the student, the advisor, and the other members of the advisory committee.

Students submitting a Master's degree program under Plan B must complete one to three written reports of projects involving together about 120 hours of independent work. You should discuss your choice of projects with your advisory committee and obtain their approval at the time you file your Master's degree program, and at any later time when you may wish to change. A project

may be a short field or laboratory research problem or review of primary literature. A project may have been part of the requirements of a course in your degree program or it may be independent of any course. The written reports must meet accepted standards for scientific publication. You must present the report or reports to your Master's examining committee for their review at least two weeks before your final oral examination.

Once the degree program is approved by the Graduate School, you can obtain the Final Examination Report form and the **Graduation Packet** from the Graduate School (online at http://www.grad.umn.edu/current_students/forms/grad_packet/masters/confirm.html or in person at 316 Johnston Hall). Submit the **Application for Degree Form** (included in the Graduation Packet) to the Registrar's office by the first working day of the intended month of graduation. After the final oral examination, submit the signed **Final Examination Report Form** to the Graduate School (due by the last working day of the intended month of graduation). The final oral examination is based primarily on the courses on your degree program and on your Plan B projects. Consult <http://www.catalogs.umn.edu/grad/gen/masters.html> for details about arranging the final oral examination.

4. Suggested Schedule for Master's Students

The following schedule is presented as a general guideline for progress in the EEB Program. It is not an absolute schedule that you must follow precisely, but deviations will be cause for concern about your progress. Students who have not filed their official degree program by the end of their third semester, or who have not completed the requirements for the degree by the end of their third year, will be considered to be making inadequate progress under normal circumstances. (See also Appendix 3 for a list of milestones.)

YEAR 1

- Before Fall term: Meet with temporary advisor and DGS to plan courses for first term and to check prerequisites.
- Fall term:
 - EEB Retreat
 - Meet with temporary advisor and advisory committee, finalize list of prerequisite courses and plan course work.
 - Take courses and try some directed study or seminars or research problems.
 - Begin planning research (Plan A) and projects (Plan B).
- Spring term:
 - Choose a degree advisor and advisory committee.
 - Meet with your advisory committee and file your degree program.
 - Take courses and try some directed study or seminars or research problems.
 - If you are a Plan A Master's candidate, give your pre-thesis seminar, which presents your research ideas and plans.
- Summer:
 - Perform research to test ideas and techniques (Plan A) or work on projects (Plan B).
 - Think about attending one or both sessions at the Itasca Field Station (Plan B).

YEAR 2

- Fall term
 - Call a meeting of your advisory committee to discuss your progress.
 - Complete course work for your Master's program.
- Spring term (and possibly Fall term of Year 3)
 - Register for the one-credit option if you have completed your course work (Plan A and B) and thesis credits (Plan A only).
 - Complete your thesis (Plan A) or projects (Plan B).
 - Schedule your final oral examination.
 - Check the GSC for deadlines (examination, submission of thesis, forms, and fees).

5. Graduation

Pick up a graduation packet from the Graduate School any time after the degree program is approved by the Graduate School. If you wish to attend a commencement ceremony, you must submit a [Commencement Attendance Approval form](#), signed by the DGS, well in advance

REQUIREMENTS FOR THE PH.D. DEGREE

If you are working toward a Ph.D. degree, you should decide on an area of research during your first year and choose a degree advisor ("permanent" advisor) and possibly a co-advisor suitable to that area. You should take time to become well acquainted with the faculty and to explore potential research opportunities before selecting an advisor. When you have selected a degree advisor and confirmed that person's willingness to advise you, inform both the chairperson of your temporary advisory committee and the Director of Graduate Studies. Your degree advisor now becomes the chair of your advisory committee. You must have a degree advisor and an advisory committee by the end of your first year.

1. The Ph.D. Degree Program

The degree program is a list of the coursework that you have taken and expect to take as the basis for your degree (<http://www.catalogs.umn.edu/grad/gen/phd.html>). The **Degree Program Form** is available online at http://www.grad.umn.edu/Current_Students/forms/g89a.pdf. It must be approved by your advisor and your advisory committee, signed by your advisor and the DGS of the EEB Program (and the minor program if you choose to have a minor), and submitted to the Graduate School no later than the end of your third semester in the program. On the

program form, list only graduate courses (4000, 5000 and 8000-level courses) that you have taken or intend to take to complete your degree. The Graduate School requires a minimum of 3 course credits and 24 thesis credits (EEB 8888) in the major, and a minimum of 12 semester credits, either as a declared minor or as a supporting program drawn from two or more fields that complement the major. You need not list all courses you have taken or plan to take but you must include the 24 thesis credits. Note that at least two-thirds of all course credits listed must be taken A-F. Transfer of graduate credit is not allowed for courses taken before the awarding of a baccalaureate degree. Graduate credits earned at other recognized graduate institutions may be applied to doctoral degrees if the coursework is graduate level and was taught by faculty authorized to teach graduate courses. Any transfer credits need to be approved by the DGS of the EEB program. Once the degree program is approved by the Graduate School, you must fulfill it in every detail. You can change the degree program at any time with approval of your advisor, your committee, and the DGS. Changes to the degree program need to be petitioned to the Graduate School by submitting a petition form available online at http://www.grad.umn.edu/current_students/forms/g59.pdf .

