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Introduction

This handbook describes the rules and regulations, guidelines and governance that impact graduate students studying in the Biology Department of the University of North Dakota. In this document the pertinent aspects of the Faculty Handbook have been extracted and edited to address issues relevant to graduate students.

This document is only concerned with Departmental rules, regulations and guidelines. It is incumbent upon all graduate students in the Biology Department to also be aware of and adhere to the rules and regulations of the Graduate School and the University.

Description of Degrees

Master of Science (Thesis)

The M.S. degree program with thesis requires the completion of a program of study of at least 30 semester credits beyond the baccalaureate degree. The program of study, prepared with the approval of a three-member faculty advisory committee, includes the following:

a. A minimum of 30 credits including coursework, research and thesis with research and thesis accounting for no more than 50% of credits.
b. A minimum of three (3) credits of BIOL 503 Seminar (credits included in a. above).
c. A minimum of four (4) credits of BIOL 509, Scientific Writing (credits included in a. above). Two credits should be taken while the student is writing their thesis proposal (see below).
d. Either: 1) BIOL 470, Biometry (3 credits) and one of BIOL 572, Design of Biological Experiments (1 credit) or BIOL 534, Quantitative Ecology (3 credits) (all credits included in a. above); or 2) prior graduate credit in statistical analysis and experimental design if approved by the student’s advisory committee.
e. Satisfactory completion of an acceptable thesis proposal (written proposal, proposal presentation and proposal defense) evaluated by the student’s advisory committee.
f. Satisfactory completion of a comprehensive examination administered by the student’s advisory committee; and
g. Satisfactory completion of an acceptable thesis (written thesis, thesis seminar and thesis defense) evaluated by the student’s advisory committee.
Master of Science (Non-Thesis)

This degree program is designed for students who wish to obtain broad training in graduate biology without research emphasis. The M.S. non-thesis degree program requires the completion of a program of study of at least 32 semester credits beyond the baccalaureate degree. The program of study, prepared with the approval of a faculty supervisor, includes the following:

- A minimum of 32 credits of coursework.
- A minimum of three (3) credits of BIOL 503 Seminar (credits included in a. above).
- A minimum of 23 credits in the major (credits included in a. above).
- BIOL 599 Research and BIOL 998 Thesis credits will not count toward the 32 credits.
- Satisfactory completion of a comprehensive examination administered by the student’s advisor and two other faculty members selected by the student with the concurrence of the advisor, the faculty members involved and the department chairperson.
- Satisfactory completion of an acceptable Independent Study. The Independent Study should be substantial and rigorous and involve a written report and a formal oral presentation to the Department.

Doctor of Philosophy

The Ph.D. degree program requires the completion of a program of study of at least 90 semester credits beyond the baccalaureate degree. The program of study, prepared with the approval of a five-member faculty advisory committee, includes the following:

- A major area of a minimum 90 credits including coursework, research and dissertation structured at the committee’s discretion but with a minimum of 18 semester credits of coursework. Work completed in a master’s program may be incorporated into the doctoral program if approved by the student’s advisory committee.
- A minor is not required, but each student is expected to show competence in related areas as determined by the student’s faculty advisory committee.
- A minimum of five (5) credits on BIOL 503 Seminar (included in a. above).
- A minimum of four (4) credits of BIOL 509, Scientific Writing (credits included in a. above). Two credits should be taken while the student is writing their thesis proposal (see below). Two credits can be waived at the discretion of the student’s
advisory committee for students with a well-written Master’s thesis and at least one first-authored publication in press.

e. Either: 1) BIOL 470, Biometry (3 credits) and one of BIOL 572, Design of Biological Experiments (1 credit) or BIOL 534, Quantitative Ecology (3 credits) (all credits included in a. above); or 2) prior graduate credit in statistical analysis and experimental design if approved by the student’s advisory committee.

f. Two scholarly tools. The nature of the scholarly tools shall be determined based upon their importance to the student’s field of research as determined by the student’s advisory committee.

g. Satisfactory completion of an acceptable dissertation proposal (written proposal, proposal presentation and proposal defense) evaluated by the student’s advisory committee.

h. Satisfactory completion of a comprehensive examination administered by the student’s advisory committee.

i. Performance of research suitable for publication in refereed professional journals and satisfactory completion of an acceptable dissertation (written dissertation, dissertation seminar and dissertation defense) based thereon.

List of Graduate Courses

Graduate students may take graduate courses in the department and some upper-level undergraduate courses for graduate credit (See Appendix I for a list). Students should also consider appropriate courses from other departments across the University. In the past graduate students have taken courses offered by the Geography Department, Geology Department, and the Medical School.

Admissions

Criteria

Requirements for all graduate programs:

a. A two-thirds "yes" vote for the applicant by the Graduate Faculty "in residence," is required except under unusual circumstances where it is agreed upon by the Graduate Director and the Chairperson that this requirement should be waived.
b. Admission to any graduate program in biology (M.S. thesis, M.S. non-thesis, Ph.D.) requires that at least one faculty member indicates a willingness to serve as the student's advisor.

c. The applicant must meet all the criteria for his/her program to be accepted. Ideally, students should be notified of their status no later than April 15.

**Masters degree (both thesis and non-thesis) applicants:**

a. All applicants must meet current minimum general requirements as published by the Graduate School.

b. All applicants seeking admission to the biology graduate program must provide GRE General test scores. Successful applicants will be required to provide GRE Subject (Biology) test scores by the end of the first semester of enrollment. Strength of scores will be considered regarding admission and awarding of departmental support.

c. The GPA must be no lower than 2.75 for all undergraduate work or 3.0 for junior-senior credits.

d. Students must indicate thesis vs. non-thesis option upon application. M.S. (thesis) students may request a change to M.S. (non-thesis) only within the first 2 semesters (not including summer) of enrollment. Such requests will be evaluated by the Graduate Director and the student’s advisory committee.

