Natural Resources
MS Graduate Student Guidelines

This guide has been prepared to explain the procedures involved when working toward a Master of Science degree in Natural Resources, options in Environmental Conservation, Environmental Economics, Forestry, Soil and Water Resources and Wildlife and Conservation Biology. The requirements stipulated here are supplemental to those described in the Graduate School Catalog. It is your responsibility to monitor your progress in satisfying these requirements before receiving the degree of Master of Science.

DEPARTMENTAL REQUIREMENTS:

1. One course in Statistics – attached is a list of approved courses.

2. One graduate-level course in research methods: NR 903, Approach to Research (2 credits). This course should be taken first fall semester.

3. A second graduate course in research methods (2 credits): Possibilities included NR 904, 905, 906 and LSA 950 (Scientific Communication). Not all courses are offered every year, additional courses may be appropriate as they are developed.

4. One graduate-level "hot topics" seminar e.g., NR 993 (preferred).

5. One semester as a teaching assistant in an undergraduate course. NR 996 carries the responsibility for setting up, teaching, and grading one laboratory section per week. Student must register for one credit in NR 996, Natural Resources Education. All MS students regardless of whether they are a paid Teaching Assistant or not, must sign up for this course during one semester of their program.

6. Students must register for 6 thesis or 4 directed research credits. You can not register for more or less than 6 thesis or 4 directed research credits. It must be this amount.

7. Selection of Advisory Committee during first semester in residence. The Graduate Program Coordinator must be notified of selection and sign the form. Please bring the completed form to the Graduate Program Coordinator’s Office for review. [Link to form]

8. Approval of Program of Study plan during first semester in residence. Committee members and the Graduate Program Coordinator must sign this form. Please bring the completed form to the Graduate Program Coordinator’s Office for review. [Link to form]

9. Regular attendance at the NRESS Seminar.
10. Presentation of a formal research proposal, if thesis option, or directed research plan, if non-thesis option, to the student’s advisory committee for approval no later than second semester in residence, May for September admit and December for January admittance.

11. Preparation and approval of a thesis or directed research report

12. Presentation and oral defense of thesis research

**GRADUATE SCHOOL REQUIREMENTS:**

It is the student's responsibility to be aware of and respond to all Graduate School Requirements. A minimum of 30 graduate credits is required for all master’s degrees. Graduate credits are 800-999 level.

Special Student Credits: A maximum of 12 credits completed by a special student (non-degree student), in UNH graduate courses may be applied to a student’s degree program.

Transfer Credit: A maximum of 8 credits earned at the graduate level and completed on the campus of an accredited institution authorized to grant graduate degrees, may be transferred to count toward their graduate program.

All graduate work for any master’s degree must be completed within six years from the date of matriculation (admission/enrollment) in the program.

**ADVISORY COMMITTEE AND COURSE PROGRAM:**

**Chair:** A committee chair is appointed by the Graduate Committee in the offer of admission letter. Contact your designated chair upon your arrival on campus.

**Committee:** The advisory committee assists and advises the student in setting up the course program and research objectives. They also provide guidance in carrying out the graduate program. The advisory committee normally serves as your examining committee, but this should be only the final step in their total function. You are encouraged to utilize your committee for advice and help during the course of your graduate program. The manner in which the committee functions will be up to you, but they should be kept informed of academic and research progress.

During the first semester of residence, you (with the help of your advisor) will recommend to the Graduate Program Coordinator a minimum of two additional UNH graduate faculty members who will serve as your advisory committee. If appropriate, the advisory committee chair may also be changed at this time. The Graduate Program Coordinator will transmit the recommendation to the Dean of the Graduate School for approval. General policy on choosing your committee is as
follows:

- Each committee shall have at least 3 members.
- At least 2 members including the chair or 1 of the co-chairs shall be regular members of the UNH Graduate Faculty.
- The chair of each committee shall be a regular member of the NREN faculty.
- NREN affiliate faculty may serve as co-chair.
- It is recommended that one committee member be from outside the department.
- The Research Director, or person providing research assistantship and/or research guidance, will normally serve as committee chair or co-chair.

**Committee Meetings:** A minimum of two formal meetings with your committee is required. The first must be scheduled during the first semester in residence to discuss your course program. At this time you should present to the committee a proposed program of study and a preliminary proposal for directed research or thesis. If your research problem has not been decided at this time a meeting should be called in the second semester to discuss your research. Choosing a research problem should not be delayed beyond this time. Your proposal will be discussed and the committee may either approve the proposal or suggest appropriate changes. Additional meetings may be called by the committee chair or you to discuss progress towards your degree.

The final meeting is to ascertain whether the M.S. degree should be granted to you. This meeting includes a review of your program, presentation and defense of your research, and other questions as necessary to determine if the requirements for the degree have been met. The exact form of the meeting is at the discretion of the committee. This meeting is normally scheduled during the last semester in residence. You will have only two opportunities to demonstrate competence.

**Course Program:** After approval of all advisory committee members is obtained, your program of study must be presented to the graduate committee for review. Only one copy is necessary, but duplicate copies should be provided to each of your committee members. Your program of study must be in the hands of the Graduate Committee no later than the end of the first semester in residence. If changes are made in the program, a revised course program must be filed.

In developing your course program, particular note should be taken that you meet all departmental requirements, as well as Graduate School requirements.

Candidates for the Master of Science Degree are expected to have a background in subject matter related to their proposed course of study. This background is largely attained at the undergraduate level. If it is lacking, deficiencies may have to be remedied without graduate credit toward the 30 required for the graduate degree, and perhaps even prior to enrolling in your approved program of courses. Your committee will determine the adequacy of your background when you propose your graduate program.
**GRADUATE APPOINTMENTS:**

Graduate appointments are for one academic year and are normally renewed provided that funds are available and that the student’s academic performance, as well as performance in carrying out the responsibilities of the appointment, is satisfactory. Students are involved in assistantship activities for twenty hours per week during the academic year.

**Teaching Assistantships:**

Graduate teaching assistantships are half-time positions. Graduate teaching assistants are expected to devote an average of 20 hours per week to teaching duties during the semester. Student must register for a maximum of one credit in NR 996, Natural Resources Education during one of the semesters that they are a TA.

**Research Assistantships:**

- This involves work on a funded research project. This work may provide the data to fulfill the research requirement for graduation, and a thesis is normally expected.

- It is obligatory that the student conduct the research study under the person responsible for the project funding the assistantship.

- Research assistantships are normally granted for two academic years. Only under extenuating circumstances will the research assistantship be extended. The student on a full assistantship is required to spend 20 hours a week working on the research assistantship during the academic year and 40 hours per week during the summer, exclusive of course work. Time off for vacation is normally expected and is accrued at a rate of 1 3/4 days per month for July and August computed on an 8-hour day equivalent, and 7/8 of a day per month for the remaining 10 months (approx. 12 days/year). Summer stipends may be available for students working on AES projects, usually for 1½ months, 20 hours per week. Project assistants on extramural funding may be able work more hours.

- A recommendation for withdrawal of assistantship support will be made if the research director, advisory committee, and Graduate Committee feel any of the above requirements are not being satisfactorily met.
**RESEARCH PROPOSAL:**

A detailed research proposal is required of all M.S. candidates. An initial draft of this plan should be prepared with the assistance of the student's advisor during the first semester. The student's graduate committee should provide signed approval of a final proposal no later than the second semester. Suggested components are listed below. (Items 1 through 5 constitute a first draft of thesis/directed research text.)

1. Title
2. General statement of the problem - including scope and justification for the study
3. Thorough review of pertinent literature
4. List of hypotheses and objectives
5. Methods to be used, including description of study area, experimental design, and statistical analyses
6. Schedule of activity
7. List of needed equipment, supplies, and cost
8. Literature cited

**THESIS/DIRECTED RESEARCH REPORTS:**

A copy of the thesis or directed research report must be presented to each committee member at least 10 working days prior to the defense. The Graduate School "strongly advises" the student to drop off a draft copy of the thesis to the Academic Counselor for format review. When you pick up the draft, the Academic Counselor will go over the (annotated) corrections needed, and will give you a checklist of what you need to do. The thesis checklist is located at the website: [http://www.gradschool.unh.edu/pdf/td_manual.pdf](http://www.gradschool.unh.edu/pdf/td_manual.pdf)

Students are expected to have worked through several drafts of the thesis or report with their advisor prior to this submission. Following successful completion of the thesis/report defense, the committee will sign final copies of the thesis/report. Students are encouraged to prepare a condensed thesis that includes only relevant material. Supplementary materials on methods, results, and literature review can be placed in a thesis supplement as an appendix to the thesis. If appropriate, students are encouraged to prepare a manuscript for publication at the time they prepare their thesis.

Instructions for preparing the thesis for submission and a final checklist are available on the Graduate School website. Each student must follow these instructions carefully. They include:

1- A signature page printed out for the committee to sign. This page along with the title page and abstract must be handed in to the Graduate School.

2- A complete electronic version in pdf format must be submitted through a website to the company
that the Graduate School has contracted to publish, print, and bind your thesis (http://www.etedadmin.com/unh). There is a flat fee charged per copy that includes printing in color regardless of the number of pages and binding. For the first copy, the cost is $56. The cost per copy drops depending on the number of copies ordered.

3. It is the department’s policy that one copy of the thesis be printed and bound for the department conference room. Also, it is expected that one printed and bound copy will be provided to each committee member. The graduate student is responsible for paying for these copies. The student may order extra copies for their own use. In the past, the bound copies were delivered by the Graduate School to the department office. With the electronic submission, the graduate student must specify where the bound copies are sent. It is very important that all the bound copies are sent to the following address:

Your Name
56 College Road, 114 James Hall
Department of Natural Resources & the Environment
University of New Hampshire
Durham, NH 03824

We will then contact the student and as necessary, send the copies belonging to the student to them and deliver the other copies to the department and the committee. It is imperative that the department receive their copy of the thesis and this is the best way to guarantee that this occurs.

4- It takes about 12-16 weeks after the order is placed for the final bound thesis to be delivered.

**Directed research reports** should follow the thesis format required by the Graduate School. Flexibility is allowed at the advisory committees' discretion. A copy of the final directed research report must be presented to the Graduate Coordinator for the Departmental files prior to certification for graduation. This copy should be bound in some way or presented in a notebook. Traditionally, each committee member should also receive a bound copy of the directed research project.

The student will schedule a formal presentation of their thesis or directed research results. The oral defense will include:

1. presentation to the entire Department including opportunities for both committee members and others to ask questions
2. a separate oral examination period, for the advisory committee to
   a. ask questions about the thesis/directed research
   b. ask questions about student’s competence in key areas
   c. directions for future revisions of the thesis, revisions due by __________, or re-exam
3. a vote by the advisory committee, majority vote for pass or fail
4. if failure occurs, new oral exam and seminar required - only 1 more chance to pass
**THE GRADUATE COMMITTEE:**

The Graduate Committee, through the Graduate Program Coordinator, has ultimate administrative responsibility for all graduate programs in the Department of Natural Resources and the Environment. After admission, the Committee will continue to supervise your progress, will review your advisory committee make-up prior to transmittal to the Graduate Dean, and will review your course program to be certain all requirements will be met. If at any time, the committee feels you are not satisfactorily progressing in your program, a graduate committee hearing will be held with you and your advisory committee to determine appropriate action. The Graduate Committee also serves as an impartial jury to adjudicate disputes between students and their advisors or committees. For this purpose, a hearing may be requested by either the student or his/her advisor. A student may also request a change in committee makeup (including Chair) by petition to the Graduate Committee. All petitions to the Graduate School must go through the Departmental Graduate Committee. Petitions to either the Graduate Committee or the Graduate School will be acted upon only after the advisory committee is selected and the course program is approved.

**COMPUTER CLUSTER:**

Graduate students may request access to the departmental computer lab in James Hall, G45 from Dr. Russell Congalton. The use of the computer lab is a privilege not a right, and students are expected to follow the lab rules.

**DESK SPACE:**

Graduate students may be assigned desk space in laboratories or in the graduate student rooms.

- The chair of the student's committee or student’s research director who has space in a laboratory may assign such space to a student. Please report such assignments to the Department Administrative Manager.

- Desk space is assigned by the Administrative Manager with help from the Graduate Program Coordinator and is approved by the department chair. The Administrative Manager will also provide you with keys/access to the buildings, offices and labs, as needed.

- Desk space is a privilege not a right. Our goal is to provide desk space for every graduate student that needs/wants a space. You are expected to keep your space orderly and to be respectful of other students sharing space in the same room. Desk space is not for the purpose of storing personal items - it is working space. If you do not actually use the space, it will be re-assigned. Typically, it is expected that a MS
student will not need a desk for more than 5 semesters. After that time, such a student will only have a desk after all other graduate students have been assigned desks. PhD students will have a desk as long as they are active on campus and require a desk. If a student is not on campus for a semester or more, their desk will be re-assigned in their absence. Upon their return, a desk (but not necessarily the same desk) will be assigned to them.

**GRADUATE STUDENT TRAVEL SPONSORED BY THE FARRINGTON FUND:**

General Information:
1. The Fund will reimburse individual graduate students giving a presentation or paper only (general attendance and workshops are not paid for). Simply hanging a poster at a meeting is not a presentation. However, participating in a poster session in which the student presents her/his poster to an audience for some given time period is acceptable.
2. The Fund will reimburse for the following expenses:
   a. Transportation
   b. Registration
   c. Lodging and meals
3. The Fund will reimburse a maximum of $1000 (1 trip per year/per student with the year going from July 1 to June 30 each year).
4. The student must also attempt to obtain funding from other sources such as advisor, the Graduate School, or elsewhere and document this effort. Farrington Funds are limited and it is possible that not every request is granted.
5. Only currently enrolled graduate students may receive such support, with the following exception. Students completing an MS degree in four or fewer semesters or a PhD (post-masters) in six or fewer semesters may be supported to present thesis-related research at professional meetings that take place within eight (8) months of their date of graduation. (This exception ensures that students are not penalized as a consequence of completing their degree requirements within the expected time period.)

Procedure:
1. The graduate student must send a written request via email to the current chair of the Farrington Fund at least 1 month before the trip.
2. The request should provide the following information:
   a. The name of the conference/meeting and location
   b. The name of the presentation/paper being given
   c. A statement listing other sources of funding applied for
   d. A budget of approximate expenses for the trip
3. The student’s advisor must provide an email to the chair of the Farrington Fund confirming the student’s participation as a presenter at the meeting (student should facilitate this email).
4. The Chair of the Farrington Fund will provide written approval via email of the request and explain procedures for getting reimbursed. (No cash advances are permitted
RESPONSIBILITIES OF THE GRADUATE STUDENT:

- It is the responsibility of each graduate student to see that all necessary requirements for graduation are met. This includes meeting all deadlines set forth herein.

- The personal affairs of the student are the sole responsibility of the student. Faculty members are under no obligation to assist, in any way in the personal financial arrangements made by the student regarding expenditures, obtaining leases, or other personal affairs.

- Graduate students are expected to be involved in the development and continued success of the Department. Participation in Departmental activities and professional development is expected of all members of the Department.

- Graduate students are expected to attend a brief meeting held every semester to discuss issues and provide information.

Approved/Revised August 2015
Natural Resources – MS Requirement
Quantitative Methods Courses

BIOL 811 - Applied Biostatistics II Credits: 4.00
Design and analysis of biological and ecological research experiments. "Real world" studies used to discuss the identification of hypotheses, appropriate experimental design, and the application of statistical analyses including ANOVA, ANCOVA, correlation and regression, cluster analysis, classification and ordination techniques. Theoretical statistical concepts tailored to consider student's own thesis and dissertation research, allowing statistical problems to be addressed at various stages of the research process. Common computer packages used for analyses. Prereq: BIOL 528; permission. Special fee.

ECON 926 - Econometrics I Credits: 3.00
Application and theory of statistical and econometric methods to problems in economics. Topics: basic statistical theory, simple and multiple regression, violations of the basic assumptions, generalized least squares, and introduction to simultaneous equation models. Prereq: undergraduate statistics course.

KIN 900 - Applied Statistics Credits: 4.00
Designed to introduce basic statistics commonly used in the research literature of their field. Concepts such as mean, standard deviation, standard error, variance, probability, sample size, and statistical power will be presented. Specific statistical methods will be covered such as paired and unpaired t-tests, correlation, regression, multiple and step-wise regression, one and two-way ANOVA, MANOVA, canonical correlation and factorial analysis.

MATH 835 - Statistical Methods for Researchers Credits: 3.00
Emphasis is on applications of statistical methods and concepts. Topics include: Basic descriptive statistics, statistical graphs, fundamentals of statistical inference, analysis of variance (ANOVA), regression analysis, introduction to statistical design of experiments, categorical data, time-ordered data, introduction to multivariate statistical techniques. Recommended to graduate students with little or no formal training in statistical methods or to graduate students looking for a refresher course in statistics.

MATH 840 - Design of Experiments I Credits: 3.00
Quality control methods; design of experiments for quality improvement; randomization and blocking; factorial designs; nested designs; fixed- and random- and mixed-effects models; fractional factorial designs; response surface methods. Industrial and engineering applications.

MATH 969 - Topics in Probability and Statistics I Credits: 3.00
Selected advanced topics from one or several of the following areas: probability, stochastic processes, design of experiments, biostatistics, Bayesian theory and methods, spatial and spatio-temporal statistics, time series analysis, nonparametric statistics. Prereq: permission. May be repeated.
NR 813 - Quantitative Ecology Credits: 4.00
Applied quantitative techniques: basic concepts in probability and statistics applied to ecological systems; population dynamics; spatial patterns; species abundance and diversity; classification and ordination; production; and energy and nutrient flow. Additional credit for in-depth mathematical analysis of a particular topic. Prereq: introduction courses in calculus, statistics, and ecology. (Not offered every year.)

PSYC 905 - Research Methodology and Statistics I Credits: 4.00
A consideration of research techniques and problems of methodology in psychology. The first semester stresses the principles of statistical inference, correlational approaches, and their interrelatedness in design. Topics considered include probability theory, linear regression, function-free prediction, the theory underlying statistical inference, parametric and nonparametric tests of significance, and principles of analysis of variance. The second semester extends correlational approach to the techniques and methodology of multiple regression and considers the appropriate use and theoretical bases of complex designs. Prereq: undergraduate statistics and experimental psychology.

PSYC 907 - Research Methods and Statistics III Credits: 4.00
The application of multivariate methods of data analysis in psychological research: multiple regression, analysis of covariance, Hotelling's T2 multivariate analysis of variance, path analysis, discriminant functions, canonical correlation, factor analysis.

SOC 901 - Sociological Methods I: Intermediate Social Statistics Credits: 4.00
Application of statistical methods to the analysis of social data, with particular emphasis on multiple regression and related topics.

SOC 903 - Sociological Methods III: Advanced Social Statistics Credits: 4.00
Multivariate statistical methods for the analysis of social data. Topics include problem-solving with multiple regression, categorical-variable models, dynamic models, and others.