Your preliminary oral examining committee is appointed by the Graduate School based on recommendations you and your advisor submit with your Ph.D. degree program. The committee is chaired by your degree advisor and includes, at minimum, two other members of the EEB graduate faculty and one faculty member from the minor or supporting program. It is your responsibility to consult the prospective members of your examining committee and solicit their willingness to serve in that capacity before you bring the program to the DGS. Once approved by the Graduate School, the members of your examining committee serve also as your advisory committee.

Submit the completed program, with recommendations for the members of your examining committee, to the DGS of the EEB program, together with a current transcript of the courses that appear on it and with the *Checklist for Course Requirements in the Ph.D. Program* (Appendix 4). If you are declaring a minor, the DGS of that program must approve and sign your program before you obtain the EEB DGS signature. The EEB DGS will confirm that you are meeting all requirements of the program. After you obtained all signatures, forward the Degree Program form to the Graduate School.

Ph.D. students are required to enroll for a minimum of 24 thesis credits. They may not register for thesis credits until the semester after they have passed the preliminary oral examination. EEB students are required to register for as many thesis credits as possible each semester (i.e., 14 credits minus the number of course credits taken during the semester) until they complete the minimum number credits. After they have taken 24 thesis credits, students are required to enroll for the one-credit FTE option if their tuition is paid through EEB departmental sources. Exceptions to this rule must be approved by the DGS.

2. Journal Club and Laboratory Tours

All new students working toward the Ph.D. degree are expected to register for the Journal Club seminar (EEB 8980, 1 cr.) and attend the weekly meetings, during their first three semesters in residence. The goal of the Journal Club is to facilitate exploration of major issues in the three

foundation areas, ecology, evolution and behavior to promote interdisciplinarity, and to identify important topics that are currently neglected, problems that are resistant to solution, and important new developments. Each semester the journal club is directed by an EEB faculty member representing one of the three foundation areas. The faculty member assigns the readings for the semester and is available, on student request, to discuss and clarify issues associated with the readings. During the Fall term, first and second year students meet together. If the two cohorts are too large, they may split into two groups such that members of each cohort and of the three core areas are represented in both groups, or the two cohorts may meet separately..

All new students are expected to register for the Laboratory Tour seminar (EEB 8980, 1 credit) during their first year. The goal of the Laboratory Tour seminar is to acquaint incoming students with the research of EEB graduate faculty, their postdocs and current graduate students. Faculty members will conduct lab tours in their laboratory and/or inform students about their research. This seminar will be organized by the DGS or a faculty member designated by the DGS.

3. Preliminary Written Examination

No later than the end of the fourth semester, students will submit to the program, through the DGS, a research proposal that describes the intended research for the Ph.D. dissertation in no more than eight pages, excluding references and the abstract (of no more than 200 words) and the budget. For further details see Appendix 2.

The students must register for the proposal writing class (EEB 8980 – “2nd Year Proposal Writing Seminar”, 1 credit) during the Fall semester of their second year (typically their third semester). The purpose of this class is to learn about the structure and format of a research proposal under the guidance of three faculty members representing the fields of Ecology, Evolution and Behavior. This class will prepare the students for writing their written preliminary exam the following semester.

Students must register for a proposal writing workshop (EEB 8980 – “Written Prelim Workshop”, 1 credit) during the Spring semester of their second year (typically their fourth semester). The purpose of this workshop is to provide a time for students to meet and discuss issues associated with writing their written preliminary exam. At the beginning of the semester, the DGS will provide an overview of the requirements of the written preliminary exam including the evaluation process. Students are expected to turn in a minimum of two drafts during this semester. Drafts will be read and reviewed by students’ peers. The final proposal must be finished and submitted as the preliminary written exam to the DGS by the end of the semester. Students who are not in residence during the Spring semester of their second year (for instance, students who are participating in OTS courses) are expected to submit their preliminary written exam by the end of the following Fall semester.

The preliminary written examination is a learning process and its form stresses the importance of clearly articulating ideas and of writing grant proposals as part of an academic career. Advisors are expected to give their students advice about writing proposals as well as about the specifics of the proposed research, and students are strongly encouraged to share their research proposals with their advisor and their advisory committee, obtain feedback during the proposal writing

process, and discuss their ideas with other faculty as well. The advisor should aid the student in the planning and organization of the proposal. The concepts, content, and writing of the proposal must be the student's own effort, however.

Because the preliminary written examination must be completed by the end of the fourth semester in residence, a student is not expected to write a proposal that would be competitive in, for instance, an NSF competition for the Doctoral Dissertation Improvement Grant. This proposal should rather be viewed as a significant step in formulating the student's research questions and developing methods for carrying out the research. The proposal should contain an overview of the student's entire research program for the thesis, clearly formulated hypotheses, preliminary results from new research as can be expected of a second year student, and proposed research. Methods for the proposed research need only be developed to the extent as can be expected of a second year student.

Proposals are reviewed critically by a panel of faculty, such that each proposal is read by no fewer than three faculty. Advisors are not permitted to evaluate papers of their own advisees. Other members of a student's advisory or examining committees may be reviewers, but at least one member of the panel must be from outside the student's committee. Students may submit a list of possible reviewers who have some knowledge of their field to the DGS, and the DGS will designate the panel after reviewing the student's suggestions. Reviewers are asked to grade both the project and the proposal. The project is either graded PASS or FAIL. If the reviewer grades the project as PASS, the reviewer must grade the proposal as PASS WITH COMMENDATION, PASS, or CONDITIONAL PASS. In addition, the reviewers are asked to rate the proposal from 1 (EXCELLENT) to 5 (UNSATISFACTORY). The purpose of the rating is to inform the student of the comparative strength of the proposal if submitted to a funding agency (see below). Details on the requirements of the preliminary written examination are explained in the *The Preliminary Written Examination* (see Appendix 2).

Rating System:

1=Excellent: The proposal describes exciting and novel research questions that are extremely likely to enhance the conceptual understanding of the student's area. The methods are likely to be successful. The proposal can be made into a highly competitive proposal.

2=Very good: The proposal describes novel research questions that are likely to enhance the conceptual understanding of the student's area. The methods are likely to be successful. The proposal can be made into a very competitive proposal.

3=Good: The proposal describes interesting research questions that are likely to contribute to the student's area. The methods are likely to be successful. The proposal can be made into a competitive proposal.

4=Satisfactory: The proposal describes research questions and methods that are not sufficiently developed. The questions, however, appear to be interesting and should be pursued.

5=Unsatisfactory: The proposal describes research questions that have major shortcomings.

The DGS will report the results to the graduate faculty with a recommendation for action. In the case of a passing vote by the graduate faculty, the DGS will notify the Graduate School that you have passed the preliminary written examination by submitting the **Preliminary Written**

Examination Form. In the case of a failing vote by the graduate faculty, the graduate faculty may decide either that the student may rewrite and re-submit the proposal, or that the student be transferred into the Master's program, or that the student be terminated (see Appendix 2 for further details). After passing the preliminary written examination, the student is eligible to take the preliminary oral examination.

The DGS will pass on to the student the comments and suggestions for improvement made by the panel. The student should use the comments and suggestions for improving the research questions and methods. The student is expected to revise the proposal according to the reviewers' suggestions and develop the proposal further in the ensuing months so that it can eventually be submitted to a funding agency, such as the NSF or NIH. (Note that the proposal cannot be submitted to the NSF Doctoral Dissertation Improvement Grant program until the student has filed the degree program, and passed both the preliminary written and oral exams, in that order).

During the academic year, the student should be informed of the results no later than four weeks after submitting the proposal; delays during the summer may occur if either the reviewers or the DGS are absent, or if a faculty meeting is required to determine the result of the exam.

4. Pre-Thesis Seminar²

The Ph.D. pre-thesis seminar is to be given before the preliminary oral examination. It can be given on the same day as the preliminary oral examination. It must be given publicly, announced one week in advance, and open to all in the program. The Friday noon seminar often serves a place for pre-thesis seminars. The pre-thesis seminar is intended to inform others of your research interests and to elicit constructive suggestions and advice that may help you carry out the research for the Ph.D. thesis. Your advisory committee must be present at the pre-thesis seminar. It is your responsibility to find a time satisfactory to your advisory committee. At the conclusion of the public seminar, you should meet with members of your advisory committee, either together or separately, to get additional input. You need to submit a pre-thesis seminar form to the DGS after you successfully completed the seminar (obtain the form from the EEB Graduate Program Secretary or go to Appendix 7).

5. Preliminary Oral Examination³

² For students entering the EEB Graduate Program before Fall 2002, (4) reads as follows: "The Ph.D. pre-thesis seminar is to be given before the end of your third Fall Semester in residence (effective 6 October 1999), while you are planning your research proposal. It should be given publicly to everyone, be well announced, and open to all in the program. It has the same function as the Master's pre-thesis seminar described in an earlier section. Follow the procedures given there. At the conclusion of the public seminar, you should meet with members of your advisory committee, either together or separately, to get additional input."

³ For students entering the Ph.D. program before Fall 2002, the previous paragraph reads as follows: "The preliminary oral examination should ordinarily be taken in the spring of your third year, after your research proposal has been approved and the Graduate School has been notified that you have therefore passed the preliminary written examination."