**Doctoral degree applicants:**

a. All applicants must meet current minimum general requirements as published by the Graduate School.

b. Applicants may enter the program with a Master’s degree or directly with a Bachelor’s degree.

c. All applicants seeking admission to the biology graduate program must provide GRE General test scores. Successful applicants will be required to provide GRE Subject (Biology) test scores by the end of the first semester of enrollment. Strength of scores will be considered regarding admission and awarding of departmental support.

d. The GPA must be no lower than 3.5 for the Master's degree work. If applying with only an undergraduate degree, the GPA must be no lower than 2.75.

**Master of Science By-Pass**

Students admitted to the M.S. program, may, after one calendar year, and upon the recommendation of his/her advisory committee, request to by-pass the masters degree
and work directly toward the Ph.D. degree. The same GRE and GPA requirements apply for by-pass as for students applying for the doctoral program and through normal application procedures, i.e., a GPA no lower than 3.5 for work completed while in the M.S. program. The recommendation of the advisory committee shall be brought to a vote in a faculty meeting. A minimum of one week before such a meeting, the faculty shall be notified that the student's up-dated file shall consist of the materials used for application to the M.S. program, a transcript of all academic work completed at UND, and any additional materials the student wishes to have considered.

Regulations and Guidelines

Guidelines for Directed Studies (Biol 592)

a. The permission of a Biology instructor is required prior to enrolling.

b. The instructor, upon consultation with the student, will determine whether the latter has the necessary prerequisites and whether the student is to be accepted for work under his/her direction.

c. Prior to undertaking a Directed Study a student must have had at least one advanced undergraduate course related to the study. This course may be a prerequisite were the Directed Study offered wholly or in part as a formal course. It may also be in a cognate field or related discipline. The relevancy of the preceding is to be determined by the instructor.

d. The number of credits are to be determined by the instructor. However, should a formal course be offered in the same area the student is advised to enroll in the course rather than undertake a Directed Study.

e. Each student accepted for a Directed Study should set up a regular work schedule for at least part of the project time to ensure assistance at a time convenient for both the student and the instructor. Directed Studies require an average of three hours application per week for each credit attempted.

f. The satisfactory completion of a Directed Study involves criteria determined by the instructor and discussed with the student at the beginning of the study. An incomplete is to be given only under the regulations set by the University.

g. Ordinarily, examinations are not required for Directed Studies unless they have assumed the nature of a formal or semi-formal course. The instructor will set the requirements for evaluation purposes. These should be met by the student on or before the last day of the examination period of the semester or summer session in which the student is enrolled.
h. A Directed Study may take on the nature of a formal or semi-formal course when it is specifically listed by subtitle in the University Time Schedule for the semester or summer session. Furthermore, it may become so, should the instructor decide that regularly scheduled laboratory, field, lecture and/or discussion periods are a necessary part of his/her Directed Study.

**Specimens from Student Research**

Representative voucher specimens collected by students, or their representatives as part of funded research or graduate studies shall be deposited in one of the departmental research collections. It is the responsibility of the faculty supervisor of each student to consult the curator about preparation and disposition. Additional specimens may be deposited if satisfactory arrangements are made between the curator and the faculty member or student.

**Advisor/Advisory Committees**

The graduate student’s advisor will recommend committee members to the Graduate Director who will have the power to approve or disapprove, using the Graduate School Committee appointment form.

Changing advisers early in a student’s graduate program should be an open, amicable and cooperative decision involving the current and proposed advisers, the Graduate Director and the Department Chair. Students contemplating such changes should visit with the Graduate Director about such procedures.

**Evaluation of Teaching**

Teaching will be evaluated each semester the student holds a GTA using a standard University approved USAT form and the Departmental Graduate Student Teaching Evaluation Form (Appendix II). Results from both will be provided to the Graduate Director.

If a departmentally supported GTA exhibits serious neglect of duty, it should be reported immediately to the Department Chairperson and the Graduate Director.

**Evaluation of Academic and Research Progress**

The student’s advisory committee should meet once a semester with the student to review progress in courses and research. Each year all graduate students will be assessed using the appropriate annual evaluation form (Appendix C for M.S. students or
Appendix D for Ph.D. students). Students will provide the initial data to their advisory committee after which the student and committee will meet to complete and discuss the form. Additionally the committee must categorize the student as having achieved satisfactory or unsatisfactory progress toward completion of their degree. Under satisfactory progress departmental support will continue if at all possible (assuming the student is still eligible for support). Under unsatisfactory progress the advisory committee can either place the student on probation allowing the student to continue their studies but without departmental support or advise the student to leave the program as there is very little chance of the student successfully completing their degree. The committee must provide a short written justification for their choice which will be made available to the rest of the department for the faculty meeting where faculty decide on continuing student support. The student’s advisor must submit the completed form to the Graduate Director by March 15th each year.

The thesis/dissertation proposal will be evaluated by the student’s advisory committee using the thesis/dissertation proposal assessment form (Appendix III – Attachment 4). The completed form must be submitted by the student’s advisor to the Graduate Director within a week of the proposal defense.

The comprehensive exam will be evaluated by the student’s advisory committee using the comprehensive exam assessment form (Appendix III – Attachment 3). The completed form must be submitted by the student’s advisor to the Graduate Director within a week of the conclusion of the exam.

The thesis/dissertation and associated seminar and defense will be evaluated by the student’s advisory committee using the three appropriate assessment form (Appendix III). The completed forms must be submitted by the student’s advisor to the Graduate Director within a week of the defense.

Faculty Input (Optional). Faculty who wish to comment on a particular student’s performance, may do so in a signed letter/memo to the Graduate Director. Such input should be submitted by the end of the spring semester.

Dissemination and Use of Evaluation Results

The Graduate Director will compile all the evaluation materials.

The Graduate Director will summarize all current evaluation materials on graduate students for consideration when the faculty makes recommendations regarding financial support.
If a graduate student receives an unsatisfactory evaluation, the Graduate Director will notify the graduate student and the major advisor in writing. The reasons why the evaluation is considered unsatisfactory will be provided. This notice will constitute a probationary warning.

All evaluation documents will be placed in the graduate student’s file. The student will have access to the file (Family Rights and Privacy Act of 1974). Additionally, copies of all evaluation documents will be provided to the student, the major advisor, and the Graduate Director for program assessment purposes (see below).

Comprehensive Examinations

The Biology Department has a long tradition of producing graduate students with a broad background in Biology. The purpose of comprehensive examinations is to provide assurance to the Department that our graduates possess such a background. Graduate students should view these examinations as an opportunity to increase their breadth of knowledge and demonstrate this breadth of knowledge to their peers.

Doctoral Comprehensive Examination

The doctoral comprehensive examination shall be extensive and searching, covering the broad areas of Biology. The exam will be administered by the student’s advisory committee, plus one additional examiner appointed by the department chair, henceforth referred to as the Examining Committee, preferably no later than the end of the third year in the program and is required to be completed at least one semester prior to the anticipated semester of graduation. The examination will cover the major areas of Biology (following the organization of the GRE Subject test), including Ecology and Evolution, Organismal Diversity and Function, and Cellular, Molecular, and Developmental Biology. Evaluation will be based on the student’s knowledge of the breadth of Biology, and deeper understanding of the student’s field of research.

Evaluation will employ a standard rubric (Appendix III – Attachment 3) with explicit recognition of appropriate depth of understanding. The doctoral comprehensive examination will have two components: a written exam and follow-up oral exam.

The number and nature of questions is left to the discretion of the Examining Committee, but the exam should encompass all the levels of understanding: knowledge, comprehension, application, analysis, synthesis and evaluation. Questions should be written so that the student clearly knows if a question is assessing breadth or depth and which levels of learning are being assessed. The exact breakdown of
questions by area and level of understanding is left to the discretion of the Committee, but each of the three major areas must be represented by at least 25% of the total.

Students will take the written portion of the comprehensive exam before taking the oral portion of the comprehensive exam. The Examining Committee will review the graded written answers and decide if the student has demonstrated an adequate level of knowledge and understanding of Biology before scheduling the oral examination.

The written exam will include questions intended to test (1) breadth of knowledge across levels of biological organization from molecules to ecosystems, including conceptual relationships among the levels, and (2) depth of knowledge and understanding within the student’s field of research, including the ability to discuss relevant theories, controversies and unanswered questions.

The exam will be composed of questions requiring approximately 15-18 hours of writing. Students will have, at most, 20 hours to complete the written exam. Normally the exam will be conducted over a 3-day period (5-6 hours per day), but may be administered over a maximum of 5 days.

The student may be given a choice of questions to answer within each area, but that is at the discretion of the Examining Committee.

At the discretion of the Examining Committee, questions may be based on reading material provided prior to the exam and test the student’s ability to read critically, synthesize and analyze knowledge within the student’s field of research. The exam will normally be graded within 2 weeks (maximum 3 weeks).

The oral examination is intended to further probe the student’s understanding of material covered in the written exam, with emphasis on the student’s field of research. The exam may take up to 3 hours and will normally be held within 7 days of completion of the grading of the written exam.

The Examining Committee will consider the totality of results from both the written and oral portions of the comprehensive exam to determine if the student passes the comprehensive exam. The student must demonstrate adequacy in all areas to pass the exam, but failure in one or more areas can be revisited later by retaking either or both components (written, oral) of the exam either in its entirety or for those deficient areas at the discretion of the Examining Committee. Only one reexamination is permitted.
Masters (thesis) Comprehensive Examination

An oral comprehensive examination will be administered by the student's advisory committee in the second full year and at least one semester prior to the anticipated semester of graduation. The examination will cover the broad area of biology. The student’s advisory committee will assess the exam using the Comprehensive Exam Assessment Rubric (Appendix III – Attachment 3). The completed rubric will be provided to the Graduate Director within one week of the exam. The results of the examination will be communicated to the department chairperson and the Graduate School.

Students failing the examination may be reexamined by the advisory committee, but prior to the anticipated semester of graduation. A failed examination may be retaken once only. Areas of weakness in the comprehensive examination may be re-examined during the thesis defense at the discretion of the student’s committee. The student must be informed which areas will be re-examined at the conclusion of the comprehensive exam.

Masters (non-thesis) Comprehensive Examination

A written comprehensive examination will be administered by the student's advisor and two other faculty members selected by the student with the concurrence of the advisor, the faculty members involved and the department chairperson at least one semester prior to the anticipated semester of graduation. The examination will cover the broad area of biology. The examining committee will assess the exam using the Comprehensive Exam Assessment Rubric (Appendix III – Attachment 3). The completed rubric will be provided to the Graduate Director within one week of the exam. The results of the examination will be communicated to the department chairperson and the Graduate School.

Students failing the examination may be reexamined by the advisory committee, but prior to the anticipated semester of graduation. A failed examination may be retaken once only.

Financial Support

Guidelines

The department recognizes the importance of providing financial support, whenever possible, to graduate students pursuing advanced degrees in biology.
Departmental financial support is defined as graduate teaching assistantships (GTA), tuition waivers, fellowships, and scholarships, which are approved by the department faculty. Non-departmental support is defined as a graduate research assistantship (GRA) from a faculty member, an external fellowship, or a scholarship obtained by the student independent of departmental action.

To stretch tuition waiver budgets further, graduate students will normally be expected to switch to ND residency by their second year of enrollment to reduce tuition waiver costs. Students will only be supported at a higher tuition rate if they can justify not switching to ND residency (e.g., an international scholar).

**Incoming students**

It is necessary to provide funding for new graduate students entering the department to maintain an ongoing graduate program. Incoming students will be ranked by the Graduate Director based on strength of application, aggregate faculty ranking, and equity of GTA support across faculty labs. This ranking will be brought to the entire department, possibly re-ranked based on discussion during the faculty meeting, and approved by the faculty. The final, departmentally approved ranking will be used to award departmental support (i.e., highest ranks first) until departmental support is depleted.

**Continuing students**

Departmental support for continuing students may be provided to qualified students for their degree program, depending upon the availability of funds. Normally departmental support is awarded on the basis of a majority vote of the faculty during a faculty meeting. The faculty’s decision will be based on the results of annual assessments conducted by the student’s advisory committee, students’ history of departmental support, and available support. The Graduate Director will make this information available to the faculty in advance of the departmental meeting regarding support for continuing students (preferably by the end of March). Students who entered either with non-departmental support (e.g., GRA) or no support (e.g., provisional admittance) and are switching to departmental support for the first time will need to be carefully considered. The Graduate Director will point out any such cases to the faculty. Under unusual circumstances, on the advice of the Graduate Director, the chairperson may award support without such a vote.
Limits for support

Normally, M.S. (non-thesis) students may receive departmental support totaling no more than the equivalent of four semesters of half time assistance (exclusive of summers), spread over no more than three academic years or six semesters (exclusive of summers).

Normally, M.S. (thesis) students may receive departmental support totaling no more than the equivalent of five semesters of half time assistance (exclusive of summers), spread over no more than three academic years or six semesters (exclusive of summers).

Normally, Ph.D. students may receive departmental support totaling no more than the equivalent of ten semesters of half time assistance (exclusive of summers), spread over no more than six academic years or twelve semesters (exclusive of summers). For students who choose to by-pass from the M.S. degree into the Ph.D. program, any departmental support received during their M.S. studies will count toward this limit.

The department highly encourages faculty and graduate students to seek non-departmental support as departmental resources are limited. To this end, semesters of non-departmental support will not count toward the departmental support limits. However, time spent on non-departmental support will not extend the ultimate time limits for departmental support (three years for M.S. students or six years for Ph.D. students).

Exceptions to the normal limits on departmental support will be considered by the faculty in the light of:

1) the academic and GTA performance of the student;
2) circumstances necessitating support beyond the normal level;
3) evidence that the student has adequately explored alternate sources of funding; and
4) goals and needs of the department's graduate program in general.

Timetable

The following timetable for GTA decisions is recommended:

Proposed reassignment of current GTAs to the faculty: 1-15 February
Deadline for Graduate School to receive applications for potential students to be certain to be considered for financial assistance: 15 February

A 15 February deadline will allow decisions regarding new GTAs to be made by 10 March. This does not mean that we will delay all recommendations to 10 March, nor does it necessarily mean we will recommend allocation of all GTAs by 10 March. It does mean, however that we will be capable of making all decisions no later than 10 March.

**Graduate Student Guide**

The Graduate Director shall prepare a list of up-dated regulations of the department and distribute these to the graduate students.

**Literature Citation Style for Theses and Dissertation**

Theses and dissertations shall utilize a citation style consistent with a highly regarded journal in the student’s area of research.

**Multiple Degrees from the University**

Normally, Ph.D. students should have received one degree at another institution. Exceptions will be made for students who spend a post-baccalaureate semester or summer at another university or research station sometime prior to the awarding of the degree.

**Registration for Thesis or Dissertation Studies**

All graduate students doing independent studies related to thesis or dissertation, which requires supervisory activity on the part of departmental faculty members, shall register in directed studies, research, thesis or dissertation for the appropriate number of credits.

**Responsibilities of Graduate Students**

It is the responsibility of the graduate student to do the following:

a. Meet the requirements set by the Graduate School and to initiate the submission of such forms and applications as are required, including, committee appointment, programs of study, topic proposal, preliminary approval, and notice of defense. It is also the responsibility of the graduate student to meet all deadlines established by the Graduate School.
b. Select a research subject and an advisor after consultation with and the consent of the prospective advisor, this process may involve lab rotations with various members of the faculty. Graduate students are expected to consult with prospective members of their committee, before requesting the Graduate Director to nominate committee members to the Dean of the Graduate School. Graduate students are expected to make this selection during their first year (and preferably their first semester) in residence.

c. Investigate and attempt to obtain additional research support from other sources.

d. Complete all course work, research papers, and directed studies projects within the time limits set by the professor or advisor concerned. If students are unable to complete this work within the allowed time, this information must be reported to the professor or advisor concerned before any incomplete grades can be assigned.

e. Arrange regular consultation periods with the advisor concerning research in progress and to meet with their advisory committee once a year at a bare minimum.

f. Bring any complaints concerning departmental procedures, programs of study, scheduling, or equipment requirements or operation to the attention of the advisor or the chairperson of the department.

g. Be sure that unauthorized students do not use Biology Department keys and that keys are not duplicated.

h. Submit a preliminary draft of the thesis or dissertation to the student’s advisory committee at least one month before the deadline specified for preliminary approval. The preliminary draft shall be in reasonable grammatical form and in approved format. If the preliminary draft fails to conform with these standards, the advisee’s committee has the prerogative to return it to the student for revision.

i. Assist the department in gathering all evaluation and assessment data.

j. Properly care for, operate, and secure any and all equipment entrusted to the student and to maintain their research area in a state conducive for theirs and others work and safety

k. Be familiar with the UND library resources, skilled in the use of abstracting sources and electronic data bases, and aware of current literature in the field. The student is expected to be consistently reading beyond what they are asked to read in classes.

l. Maintain a professional and mature attitude during residence at UND, since the graduate student is a representative of the department and serves as a guide and inspiration to undergraduate students. In particular, the student should be aware of the Code of Student Life and how it pertains to graduate student conduct.
m. Attend Biology Department sponsored seminars or lectures. The graduate student also is encouraged to attend germane seminars or lectures outside the department and to include more than the minimum number of seminars in their program of study.

The faculty recommends that the graduate student do the following:

a. Complete the program for the masters degree within 2-3 years and for the doctorate degree within 4-5 years.

b. Complete a rather thorough literature review before initiating research. The graduate student should assess the possibility of successful completion of the research, equipment needs and equipment available in the department, and the time and money requirements necessary for the successful completion of the project. Serious consideration of such factors may save the student from embarking on a research project that may not be feasible within this department or that may not be assured of completion.

c. Assist each other in the preparation of theses or dissertations through discussion, constructive criticism, and reading each other’s preliminary drafts. This cooperation will improve the writing ability of all concerned.

d. Discuss the publication of meritorious research results with the advisor and attempt to publish some results before leaving the university. The publication of research papers will enhance the prospect of placement after graduation.

**Scholarly Tool Requirement**

Two scholarly tools are required for the Ph.D. The nature of the scholarly tools shall be determined based upon their importance to the student’s field of research as determined by the student’s advisory committee.

**Sign-out Procedure**

Departing graduate students are required to take an exit interview administered by the department administrative secretary that all commitments have been fulfilled and appropriate signatures attesting that have been obtained.
Graduate Program Assessment

Mission Statement

The mission of the Biology Graduate Program is to prepare our students well for careers in teaching and/or research in academics, government or industry, or for further graduate training. We strive for excellence in graduate education, mentorship and research across the breadth of biology, while focusing on strengths in vital sub-disciplines. We provide enriched, forward-looking graduate experiences in the areas of Ecology, Evolution, and Conservation Biology and Molecular, Cellular, and Developmental Biology. We strive to prepare students for the increasingly important integration of biological knowledge across levels of organization from molecules to the environment.

Goals and Associated Learning Outcomes for the Graduate Program in Biology

1. By the time they complete graduate degrees in Biology at the University of North Dakota:
   a. MS Students will demonstrate a broad knowledge and understanding of the major concepts of modern biology across all levels of biological organization from molecules to ecosystems, including the conceptual relationship among these levels of organization, and a deeper understanding of at least one sub-discipline of biology.
   b. PhD students will demonstrate a broad knowledge and understanding of the major concepts of modern biology across all levels of biological organization from molecules to ecosystems, including the conceptual relationship among these levels of organization, and exhibit substantial depth of knowledge and ability to evaluate and communicate relevant theories, controversies, and unanswered questions in at least one sub-discipline of biology.

2. As students progress through the MS and PhD programs at the University of North Dakota, they will exhibit an increasing ability to independently engage in the scientific process to both create and disseminate new knowledge. This will include the ability to:
   a. Clearly and concisely propose a research project that incorporates the most recent body of knowledge in the discipline, critically analyzes accepted and emerging ideas in the discipline, and poses clear objectives and testable hypotheses along with appropriate methods and techniques for testing those hypotheses.
b. Demonstrate mastery of the technical skills necessary for making observations, gathering and analyzing data, and testing hypotheses in the particular sub-discipline.

c. Synthesize information and communicate the results of their research clearly and effectively in oral, written and visual form, including publication in peer-reviewed outlets and presentation at professional meetings.

3. Students will develop and display an understanding of professional ethics in the conduct of research, teaching, and service as scientists.

**Attaining educational goals and learning outcomes: graduate mentorship**

To facilitate the transition into the graduate program and assure continued progress towards meeting the educational goals, we require continued interaction between the Graduate Advisory Committee (GAC) and the student. This ongoing mentorship is facilitated by an initial review of the student’s background conducted early in the first semester, and annual follow-up meetings that also serve as assessment opportunities:

**Initial review of student knowledge and abilities by the Graduate Advisory Committee (GAC).** This review is conducted early in the first semester of the graduate program to identify potential deficiencies in the student’s background. The GAC will review the student’s transcripts and GRE scores and conduct a brief “interview” to assess their current knowledge in basic principles of biology. The review will be used to make a recommendation regarding courses that will be part of the program of study or other activities (see Appendix III – Attachment 1).

**Attaining educational goals and learning outcomes: direct assessment of student performance**

The Biology Department uses a 4 stage process to directly assess effectiveness of our MS and PhD programs.

**Annual evaluation of student progress.** The GAC will meet with the student each academic year to assess progress towards completion of the program of study and the thesis/dissertation research project. The meeting also provides an opportunity to advise the student on questions related to research progress. The GAC completes an evaluation of student progress (see Appendix III - Attachment 2), including the level of professional development based on performance in coursework, participation in departmental and professional activities (e.g. attendance at seminars,) and research progress. A summary of participation in professional activities, including presentation of papers at professional meetings and publications in peer-reviewed outlets, is provided
to the department’s Director of Graduate Studies (DGS) and used to assess overall effectiveness of the program in meeting **Goal 2c.** In addition, each year all graduate students present a brief (15-20 minute) oral summary of their research progress to the department.

**Comprehensive examination administered by the Examining Committee.** The comprehensive exam is normally conducted in the second full year for an MS student and no later than the third year for PhD students. The examining committee consists of the GAC for M.S. students and the GAC with an additional member appointed by the Chair for Ph.D. students. Both exams cover all levels of organization in biology, from molecules to ecosystems, but with increased emphasis on depth of knowledge and understanding of the specialty sub-discipline in the PhD program. The comprehensive exam is graded by the examining committee using a standard rubric (see Appendix III – Attachment 3) to evaluate the student’s understanding of biology and the program’s effectiveness in achieving **Goal 1a (MS students) or Goal 1b (PhD students).**

**Ethical training.** All graduate students are required to pass a course in the ethics of professional activities (e.g., BIMD 516). Students will receive training in ethical and compliance issues associated with careers as educators and scientists. In particular, students are educated to understand the sources of conflicts and the sources of information or guidance useful in making ethical decisions. Successful completion of the course by the graduate students in our program is indicative of overall effectiveness of the program in meeting **Goal 3.**

**Thesis or dissertation research.** Students will design and conduct a research study, analyze the resulting data, and write a thesis or dissertation describing in detail the significance of the research, relevant scientific literature, materials and methods, results, interpretation of results, conclusions, and broader implications. The research is supervised and the final product evaluated by the student’s GAC. **Goals 2 and 3** are assessed at a series of three stages leading to the final thesis or dissertation.


The written research proposal is evaluated by the GAC and an oral presentation of the proposal is made to the department and evaluated by the GAC. Assessment will focus specifically on knowledge of the biological problem, the relevant literature, the technical approaches suitable for addressing the problem, and scientific inference. The GAC evaluates the proposal and its defense using a standardized rubric (see Appendix III – Attachment 4). The rubric serves as a direct assessment of the program’s effectiveness in achieving **Goal 2a.**
b. Departmental Seminar.

Each graduate student will present the results of their thesis or dissertation research to the Department as part of the seminar series. Biology faculty members, students, and others typically attend these seminars. The student’s GAC evaluates the seminar using a standardized rubric (see Appendix III – Attachment 5) as part of the Final Defense, which follows immediately after the seminar. The rubric serves as a direct assessment of the program’s effectiveness in achieving Goals 2a-c.

c. Final Thesis/Dissertation and Defense. Each graduate student will defend his or her thesis or dissertation research prior to graduation. This is an oral examination conducted by the student’s GAC and other faculty members that choose to attend. The GAC uses a standardized rubric to evaluate the thesis/dissertation content (see Appendix III – Attachment 6) and defense of the thesis/dissertation (see Appendix III – Attachment 7). These rubrics serve as a direct assessment of the program’s effectiveness in achieving Goals 2 and 3.

**Measuring educational success: indirect assessment methods, timeline, and responsibility**

In addition to direct assessment, the department also gathers indirect measures of student success. On an annual basis, the department’s Director of Graduate Studies (DGS) obtains summary statistics for three indirect measures of student success and this information is maintained in a database within the department. Many of these are obtained directly from the Office of Institutional Research or the Graduate School. These measures include:

**Retention and Graduation Rates:** the percentage and number of students initially enrolled in the program that actually graduate, along with time to graduate and other measures of student success are recorded,

**Student Evaluations:** student evaluations for graduate courses are aggregated for a department-wide analysis of not just student perception of the quality of instruction, but also the clarity of the learning goals in our courses and how well students thought they actually achieved those learning goals,

**Current Graduate Student Survey:** Current graduate students are surveyed annually to obtain their perceptions of the program, including the nature of the financial support provided, intellectual support from the GAC, and suitability of training received during their program.
Alumni Surveys and Career Development: The department tracks students after they complete their programs and monitors their success at: (a) admission into further graduate training programs (for M.S. graduates) and (b) finding jobs related to their field of study. We also use a mailed questionnaire to solicit feedback on what graduate students found to be useful in their graduate training, or what they needed in their later work that was not provided in their training.

Use of direct and indirect assessment results: documentation and decision making

Results from direct and indirect assessment are summarized annually by the DGS and presented to the entire faculty for discussion during the spring semester. The annual summaries are maintained as part of a permanent record in the department. In addition to annual reports, multi-year trends in assessment results are provided to the faculty by the DGS when deemed appropriate, but at a minimum of every 7 yrs, associated with the graduate program review and evaluation. Based on assessment results, the faculty is encouraged to express any concern(s) it might have about the pattern of student performance and, more importantly, suggest how deficiencies in student performance might be improved, either by additional resources, restructuring of course offerings, or alterations in procedures associated with graduate mentoring. The Chairperson of Biology, in consultation with the departmental Executive Committee and the DGS, then makes recommendations to the department’s faculty and higher level administration, regarding the need for programmatic adjustments and/or additional resources to enhance student performance. In addition to program assessment, the DGS will periodically review the utility of assessment practices and implements (e.g. Rubrics) and determine if any changes should be considered by the faculty.

Student Awards & Scholarships

Outstanding Graduate Student Research Award

This award is to recognize that graduate student who, in the opinion of the faculty, performs the most outstanding research during the period July 1 to June 30.

Each spring the Academic Programs and Student Awards Committee will study the credentials of students recommended by various faculty members, select and present outstanding candidates to the Biology Faculty for their action.
Joe K. Neel Memorial Endowment in Limnology and Aquatic Invertebrate Zoology

This endowment was established in 1991 to recognize the contributions of Dr. Neel to the University of North Dakota Biology Department from 1966 until his retirement in 1981. The interest income should be used each year for an award to a graduate student in the Biology Department who is pursuing thesis or dissertation research in the two main fields of Dr. Neel’s expertise, limnology and aquatic invertebrate zoology. Specifically, the funds will be used to enhance graduate recruitment and graduate training in these areas by providing the Joe K. Neel graduate research fellowship in limnology and aquatic invertebrate zoology. The amount of the annual award will be based on the availability of funds and will provide up to $3,000 to support both the research and living expenses of the graduate student.

Each Spring, APSAC will solicit nominations from the faculty in a timely manner for graduate recruitment. Nominations can come from either the pool of current graduate students or students being considered for acceptance to the graduate program. The possibility will exist for offering the award to either a current or perspective graduate students for more than one year, given satisfactory performance. An M.S. student will be eligible for up to two awards during their graduate career, while a Ph.D. student will be eligible for up to three awards. Potential candidates will be evaluated and selected from the group of nominees. Preference will be given to Ph.D. students in the evaluation process.

Esther Wadsworth Hall Wheeler Award

The award was established by the Wheeler family in 2000 to assure that Esther Wadsworth Hall Wheeler’s contributions to the Biology Department during some of its most difficult times during the depression were not lost to the institutional memory. The award is dependent on annual donation of funds by the Wheeler family. Nominees are solicited by the Chair of the Department and the award is presented to a current graduate student to support his or her research project.

Stella H. Fritzell Memorial Scholarship

The award should be given to an undergraduate or graduate student in alternate years (i.e., given annually but alternately to a grad or undergrad).

The awardee should have an outstanding record in field biology and an interest in and knowledge of governmental affairs in environmental or natural resource management.
**Student Research Stipends**

Stipend awards are intended to encourage and to promote student research in the biological sciences at the University of North Dakota by providing a supplemental source of funding for research-related activities.

Students, regardless of major, conducting research in biology with the supervision of a faculty member from the Biology Faculty shall be eligible for financial assistance offered by APSAC.

General guidelines for APSAC stipend award applications:

1. Applications for awards shall be solicited with specific deadlines during Fall and Spring semesters.
2. Applications must contain a brief statement of the rationale for the request as well as an itemization of the amount requested.
3. Applications must be accompanied by a supporting letter from the faculty advisor.
4. Applications and/or supporting letters from faculty advisors must demonstrate that attempts were made to obtain the requested funds from other sources.
5. Applications shall be considered only from currently enrolled undergraduate and graduate students in biology.

Expenses directly related to research shall be eligible for support under the following guidelines:

1. Research equipment and supplies
2. Research travel expenses
3. Undergraduates shall be eligible for a maximum non-renewable award of $200, inclusive of research and travel to professional meetings
4. Master's candidates shall be eligible for a maximum non-renewable award of $350, inclusive of research and travel to professional meetings.
5. Doctoral candidates shall be eligible for a maximum non-renewable award of $550, inclusive of research and travel to professional meetings.
6. Graduate students in biology not enrolled in a degree program shall be eligible for a maximum non-renewable award of $200 for research travel, equipment and supplies only; travel to professional meetings will not be supported

APSAC, and the Biology department, realize that the levels of funding available for students are not sufficient to support an entire research project. Graduate students are
strongly encouraged to apply for outside sources of funding to support their research. We encourage students to check with the Biology Stockroom for research supplies that may be available at a reduced cost. For travel costing more than the maximum award available from the department, we encourage students to check with the Biology Department Chairperson, who may have more funds available, and to check with the Graduate School Office with the Office of Research and Compliance. Additional travel funding has been available from these sources in the past.

Expenses related to travel to professional meetings shall be eligible for support under the following guidelines:

1. When expenses for air travel are requested, support shall be considered for round trip coach airfare from Grand Forks, ND to the destination and it is expected that special rates shall be investigated.
2. Cooperative travel among students attending the same meetings will be encouraged and given priority.
3. In event of cooperative travel with a University vehicle, support to defray the expenses of the University vehicle shall be awarded to the group rather than an individual.
4. Requests for lodging will be supported when financially feasible.
5. Individual student travel for those persons presenting oral or poster papers at professional meetings will receive highest priority for funding.

Guidelines for selection:

Research activities in biology eligible for support by APSAC shall be ranked in the following priority:

1. First time applications for: research supplies and research travel
2. Travel for presentation of papers (oral or poster)
3. Subsequent applications for research supplies or travel to professional meetings that do not include presentations

Only in unusual circumstances should requests be made for funds from the graduate student research allocations to defray expenditures previously committed by faculty or students.

The Biology Department expects acknowledgement of those awards in theses, dissertations, and publications where applicable.
Graduate Teaching Assistantships

Teaching Assistants

Teaching assistantships will be awarded to students whose research interests coincide with those of the faculty.

Assistantships are awarded for up to 6 semesters (3 academic years) to a graduate student working towards a Master's degree and for up to eight semesters (4 academic years) to a graduate student working towards a Doctor's degree. Only in rare and exceptional cases would any extensions be made.

The following timetable for GTA decisions is recommended:

Evaluation and reassignment of current GTAs: 1-15 February

Deadline for new students to be certain to be considered for financial assistance: 15 February

A 15 February deadline will allow decisions regarding new GTAs to be made by 10 March. This does not mean that we will delay all recommendations to 10 March, nor does it necessarily mean we will recommend allocation of all GTAs by 10 March. It does mean, however, that we will be capable of making all decisions no later than 10 March.

Continuing graduate students must decline or sign and return the contract for a GTA position for the next academic year or semester by 15 April. If the contract is issued after 1 April, the graduate student must decline or sign and return the contract for a GTA appointment within two weeks of receipt of such contract.

Evaluation of Teaching Assistants

All teaching assistants are evaluated with standard university student teaching assessment (USAT) forms and by their supervising faculty member (Appendix II).

Contact Hours

The contact hours of graduate teaching assistants will be as follows:

1/2-time = 9 contact hours plus preparation
1/4-time = 6 contact hours plus preparation
Early Release from Duties

Graduate students desirous of being relieved of their teaching duties for a portion of a semester to carry out research or participate in a special program must: 1) make their intentions known to the course supervisor and the department chairperson at the beginning of the semester; 2) secure a qualified replacement who is acceptable to the course supervisor and who can meet the assigned classes; and 3) take care of all arrangements at the payroll and graduate offices. In regard to #2 above, it is understood that only under exceptional circumstances (e.g., when one has completed all the degree requirements) will a graduate student who already holds a half-time teaching and/or research appointment be acceptable.

Request for Resignation

Requests for resignations of signed GTA contracts will be considered by the Chair, DGS and Executive Committee on an individual basis and will be considered in decisions on subsequent departmental support.

Facilities

Starcher Hall

The principal facility for the department is Starcher Hall, completed in 1981. Biology occupies 58,000 sq. ft. in Starcher Hall. Specific facilities in this building include the departmental office, the Alumni Conference Room, a seminar-lecture room, 10 teaching laboratories and associated preparation areas, stockroom, animal quarters, biology core molecular facility, data analysis room, plant tissue culture lab, animal tissue culture lab, herbarium, invertebrate museum, vertebrate museum, 3 greenhouses, 17 faculty offices, 16 faculty research labs and 5 graduate student offices.

Chandler Hall

Auxiliary facilities for the maize genetics research project are located in Chandler Hall.

Biology Field Stations

In association with the University, the Biology Department manages 2 field stations – the Forest River Biology Area and Oakville Prairie. It also has access to and use of old fields associated with what is called the Air Base land. On June 21, 2007 the University
of North Dakota established The Biology Field Station Operation and Management Policy which governs the management and use of these sites (Appendix IV).

Collections

The department has three facilities to house specimens that are representative of the flora and fauna of the state and region: an herbarium, an invertebrate museum and a vertebrate museum. The primary mission of these collections is as research collections, with recognized use in teaching as necessary.

The department chairperson is authorized to assign one, ½ time GTA to each of the following: herbarium, invertebrate museum and vertebrate museum. Such GTAs may have teaching duties in addition to curatorial duties.

Herbarium

The herbarium contains botanical specimens of extant vascular and non-vascular plants and fossils. There are over 16,000 vascular plant specimens, several hundred non-vascular plants (mostly fungi) and approximately 50 fossils. Housed with the herbarium is the Vera Facey Botanical Reference Collection. In addition to the library donated by Dr. V. Facey, there are references on loan from the library, as well as additional materials donated to the collection.

Invertebrate Museum

The Invertebrate Museum has four main groups of collections: the Rohde Shell Collection, which consists of about 3,500 shells, primarily marine, a collection of non-insect invertebrates comprising about 4,000 specimens; a world-wide collection of ants numbering more than 10,000 collections and 300,000 specimens; and the insect collection which, exclusive of ants, has about 30,000 specimens. Associated with the invertebrate museum, but separately housed, is a parasite collection of about 1,000 specimens. The Neal Weber Library, a valuable collection of books and reprints on social insects, is housed in a room adjacent to the Invertebrate Museum.

Vertebrate Museum

The Vertebrate Museum occupies about 1200 square feet in Starcher Hall. In addition to the museum proper, there is a small preparation room with facilities for study of skin preparation and skeletonizing of vertebrates. The museum currently houses cataloged specimens of approximately 600 amphibians and reptiles, 1300 birds, and 2400 mammals. Specimens of several threatened or endangered species are housed in the
collections. The museum also houses a collection of study skins and taxidermy acquired from a pioneer North Dakota naturalist, H. V. Williams, during the 1960's. A portion of this collection has been recently loaned to the Myra Museum of Grand Forks for development of a display on wildlife of the Red River Valley.

The museum routinely provides teaching specimens for a variety of biology courses and houses specimens acquired through student and faculty research. Loans of specimens are made to investigators from other institutions, and occasionally donations of dateless material are made to regional schools and nature centers. Tours have been occasionally conducted for school groups or other organizations. The museum has also provided specimen identification services for other agencies and the general public and has provided assistance to wildlife enforcement agencies.

Beginning in 1998, office space was provided for two retired faculty members at the back of the vertebrate museum.

Equipment

Various modern pieces of equipment are available within department for research and learning purposes.

Library Holdings

Books and periodicals in biological disciplines are housed primarily in the Chester Fritz Library, but many others are in the Harley French Medical Library. Book holdings are estimated at 11,000 volumes, exclusive of the Medical Library books, while the number of active biology periodicals is currently 158 (inactive estimated at 373). Through request of the Biology Department, approximately 75 books are added annually.

Facility Use

Animal Care Facility

Approximately 25% of the animal holding facilities, as well as other rooms that are subsequently developed as organism holding facilities, will be reserved for maintenance of animals for teaching purposes. The remaining 75% will be allocated for research projects on the following priority basis:

1. External funded research by faculty that also enhances graduate and undergraduate training*
2. Externally funded research by faculty that does not involve graduate or undergraduate training
3. Non-funded research for faculty**
4. Long-term storage of non-animal materials

*Use of facilities by multiple faculty for collaborative projects or shared equipment use will enhance the priority

**A shift from externally funded to non-funded research occurs when additional external funds for continuing the research are not obtained, normally within a 2 year period.

Only the times when research investigations require less than 75% of the facilities will additional space be allocated for organisms needed in teaching (in the Department of Biology or any other department on campus).

The use of special function animal quarters rooms (e.g., quarantine, autopsy/surgery, and observation rooms) will be assigned on a short-term basis according to specific needs and may deviate from the 25-75% teaching-research breakdown above.

Space allocation is the responsibility of the animal quarters supervisor in consultation with the departmental chairperson. Use of the facilities for funded research by persons outside the Department of Biology will be considered on a case by case basis by the facility supervisor and the chairperson.

Data Analysis Room

A single full-time faculty member, appointed by the chairperson is to act in an advisory and supervisory capacity for the Data Analysis Room and the equipment associated with it.

The equipment and supplies purchased for and housed in the data analysis room shall not be removed from the room unless approved by the faculty member in charge. Borrowed equipment may be used only on a temporary basis (1-2 weeks).

The equipment in the Data Analysis Room is to be used only by biology faculty, students or others sponsored by the department.

Utilization of the data analysis equipment for instruction should be scheduled with the faculty member in charge at least one week prior to planned usage.
Greenhouse

Approximately 25% of the greenhouses will be reserved for the maintenance of plants for teaching purposes. The remaining 75% will be allocated for research projects on the following priority basis:

1. Externally funded research by faculty that also enhances graduate and undergraduate training*
2. Externally funded research by faculty that does not involve graduate or undergraduate training
3. Non-funded research by faculty**
4. