

Welcome

Dear graduate student,

Greetings from Michigan Tech! The School of Forest Resources and Environmental Science (SFRES) welcomes you to explore details of our graduate program. We offer seven different graduate degrees:

- **Master of Science in Forestry (M.S.)**
- **Master of Science in Forest Ecology and Management (M.S.)**
- **Master of Science in Applied Ecology (M.S.)**
- **Master of Science in Forest Molecular Genetics and Biotechnology (M.S.)**
- **Master of Forestry (M.F.)(Professional MS degree for non-forestry majors)**
- **Doctor of Philosophy in Forest Science (Ph. D.)**
- **Doctor of Philosophy in Forest Molecular Genetics and Biotechnology (Ph. D.)**

The following information serves as a general guideline for current Masters and Ph.D. students. Basic academic requirements for each degree program are presented along with information on the past theses and dissertations written by our graduate students. We also have included description of research interests of our faculty members.

Our best wishes for your successful graduate studies at Michigan Tech. Please do not hesitate contacting me if you have any questions.

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General Program Information for Current Graduate Students

There are two general areas of research interests within our graduate programs:

- 1) Forest Sciences including Forestry, Forest Ecology and Management, & Wood Science**
- 2) Forest Molecular Genetics and Biotechnology**

The following is a description of these two areas and degrees offered within each of these areas.

- Forest Sciences -

Students interested in forest sciences come from a wide variety of backgrounds, including areas such as biology, zoology, agricultural sciences, wildlife, geology, entomology, pathology, soil science, microbiology, applied mathematics, physics, and chemistry. They are interested in working in either the public or private sector with rewarding careers in such areas as forest ecology, forest soils, silviculture, tree improvement, forest wildlife ecology and management, economics, inventory, geographic information systems, growth and yield, wood science and forest biology.

Individual student programs vary according to the backgrounds and career objectives of the students. Programs of study are developed to include courses in a particular career area coupled with a strong quantitative background. While in graduate school, students are encouraged to attend national conferences, local seminars, and to interact with scientists from the nearby USDA Forest Service research station and Isle Royale National Park.

We offer four Masters Degree programs and one PhD degree program in the area of Forest sciences. They are as follows:

- **Masters of Forestry**
- **Master of Science in Forestry**
- **Master of Science in Forest Ecology and Management**
- **Master of Science in Applied Ecology**
- **Doctor of Philosophy in Forest Science**

We also have a directed program for potential Peace Corps volunteers:

- **Master's International Program in Forestry**

Note: Any student in this directed program can elect to get a degree in one of the MS degree programs listed above.

Potential topic areas within our degree programs are:

- ❖ **Agroforestry**
- ❖ **Biogeochemistry**
- ❖ **Biometrics**
- ❖ **Community Forestry**
- ❖ **Conservation Biology**
- ❖ **Ecological Modeling**
- ❖ **Ecophysiology**
- ❖ **Ecosystem Ecology**
- ❖ **Ecosystem Science**
- ❖ **Environmental History**
- ❖ **Environmental Policy**

- ❖ **Environmental Studies**
- ❖ **Forest Ecology**
- ❖ **Forest Entomology**
- ❖ **Forest Management**
- ❖ **Forest Pathology**
- ❖ **Forest Soils**
- ❖ **Forestry and International Development**
- ❖ **Geographic Information System (GIS)**
- ❖ **Global Change Biology**
- ❖ **Landscape Ecology**
- ❖ **Plant Ecology**
- ❖ **Microbiology**
- ❖ **Molecular Biology**
- ❖ **Molecular Ecology**
- ❖ **Mycorrhizal Community Dynamics**
- ❖ **Mycorrhizal Ecology**
- ❖ **Ornithology**
- ❖ **Remote Sensing**
- ❖ **Restoration Ecology**
- ❖ **Silviculture**
- ❖ **Soil Ecology**
- ❖ **Tropical Ecosystems**
- ❖ **Wetland Ecology**
- ❖ **Wildlife Ecology and Management**
- ❖ **Wood Chemistry**
- ❖ **Wood Composites**
- ❖ **Wood Decay and Preservation**

- **Forest Molecular Genetics and Biotechnology (FMGB) -**

Graduate students interested in Forest Molecular Genetics and Biotechnology come from a wide variety of backgrounds, including such areas as forestry, biology, zoology, microbiology, agricultural sciences, wildlife, entomology, pathology, soil sciences, applied mathematics and statistics, computer science, physics, and chemistry. These graduate degrees emphasize intensive hands-on molecular biology research matched with excellent laboratory, greenhouse, and field trial facilities, producing a student with a solid understanding of growth and developmental processes in trees and other life forms. Study prepares students for leadership in either the public or private sector with career development in the fields of biotechnology, molecular medicine, molecular genetics, forest and ecological genetics, and forest bioinformatics.

Individual student programs vary according to the backgrounds and career objectives of the students. Programs of study are developed to include courses in a particular career area coupled with a strong background in laboratory methods. While in graduate school, students are encouraged to attend national conferences, local seminars, and to interact with scientists from the nearby USDA Forest Service research station and Isle Royale National Park. Most of our faculty are also members of Biotechnology Research Center, a campus-wide biotechnology research network.

Graduate studies in *Forest Molecular Genetics and Biotechnology* research leads to the following degrees:

- **Master of Science in Forest Molecular Genetics and Biotechnology**
- **Doctor of Philosophy in Forest Molecular Genetics and Biotechnology**

Potential topic areas within our programs are:

- ❖ **Bioinformatics**
- ❖ **Biotechnology**
- ❖ **Cellulose biosynthesis**
- ❖ **Climate Change and forest productivity**
- ❖ **Control of flowering**
- ❖ **Demographic and genetic elements of population biology**
- ❖ **Phenylpropanoid metabolism**
- ❖ **Functional genomics**
- ❖ **Gibberellins metabolism and signal transduction pathways**
- ❖ **Molecular regulation of growth**
- ❖ **Lignin biosynthesis**
- ❖ **Microarray profiling**
- ❖ **Molecular biology of adventitious and lateral root formation**
- ❖ **Molecular ecology**
- ❖ **Mycorrhizal community dynamics**
- ❖ **Small RNA (microRNA) regulation of wood formation**
- ❖ **Wood Formation**
- ❖ **Woody plant tissue culture and transformation**

Specific Guidelines for MASTER DEGREES

Degrees Awarded:

Master of Science (M.S.) in Forestry

Master of Science (M.S.) in Forest Ecology and Management

Master of Science (M.S.) in Applied Ecology

Master of Science (M.S.) in Forest Molecular Genetics and Biotechnology

Master of Forestry (M.F.)(Professional degree)

All work required for the *Master of Science* degrees or the professional *Master of Forestry* degree must be completed within **five** years after **first** registering for classes. **Completion of Graduate School forms by required dates is the responsibility of the graduate student.** Always keep a copy for your files before sending the signed forms down to graduate school.

There are three options offered for all *Masters of Science* Degrees in the School of Forest Resources and Environmental Science (MF degree will be described later):

Plan A: Development of a thesis with a scientifically sound development of a research problem;

Plan B: Development of a report with a complete description of the project; and

Plan C: Course work only, concentrating on a general area of expertise

There are differences in the amount of course work needed for each of these three plans. More details on the course work requirements for the individual plans are given in the **Section III** below or by contacting your faculty advisor. Here is some general information that is common to all MS programs at SFRES.

I. ADVISORY COMMITTEE

Your Graduate Advisory Committee should be appointed latest by your **second semester of residence**. The Advisory Committee consists of at least **three** members of the graduate faculty, including one member designated as a 'Chair'. The Chair is always your Advisor. The Chair must be a member of the School of Forest Resources and Environmental Science and the MTU Graduate School faculty. Please visit <http://www.gradschool.mtu.edu/research/gradfaculty.html> to see if your advisor and other committee members are designated as graduate faculty by the graduate school. A minimum of **two** other members of your advisory committee, consisting of at least one '**outside**' member, are selected by you and your Advisor. The '**outside**' member must be from **another department** within Michigan Technological University. Other committee members can be selected from outside of the MTU community; however, these members cannot serve as the '**outside**' member of Michigan Tech. If so desired, your Advisor must write a memo to the Graduate School and the School's Graduate Program Director, asking permission to place someone from outside the University community on your Advisory Committee. The memo must also include a justification for having this person (or persons) on your Advisory Committee.

Plan A and Plan B Masters

It shall be the function of the Advisory Committee to approve the design of your research thesis (Plan A) or of your report (Plan B), and the necessary course work that needs to be successfully completed for your project. It is the responsibility of the student's Advisor to ensure the research topic/thesis or report is within the capability of the student and can be completed within a reasonable period of time.

The Advisory Committee may offer suggestions to strengthen the research, but changes cannot be

required by any member of the committee that will change either the objectives or scope of the study without approval of the student's Advisor. If a student and his/her Advisor do not accept the suggested changes and the other committee member does not agree, the Advisor may select a replacement for the dissenting committee member.

If any member of the Advisory Committee disagrees with a certain part of the study design and does not indicate that at the time it is presented to the Committee, then the committee member cannot refuse to grant approval of the thesis/report at the time of the defense. The committee member can, however, refuse approval if the design is changed without prior consent, or if he or she feels it is poorly written or otherwise does not meet the criteria for a thesis or report.

Meetings with the Advisory Committee should be held at least semiannually to review the student's progress. It is emphasized that such meetings are to be tutorial and informative in nature. The student will be expected to give a short presentation of results at these meetings, followed by a discussion. An important goal of these meetings is to help the student develop a high degree of professional competence and confidence.

Plan C Masters

It shall be the function of a Plan C Master's Advisory Committee to: (1) help a student choose course work; (2) keep track of the student's progress in his or her course work; and (3) to test the student's knowledge on his or her course work at the student's oral defense. The student should also meet with Advisory Committee semiannually to discuss coursework schedule and progress.

II. GENERAL SCHEDULE FOR THE MASTER DEGREE PROGRAM

A plan of work showing the courses to be taken, the topic of the thesis/report research (Plans A and B), and the thesis/report format (Plans A and B) is first prepared by the student and his/her Advisor. The student's Advisory Committee will review the course work (Plans A, B, and C) and design of study (Plans A and B) by **the end of the second semester in residence**.

For a Plan A and B Masters, you need to prepare a study plan for your thesis/report, acceptable to your Advisor and Advisory Committee. This research study plan should be presented to the student's Advisory Committee no later than the end of the **second semester in residence** (except for Peace Corps Masters International students who may develop their study plan while in residence in their country). ***A printed copy of the approved study plan will be given to all committee members and graduate program Director and should be placed in your academic file, once approved by the Advisory Committee.***

All graduate students are required to be enrolled each academic term following entry into the Masters program until completion of all degree requirements. A full-time student on an assistantship must enroll for a minimum of nine credit hours per semester but not more than 12 credit hours each semester (**The school pays only for 9 credits when such assistantship is offered**). During the summer, a full-time student on an assistantship must enroll for one (1) credit hour. Exemptions from this requirement for finite time periods, such as during a co-op employment program, may be obtained, in writing, from the Dean of the Graduate School.

A grade of "A", "AB", or "B" should be obtained in ALL courses listed on your degree schedule; however, up to six credits of "C" may be applied toward your degree if 1) the courses are not Forest Resources and Environmental Science (FW) courses, 2) are not **required courses for the degree**, and 3) ***approved by the Graduate Program Director of the School of Forest Resources and Environmental Science and the student's Advisor.*** No grade below a "B" is acceptable for required courses and courses within the School that are applied towards your degree.

III. GENERAL COURSE WORK REQUIREMENTS

A minimum of 30 semester credits is required for graduation (Table 1) for all three plans (A, B and C). Please note the minimum requirements for 5000-6000 level courses and the maximum allowance of 12 credits for 3000-4000 level classes (Table 1). The student's Advisory Committee should help the student choose their courses. Please note: Certain courses are required by the School to complete your degree. And different courses are required for the directed programs for our Peace Corps Masters International programs and Master of Forestry (MF). Please contact Dr. Blair Orr (bdorr@mtu.edu) for the requirements for Peace Corps and Dr. Jim Pickens (jpickens@mtu.edu) for MF programs.

TABLE I. Semester Credits by Course Level for Plan A, B, and C Masters Students

Plan A: Thesis Option

-Course Work 20-24 Credits	
-12 Credits (Maximum): 3000-4000 Levels	
-12 Credits (Minimum): 5000-6000 Levels	
-Thesis Research:	6-10 Credits
-Total (Minimum):	30 Credits

Required Courses:

-FW5800 Master's Graduate Seminar	1 credit
-FW5810 Research Methods in Natural Resources (Except Peace Corps and Masters of Forestry)	2 credits
-One Upper Division Statistics class from the list of suggested courses** (except for Peace Corps and Masters of Forestry students who must have taken a similar class before joining our graduate programs)	

Plan B: Report Option

-Course Work 24-28 Credits	
12 Credits (Maximum): 3000-4000 Levels	
12 Credits (Minimum): 5000-6000 Levels	
-Thesis Research:	2-6 Credits
-Total (Minimum):	30 Credits

Required Courses:

-FW5800 Master's Graduate Seminar	1 credit
-FW5810 Research Methods in Natural Resources (Except Peace Corps and Masters of Forestry)	2 credits
-One Upper Division Statistics class from the list of suggested courses** (except for Peace Corps and Masters of Forestry students who must have taken a similar class before joining our graduate programs)	

Plan C: Course Work Option

-Course Work 30 Credits	
12 Credits (Maximum): 3000-4000 Levels	
18 Credits (Minimum): 5000-6000 Levels	
Thesis Research:	None
Total (Minimum):	30 Credits

Required Courses:

-FW5800 Master's Graduate Seminar	1 credit
-FW5810 Research Methods in Natural Resources (Except Peace Corps and Masters of Forestry)	2 credits
-One Upper Division Statistics class from the list of suggested courses** (except for Peace Corps and Masters of Forestry students who must have taken a similar class before	

joining our graduate programs)

** List of suggested statistics classes

MA 4710 - Regression Analysis
MA 4720 - Design and Analysis of Experiments
MA 4730 - Nonparametric Statistics
MA 4740 - Sampling Methods
MA 4750 - Applied Multivariate Statistics
MA 4760 - Mathematical Statistics I
MA 4770 - Mathematical Statistics II
BL 4470 - Analysis of Biological Data
MA 5701 - Statistical Methods
MA 5711 - Mathematical Statistics I
MA 5712 - Mathematical Statistics II
MA 5731 - Linear Models
MA 5740 - Advanced Sampling Methods
MA 5750 - Statistical Genetics
MA 5761 - Computational Statistics
MA 5791 - Categorical Data Analysis
BE 5550 - Biostatistics for Health Science Research
FW 5411 - Applied Regression Analysis
FW 5410 - Analysis of Natural Resource Data

Approval of equivalent courses can be given by the School of Forest Resources and Environmental Science Graduate Program Director in consultation with the student's Advisory Committee. The Advisory Committee may specify certain courses in which a student must achieve a grade better than a 'B'. The student must submit to the Graduate School an approved Graduate School M4 Form "Degree Schedule" **at least 12 weeks prior to the oral defense**. Copies should be given to the student's Advisory Committee and to the Graduate Program Director of the School to be placed in the student's file.

IV. ORAL DEFENSE

All Masters students must go through an oral defense. The oral defense for **Plan A and B** Masters students focuses around the student's thesis or report and their course work. **Plan A and B** students must give a scheduled oral presentation before their defense. The oral defense for Plan C students focuses around their course work. The student must contact their Advisory Committee members to schedule an appropriate time for the oral defense at least **a month** before the exam. The student must submit **Graduate School Form M5, "Schedule of Oral Examination"**, at least two weeks prior to the defense/examination. **The Graduate School Form M6, "Report on Oral Examination", is due in the Graduate School immediately following the defense.** Please see the Graduate School's "Keeping on Track" Manual for other instructions regarding thesis or report format.

Plan A and B Masters

Early in the student's last semester, a draft of the thesis/report should be submitted to the student's Advisor. Following review and revisions by the Advisor, the thesis/report should be submitted to the student's Advisory Committee and the graduate school **at least two weeks** before the scheduled oral examination.

V. CHANGE OF STATUS

Students can change their status from M.S. to Ph.D. at no charge by submitting a new application and the Graduate School **Form D1, "Acceptance into the Doctoral Program"**, to the Graduate School at any time before or after their MS degree is received.

The following are the special instructions for MF program. Please contact Dr. Jim Pickens (jpickens@mtu.edu) if you have any questions.

Suggested Course Work for Master of Forestry (MF) degree

Master of Forestry (Plan B and Plan C)

The Master of Forestry (M.F.) degree program is Plans B and C only, and is intended for students who want a course work-only professional degree or who may be interested in working on a small project with a report. This program is for students who lack a forestry background at the bachelors level, and wish to change their career to forestry. The structure of this program is significantly different from our other Master of Science Degree programs. In addition to a Bachelors degree, students applying for this program are expected to have had 1 semester of Chemistry, and 1 semester of Elementary Statistics. The curriculum for the M.F. is listed below. Students completing plan B may choose to take 2-6 research credits in addition to the required course work listed below, upon consultation with their advisor. Curriculum: 34 credits, depends on previous course work (at a minimum 30 credits)

Fall Semester (11 credits)

FW3020 Forest and Landscape Ecology (3 cr)

FW3330 Soil Science (4 cr)

FW5020 Identification and Biology of Forest Vegetation (2cr)

FW5030 Forest Measurement and Assessment (2 cr)

Spring Semester (13 credits)

FW3110 Natural Resource Policy (3 cr)

FW3540 Remote Sensing/GIS (4 cr)

FW4130 Biometrics (2 cr)

FW5080 Advanced Forest Economics and Finance (3 cr)

FW5800 Master's Graduate Seminar (1 cr)

Fall Semester (10 credits)

FW5700 Graduate Field Forestry (8 cr)

FW5760 Graduate Tropical Forestry (2 cr)

Advisory Committee

The student's Graduate Advisory Committee should be appointed by the second semester of residence. The Advisory Committee will consist of at least four members, including one member designated as Chair. The chair is the student's graduate advisor. The Chair must be a member of the School of Forest Resources and Environmental Science and the MTU Graduate School faculty. At least one member of the Advisory Committee must be from outside the School. The Advisory Committee must approve the report (Plan B), and the necessary course work to successfully complete the project. The student's Advisor is responsible for ensuring the report (Plan B) is within the capability of the student and can be completed within a reasonable period of time. The Advisor and the Advisory Committee are responsible for ensuring the report (Plan B) and course work (Plans B and C) fall within the Masters program selected by the student and the student's Advisor. The role of the Advisory Committee for Plan C students is to help the student choose course work, keep track of the student's progress in his/her course work, and to test the student's knowledge on his/her course work at the student's oral defense.

General Procedures

A plan of work showing the courses to be taken, the topic of the report (Plan B), and the report format (Plan B) will be prepared by the student with his/her Advisor. The student's Advisory Committee will review the course work (Plans B and C) and design of study (Plan B) by the end of the second or third semester in residence. For a plan B Masters, the study plan must be presented to the student's Advisory Committee no later than the end of the second semester in residence. A copy of the approved study plan will be given to all committee members once approved by the Advisory Committee. All graduate students are required to be enrolled each academic term following entry into the Masters program until completion of all degree requirements. A full-time student on an assistantship must enroll in a minimum of 9 credit hours per semester and not more than 12 credit hours each semester. During the summer, a full-time student on an assistantship must enroll for one credit hour. All Masters students will go through an oral defense. The oral defense for Plan B Masters students will focus around the student's report and their course work. Early in the

student's last semester, a draft of the report should be submitted to the student's Advisor. Following review and revisions by the Advisor, the report should be submitted to the student's Advisory Committee at least two weeks before the scheduled oral examination. Plan B students must give a scheduled oral presentation before their defense. The oral defense for Plan C students will focus on their course work. All work required for the M.F. degree must be completed within five years after first registering for classes.

Grades

All grades must be B (3.0 on a 4.0 scale) or better in the major subject area. The Graduate Program Coordinator of the School of Forest Resources and Environmental Science and your advisor can jointly approve no more than six credits of C (2.0) in a cognate department. The student must maintain a cumulative grade point average of 3.0 or better.

The master's degree demonstrates advanced ability. The master's student must complete the following:

- choose an advisor and file a Recommended Advisor form (M2-GSO)
- Prepare a Preliminary Course Plan (M3) (student worksheet only)
- file a Degree Schedule form (M4)
- complete the coursework requirements
- Successfully complete an oral examination
- fulfill the campus residency requirement
- finish the degree within the prescribed time limit
- submit an approved document in plans A & B
- Forms are available on-line at <http://www.admin.mtu.edu/rgs/graduate/trackingforms.html>

Advisor

Initially the advisor may be the department's graduate coordinator or Dr. Jim Pickens, but as soon as possible, and no later than the end of the second term in residence, a permanent advisor should be chosen. This MTU graduate faculty member advises the student on course selection. The advisor is an important factor in the graduate student's timely and successful completion of the program of study.

Degree Schedule

The Degree Schedule form (M4) is used to list all the courses that are to be applied to the degree requirements, including those yet to be taken. The completed M4 should be submitted in the term prior to the defense term. It must be approved before the defense is scheduled.

The courses listed on the M4 must meet certain requirements, described in each option below, and they must be approved by the advisor and the department chair. Courses taken while an undergraduate at MTU may be used for graduate degree credits if the Senior Rule form (available from the department secretary) has been appropriately filed. Courses taken while a post-grad may be used on the Degree Schedule with departmental approval.

Plan B: Report Option—This plan requires a report describing the results of an independent study project. Of the minimum total of 30 credits, at least 24 must be earned in course work other than the project.

Course work	24 credits
Report	2–6 credits
Total (minimum)	30 credits
Distribution of course work credit	
5000–6000 series (minimum)	12 credits
3000–4000 level (maximum)	12 credits

Plan C: Course Work Option—This plan requires the minimum 30 credits be earned through course work.

Distribution of course work credit	
5000–6000 series (minimum)	18 credits
3000–4000 level (maximum)	12 credits

Oral Examination

Examination by and approval of a faculty committee is required for awarding a master's degree. This committee will examine the general professional knowledge, course work, and (in Plan B) the written documents of each master's candidate. The defense is scheduled and the committee nominated via the Scheduling of Final Oral Examination form (M5), which must be in the Graduate School office two weeks prior to the defense date.

Examination Committee— Must be nominated by the chair of the major department, usually in consultation with the advisor, and approved by the dean of the Graduate School. At least three of the four examiners must be members of the graduate faculty and one of the graduate faculty must be from outside the major department.

Thesis or Report

Distribute copies to the Examining Committee at least two weeks prior to the examination date.

Defense—Must be scheduled and the committee nominated via the Scheduling of Final Oral Examination form (M5). The committee's written evaluation must be filed on the Report on Oral Examination form (M6). The student must be enrolled to defend.

The following are the special instructions for “The Loret Miller Ruppe Peace Corps Master’s International Program in Forestry” graduate course work. Please contact Dr. Blair Orr (bdorr@mtu.edu) if you have any questions.

The Master’s International Forestry Curriculum is a blend of traditional forestry courses, several ecology courses, and several courses and seminars specifically created for this program. All are applicable to your work as a Peace Corps Volunteer.

The sequence of courses is also designed to leave the student the option of developing a Master's Degree program as a thesis degree, a project degree, or a course-work only degree.

Graduate committees routinely substitute other appropriate courses for students who have completed any of the required courses during their undergraduate program.

Courses for Students Entering after Fall 2005.

Fall Semester

- FW5700 Graduate Field Forestry - 8 cr. Two options are available for this course. Option A (Forestry Emphasis) covers Silviculture, Insects and Diseases of Forest Ecosystems, Multi-Resource Assessment, Global Positioning Systems, Timber Harvesting, and Wildlife Habitat. Option B (Ecology Emphasis) covers Insects and Diseases of Forest Ecosystems, Multi-Resource Assessment, Global Positioning Systems, Insect Ecology, Wildlife Habitat, Vegetation and Geomorphology, and a survey of Silviculture.
- FW5760 Graduate Tropical Forestry - 2 cr.
- FW5740 Overseas Research - 1 cr.

Spring Semester

- FW5710 Trees in Agricultural Systems - 2 cr.
- FW5770 Rural Community Development Planning and Analysis - 2 cr.
- FW3540 Remote Sensing and Geographic Information Systems in Natural Resource Management - 4 cr. (Students are not required to take FW3540 during this semester but must take either FW3540 or FW 5550 - Geographic Information Systems for Resource Management when they return from Peace Corps service.)
- CE5993 Civil & Environmental Engineering in the Developing World - 2 cr.
- MA2720 or equivalent. Principles of Statistics 4 cr. Required of students who do not have an undergraduate statistics course.
- 3 credits of electives.

Peace Corps Service

- FW5730 International Forestry Practicum 1 cr. per academic semester including the summer. (Tuition paid by Michigan Tech.)

Upon Return from Peace Corps Service

- FW5999 Graduate Research in Forestry. variable credits.
- FW5720 Seminar in International Forestry 1 cr.
- FW5800 Graduate Seminar in Forestry 1 cr.

30 credits required to graduate. No more than 12 credits in 3000 and 4000 level courses.

This set of courses was designed cooperatively with the US Peace Corps. It will provide a set of skills for both forestry and environmental education placement in Peace Corps and work in forestry and environmental sciences in the United States.

The School of Forest Resources and Environmental Science at Michigan Tech is one of 48 accredited forestry programs in the United States.

Time Line to Degree

IMPORTANT: When you consult your advisor for your degree schedule, take this time line to the meeting so you and your advisor are in agreement on your plans.

Date: _____

_____ Enrolling for the first time.

- Get into **course work** under the direction of your faculty advisor. Complete **M2-GSO** form during first term (GSO = Graduate School Office)
- Make sure the GSO has **official final transcripts** showing proof of your previous degrees (if they are not from MTU).
- Fill out “**Patent, Research and Proprietary Rights**” form in your department office.
- Get a **social security number** if you will be getting a GRA or GTA, or otherwise working.
- Start looking for a **faculty advisor** for research projects if not done so already; she or he should be chosen latest **by the end of the second semester** in residence.
- Inform the Office of Student Records and Registration of any changes in your status, address, student identification number, expected graduate date, etc.

_____ During the course of your studies, fill out **M3 Preliminary Course Plan (Student Worksheet)**. This is just for your information only and there is **no need** to submit this form to GSO. It is advisable to do this during first-second term.

_____ At least 14 weeks (a term) prior to defense, complete the **M4, Degree Schedule¹** in consultation with your advisor. If there are problems, you have a term in which to correct them. Because it is approved by your advisor and your department Graduate Program Director, any **changes** must also have their approval. If credit transfers are necessary, use the Transfer Credits form found in this booklet.

_____ At least two weeks prior to defense, **M5, Schedule of Oral Examination**, completed in consultation with your whole committee. This names your four-member examining committee and schedules your oral examination. (Check departmental policy on choosing your committee)

_____ At least two weeks prior to defense, distribute readable copies of the thesis/report to the examining committee and to graduate school.

_____ **Oral Examination.** Faculty and students will be invited to hear at least your defense presentation. It is wise to attend a few of these early in your tenure at Michigan Tech. The examination for the course work option varies with the programs allowing this option. Take your **M6, Report on Oral Examination**, to the exam for signatures. (Your advisor/department might retain your M6 until the corrected, signed document is submitted; research grades are not changed until M6 is in the GSO.) Make corrections as indicated by your committee. Get the new original signed.

Plan B Report: One copy to the GSO, bound in a sturdy ACCO or Smead binder or the hot-glued plastic binder available in the Campus Store or library. (Your advisor/department may want more copies.)

Plan A Thesis: The Graduate School requires two copies in the library; one with original signatures. Your department/advisor may want more. Instructions for payment and library submissions are on the invoice you will receive when you defend. Take unbound

copies and proof(s) of payment to the library, Binding and Preservation Office, and get a thesis receipt for the Graduate School. (The extra copies will be sent to your department when they return from the bindery; be sure your department knows what to do with them.)

_____ **The Goal: Graduation.** No more than five calendar years after you started Graduate School. When you have completed your degree requirements, take your thesis receipt/stamped invoice from the library to the GSO; you can usually receive a certification letter immediately. Your *transcript* will indicate degree granted by the fourth week of the next semester/semester. Your *diploma* will be mailed to you about 90 days after the terms ends. Leave a valid address. Be sure the GSO and your advisor are aware of your commencement plans at the *beginning* of the commencement semester/semester.

All forms can be sent by you or your advisor/department to the Graduate School Office via campus mail. Copies of signed forms will be returned to you and the department.

Forms for the Master's Degree

The following forms must be downloaded from the MTU Graduate School website located at: <http://www.gradschool.mtu.edu/forms/tracking.html>

Note: Our school does not offer a Plan D MS degree.

*** To obtain Graduate Program Director's signature on all these M forms, please keep the completed form in the mailbox of Dr. C. P. Joshi and he will sign and return it to your mailbox for mailing to the Graduate school. Please make a Xerox copy for your records and send the original to **Nancy Byers Sprague, Graduate School** via interdepartmental mail.

Tracking Forms—Master of Forestry, Master of Science

- [M2-GSO—Recommended Advisor / Advisory Committee](#)
- [M3—Preliminary Course Plan \(Student Worksheet only\)](#)
- [M4—Degree Schedule—Master of Science](#)
- [M5—Scheduling of Final Oral Examination](#)
- [M6—Report on Oral Examination](#)
- [M7—Electronic Thesis and Dissertation Approval Form](#) (Only if you wish your thesis/dissertation to be available via MTU library website)

Recent Master Theses & Reports (Updated 1/9/2009)

Butler Patricia. 2008. Composition of Solid Waste in the Municipal Dump in Berd, Armenia. MS Forestry (Orr)

Rhoades Jason. 2008. Impacts of Deforestation and Land Cover Change on Mountain Soils in Hrazdan, Armenia MS Forestry (Orr)

Vital, Jessie. 2008. Land Use/Cover Change Using Remote Sensing and Geographic Information Systems: Pic Macaya National Park, Haiti. MS Forest Ecology and Management (Maclean).

Rouse, Lisa. 2008. Characterizing Ozone Tolerance in Poplar: Implications for Carbon Sequestration. MS Forest Molecular Genetics and Biotechnology (Burton)

Frederick, Janet. 2008. Ash Resources Threatened by the Emerald Ash Borer (*Agrilus planipennis* Fairmaire) in Recreational Areas throughout Michigan. MS Forest Ecology and Management (Storer)

Carpenter, Rachel. 2008. Assessment of Motivation and Performance in an Integrated Field Practicum for Ecologists and Foresters. MS Forestry (Nagel)

Chen Han-Yi. 2008. Characterization of Two Distinct 4-coumarate:CoA ligase Genes in Loblolly Pine (*Pinus taeda*). MS Forest Molecular Genetics and Biotechnology (Tsai)

Potvin, Lynette. 2008. An Investigation of Mosaic Stunting in Jack Pine Nursery Seedlings. MS Forest Ecology and Management (Jurgensen)

Roosien, Bryan. 2007. Plant Communities Associated with Native Monterey Pine (*Pinus radiata*) Forests. MS Forestry (Storer and Orr)

Rosengarden, Casey. 2007. Land Management Strategies and Fuelwood Collection in the Indigenous Ngäbe Village of Hato Horcón, La Comarca Ngäbe-Buglè, Panamá. MS Forestry (Orr)

Shartell, Lindsey. 2007. Risk Assessment for Invasive Exotic Plants using Predictive Modeling. MS Forest Ecology and Management (Nagel)

Satterlee, Brian. 2007. Maize Yield and Soil Properties Response to *Entada abyssinica* Cuttings in the Adamawa Lowlands, Cameroon. MS Forestry (Orr)

Kenny, Amber. 2007. Resource Allocation of Teak (*Tectona grandis*) for Small Landholders in Togo West Africa. MS Forestry (Orr)

Colling, Trisha. 2007. Discovery of an Activation Tagged Auxin Transporter in Poplar. MS Forest Molecular Genetics and Biotechnology (Busov)

Hancock, Jessica. 2007. Plant Growth Biomass Partitioning and Soil Carbon Formation in Response to Altered Lignin Biosynthesis in *Populus tremuloides*. MS Forest Ecology & Management (Pregitzer and Giardina)

Szczechowski, Bruce. 2007. Polychlorinated Biphenyl (PCB) Trends in Common Tern (*Sterna hirundo*) Eggs from the Detroit River and Michigan Great Lakes: 1972-2004. MS Applied Ecology (Gale)

- Mason, Lacey.** 2007. GIS Modeling of Riparian Zones Utilizing Digital Elevation Models and Flood Height Data. MS Forestry (Maclean)
- Eberhart Tara.** 2007. Emerald Ash Borer: Host Preferences of a Newly Established Population and Development of Silvicultural Management Tools. MS Forest Ecology & Management (Storer)
- Gahagan, Adam L.** 2007. Carbon Cycling and Storage after 60 Years of Stand Development in Red Pine (*Pinus resinosa*) Plantations and Mixed Hardwood Stands in Northern Michigan Old Fields. MS Forestry (Giardina)
- Janowiak, Maria.** 2007. Stand Structure and Diameter Distributions in Uneven-aged Northern Hardwoods. MS Forest Ecology & Management (Nagel)
- McClure, Jason D.** 2006. Hydrologic Contributions to Baseflow for a Northern Old-Growth Riparian Ecotone. MS Forest Ecology & Management (Giardina)
- Paulete, Francisca E.** 2006. The Gambia All Schools Tree Nursery Competition: Promoting Conservation in the Gambia through Grassroots Environmental Education. MS in Forestry (Orr)
- Joshua L. Reed.** 2006. Stand age and overstory effects on wood decomposition in Northern Great Lakes red pine and aspen. MS Forestry (Jurgensen).
- Joshua Shields.** 2006. Initial Effects of Group Selection with Seed-Tree Retention on Biodiversity in Northern Hardwoods. MS Forest Ecology & Management (Webster)
- Rewati R. Potkar.** 2006. Populus Micro-RNA and their Regulatory Role In Vegetative Dormancy. MS Forest Molecular Genetics and Biotechnology (Busov)
- Rachel Tarpey.** 2006. The Long-Term Effects of Silvicultural Thinning on Soil Physical Properties, Carbon, and Nitrogen Pools in a Red Pine (*Pinus resinosa* Ait.) Forest. MS Forest Ecology and Management (Jurgensen)
- Asha Latha Lakkavaram.** 2006. Comparative Bioinformatics Analysis of Cellulose Synthases in Arabidopsis thaliana and Populus trichocarpa Genomes. MS Forest Molecular Genetics and Biotechnology (Joshi)
- Robin M. Johnson.** 2006. Concentration of sugars, phenolic acids, and amino acids in the soil of forests exposed to elevated atmospheric CO₂ and O₃. MS Applied Ecology (Pregitzer)
- Janet Bandedff.** 2006. Understory 15N Acquisition and Methods for Determining d13C of Soil Respiration: Two Stable Isotope Studies. MS in Forest Ecology and Management (Pregitzer)
- Fanny Lys Casado Pena.** 2006. Tradeoffs between Growth and Condensed Tannins-Phenolic Glycosides Levels in Foliar Tissues of Salix. MS Forest Molecular Genetics and Biotechnology (Tsai/Harding).
- Pilon, Crystal.** 2005. Effectiveness of a Nondestructive Evaluation Technique for Assessing Standing Timber Quality. MS in Forestry (Erickson/Gale)
- Lund, Jennie M.** 2005. Garlic Mustard (*Alliaria petiolata*) Germination at Different pH Levels and Detection and Control in the Upper Peninsula of Michigan. MS Forest Ecology & Management (Nagel)
- Zumstein, Matthew D.** 2005. The USDA Forest Service, Public Participation and Content

Analysis. MS Forestry (Halvorsen)

Huntzinger, Brett. 2005. Winter Wolf Kill Rates of White-Tailed Deer in the Upper Peninsula of Michigan. MS Applied Ecology (Vucetich/Peterson)

Manarolla, Michelle. 2005. Breeding bird community structure in developed and undeveloped areas along the Lake Superior shoreline. MS in Applied Ecology (Flaspohler)

Ely, Marjorie D. 2005. Analysis of Renewable Energy Project Implementation: Biogas and Improved Cook Stoves in the Village of Chhaling, Bhaktapur District, Nepal. MS in Forestry (Orr)

Henry, Brian P. 2005. Monterey Pine (*Pinus radiata* D. Don) in California: Variation Among Native Forests and Forest Health as a Predictor of Tree Removal in Urbanized Forests MS Forestry (Storer)

Zerbock, Olaf. 2005. Land Use and Water Quality in El Corpus, Choluteca, Honduras. MS Forestry (Orr)

Calhoon, Emily. 2005. Nitrogen, Carbon, and Vegetation Dynamics in Subsurface Water of a Managed Forested Wetland. MS Forest Ecology and Management (Gale)

Robinson, Sara Craig. 2005. Fungal Interaction in Sugar Maple: The Development of Spalting and its Impact on Machinability. MS. (Laks/Richter)

Griggs, Jennifer. 2005. Simplified Floral Diversity and the Legacy of a Protected Deer Herd in the Agricultural Woodlots of Cade Cove, Great Smoky Mountains National Park. MS. (Webster)

Kruger, Laura. 2005. Evaluation of Stable Isotopes as a Tool to Delineate Geographic Catchment Areas of Little Brown Bat Hibernacula in Western Upper Michigan. MS. (Peterson)

Neuendorff, Jonathan. 2005. Stand Structure and Composition in a Northern Hardwood Forest After 40 Years of Single-Tree Selection. MS. (Nagel)

Powers, Matthew. 2005. Causal Mechanisms and Impacts of Pennsylvania Sedge Dominance in Wisconsin's Northern Hardwood Forests. MS. (Nagel)

Zanin, Daniella. 2005. Feasibility of Teak Production for Smallholders in Eastern Panama. MS. (Orr)

Vehring, Jon. 2005. Effect of Manufacturing Variables on Mold Susceptibility of Wood-Plastic Composites. MS. (Laks)

Desantis, Ryan. 2004. Post-harvest Effects of Mechanical Treatment and Prescribed Fire on Jack Pine (*Pinus banksiana*) Forest Biodiversity. MS. Applied Ecology (Storer)

Brodeur-Campbell, Sarah. 2004. Insect Herbivory on Low-Lignin Transgenic Aspen. MS. (J. Vucetich)

Durham, Andrea. 2004. Social Network Analysis of Women, Resources, and Community in Angia, Ecuador. MS. (Orr)

Eikenberry, Jennifer. 2004. Chronic Nitrate-Addition Alters Northern Hardwood Root and Leaf Litter Chemistry. MS. (Pregitzer)

- Filius, Kara.** 2004. 100% Inventory Methods for Urban Parks in Khimelnitsky, Ukraine. MS. (Orr)
- Graham, Elizabeth.** 2004. Disruption of the Response of Bark Beetles (Coleoptera: Scolytidae) to Compounds that Elicit Adult Aggregation in the Upper Peninsula of Michigan. MS. (Storer)
- Gurganus, Greer.** 2004. A Study of the Farming System and Technology Adoption in Yade-Bohou, Togo. MS. (Orr)
- Hubscher, Sandra.** 2004. Cryopreservation of Transgenic Populus Tremuloides Using a Vitrification Protocol. MS. (Tsai)
- Johansen, Angela.** 2004. Ammonium and Nitrate Uptake by *Populus tremuloides* in an Elevated carbon Dioxide and Ozone-Atmosphere. MS. (Friend)
- Judd, Matthew.** 2004. Introduction and Management of Neem (*Azadirachta indica*) in Smallholder's Farm Fields in the Baddibu Districts of the Gambia, West Africa. MS. (Orr)
- Keinath, Sara.** 2004. Environmental Education and Perceptions in Eastern Nepal: Analysis of Student Drawings. MS. (Orr)
- Lincoln, Kathryn.** 2004. The Use and Potential of the Pita Plant, *Aechmea Magdalenae* (André) André Ex. Baker, In a Ngõbe Village: A Case Study of Chalite, Bogas Del Toro, Panama. MS. (Orr)
- Musolf, Joseph.** 2004. Multi-dimensional Density Management Diagrams and Stand Structure Influence on Ground Flora for Jack Pine in the Sandy Outwash Plains of Michigan's Upper Peninsula. MS. (Nagel)
- Marshall, Jordan.** 2004. Biological Control and Ecological Impacts of Spotted Knapweed (*Centaurea Maculosa*) in the Upper Peninsula of Michigan. MS (Storer)
- Schwartz, Joseph.** 2004. Stand Dynamics and Silvicultural Recommendations for Uneven-Aged Northern Hardwoods in Upper Michigan. MS. (Nagel)
- Snively, Marian.** 2004. A Comparative Study of Cadmium and Copper in Ruffed Grouse (*Bonasa Umbellus*) From the Keweenaw Peninsula and Northern Wisconsin. MS. (Orr)
- Slatton, Russell.** 2004. An evaluation of Agricultural Adoption by Ngõbe Farmers in Chalite, Panama. MS. (Orr).
- Taylor, Jennifer.** 2004. Wetland Development and Genetic Diversity of *Sarracenia purpurea* L. (pitcher plant) in the Western Lake Superior Basin. MS. (Gale)
- Tischler, Keren.** 2004. Aquatic Plant Nutritional Quality and Contribution to Moose Diet at Isle Royale National Park. MS. (Peterson)
- Wangen, Steven.** 2004. Spatial and Temporal Dynamics of an Introduced Tree Species as it Invades a Temperate Forested Island. MS. (Webster)
- Aragona, Franklyn.** 2003. A Case Study of Onion Production in the Tipajara Watershed, Mizque Bolivia. MS. (Orr)

- Downs, C. Michael** 2003. Hearth Fuel Acquisition and Use in Morocco's Imnane Valley. MS. (Orr)
- Jones, Michael.** 2003. Evaluation of Honduran Forest Cooperatives: Five Case Studies. MS. (Orr)
- Joyce, Susan.** 2003. Pleasing All of the People None of the Time: The Challenges of Forest Planning. MS. (Halvorsen)
- Kaplan, Joseph.** 2003. Human Recreation and Loon Productivity in a Protected Area, Isle Royale National Park. MS. (J. Vucetich)
- Karberg, Noah.** 2003. Influence of Soil pCO₂ on Dissolved Inorganic Carbon Chemistry Under Elevated CO₂ and O₃. MS. (Pregitzer)
- Kinouchi, Michiko.** 2003. The Relative Abilities of Northern Conifers to Sequester Carbon in the Upper Peninsula of Michigan. MS. (Karnosky)
- Nakoulima, Angela.** 2003. Public Participation in National Forestland and Resource Management Planning. MS. (Halvorsen)
- Owens, Kristina.** 2003. Genetic Diversity of Annona cherimola Mill in South Central Bolivia. MS. (Orr)
- Owens, Wendy A.** 2003. Riparian Buffer Zones of the Ybytyruzú Mountain Range, Paraguay. MS. (Orr)
- Potvin, Marcel J.** 2003. A Habitat Analysis for Wolves in Michigan. MS. (Peterson)
- Wright, Gregory J.** 2003. An Analysis of the Northern Yellowstone Elk Herd: Population Reconstruction and Selection of Elk by Wolves and Hunters. MS. (Peterson)
- Amend, Joshua D.** 2002. Risk and Coffee Production in Mhaji, Tanzania. MS. (Orr)
- Blumer, Sara.** 2002. Characterization of a *Populus tremuloides* 5-Hydroxyconiferaldehyde O-methyltransferase (AsdOMT) Gene Promoter. MS. (Tsai)
- Campbell, Madeline I.** 2002. Spatial Variation in Stand Structure and the Role of Moose Herbivory at Isle Royale National Park, Michigan. MS. (Peterson)
- Cohen, Matthew E.** 2002. Utilizing Microcatchment Systems to Increase Tree Establishment Rates in the Bolivian High Plains. MS. (Orr)
- Crawford, Jeffrey N.** 2002. The Effects of Nitrogen Amendments on Belowground Carbon Cycling in Second Growth Sugar Maple Forests Along a Climatic and N-Deposition Gradient in Michigan, USA. MS. (Pregitzer)
- Fox, Susan G.** 2002. Analysis of Ecotourism: The Municipal Reserve "Curichi Cuajo" Buena Vista, Bolivia. MS. (Orr)
- Jarvis, Alec J.** 2002. Paraguayan Tung (*Aleurites fordii hensl.*): An Important Small Farmer Crop Diversification Strategy. MS. (Orr)

- Manty, Terry.** 2002. A Geographic Information System for Use in Making Management Decisions at the Ford Center Research Forest. MS. (Mroz)
- Mark, Phaik Yin.** 2002. Identification of Amino Acid Sequences that Determine Substrate Utilization by 4-Coumarate:Coenzyme A Ligase (4CL) Proteins in Aspen (*Populus tremuloides* Michx.) MS. (Tsai)
- Martinson, Tammie J.** 2002. Winter Bird Feeding and Localized Predation on Simulated Bark-Dwelling Arthropods. MS. (Flaspohler)
- Pregitzer, Maria I.** 2002. Forests of Eastern North America. MS. (Gale)
- Seablom, Thomas J.** 2002. Evaluation of Mechanized Logging Damage in Western UP Northern Hardwoods. MS. (Reed)
- Shao, Margaret.** 2002. *Parkia biglobosa*: Changes in Response Allocation in Kandiga, Ghana. MS. (Orr)
- Anderson, Heidi M.** 2001. Vascular and Non-Vascular Plant Community Responses to Created Microtopographies in a Managed Forested Wetland. MS. (Gale)
- Bub, Brian R.** 2001. Riparian and Upland Breeding Bird Communities in Northern Hardwood Forests Logged Using the Selection Method. MS. (Flaspohler)
- Chavli, Rajesh.** 2001. Molecular Cloning of Hypervariable Region II of Cellulose Synthase, Cellulose Synthase-like Genes in *Populus tremuloides* (aspen) MS. (Joshi)
- Cookman, Becky E.** 2001. Inventory of Habitat Critical to Juvenile Lake Sturgeon in the Lake Superior Basin Using Aerial Photographs. MS. (Maclean)
- Fox, Jennifer E.** 2001. Stress Physiology and Movement Behavior of Gray Wolves in Voyageurs and Isle Royale National Parks. MS. (Peterson)
- Gundale, Kelley Bassett.** 2001. Communicating Science to Fourth Grade Students at Hancock Elementary School in Hancock, Michigan. MS.(Orr)
- Heist, William L.** 2001. Community Tree Nurseries in Ghana, West Africa: A Case Study of the Collaborative Community Forestry Initiative (CCFI). MS. (Orr)
- Jones, Wendy S.** 2001. Selected Hybrid Larch Clones for Northern Regions: Evaluation of Growth, Frost and Soil Tolerances and Vegetative Propagation. MS. (Karnosky)
- Kane, Evan S.** 2001. Soil CO₂ Efflux Along a Diverse Environmental Gradient in Olympic National Park, Washington. MS. (Pregitzer).
- Ketchum, Blake.** 2001. Five Methods of Particle Size Analysis Used to Determine the Silt Content of Soil: A Comparison. MS. (Jurgensen/Gale)
- Rahn, Kristen E.** 2001. Cultural Assessment of Reforestation Practices in Rural Eastern Paraguay. MS. (Orr)
- Schnobrich, Katrina M.** 2001. An Ethnographic Study of Tree Planting Successes by Small Farmers in Paraguay. MS. (Orr)

Steinbrecher, Rebecca J. 2001. Characterization of Transgenic Aspen (*Populus tremuloides* Michx.) With Altered Expression of Two 4-Coumarate:CoA Ligase Genes and Field Study of Transgenic Aspen (*Populus tremuloides*) with Altered Lignin. MS. (Tsai)

Tirocke, Joanne M. 2001. Mycorrhizal Colonization of Red Pine and Jack Pine by Commercial Spore and Agar Slurry Inocula of Native Fungi in an Unfumigated Bare-Root Nursery. MS. (Richter)

Bergert, Daniel. 2000. Management Strategies of *Elaeis Guineensis* (oil palm) in Response to Localized Markets in Southeast Ghana, West Africa. MS. (Orr)

Bodine, Jason T. 2000. The Effects of Eight Silvicultural Treatments on Quality Development, Financial Returns and Regeneration Following 42 Years of Management. MS. (Mroz)

Brower, Andrew M. 2000. Honduras: An Ethnographic Study of El Armado National Wildlife Refuge and Guayape, Olancho. MS. (Orr)

Collins, Mary E. 2000. Age Structure, Growth and Regeneration of *Fraxinus nigra* Populations in the Upper Great Lakes States. MS. (Pregitzer)

DeForest, Jared L. 2000. Description of the Fine Roots of Nine North American Trees. MS. (Pregitzer)

Jacobs, Amy. 2000. Leadership Behavior in Dominant Breeding, Subordinate Breeding, and Non-Breeding Wolves (*Canis lupus*) in Yellowstone National Park, WY. MS. (Peterson)

Jaidee, Kongjak. 2000. Application of Digital Image Processing and 3-D GIS for Evaluating the Ecological Regions of the Little Carp River Watershed. MS. (Maclean)

Johnson, Jamie S. 2000. The Return of the Gray Wolf (*Canus lupus*) to Upper Michigan. MS. (Peterson)

Ploetz, Jeffrey D. 2000. Implementation and Effectiveness of a Traveling Nature Display for Environmental Education in Central Balkan National Park, Bulgaria. MS. (Orr)

Ploetz, Kerry L. 2000. An Ethnobotanical Study of Wild Herb Use in Bulgaria. MS. (Orr)

Risch, Anita. 2000. Vegetation-Environment Relationships within Small Tributary Watersheds of an Old-Growth Forest in Upper Michigan, United States. MS. (Pregitzer)

Schaefer, Carrie L. 2000. Spatial and Temporal Variation in Wintering Elk Abundance and Composition and Wolf Response on Yellowstone's Northern Range. MS. (Pregitzer)

Schmidt, Katrin. 2000. Effects of Elevated CO₂ and Soil Fertility on Fungal Biomass and Root Litter in Decomposing Pine Roots of Trembling Aspen (*Populus tremuloides Michaux*). MS. (Pregitzer)

Schmierer, James M. 2000. Growth and Development of Tamarack (*Larix laricina* (Du Roi) K. Koch) Following Bucket Mounding Site Preparation in an Upper Michigan Mineral Wetland. MS. (Reed)

Watkins, Radley. 2000. Road Effects on Understory Vascular Plants in a Managed Forest Landscape. MS. (Chen)

Wells, Christie J. 2000. The Effect of Potassium Oleate on the Bioremediation of a Petroleum Product and Volatile Organic Compounds. MS. (McGinnis)

Specific Guidelines for DOCTORAL DEGREES

Degrees Awarded:

Doctor of Philosophy (Ph.D.) In Forest Science

Doctor of Philosophy (Ph.D.) In Forest Molecular Genetics and Biotechnology

The doctor of philosophy degree is a terminal research degree. It is awarded in recognition of demonstrated mastery of subject matter in a chosen field of study and demonstrated competence in the conduct of an individual research investigation that represents a significant contribution to the cumulative knowledge of the field. The program of study and research will be planned and supervised by an Advisory committee. Each candidate's course work and research topic must be approved by the advisory committee as meeting the standards generally associated with the doctoral degree. A minimum of 30 course and/or research credit hours **beyond the MS degree** (or its equivalent) or a minimum of 60 course and/or research credit hours **beyond the bachelor's degree** is required.

Completion of Graduate School forms by required dates is the responsibility of the graduate student. Always keep a copy for your files before sending the signed forms down to graduate school. Comprehensive Exams must be completed within **five** years, and all requirements must be completed within **eight** years after first registering. It is advised, however, to complete your comprehensive exams **within first two years of your residence** so that you can focus on your research.

Campus Residency Requirement— Doctoral students must spend at least **four semesters** on campus at MTU beyond attainment of a bachelor's degree, or **two semesters** beyond attainment of a master's degree, in a formal program of study and research under direct supervision of their major advisor. The semesters in residence do not have to be continuous and can include summer terms. In special pre-approved instances, this residency requirement may be waived.

I. ADMISSIONS AND ACCEPTANCE

All incoming students will be expected to have an outstanding ability in previous academic work and will normally have completed a Master of Science program. In exceptional cases, students who have completed Bachelors of Science may also be admitted.

Students will be admitted by the Dean of the Graduate School after evaluation and recommendation by the faculty advisor and Graduate Program Director of the School of Forest Resources and Environmental Science.

Your acceptance in our program is equivalent to submitting Graduate School Form D1, "Acceptance into the Doctoral Program". A specific Graduate School Form D1 should only be filed if you are changing your status from MS to Ph. D.

II. ADVISORY COMMITTEE

Your Graduate Advisory Committee should be appointed before the end of **second semester of residence**. The Advisory Committee consists of a least **four** members, including one member designated as 'Chair'. The Chair is always the student's Advisor. The Chair must be a member of the School of Forest Resources and Environmental Science and the MTU Graduate School faculty. A minimum of **three** other members of your advisory committee, consisting of at least one **'outside'** member is to be selected by the student and his or her Advisor/Chair. The outside

member must be from another department or school within Michigan Technological University. Other committee members can be selected from outside of the MTU community (and not designated as adjunct faculty); however, these members cannot serve as the outside member of Michigan Tech. Your advisor must write a memo to the Graduate School and the School's Associate Dean, asking permission to place someone from outside the MTU community on your Advisory Committee. The memo must also include a justification for having this person (or persons) on your Advisory Committee.

Graduate School Forms D2 “Recommended Advisor” and D4A, “Recommended Advisory Committee”, are due in the Graduate School Office during or before the end of the **second semester of residence**. Changes in the Advisory Committee membership may be appropriate as the student's program evolves. Such changes must be approved in writing by the student's advisor and the School's graduate program Director, with proper notification to the Dean of the Graduate School. The Advisory Committee shall meet with the student early in the period of his or her residence to discuss and prepare an initial program of course work necessary for successful completion of the doctoral program. The list of course work is usually based on what the student may need for one or more of the following: (1) career goals; (2) research project; or (3) expertise needed to fulfill professional goals. The required courses should be listed on **Graduate School Form D3, “Preliminary Program of Study”**. This form is only for student's reference and should not be submitted to the Graduate School Office.

Meetings with the Advisory Committee shall be held at least semiannually to review the student's progress. It should be emphasized that such meetings are to be of tutorial and informative nature. The student will be expected to give a short presentation of his or her progress (course work and research) at these meetings, followed by a discussion. An important goal of these meetings is to help the student develop a high degree of professional competence and confidence.

Students on assistantships or fellowships must enroll for a minimum of nine credits, but not more than 12 credits, each semester (**The school will pay only for maximum of the 9 credits when assistantship is offered**). A grade of “A”, “AB”, or “B” should be obtained in ALL courses listed on your degree schedule; however, up to six credits of “C” may be applied toward your degree if 1) the courses are not the Forest Resources and Environmental Science (FW) courses, 2) are not **required courses for the degree**, and 3) **approved by the Graduate Program Director of the School of Forest Resources and Environmental Science and the student's Advisor**. No grade below a “B” is acceptable for required courses and courses within the School that are applied towards your degree.

III. COURSE WORK REQUIREMENTS

Each doctoral student's course work must be approved by his or her Advisory Committee. A minimum of **30** semester course and/or research credit hours beyond the Master's degree (or its equivalent), or a minimum of **60** semester course and/or research credits beyond the Bachelor's degree is required. Specific School of Forest Resources and Environmental Science course work requirements for Ph.D. students are listed in Table 2.

TABLE 2: Required courses for Ph. D. Students

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- 1) FW5800: Graduate Seminar. Students must register for this class during their first year of residence (credits 1).
 - 2) FW6800: Graduate Seminar. Students must register for this class sometime before their last year in residence (credits 1).
 - 3) FW6980: Graduate Teaching Experience (credits variable up to 4, discuss with your advisor).
 - 4) FW5850: Effective Grantsmanship Workshop (credits 3)(Spring)
 - 5) One Upper Division Statistics class from the list of suggested courses**
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** List of suggested statistics classes

MA 4710 - Regression Analysis
MA 4720 - Design and Analysis of Experiments
MA 4730 - Nonparametric Statistics
MA 4740 - Sampling Methods
MA 4750 - Applied Multivariate Statistics
MA 4760 - Mathematical Statistics I
MA 4770 - Mathematical Statistics II
BL 4470 - Analysis of Biological Data
MA 5701 - Statistical Methods
MA 5711 - Mathematical Statistics I
MA 5712 - Mathematical Statistics II
MA 5731 - Linear Models
MA 5740 - Advanced Sampling Methods
MA 5750 - Statistical Genetics
MA 5761 - Computational Statistics
MA 5791 - Categorical Data Analysis
BE 5550 - Biostatistics for Health Science Research
FW 5411 - Applied Regression Analysis
FW 5410 - Analysis of Natural Resource Data

All graduate students are required to be enrolled each academic term following entry into the PhD program until completion of all degree requirements. A full-time student on an assistantship must enroll for a minimum of nine credit hours per semester and not more than 12 credit hours each semester. During the summer, a full-time student on an assistantship must enroll for one (1) credit hour. Exemptions from this requirement for finite time periods, such as during a co-op employment program, may be obtained, in writing, from the Dean of the Graduate School.

[Research Only Mode petition](#)

Due one week prior to the first day of classes in the semester student plans to enter research only mode. All coursework, comprehensive exam and proposal defense must be completed and appropriate tracking forms must be on file.

IV. PROCEDURES FOR THE DOCTORAL PROGRAM

Doctoral students have three examinations/defenses they need to pass before they can obtain their Ph. D. degree (in the same order): (1) Comprehensive Examination; (2) Research (Dissertation) Proposal Defense; and (3) Final Dissertation Defense. The descriptions of each of these examinations/defenses are given below.

I) Comprehensive Examination

There are two parts to the comprehensive examination: **written and oral**. This exam is given to a student to test knowledge in at least four subject areas. The four subject areas are usually chosen by the student and their Advisor in consultation with the Advisory Committee. It is strongly advised that this exam should be taken and successfully completed within the first two years of enrollment. The following are descriptions of the examination committee and the written and oral examinations.

- 1.) **Examination Committee**: The Examination Committee will be comprised of the student's Advisory Committee. Additional members can be added at the discretion of the Committee, based on the subject areas chosen by the student and the Advisor.

- 2.) **Written Examination**: The written examination is the first exam given and is designed to test the student's knowledge and understanding, as well as ability to synthesize in the following areas:
 - (A) Basic concepts of the four subject areas, including any information necessary to teach an introductory course in these fields;
 - (B) Advanced material in four subject areas; and,
 - (C) Specific aspects of the student's proposed research field/area of specialty. Ultimate acceptance or rejection of answers given by the student on this examination will rest with the Examination Committee. *The written examination is usually taken after the student has completed most of the course work as required by the Advisory Committee. The written portion of the comprehensive examination should generally be scheduled no later than the last semester of the second year of residency.*

- 3.) **Oral Examination**: Subsequent to successful completion of the written examination, an oral examination covering material from the written examination and course work (undergraduate, as well as graduate courses) will be given. The student is expected to demonstrate orally an understanding of the current state of knowledge in those specific research areas. The oral examination must be taken *within one month after successful completion of the written examination.*

The Committee may require **re-examination in some or all areas** or may recommend **termination of the student's program at this time**, depending on the written and oral answers given by the student. Any re-examination must be taken within three months.

Graduate School Form D4, "Report on the Comprehensive Examination," should be submitted to school's Graduate Program Director before end of the second year of residence or at least **two** semesters prior to the research dissertation defense.

Upon satisfactory completion of the Comprehensive Examination, the **Graduate School Form D5, “Degree Schedule,”** *must be filed in the Graduate School Office prior to the semester of the final oral examination.* This degree schedule should include a list of all course work taken in the Masters and the Doctoral Programs. ***The Degree Schedule must be filed and approved prior to scheduling a dissertation defense.*** It must be approved by the Advisory Committee as meeting the standards associated with the Doctor of Philosophy degree.

NOTE: After successful completion of the Comprehensive Exam, the doctoral student becomes a “**doctoral candidate**”.

Research (Dissertation) Proposal Defense

A written research (dissertation) proposal is required of all PhD students. This proposal should include an introduction to the general topic of research, a relevant literature survey, an explicit statement of the hypotheses to be tested and/or goals or objectives of the research, methods needed to complete the research project and preliminary results or supporting evidence as to the legitimacy of the hypotheses.

The student should work closely with his or her Advisor to prepare the proposal. The student should submit the proposal to the Advisory Committee ***at least two weeks before the defense of the proposal.*** The student will be asked to orally defend his or her research (dissertation) proposal usually before the end of **the third year in residence.** The oral defense of the proposal will involve inquiries from the Advisory Committee concerning the student’s knowledge of the subject areas, and his or her proficiency as related to the dissertation research. At this point, the Committee will decide one of three options: (1) accept the proposal with little or no revision; (2) accept the proposal with major revisions; or (3) reject the proposal. Revisions may include a requirement for additional course work. Rejection of the proposal will result in dismissal from the doctoral program. Only option number (1) (acceptance of the research dissertation proposal) will provide the basis for approval of the dissertation proposal. The signed **Graduate School Form D6, “Approval of Dissertation Defense”**, should be sent to the Graduate School Office immediately after the proposal defense.

Final Dissertation Defense

The defense will be given following the successful completion of the Comprehensive Examination and the dissertation proposal defense. The final dissertation defense consists of a public seminar and a closed dissertation defense afterwards with the student’s Advisory Committee. The defense date has to be approved by the student’s Advisor, the School’s Graduate Coordinator and the Dean of the Graduate School. **Graduate School Form D7 “Scheduling of Final Oral Examination”** is due in the Graduate School Office at least ***two weeks prior to the defense.***

Doctoral Dissertation: The research study undertaken as a part of the doctoral degree program will be presented in the form of a dissertation that can be a permanent acquisition of the Library. An expanded abstract, not exceeding 350 words, should also be prepared and submitted electronically to Graduate school and School’s Graduate Program Director. Any classified or proprietary material that cannot be made available to the public is **not acceptable** as a dissertation. The dissertation will be written and prepared under the supervision of the

student's Advisor. A completed draft, prepared in accordance with the 'Instructions Concerning the Preparation of Theses and Dissertations', ***must be presented to the Advisory Committee at least four weeks prior to the final examination.***

Public Seminar: A final oral seminar on the doctoral research and dissertation will be given immediately preceding the dissertation defense. The seminar is open to the public. The candidate should state a short description of past work conducted by others in the research area and justify the objectives and the methods of the research with the results and conclusions contained in the dissertation. The candidate should be familiar with the importance of the particular investigation reported in the dissertation relative to the larger body of existing knowledge. A closed dissertation defense will take place afterwards with the student's Advisory Committee only.

Dissertation Defense: After the final examination has been satisfactorily completed, recommended editorial changes in the dissertation should be made with the approval of the student's Advisor and the Advisory Committee. The results of the examination must be reported to the Graduate School Office using **Graduate School Form D8, "Report on the Dissertation Defense", immediately following the exam, and no later than the first day of the month of commencement.**

Preparation of Dissertation for the Library: At least three copies of the dissertation and a cashier's receipt of payment for each copy to be bound must be submitted to the MTU Library. The Library will forward the copy for microfilming to the Graduate Student Office. An additional copy of the dissertation needs to be given to the School of Forest Resources and Environmental Science

V. CHANGE IN STATUS

Students can change their status from the Doctoral program to a Masters program by submitting a formal, written petition to the Advisory Committee and the School's Graduate Director. Once a change of status is approved, the Graduate School should be notified by the student in the form of a written petition.

Time Line to Degree: PhD

First reconcile this *suggested* chronology with your department's requirements. The sequence may not be the same as written here. Take this time line to a meeting your Advisory Committee to make sure that your goals are consistent with their expectations.

Date: _____

During the first semester of residence or as soon as possible thereafter:

_____ **Acceptance into the Doctoral Program¹ is equivalent to D1 form.** A formal D1 is only required if you are a MTU student and changing status from MS to Ph. D. [*For internal applications from Master's program only*].

_____ **D2, Recommended Advisor**—Your departmental graduate program Director appoints an advisor to meet with you and prepare a program of courses and research work. If at any time you wish to change advisors, it should be approved by the department graduate program Director and reported to the GSO (Graduate School Office). Arrange a meeting with your advisor to work on the D3, D4A and plan your degree path. Do this before **Second Term** on campus.

_____ **D4-A, Recommended Advisory Committee**—Your department graduate program Director appoints an advisory committee of graduate faculty members to meet with you and prepare a program of research work. Any changes in the membership of this committee should be approved by the department chair and reported to the GSO.

- Make sure the Graduate School Office has **official** final transcripts showing proof of your previous degrees (if not from Michigan Technological University).
- Get a **social security number** if you will be a Graduate Research Assistant (GRA) or Graduate Teaching Assistant (GTA), or otherwise working.
- Fill out a **Patent, Research and Proprietary Rights** form in your department office.
- Inform the Office of Student Records and Registration of any changes in your status, address, student identification number, etc.

During the second semester/semester of residence:

_____ **D3, Preliminary Program of Study.** Traditionally, this work contract is a list of all courses you have completed since you received your BS and any additional courses your committee says you should take. Do this by second semester if possible. Subsequent changes in course selections or anticipated completion date can be made on the D5 form. If credit transfers are necessary, use the Transfer Credits form found in this booklet. This form is only for your reference and should not be submitted to GSO.

As work goes on:

_____ **At least two semesters/semesters prior to scheduling the final oral examination** and no more than five years after beginning your doctoral program, you will be given a **written comprehensive exam** and an oral

exam. Satisfactory performance on the comprehensive exam indicates that no additional course work is needed, although you have the option of taking more.

_____ **D4, Report on the Comprehensive Examination.** We hold this form until the oral section of the exam. This exam must be taken at least two terms prior to defense and within 5 years of starting program. The D4 form will be submitted to your graduate program director only and not to GSO.

_____ **D5, Degree Schedule.** The Graduate School Office can start verifying your grades immediately.

¹All these forms can be sent by you or your advisor/department to the Graduate School Office via campus mail. Copies of signed forms will be returned to you and the department.

The Dissertation

Date:

_____ **D6, Approval of Dissertation Proposal.** This should be a statement of your research goal and plan of attack based on your dissertation proposal that should include an introduction to the general topic of research, a relevant literature survey, an explicit statement of the hypothesis(es) to be tested and/or goals or objectives of the research, methods needed to complete the research project and preliminary results or supporting evidence as to the legitimacy of the hypothesis(es).

_____ At least four weeks prior to your defense, send the dissertation draft to your advisory (four-member) committee.

_____ **D7, Scheduling of Dissertation Defense.** Due in the Graduate School Office at least **two weeks before the defense date**, but after the Advisory Committee has **approved** your draft and signed the back of the D7. The defense committee must be comprised of at least four graduate faculty members, including at least one from a cognate department. Non-MTU members of your committee must be pre-approved. Your copy of the signed form will be returned with instructions on how to complete your degree.

_____ **Dissertation Defense.** Take your **D8, Report on Dissertation Defense**, to your defense for signatures. Your advisory/department might hold the signed form until the corrected dissertation is submitted. Your research grades will not be changed until this form is in the Graduate School Office.

_____ After the defense, make corrections as directed and get the new original dissertation signed by the Dean Dr. Peg Gale and your advisor on cover page. Determine how many copies you need to make. The Graduate School requires three copies (two for the Library to bind and keep, and one for microfilming), but you and your advisor/department may want additional copies. Other details of completing your degree will be attached to your copy of the signed D7.

_____ **The Goal: Graduation.** No more than eight years after starting the doctoral program. You must take your dissertation receipt/stamped invoice, UMI

dissertation copy, UMI forms and payment receipt from the Library to the Graduate School Office. You can usually receive a certification letter immediately if all your degree requirements are complete. Your transcript will indicate degree granted by the fourth week of the next semester/semester. If you have left a valid address, your diploma will be mailed to your about 90 days after semester/semester end.

Be sure the Graduate School Office and your advisor are aware of your commencement plans at the **beginning** of the commencement semester/semester.

Forms for the Doctoral Degree

Forms listed below must be downloaded from the MTU Graduate website located at: <http://www.gradschool.mtu.edu/forms/tracking.html#doctoral>

- **D1—Acceptance into the Doctoral Program (Only for MTU MS Students)**
- **D2—Recommended Advisor**
- **D3—Preliminary Program of Study—PhD (for your information only)**
- **D4A—Recommended Advisory Committee**
- **D4—Report on the Comprehensive Examination (For school only)**
- **D5—Degree Schedule—PhD**
- **D6—Approval of Dissertation Proposal**
- [Research Only Mode petition](#)
Due one week prior to the first day of classes in the semester student plans to enter research only mode. All coursework, comprehensive exam and proposal defense must be completed and appropriate tracking forms must be on file.
- **D7—Scheduling of Final Oral Examination**
- **D8—Report on Final Oral Examination**
- **D9—Electronic Thesis and Dissertation Approval Form (Only if you wish your thesis/dissertation to be available via MTU library website)**

Recently in 2008, Graduate school made some changes in their policies. A letter from the Dean of Graduate School is available on the web (http://www.gradschool.mtu.edu/news/Dean_letter_0708.html) and can be seen on the next page.

Letter from the Dean of the Graduate School

July 18, 2008

I want to let you know about some changes to Michigan Technological University's policies regarding graduate student tuition and stipends that will be put into place starting in fall 2008.

The changes were proposed by a group of faculty, graduate students, and the dean of the Graduate School who were given a charge in January 2007 by the Executive Team to examine University policies related to graduate tuition and stipends. The group's final report was presented to the Executive Team in May 2008. [The entire report is available on the President's website at: www.mtu.edu/mtuonly/reports/]. The Executive Team presented its recommendations to the University's Board of Control in June 2008. The Board of Control approved the recommendations that are described below. These changes will become effective in fall 2008.

If you have any comments or questions, please contact either Jackie Huntoon or Nancy Byers Sprague (in the Graduate School). We will try to answer any questions or address any concerns.

Jackie Huntoon, dean of the Graduate School

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- I. **Changes to Tuition Policies:**
 - A. **Old policy:** All graduate students must register for at least 9 credits at the regular tuition rate to be considered full-time.
 - B. **New policy:**
 1. PhD students who have satisfactorily completed both their qualifying and dissertation proposal exams as well as all courses required for their degree (as applicable) can move into full-time research-only mode. The Graduate School will continue to enter documentation of completion of the proposal exam (or equivalent) into BANNER when the D6 form is received in the Graduate School. Departmental staff members will need to continue to enter the results of the qualifying exam (or equivalent exam, typically reported using the D4 form). Students in research-only mode will be eligible to register for full-time research for 9 credits and be charged a graduate research-only tuition rate that is equal to 1/3 of the normal graduate tuition rate at the start of the first semester following the student's completion of the required milestones. Students will petition (using a standard form

[available online](#)) the Graduate School for permission to enter research-only mode.

2. MS students will also be allowed to move into full-time research-only mode at the start of the first semester following completion all required courses as well as the required number of credits for their degree.

C. **Rationale:**

Purpose is to provide assistance to faculty who are supporting graduate researchers on external funds and assist self-supported students who wish to be full-time as well as international students who must be full-time for reasons related to immigration.

II. **Changes to Minimum Stipend Policies:**

A. **Old policy:**

1. All supported MS students were required to receive a minimum stipend of \$4684 per semester during 2007-08.
2. All supported PhD students were required to receive a minimum stipend of \$5438 per semester during 2007-08.

B. **New policy:**

[Table 1](#) summarizes the changes to the minimum stipend levels for MS and PhD students. The Graduate School is working to streamline methods for running BANNER reports that will help departmental staff determine which category the students within their unit fall. A training session for staff members will be offered as soon as the programming is completed that will allow the reports to be generated on a department-by-department or program-by-program basis. Students will be eligible for the increased stipend and the start of the first semester following completion of the required milestones.

C. **Rationale:**

Purpose is to encourage students to complete required milestones and begin working on their research in a timely manner.

III. **Changes to Continuous Enrollment Policies:**

A. **Old policy:**

1. Students who needed time out for special circumstances and due to enrollment in programs with inactive terms enrolled in UN5951 (Graduate Status - Maintenance of Continuous Enrollment). Course carried a \$100 fee. A special “no-fee” section was available for students on active military duty (proof of active status was required), Applied Science Education (SASE) students, and students pursuing online degrees.
2. Students who were engaged in writing or revising a report, thesis, or dissertation while off campus could enroll in UN5952 (Report, Thesis, Dissertation – Independent Writing and Revision) for 0.25 credits.

3. Students who needed to enroll in one credit to comply with Michigan Tech 's requirement that students must be enrolled in a minimum of one credit during their defense semester could enroll in UN5953 (Final Term Graduate Registration).

B. New policy:

1. Allow students who need a "time-out" due to extenuating circumstances (such as illness) or lack of available courses (for students in online or blended degree programs) to register for the no-fee section of UN5951. Graduate School permission (using an online form) is needed prior to registration for this course. The Graduate School will require a doctor's recommendation for a leave of absence if registration in UN5951 is requested due to illness.
2. UN5952 is now eliminated. Students must register for at least one full credit per academic-year semester to remain continuously enrolled.
3. UN5953 will continue to be used for final-semester enrollment and can now also be used for continuous enrollment purposes if it is more appropriate for a student than enrollment in a single credit of thesis research. Departmental permission is needed prior to students' registration for this course. Departments will use the same process that is used to grant permission to register for research credits.

C. Rationale:

Purpose is to eliminate fee for UN5951, eliminate the 0.25 credit course UN5952, standardize the required minimum enrollment, and reduce the financial incentive for students to leave campus prior to completing their degrees.

Table 1: Schedule for minimum stipend rates for MS and PhD students at Michigan Tech during 2008-09. Minimum stipends for the 2007-08 are noted for comparison purposes.

Graduate Student Minimum¹ Stipend Rate Categories for 2008-09	Minimum 2008-09 Rates	Minimum 2007-08 Rates For Comparison
MS Students	\$ 4,871	\$ 4,684
Incoming PhDs Lacking an MS Degree ²	\$ 5,438	\$ 5,438
Continuing PhDs Lacking an MS Degree	\$ 5,438	\$ 5,438
Incoming or Continuing PhDs with an MS Degree ³	\$ 5,656	\$ 5,438

PhDs After Passing Qualifying Exam (with or without MS)	\$ 5,906	\$ 5,438
PhDs After Passing Qualifying and Proposal Defense Exam (with or without MS)	\$ 6,156	\$ 5,438
<p>1. Departments or faculty can use funds from external or Michigan Tech Fund sources to provide students with higher stipends up to a maximum of \$30,000 per year. Support from Michigan Tech Fund sources can also be used to supplement stipends funded from Michigan Tech's General Fund (i.e., GTA stipends).</p>		
<p>2. Incoming PhD students who lack an MS who have already been made offers of support will be "grandfathered in" and receive support at the 2007-08 minimum PhD stipend level. Beginning in fall 2009, all newly accepted PhD students lacking an MS will receive minimum support at a level equal to the MS rate. After completion of the qualifying exam, all PhD students will receive minimum support at the post-qualifying exam rate.</p>		
<p>3. This stipend rate will be used by Research and Sponsored Programs for all PhD students during the preparation of budgets for proposals to external sponsors.</p>		

Recent Ph.D. Dissertations (Updated 1/9/2009)

Van Diepen, Linda. 2008. Role and Diversity of Arbuscular mycorrhizal Fungi in Acer saccharum Dominated Forest Ecosystems Under Natural and N-amended Conditions. PhD Forest Science (Lilleskov and Pregitzer)

Powers Matthew. 2008. Physiological Performance and Stand Dynamics in Managed Red Pine Forests with Complex Stand Structures. PhD Forest Science (Webster and Pregitzer)

Anton Fernandez, Clara. 2008. Towards Greater Accuracy in Individual-Tree Mortality Regression. PhD Forest Science (Froese)

Bassett-Touchell, Audra C. 2008. Anthropogenic Influences on the Ecology of Forest Songbirds at Sleeping Bear Dunes National Lakeshore: Focusing on Roads. PhD Forest Science (Flaspohler)

Windels, Steven. 2008 The Ecology of Canada Yew (*Taxus canadensis* Marsh.), a Declining Species. PhD Forest Science (Flaspohler)

Anino, Edward. 2008. Characterization of *Populus tremuloides* 4CL1, 4CL2 and COMT Gene Promoters to Identify Regulatory Elements. PhD Forest Molecular Genetics and Biotechnology (Tsai)

Gleason, Mark. 2008. The Potential Use and Impacts of Underwater Remotely Operated Vehicles in Public Natural Resources Education. PhD Forest Science (Gale)

Pokharel, Bharat. 2008. A Critical Evaluation of Diameter Increment Modelling in the Great Lakes Region. PhD Forest Science (Froese)

Brodeur-Campbell, Sarah. 2008. Ash (*Fraxinus* spp.) in Upper Michigan: Current Conditions and Short Term Changes of a Resource Threatened by the Exotic Emerald Ash Borer (*Agilus planipennis*) PhD Forest Science (Storer)

Karberg, Jennifer M. 2008. Restoration, Genetic Diversity and Adaptation of Carnivory in Response to Environment in *Sarracenia purpurea* (the Northern Pitcher Plant). PhD Forest Science (Gale)

Bump, Joseph, 2008. Large predators, prey carcasses, resource pulses, and heterogeneity in terrestrial ecosystems. PhD Forest Science (Peterson and Vucetich).

Thammannagowda, Shivegowda. 2007. Molecular Genetic Analysis of Cellulose Biosynthesis in Poplars. PhD in Forest Molecular Genetics and Biotechnology (Joshi)

Fissore, Cinzia. 2007. Biotic and Abiotic Controls on Soil Organic Carbon Quality Along a Paired Pine and Hardwood Climosequence. PhD Forest Science (Giardina)

Darbah, Joseph. 2007. Impacts of Elevated Atmospheric CO₂ and/or O₃ on Carbon Gain and Reproductive Capacity in Northern Forest Ecosystems. PhD Forest Science (Karnosky)

Hurley, Peter. 2007. White-tailed Deer (*Odocoileus virginianus*) Overabundance and the Ecology of Forest Understory Communities in Protected Areas. PhD Forest Science (Flaspohler)

Corace, Gregory III. 2007. Geographic Assessment Methodologies for Openland Cover Types and Bird Species: From 12 Midwest States to the Upper Peninsula of Michigan, What are the Conservation Implications? PhD Forest Science (Flaspohler).

Rajinikanth Mohan. 2006. Cloning and characterization of glycine decarboxylase complex and serine hydroxymethyltransferase genes involved in one-carbon metabolism in *Populus tremuloides*. PhD in Forest Molecular Genetics and Biotechnology (Tsai)

Rosemier, Justin. 2006. Beech Bark Disease: Assessing the Potential Impacts of an Exotic Forest Pest Complex on Native Small Mammal Communities in the Upper Peninsula of Michigan. Ph. D. Forest science (Storer)

Opuni-frimpong, Emmanuel. 2006. Improving productivity and conservation of African mahogany: genetic selection propagation and silvicultural management of *Hypsipyla robusta* (Moore). Ph. D. Forest Science (Karnosky/Storer)

Ranjan, Priya. 2005. Analysis of Expressed Sequence Tags in *Populus* Tissues and Characterization of Copia Elements in Arabidopsis Genome. Ph. D. Forest Molecular Genetics and Biotechnology (Joshi/Tsai)

Wu Yun. 2005. Fungal Associates of Mile-A-Minute Weed (*Polygonium perfoliatum* L.) and the Potential as Biological Control Agents. Ph. D. Forest Science (Gale)

Lung, Jrhau. 2004. Molecular Characterization and Expression Analysis of Taxadiene Synthase and 10-Deacetyl Baccatin III Acetyltransferase From *Taxus mairei*. PhD (Tsai)

Euskirchen, Eugenie S. 2003. Carbon Fluxes in Managed Forest Landscapes: An Empirical and Model-Based Approach. PhD (Pregitzer)

Kalluri, Udaya. 2003. Comparative Expression Analysis of Cellulose Biosynthesis Related Genes from Aspen Trees (*Populus tremuloides*). PhD (Joshi)

Samuga, Anita. 2003. Molecular Characterization of Four Members of Cellulose Synthase Gene Superfamily in Aspen (*Populus tremuloides*). PhD (Joshi)

Sharma, Pooja. 2003. Moderation of Co₂-induced Gas Exchange Responses by Elevated Topospheric CO₂ in Trembling Aspen and Sugar Maple. PhD (Karnosky)

Stark, Nicole. 2003. Photodegradation and Photostabilization of Weathered Wood Flour Filled Polyethylene Composites. PhD (Matuana)

Li, Qingxiu. 2002. Extrusion Foaming of Polyblefin/Wood-Flour Composites. PhD *(Matuana)

- Verhey, Steven A.** 2002. The Effect of Manufacturing Variables, Fungal Exposure, and Moisture Cycling on the Durability of Wood Fiber/thermoplastic Composites. MS (Laks)
- Wang, Yuh-Shuh.** 2002. Isolation and Characterization of cDNAs Involved in Vascular Development of Quaking Aspen (*Populus tremuloides*). Ph.D. (Tsai)
- Blickenderfer, Mary M.** 2001. Adaptations of *Andropogon gerardii* and *Schizachyrium scoparium* in Disjunct Populations Northeast of Their Contiguous Range. Ph.D. (Gale)
- Kao, Yu-Ying.** 2001. Genetic Transformation of *Acacia magium x auriculiformis* and Molecular Characterization of Phenylalanine Ammonia-Lyase in Quaking Aspen (*Populus tremuloides*) PhD (Tsai)
- Goebel, Patrick C.** 2001. Hydrogeomorphic Controls on Riparian Areas of the Northern Lake States. Ph.D. (Pregitzer)
- Mengeloglu, Fatih.** 2001. Rigid Polyvinyl Chloride/Wood-Flour Composites and Their Foams. Ph.D. (Matuana)
- Noormets, Asko.** 2001. The Effect of Interacting CO₂ and O₃ on the Carbon Balance of Aspen (*Populus tremuloides Michx.*) Grown in an Open-Air CO₂ and O₃ Enrichment System. Ph.D. (Karnosky)
- Owens, Karen E.** 2001. Development and Analysis of Current and Presettlement Forest Cover Mapping Methods for the Eastern Upper Peninsula of Michigan, Luce District. Ph.D. (Maclean)
- Pechter, Priit.** 2001. Characterization of Transgenic Aspen (*Populus tremuloides Michx*) Harboring a Homologous Cinnamate 4-Hydroxylase (*C4H*) Transgene and Analysis of Two Aspen 4-Coumarate: CoA Ligase (*4CL*) Gene Promoters. Ph.D. (Tsai)
- Vucetich, Leah.** 2001. Genetics, Fitness, and Mercury Exposure in Isle Royale Deer Mice (*Peromyscus maniculatus*). Ph. D. (Peterson)
- Brown, Shannon E.** 2000. Production Dynamics and Climate in Four Northern Hardwood Stands Located in Michigan. Ph.D. (Pregitzer)
- Jaiteh, Malanding S.** 2000. The Dynamics of Human-Induced Land Cover Change in Miombo Ecosystems of Southern Africa. Ph.D. (Chen)
- Londo, Andrew J.** 2000. Effects of Bucket Mounding Site Preparation on the Processes and Functions of A Subboreal Mineral Wetland. Ph.D. (Mroz)
- Brosofske, Kimberly.** 1999. Relationships Between Understory Vegetation a Landscape Structure Across Multiple Spatial Scales in Northern Wisconsin. Ph.D. (Chen)
- Wang, Wenlong.** 1999. Colatile Organic Compound Emissions During Particleboard Hot-Pressing with Southern Pine Finish. Ph.D. (Gardner)

Kudray, Gregory. 1999. Ecological Classification of Wetlands in the Western Half of the Hiawatha National Forest, Upper Michigan, USA. Ph.D. (Gale)

Wang, Wenlong. 1999. Volatile Organic Compound Emissions During Particleboard Hot-Pressing with Southern Pine Finish. Ph.D. (Gardner)

Wang, Xiping. 1999. Stress Wave-Based Non-Destructive Evaluation (NDE) Methods for Wood Quality of Standing Trees. Ph.D. (McGinnis)

Sen, Banalata. 1999. Molecular Characterization and Functional Analysis of MADS Box Family Genes from Dioecious Aspen. Ph.D. (Karnosky)

Vucetich, John A. 1999. The Influence of Population Variability on Demographic and Genetic Components of Extinction Risk. Ph.D. (Peterson)

List of SFRES Graduate Faculty Members

- Dr. Andrew Burton.** Research interests: Forest responses to global change factors, belowground processes, carbon and nutrient cycling, physiological ecology of tree roots, ecosystem ecology, undergraduate involvement in research. Email: ajburton@mtu.edu
- Dr. Victor Busov.** Research interests: Tree functional genomics; activation tagging for functional gene discovery in trees; hormonal regulation of tree growth and development; micro RNAs role in regulation of woody plant development. Email: vbusov@mtu.edu
- Dr. Rod Chimner.** Research interests: Applied wetland ecology, Riparian and wetland restoration, Peatlands, Mountain wetlands, Tropical peatlands, Ecosystem carbon cycling, Wetland ecohydrology. Email: rchimner@mtu.edu
- Dr. Paul Doskey.** Research interests: Atmospheric Sciences, Environmental Engineering, Environmental Biogeochemistry and Sustainability. Email: pvdoskey@mtu.edu
- Dr. David J. Flaspohler.** Research interests: Conservation biology, ornithology, reproductive ecology and forest management, forest and openland songbird habitat use and demography, seabird habitat use, amphibian ecology, tropical ecology. Email: djflaspo@mtu.edu
- Dr. Robert E. Froese.** Research interests: Forest vegetation simulation modelling. Modelling tree height growth and yield. Site quality estimation using methods based on tree physiology. Applied statistical tools to support quantitative resource analysis and modelling. Measurement error models. Email: froese@mtu.edu
- Dr. Margaret R. Gale.** Research interests: wetland ecology, plant ecology, root ecology. Email: mrgale@mtu.edu
- Dr. Kathleen E. Halvorsen.** Research interests: Sociology of natural resources; natural resource and environmental policy; ecosystem management. Email: kehalvor@mtu.edu
- Dr. Chandrashekhar P. Joshi.** Research interests: Plant molecular genetics, genetic engineering of cellulose and lignin in trees, regulation of gene expression during fast growth, tree genomics and forest bioinformatics. Email: cpjoshi@mtu.edu
- Dr. Martin F. Jurgensen.** Research interests: Forest soils/soil biology; organic matter decomposition/soil carbon relationships; management effects on soil chemical, physical, and microbiological properties; soil/forest productivity relationships. Email: mfjurgen@mtu.edu
- Dr. Peter E. Laks.** Research interests: Wood preservation, the development of low mammalian toxicity wood preservatives based on agricultural chemistries, the use of chemical additives to improve the properties of wood composites, phytochemistry. Email: plaks@mtu.edu
- Dr. Erik Lilleskov.** Research interests: Mycorrhizal communities at the stand level--examining the spatial structure of ectomycorrhizal fungal communities and, through experimental lab and field studies, determining the effect of small-scale alteration of nutrient availability on mycorrhizal community dynamics. elilleskov@fs.fed.us
- Dr. Ann L. Maclean.** Research interests: Remote sensing, digital image processing, geographic information systems. Email: amaclean@mtu.edu
- Dr. Linda M. Nagel.** Research interests: Silviculture; forest vegetation dynamics; physiological processes of forest stand structures; tree ecophysiology. Email: lmnagel@mtu.edu

Dr. Blair D. Orr. Research interests: International forestry (particularly arid areas in developing countries), economic modeling of forest management and industries. Email: bdorr@mtu.edu

Dr. Rolf O. Peterson. Research interests: Ecology and population dynamics of mammals; carnivore ecology; predator-prey relationships; wolf-prey dynamics and other ecological studies at Isle Royale National Park. Email: ropeters@mtu.edu

Dr. James B. Pickens. Research interests: Management science, harvest scheduling, operations research, mathematical models. Email: jpickens@mtu.edu

Dr. Thomas Pypker. Research interests: Forest Hydrology, micrometeorology, ecohydrology, carbon cycling, stable isotopes. Email: tgypker@mtu.edu

Dr. Dana L. Richter. Research Interests: Forest mycology, pathology, fungal ecology; tree and forest disease diagnosis and assessment; wood decay and mold/stain testing of wood, composites, coatings, preservatives and fungicides; fungus isolation and identification; mycorrhizae; mushrooms. drichte@mtu.edu

Dr. Andrew J. Storer. Research interests: Forest insect ecology; insect/fungus/plant interactions; impacts of exotic species on forest ecosystems; interaction among fire, insects and disease; urban forest health. Email: storer@mtu.edu

Dr. John A. Vucetich. Research interests: Quantitative ecology, demographic and genetic aspects of population biology (e.g., predation and management of genetic diversity), and the application of population models to management. Email: javuceti@mtu.edu

Dr. Leah M. Vucetich. Research interests: Molecular ecology, laboratory and statistical analysis of genetic data, analysis of survival data, and the effect of moose herbivory on forest dynamics. Email: lmvuceti@mtu.edu

Dr. Christopher R. Webster. Research interests: Quantitative ecology and forest management; stand dynamics and silviculture in structurally complex, mixed-species forests; plant community ecology; ecological restoration; dendrochronology; plant herbivore interactions. Email: cwebster@mtu.edu

Dr. Hairong Wei. Research interests: Plant Bioinformatics, Systems biology and Genomics. Email: Hairong@mtu.edu

Dr. Xiaohong Zhu. Research interests: Plant molecular biology and biochemistry, Amino acid metabolisms, VIGS, cellulose biosynthesis. Email: xzhu1@mtu.edu

Code of Conduct For All Graduate Students

The quality of a graduate education depends in part on the quantity and quality of interactions between students and advisors (and students and students!). Each person's experience in graduate education is unique, and advising expectations need to be developed through discussions between the student and advisor. This prospectus gives a general view of graduate education, and is intended as a starting point for developing programs that suit each student.

Philosophy:

Graduate education deals with developing knowledge, the ability to use knowledge, and the ability to think with creativity and skepticism. A Masters level education aims to develop a student's ability to participate in research, typically at the level of applying research (to natural resource issues, for example). A doctoral level education aims to produce researchers (professional or vocational). There are high expectations for student accomplishments, and time invested to help students achieve their goals.

A doctoral program is qualitatively different from a masters program – not just more of the same. Differences include greater rigor for a PhD -- not just in hours expended, but in accomplishments and abilities as a researcher. Students gain knowledge and understanding from many parts of a university -- by hanging out with fellow students, in classes, in journals, and in research projects.

The advisor serves a double role in graduate programs. As a mentor, the advisor supports, encourages and nurtures each student's development. As a professor, the advisor also judges the accomplishment and potential of each student. Students should expect support from advisors, but this support may sometimes include uncomfortable criticism and challenges. Some students begin graduate work with a vision that turns out not to match the real program – such as the program requiring greater dedication, sharper thinking, broader knowledge, more skills in math, writing, analysis, logic, or chemistry. The advisor is responsible for helping students develop their visions and accomplishments to meet the demands of the program. On rare occasion, the match just doesn't come, and the student and advisor need to discuss a transition out of the program. **(Binkley, Personal Communication)**

WORK AND VACATION

Students with half-time research assistantships are required to fulfill a work requirement averaging 20 hours per week. How these hours are spent and to whom they are owed must be worked out between the individual graduate student and your Advisor. Teaching assistantships (not FW6980) normally require 16 to 20 hours per week assisting in the conduct of assigned classes. These hours may include classroom teaching, preparation and clean up for class and or laboratory, grading, office hours, and generally helping out in lectures and/or labs when needed. The specific details of each teaching assignment must be worked out between the teaching assistant and the principal instructor for each course. Students without assistantships owe their time to no one but themselves. *However*, all students, regardless of whether they have an assistantship or not, are encouraged to associate with other graduate students and to lend a hand when needed. Students on graduate assistantships are not entitled to many fringe

benefits, including vacation, which permanent employees receive. However, time off can usually be arranged as needed by proper planning and coordination with their Advisor. In other words – **plan ahead!** In general, it is best you give your Advisor a copy of your class schedule at the beginning of each semester. It tends to minimize confusion.

ETHICS

Each student will be expected to maintain an ethical conduct throughout his or her graduate program in the School of Forest Resources and Environmental Science. Ethical conduct is conforming to well-accepted and well-established professional standards of conduct. Unethical conduct is considered: (1) cheating on examinations and other assignments; (2) plagiarism, the presentation of ideas and exact words of another person as one's own (e.g., copying verbatim passages, tables and figures from books and articles); and (3) falsification or misrepresentation of ideas or research data. Copyright laws in the United States allow the use of limited quotes from books and research articles. Students should confer with their Advisor and Advisory Committee for procedures and limitations associated with citing published material. Unethical conduct by a student will be brought to the attention of student's Advisory Committee and the School's Dean for disciplinary action.

PUBLICATIONS

With assistance of their Advisor, students are strongly encouraged to prepare papers based on their thesis, report or dissertation to be submitted for publication or for public presentation.

GRIEVANCES

Any student who has a grievance with his or her Advisory Committee or Advisor may do so using established School procedures as outlined in the Charter of the School of Forest Resources and Environmental Science or by talking with the Dean or Graduate Program Coordinator of the School.

COURSE WORK OFFERINGS

Course Work offerings for graduate degrees in forest Science areas

Forestry

- FW 3010 - Practice of Silviculture
- FW 3012 - Survey of Silviculture
- FW 3020 - Forest and Landscape Ecology
- FW 3075 - Introduction to Biotechnology
- FW 3080 - Engineered Wood Products
- FW 3082 - Solid Wood Products
- FW 3098 - Wood Processing and Manufacture
- FW 3110 - Natural Resource Policy
- FW 3150 - Timber Harvesting
- FW 3170 - Land Measurements and GPS
- FW 3180 - Geomorphology, Landscapes and Ecosystems
- FW 3190 - Multi-resource Assessment
- FW 3200D - Introduction to Outdoor Recreation and Parks, and Tourism
- FW 3202 - Lake Superior Field Course
- FW 3203 - Conservation Communication
- FW 3204 - Environmental Interpretation
- FW 3205 - Wilderness Leadership
- FW 3206 - Outdoor Skills
- FW 3208 - Internship Isle Royale National Park
- FW 3300 - Introduction to Genomics
- FW 3330 - Soil Science
- FW 3376 - Forest & Environmental Resource Management (The FERM)
- FW 3410 - Conservation Biology
- FW 3540 - An Introduction to Geographic Information Systems for Natural Resource Management
- FW 3600 - Wildlife Habitat
- FW 3610 - Ornithology
- FW 3620 - Field Ornithology
- FW 3630 - Wildlife Habitat and Population Ecology
- FW 3760 - Human Dimensions of Natural Resources
- FW 3800 - Insect Ecology
- FW 3840 - Forest Health
- FW 3900 - Conservation Biology and Ecology in Vera Cruz
- FW 3910 - Mushrooms of Vera Cruz
- FW 4080 - Forest Economics and Finance
- FW 4087 - Molecular Genetics of Trees
- FW 4089 - Bioinformatics
- FW 4110 - Tree Seedling Production and Greenhouse Management
- FW 4120 - Tree Physiology and Genetics
- FW 4130 - Biometrics
- FW 4140 - Vegetation Modeling
- FW 4150 - Forest Resource Management
- FW 4220 - Wetlands
- FW 4240 - Mammalogy
- FW 4300 - Introduction to Wildland Fire
- FW 4360 - Forest Soils and Watershed Management
- FW 4400 - Urban Forestry
- FW 4500 - Independent Study
- FW 4540 - Remote Sensing of the Environment
- FW 4610 - Wildlife Ecology

FW 4630 - Isle Royale Field Ecology Camp
FW 4632 - Southwest Field Ecology Camp
FW 4750 - Forest Diseases and Fungal Ecology
FW 4810 - Integrated Resource Assessment
FW 4850 - Environmental Education Methods
FW 5020 - Identification & Biology of Forest Vegetation
FW 5024 - Advanced Wood Preservation
FW 5030 - Forest Measurement & Assessment
FW 5050 - Current Topics in Forest Biotechnology
FW 5068 - Advanced Wood Composites
FW 5070 - Developmental and Ecological Genetics
FW 5080 - Gene Profiling Analysis
FW 5085 - Functional Genomics and Biotechnology
FW 5088 - Forest Finance & Economics
FW 5089 - Tools of Bioinformatics
FW 5100 - Advanced Terrestrial Ecology
FW 5110 - Advanced Natural Resource Policy
FW 5115 - Restoration Ecology
FW 5120 - Ecophysiology of Forest Productivity
FW 5130 - Forest Vegetation Dynamics
FW 5150 - Advanced Natural Resource Policy Analysis
FW 5160 - Operations Research in Natural Resource Management
FW 5221 - Advanced Wetland Science
FW 5350 - Soil Biology
FW 5376 - Advanced Forest and Environmental Resource Management
FW 5400 - Advanced Conservation Biology
FW 5410 - Analysis of Natural Resource Data
FW 5411 - Applied Regression Analysis
FW 5510 - Special Topics in Natural Resources
FW 5550 - Geographic Information Systems for Resource Management
FW 5560 - Digital Image Processing: A Remote Sensing Perspective
FW 5600 - Advanced Insect Ecology
FW 5641 - Global Change Institute for Teachers
FW 5700 - Graduate Field Forestry
FW 5701 - Graduate Field Applied Ecology
FW 5710 - Trees in Agricultural Systems
FW 5720 - International Forestry Seminar
FW 5730 - Field Work in International Forestry
FW 5740 - Overseas Research
FW 5760 - Graduate Tropical Forestry
FW 5770 - Rural Community Development Planning and Analysis
FW 5800 - Master's Graduate Seminar
FW 5810 - Research Methods in Natural Resources
FW 5850 - Effective Grantsmanship Workshop
FW 5998 - Forest Resources and International Forestry Master's Research
FW 5999 - Forest Resources and Environmental Science Master's Research
FW 6800 - Doctoral Graduate Seminar
FW 6980 - Graduate Teaching
FW 6999 - Forest Resources and Environmental Science Doctoral Research

Computer Science

CS4421 Database Systems

Biological Science

BL4010 Biochemistry I

BL4020 Biochemistry II

BL4140 Plant Physiology
BL4220 Applied and Industrial Microbiology
BL4430 Biological Simulation Techniques
BL4450 Limnology
BL4470 Analysis of Biological Data
BL4740 Introduction to Mycology
BL4810 Plant Taxonomy
BL4820 Biochemical Lab. Techniques I
BL5150 Advanced Plant Physiology
BL5160 Plant Biochemistry & Molecular Biology
BL5460 Advanced Ecology: Ecosystems
BL5750 Advanced Ecology: Communities

Civil Engineering

CE4502 Wastewater Treatment and Collection
CE3610 Hydrology
CE4630 Hydraulic Structures

Economics

EC3400 Economic Decision Analysis

Geology

GE4760 Eng. Evaluation of Mineral Deposits

Humanities

HU4625 Risk Communication
HU6060 Special Topics in Philosophy

Mathematics

MA4760 Mathematical Statistics I
MA4770 Mathematical Statistics II
MA5510 Ordinary Differential Equations
MA4710 Regression Analysis
MA4720 Design and Analysis of Experiments
MA4730 Non-parametric Statistics
MA4330 Linear Algebra I
MA2720 Statistical Methods I

Mechanical Engineering

ME4610 Advanced Machining Processes
ME4660 Data Based Modeling

Mining Engineering

MG4600 Geostatistics I

Course Work offerings for degrees in Forest Molecular Genetics and Biotechnology

Forestry

FW 3075 - Introduction to Biotechnology
FW 3300 - Introduction to Genomics
FW 3410 - Conservation Biology
FW 4087 - Molecular Genetics of Trees
FW 4089 - Bioinformatics
FW 4110 - Tree Seedling Production and Greenhouse Management
FW 4120 - Tree Physiology and Genetics

FW 4130 - Biometrics
FW 5050 - Current Topics in Forest Biotechnology
FW 5070 - Developmental and Ecological Genetics
FW 5080 - Gene Profiling Analysis
FW 5085 - Functional Genomics and Biotechnology
FW 5089 - Tools of Bioinformatics
FW 5800 - Master's Graduate Seminar
FW 5850 - Effective Grantsmanship Workshop
FW 5999 - Forest Resources and Environmental Science Master's Research
FW 6800 - Doctoral Graduate Seminar
FW 6980 - Graduate Teaching
FW 6999 - Forest Resources and Environmental Science Doctoral Research

Mathematics

MA4550 Math Models in Biomathematics
MA4710 Regression Analysis
MA4720 Design/Analysis of Experiments
MA4760 Mathematical Statistics I
MA4770 Mathematical Statistics II
MA5405 Complex Variables
MA5504 Mathematical Modeling I
MA5505 Mathematical Modeling II
MA5524 Functional Analysis
MA5545 Applied Integral Equations
MA5701 Statistical Methods
MA5711 Mathematical Statistics I
MA5712 Mathematical Statistics II
MA5750 Statistical Genetics
MA5731 Linear Models
MA5741 Multivariate Statistical Methods
MA5791 Categorical Data Analysis
MA6701 Probability

Metallurgical & Materials Engineering

MY5200 Scanning Electron Microscopy

Chemistry

CH4212 Instrumental Analysis
CH4272 Process Analytical Chemistry
CH4412 Spectroscopy of Organic Chemistry
CH4430 Intermediate Organic Chemistry
CH 4710 - Biomolecular Chemistry I
CH 4720 - Biomolecular Chemistry II
CH 4790 - Current Topics in Biochemistry
CH5210 Analytical Separations
CH/CE5509 Env. Organic Chemistry
CH5520 Chemical Kinetics
CH5530 Molecular Spectroscopy
CH5570 Biophysical Chemistry

Computer Science

CS4321 Introduction to Algorithms
CS4421 Database Systems
CS4611 Introduction to Computer Graphics
CS5321 Advanced Algorithm

Biological Science

BL 3190 - Evolution
BL 3210 - General Microbiology
BL 3240 - Cell Biology
BL 3300 - Introduction to Genomics
BL 3640 - General Immunology
BL 4010 - Biochemistry I
BL 4020 - Biochemistry II
BL 4030 - Molecular Biology
BL 4040 - Environmental Biochemistry
BL 4140 - Plant Physiology
BL 4220 - Applied and Industrial Microbiology
BL 4470 - Analysis of Biological Data
BL 4500 - Critical Discussions in Bioinformatics
BL 4820 - Biochemical Laboratory Techniques I
BL 4830 - Advanced Biochemical Techniques
BL 4840 - Molecular Biology Techniques
BL 5030 - Molecular Biology
BL 5040 - Electron Optical Methods of Analysis I
BL 5050 - Electron Optical Methods of Analysis II
BL 5060 - Biological Ultrastructure
BL 5150 - Advanced Plant Physiology
BL 5160 - Plant Biochemistry and Molecular Biology
BL 5170 - Plant Cell & Development
BL 5431 - Population Ecology

Biomedical Engineering

BE 4440 - Introduction to Genetic Engg
BE 5440 Genetic Eng. and Molecular Medicine

Business Administration

BA4590 Environmental Law

Civil and Environmental Engineering

CE4501 Environmental Engineering Chemical Processes
CE4506 Application of Environmental

Where to go for...

General advice and questions:	Shekhar Joshi (Room 168, 7-3480)
Office assignments:	Shekhar Joshi (Room 168, 7-3480)
Office Keys (Ph. D. students only):	Sherry Sandretto (Room 131, 7-1951)
Computer access and problems:	Jim Moore (Room 144D, 7-2355)
Research questions and advice:	Your advisor and advisory committee
Graduate School questions:	Bonnie Gagnon (Grad School 401, 7-2326)
Graduate forms questions:	Nancy Byers Sprague (Grad School, 7-2755)
Stipend/ tuition fee questions:	Suzanne Knott (Room 129, 7-3437)
Your personal file/forms/final thesis:	Mary Jurgensen (Room 119, 7-2953)
Outreach activities:	Chris Hohnholt (Rooms 133, 7-2417)
Alumni activities:	Carrie Richards (Room 128, 7-3148)
Ecosystem Science Center:	Andrew Burton (Room 174, 7-2566)
Biotechnology Research Center:	Shekhar Joshi (Room 168, 7-3480)
USDA Forest Service:	Erik Lilleskov (USFA Bldg, 482-6303 ext 22)

Problems not solved by anyone else: Dean Peg Gale (Room 121, 7-2352)

Where to go for departmental signatures...

All M and D forms	Shekhar (C.P.) Joshi (Please put in his mail box in Xerox room)
Final thesis check	Mary Jurgensen (Room 119, 7-2953)
Final thesis cover page	Dean Peg Gale (Room 121, 7-2352)