The preliminary oral examination must be taken no later than your fifth semester in residence (typically in the Fall semester of your third year), after the pre-thesis seminar and at least one week after the Graduate School received the Preliminary Written Examination Report form that informs the Graduate School that you passed the preliminary written examination. Schedule the preliminary oral examination with the Graduate School at least one week in advance of the exam. This form is available on http://www.grad.umn.edu/current_students/forms/gsl2.pdf . Scheduling the exam will generate the **Preliminary Oral Examination Report Form**, which will be sent to the chair of the examining committee.

The Graduate School requires that you submit the signed Preliminary Oral Examination Report Form within one working day of completion of the preliminary oral examination.

The purpose of the preliminary oral examination is to test your ability to synthesize and apply the knowledge represented by the coursework on your Ph.D. degree program, to reason out scientific problems, and to argue current hypotheses and opinions in your area of expertise. The exam includes material from your minor or supporting program. It may touch on your research proposal or may concentrate on the courses on your Ph.D. degree program and any work fundamental to subjects related to your research. You are encouraged to discuss the format and conduct of the exam beforehand with your advisor and the other members of your examining committee, and you may find it helpful to stage mock examinations with other graduate students.

6. Ph.D. Thesis Proposal

Submit the **Thesis Proposal Form** (available at http://www.grad.umn.edu/Current_Students/forms/GS63A.PDF) after passing the preliminary oral examination, but no later than one term following your passing the preliminary oral examination. The Thesis Proposal Form consists of three forms, the Thesis/Project Proposal Transmittal form, the Thesis/Project Proposal Title form, and the Thesis/Project Proposal form.

Submit the Thesis Proposal Form to the DGS together with the names of your final oral examining committee. Your final examining committee may be the same as your preliminary oral committee, or you may substitute one or more members based on their ability to evaluate your research. The committee again must consist of at least three members of the EEB graduate faculty plus one member from outside that faculty, representing your minor or supporting program. The outside member must be from a budgetary unit other than EEB and must represent a graduate program other than EEB. Designate three members, your advisor and one other from the major and one from the minor or supporting program, as reviewers. The chair of the final oral committee will be a member other than your advisor.

Because research commonly opens new opportunities and meets unanticipated difficulties as it proceeds, you should not feel unduly restricted by the thesis proposal once it is approved, but it is your responsibility to keep the members of your committee informed of any changes in the direction or emphasis of your research and departures from your original plan as they occur.

Anytime after the Ph.D. Thesis Proposal has been approved by the Graduate School, you can request a **Graduation Packet** from the Graduate School (online at http://www.grad.umn.edu/current_students/forms/grad_packet/doctoral/confirm.html or in person at 316 Johnston Hall).

7. Preparation of Thesis

Your dissertation must pass three checkpoints. First, the advisor must be satisfied; second, the thesis reviewers on the examining committee must certify that it is ready for defense; finally, it must be approved by vote of the examining committee at the final oral examination.

Satisfying your advisor. Theses vary greatly in form, length, and content, and advisors have different ways of providing critiques and giving advice. Often, a thesis has several major parts and these mature in sequence. Students should expect to have to revise their early drafts, usually several times, in response to constructive criticisms from their advisor. Only the most experienced writers can expect their first drafts to be approved without considerable rearrangement and editing. For many graduate students, writing up their thesis proves to be an especially exciting and satisfying phase of research, when relationships finally become clear and compelling. Students should actively seek rigorous criticism at this stage and not be dismayed by it. By providing thorough, thoughtful critiques advisors play an especially important role in assuring that a thesis matures. Students, many of whom will be advisors themselves some day, must learn how to edit and polish manuscripts. Consult with your advisor and committee in deciding on a style or styles for your thesis. Obtain instructions from the Graduate School about the preparation of the doctoral thesis and follow them.

Your advisor may encourage you to write your dissertation in the form of several papers, as chapters, ready for publication. Indeed, portions of your dissertation may already be published before the entire thesis is completed. If you follow this style, you should write an integrating introduction and a final overall discussion. A thesis generally has one central theme, and you are expected to show that all parts are related to this theme. If a portion of your thesis is being published with one or more authors besides yourself, describe in the introduction the parts both you and your co-authors had in that portion.

Students routinely underestimate the amount of time needed for reworking early thesis drafts. By setting for yourself deadline dates when each phase of thesis preparation is to be completed (e.g. data analysis, tables and figures, writing, literature review for each section) you can monitor your progress. Most students have an approximate final deadline date in mind when they begin work on the thesis, and later they may find that they must finish it by a certain date. It is the student's responsibility to prepare thesis drafts early enough to allow time for revisions that the advisor may consider essential.

Satisfying readers. A thesis should be presented to the reviewers and other members of your committee in a polished form, without major typographical errors, paginated, in final organizational format, and with at least semi-final figures. Do not expect reviewers to respond in

less than two weeks. The Graduate School suggests that you give them two weeks advance notice of when to expect to receive the thesis, as well as two weeks to review it. It is not unusual for reviewers to require or suggest revision before they agree to certify that the thesis is ready for defense, and time should be budgeted to permit this. Reviewers may differ in their suggestions about the structure of the thesis and on specific points, in which case you should seek guidance from your advisor.

Committee members can be helpful at an earlier stage of writing, or even in the planning stage. Feel free to seek their advice; it may save you time later.

Defending the thesis. Additional suggestions for improvement of the thesis are often made during the final examination. These may require retyping, or redrawing figures, and other work before the thesis is ready to be delivered to the Graduate School, and even (rarely) major alterations. Even if the defense is considered satisfactory by the committee, some committee members may refuse to sign the approval form until these changes are made. Here again, students should budget enough time to make these final changes.

8. Public Presentation and Ph.D. Final Oral Examination

By the time you have completed your Ph.D. research, you will be a leading expert in the field of your research, and you are expected to share your knowledge and experience with the university community in a public presentation.

By the first working day of the intended month of graduation, submit an **Application for Degree** (included in the Graduation Packet) to the Registrar's Office. At least one week prior to the examination, schedule the final oral examination and submit the signed **Reviewer's Report Form** to the Graduate School (the Reviewer's Report form is included in the Graduate Packet), and schedule the presentation and the final oral examination that immediately follows it, at least one week in advance with the Graduate School. This will generate the **Final Oral Examination Report Form**, which will be sent to the chair of the examining committee. You must choose a time and place agreeable to the members of your final examining committee. Please give details of title, time and place to the EEB office at least one week in advance, so that your seminar may be adequately announced.

The signed Final Oral Examination Report Form is due at the Graduate School no later than one working day after the oral exam if no revisions are required. In the case of revisions, the chair of the committee will hold the form until all revisions are incorporated and approved by your advisor. Details on the procedure are included in the Final Oral Examination Report Form that will be sent to the chair of your committee prior to the defense.

A copy of your thesis abstract and your thesis, together with other material as outlined in the Graduation Packet must be submitted by the last working day of the intended month of graduation.

9. Suggested Schedule for Ph.D. Students

The following schedule is presented as a general guideline for progress in the EEB program. It is not an absolute schedule that you must follow precisely, but deviations may be cause for concern about your progress. Ph.D. Students who have not filed their official degree program by the end of their fourth semester, or who have not passed the preliminary oral examination by the end of their third year, or who have not completed their Ph.D. degree by the end of their sixth year, will be considered to be making inadequate progress under normal circumstances. (See also Appendix 5 for a list of milestones.)

YEAR 1

- Before Fall term: Meet with temporary advisor and DGS to plan courses for first term and to check prerequisites.
- Fall term:
 - EEB Retreat
 - Meet with temporary advisory committee (file form with DGS), finalize prerequisite courses, and plan other course work.
 - Journal Club and Laboratory Tours
 - Begin formulating preliminary research ideas and reading relevant primary literature.
- Spring term:
 - Journal Club and Laboratory Tours
 - Directed study or seminars or research problems
 - Choose a degree advisor and advisory committee.
 - Meet with advisory committee (file form with DGS).
- Summer: Begin research to test ideas and techniques.

YEAR 2

- Fall term:
 - Finalize and meet with advisory committee (file form with DGS).
 - Submit Ph.D. Degree Program Form.
 - Journal Club jointly with 1st year students or help 1st year students with their Journal Club.
- Spring term:
 - Proposal Writing Seminar
 - Submit preliminary written examination (research proposal) to DGS (must be completed by end of second year).

YEAR 3

- Fall term:
 - Give pre-thesis seminar (file form with DGS).
 - Take preliminary oral examination (must be passed by end of fifth semester).
- Spring term:
 - Submit the Thesis Proposal Form.
 - Complete all course work.
 - Take maximum number of thesis credits.

YEAR 4

- Fall term:
 - Take maximum number of thesis credits.
- Spring term:
 - Take remaining number of thesis credits or (if you completed all 24 thesis credits, register using the one-credit FTE option or the GRAD 0999 no-tuition, zero-credit option).

YEAR 5

- Each term, register for the one-credit FTE option or the GRAD 0999 option.
- Complete thesis research and defend thesis and take final oral examination. The thesis committee should continue to meet at least once a year with you to review your research progress.

10. Exceptions to the Suggested Schedule⁴

Students who enter with a Master's degree may proceed at an accelerated schedule. If appropriate, they are allowed to skip the first year and thus enter as a member of the 2nd year cohort. If they choose to do so, they need not take the first-year Journal Club and the Lab Tours, but, instead, attend the 2nd year Journal Club in the Fall semester and the proposal writing club in the Spring semester of their first year in the program. They should complete the research proposal and take the preliminary oral examination by the end of the second year.

Ph.D. students who delay their Ph.D. program to acquire a Plan A Master's should attend the Journal Club and Laboratory Tours, and complete the preliminary written and oral examinations on the Ph.D. schedule.

Exceptions to the suggested schedule are permitted, for instance, for students who are absent during the Spring semester of their second year. In such cases or if there are other reasons a delay in the schedule is expected, the student must notify the DGS.

11. Graduation

Any time after the Thesis Proposal has been approved, you can pick up a graduation packet from the Graduate School. If you wish to attend a commencement ceremony, you must submit a Commencement Attendance Approval form

⁴ For students who entered before 1 July 2002, the following applies:

“Students who enter with a Master's degree are expected to proceed at an accelerated schedule. They should have completed the research proposal before the second summer of the graduate program and should aim to take the preliminary oral exam during the fall term of the third year. Ph.D. students who delay their Ph.D. program to acquire a Plan A Master's should complete the written and oral examinations on the same schedule. The Ph.D. thesis proposal may not be delayed more than one year.”

(http://www.grad.umn.edu/current_students/degree_completion/commencement/index.html), signed by the DGS, well in advance .

Appendix 1

The following is a list of courses that satisfy the breadth requirement explained in Section D.3.4. For courses not listed below whose course content satisfies one of the four areas, get approval from the DGS.

Ecology:

Biol 5407	Ecology
EEB 4014W	Ecology of Vegetation
EEB 4068	Plant Physiological Ecology
EEB 4609W	Ecosystem Ecology
EEB 4611	Biogeochemical Processes
EEB 5053	Ecology: Theory and Concepts
EEB 5146	Science and Policy of Global Environmental Change
EEB 5601	Limnology
EEB 5609	Ecosystem Ecology
EEB 8641	Spatial Ecology

Evolution:

Biol 5409	Evolution
PBIO 4511	Flowering Plant Systematics
EEB 5221	Molecular and Genomic Evolution
EEB/ENT 5371	Principles of Systematics
PBIO 5416	Plant Morphology, Development, and Evolution

Behavior:

EEB 4329	Primate Ecology and Social Behavior
ENT 4231	Insect Behavior

FW 4401	Introduction to Fish Physiology and Behavior
EEB 5321	Evolution of Social Behavior
EEB 5322	Evolution and Animal Cognition
EEB 5327	Behavioral Ecology

Organismal Biology:

EEB/FW 4129	Mammalogy
EEB 4134	Introduction to Ornithology
EEB/FW 4136	Ichthyology
PBIO 4321	Taxonomy of Minnesota Flora
ENT 5021	Insect Taxonomy and Phylogeny
ENT 5361	Aquatic Insects
MICA 8002	Structure, Function, and Genetics of Bacteria and Viruses
MICB 4111	Microbial Physiology and Diversity
PBIO 5412	Plant Physiology



Appendix 2

THE PRELIMINARY WRITTEN EXAMINATION

This document explains the purpose of the preliminary written exam, lists the deadlines, explains the criteria for passing/failing the preliminary written exam, and the evaluation procedures.

The preliminary written exam is a research proposal that describes the intended research for your Ph.D. dissertation. It is a learning process and its form stresses the importance of clearly articulating ideas and of writing grant proposals as part of an academic or professional career. Advisors are expected to give their students advice about writing proposals as well as about the specifics of the proposed research, and students are strongly encouraged to share their research proposals with their advisor and advisory committee, obtain feedback from their advisors during the proposal writing process, and discuss their ideas with other faculty as well. The advisor should aid the student in the planning and organization of the proposal. The concepts, content, and writing of the proposal must be the student's own effort, however.

Because the preliminary written examination must be submitted to the DGS by the end of the fourth semester in residence for students who entered the program in Fall 2002 or later, students are still in the early planning stages of their thesis project and have only had limited experience with methods and have only collected limited data to describe past research and methods. A student in this category is therefore not expected to write a proposal that would be competitive if submitted to a funding agency, such as the NSF or NIH. The proposal should rather be viewed as a significant step in formulating the student's research questions and developing methods for carrying out the research. The deadline ensures that students will receive valuable feedback on their research early in the development of their thesis projects. To help meet the deadline, all

second year students must sign up for a proposal writing seminar (EEB 8980, 1 credit) during the Fall semester of their second year (typically their third semester). The purpose of this class is to learn about the structure and format of a research proposal under the guidance of three faculty members representing the fields of Ecology, Evolution and Behavior. This class will prepare the students for writing their written preliminary exam the following semester.

Students must register for a proposal writing workshop (EEB 8980, 1 credit) during the Spring semester of their second year (typically their fourth semester). The purpose of this workshop is to provide a time for students to meet and discuss issues associated with writing their written preliminary exam. At the beginning of the semester, the DGS will provide an overview of the requirements of the written preliminary exam including the evaluation process. Students are expected to turn in a minimum of two drafts during this semester. Drafts will be read and reviewed by students' peers. The final proposal must be finished and submitted as the preliminary written exam to the DGS by the end of the semester. Students who are not in residence during the Spring semester of their second year (for instance, students who are participating in OTS courses) are expected to submit their preliminary written exam by the end of the following Fall semester.

The proposal should contain an introduction that puts the proposed research in a broader context, an overview of the student's planned research program for the thesis, clearly formulated hypotheses, preliminary results from new research as can be expected of a second year student, proposed research, significance and broader impact of the proposed research. Methods for the proposed research need only be developed as can be expected of a second year student. In this way, the proposal differs significantly from the expectations of the NSF Doctoral Dissertation Improvement Grant. However, the proposal should not primarily consist of literature review; it needs to be well-balanced with respect to review of the research area, significance of the proposed research, accomplished research, proposed research, and methods. The proposal is limited to 8 pages including figures. A title, an abstract of less than 200 words, a list of references, and a budget are also required but are not included in the 8-page limit.

The preliminary written exam is evaluated by a committee of no fewer than three EEB Graduate Faculty members. The reviewers are not informed of the identity of the student. The identity of the student will be revealed to the EEB Graduate Faculty (including the reviewers) after the EEB Graduate Faculty voted on the recommendation of the reviewers. Resubmitted proposals are not treated anonymously.

Written comments are very important for communicating professional standards to the student. The reviewers must therefore provide the student with detailed written comments in addition to completing the proposal evaluation form. If the reviewer makes comments directly on the copy of the proposal, the reviewer may return the copy to the student. The student will receive the written comments of the reviewers. The reviews are non-anonymous and the student is encouraged to discuss the reviews with the reviewers.

When reviewing the proposal, it is important to keep in mind that the criteria for passing the exam are NOT whether the proposal is competitive if submitted to the NSF. The criteria are instead

- Did the student formulate an interesting question that can be answered within the scope of a thesis?
- Does the student have some idea about approaches (but not necessarily specific techniques)?
- Is the student aware of potential problems?
- Has the student demonstrated a reasonably good knowledge of the literature and can the student put it into a larger context?
- Does the proposal demonstrate creativity and originality?
- Is the introduction and background section clearly written?
- Does the proposal have clearly formulated hypotheses?
- Is it clear from the proposal what the proposed research will accomplish?
- Does the proposal have the potential to be made into a competitive proposal with completion of some of the proposed work?
- Is the budget reasonable?

The written exam should be deemed failed if

- The student did not demonstrate an ability to ask a research question that can be made into a thesis project.
- The proposal has serious logical flaws.
- The research will not contribute new insights.
- The research is neither creative nor original.
- The proposal is not written with sufficient clarity that would allow the reviewer to assess the proposal.

Reviewers are asked to grade both the project and the proposal. The project is either graded PASS or FAIL. If the reviewer grades the project as PASS, the reviewer must grade the proposal as PASS WITH COMMENDATION, PASS, or CONDITIONAL PASS. In addition, the reviewers are asked to rate the proposal from 1 (EXCELLENT) to 5 (UNSATISFACTORY).

If the reviewers unanimously recommend passing the project, no faculty meeting is needed to discuss the case; a vote by e-mail by the faculty suffices to determine the outcome of the preliminary written exam (PASS or CONDITIONAL PASS, see below) according to the following procedure: If the reviewers unanimously pass the project and rate the proposal with one or fewer CONDITIONAL PASS, the EEB Graduate Faculty will be asked to vote on either PASS or CONDITIONAL PASS for the preliminary written exam and the final decision is reached by majority vote. If the reviewers unanimously pass the project but rate the proposal with more than one CONDITIONAL PASS, the EEB Graduate Faculty is asked to either approve the reviewers' recommendation of a CONDITIONAL PASS for the preliminary written exam or request a faculty meeting for further discussion.

If at least one reviewer recommends to FAIL the project, the proposal must be discussed in an EEB Graduate Faculty meeting and the following outcomes are possible:

- Exactly one failing vote by the reviewers: CONDITIONAL PASS or FAIL
- More than one failing vote by the reviewers: FAIL

CONDITIONAL PASS for the preliminary written exam: The student is asked to re-write the proposal within six weeks. The reviewers are asked to review the proposal and to determine whether the re-written proposal is satisfactory. (Different reviewers may be chosen for the review of the re-written proposal.) If the reviewers unanimously recommend passing the student, the student passes the exam without further vote by the EEB Graduate Faculty. Otherwise, the proposal must be discussed by the EEB Graduate Faculty in a meeting to determine whether (i) the student should be allowed to re-write the proposal for a second time, or (ii) the student should be switched to the Master's program (Plan A or B), or (iii) the student should be terminated. If the student is allowed to re-write the proposal for a second time, the student shall be given six weeks to resubmit the re-written proposal. (Different reviewers may be chosen for the review of the re-written proposal.)

FAIL for the preliminary written exam: The EEB Graduate Faculty must decide whether (i) the student should be allowed to re-write the proposal, (ii) the student should be switched to the Master's program (Plan A or B), or (iii) the student should be terminated. If the student is allowed to re-write the proposal, the student shall be given six weeks to resubmit the re-written proposal. (Different reviewers may be chosen for the review of the re-written proposal.) If the reviewers unanimously recommend passing the student, the EEB Graduate Faculty is asked to vote on the recommendation of the reviewers either by e-mail or in a faculty meeting. Otherwise, the proposal must be discussed by the EEB Graduate Faculty in a meeting to determine whether (i) the student should be allowed to re-write the proposal for a second time, or (ii) the student should be switched to the Master's program (Plan A or B), or (iii) the student should be terminated. If the student is allowed to re-write the proposal for a second time, the student shall be given six weeks to resubmit the re-written proposal. (Different reviewers may be chosen for the review of the re-written proposal.)

The number of times a proposal can be re-written is limited to two. If the reviewers do not agree to unanimously PASS the student after the student had a chance to re-write the proposal twice, the EEB Graduate Faculty must decide whether the student should be switched to the Master's program (Plan A or B) or terminated.

Appendix 3

MS DEGREE PROGRAM MILESTONES

Student Name: _____ Advisor: _____

Starting Date: _____ Advisory Committee: _____

1. Temporary advisor assigned by DGS¹
2. Assignment of advisory committee²
3. First meeting with advisory committee³
4. Choose degree advisor⁴
5. Degree program approved by the DGS and submitted to the Graduate School⁵
6. Annual meetings with the advisory committee⁶
7. Pre-thesis seminar (Plan A only)⁷
8. Request Graduation Packet from Graduate School and submit Application for Degree form to the Registrar's office
9. Submit signed Thesis Reviewer's Report form to the Graduate School (Plan A)
10. Final oral examination⁸
11. Submit signed Final Examination Report form to the Graduate School⁹
12. Degree completed within 2 to 2.5 years

¹ Before student enters program

² By the end of the first month in the program

³ By the end of the second month in the program (file form with DGS)

⁴ No later than the end of the second semester in the program

⁵ By the end of the second semester or after completion of approximately 10 credits (whichever occurs first)

⁶ File form with DGS

⁷ By the end of the second semester (file form with DGS)

⁸ After completion of required course credits, and after thesis has been approved by committee (Plan A) or after completion of projects (Plan B)

⁹ By the end of the last working day of the intended month of graduation



Appendix 4

CHECKLIST FOR COURSE REQUIREMENTS IN THE PH.D. PROGRAM
(Submit with the Degree Program Form to the DGS)

Student Name: _____ Advisor: _____

Starting Date: _____ Advisory Committee: _____

Prerequisite Courses: _____

Field or Laboratory Experience: _____

Graduate Coursework (list courses):

Quantitative Skills: _____

History and Philosophy of Science: _____

EEB Courses:

Ecology: _____

Evolution: _____

Behavior: _____

Organismal Biology: _____

Appendix 5

PH.D. DEGREE PROGRAM MILESTONES

Student Name: _____ Advisor: _____

Starting Date: _____ Advisory Committee: _____

1. Temporary advisor assigned by DGS¹
2. Assignment of advisory committee²
3. Meeting with advisory committee³
4. Choose degree advisor⁴
5. Degree program approved by the DGS and submitted to the Graduate School⁵
6. Preliminary written examination (research proposal)⁶
7. Pre-thesis seminar⁷
8. Preliminary oral examination⁸
9. Ph.D. Thesis Proposal⁹
10. Public presentation of thesis research and Ph.D. final oral examination¹⁰
11. Degree completed within 5 to 6 years

¹ Before student enters program

² By the end of the first month in the program

³ First meeting by the end of the second month in the program, second meeting by the end of the first year, subsequent meetings at least once a year (file report with DGS until after preliminary oral examination)

⁴ No later than by the end of the second semester

⁵ By the end of the third semester and at least two terms before you take the preliminary oral examination

⁶ By the end of the fourth semester

⁷ Before preliminary oral examination (file report with DGS)

⁸ No later than the end of the fifth semester

⁹ After filing the degree program and no later than one term following the preliminary oral examination

¹⁰ After thesis has been approved by committee



Appendix 6

University of Minnesota
Graduate Program in EEB

Student Advisory Committee Form

Graduate Student's Name: _____

The discussion should address coursework, research, plans to fund the proposed research.

Recommendations:

Signatures:

Student: _____

Committee: _____
(Advisor)

Date: _____

Return the completed report to the Director of Graduate Studies



Approval by DGS: _____

Date: _____

Appendix 7

University of Minnesota
Graduate Program in EEB

Pre-thesis Seminar Form

Title of Seminar: _____

Graduate Student's Name: _____

Committee Members' Names: _____
(present at meeting)

Recommendations:

Signatures:

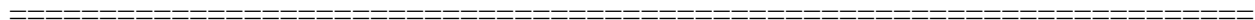
Student: _____

Date: _____

Advisor: _____

Date: _____

Return the completed report to the Director of Graduate Studies



Approval by DGS: _____

Date: _____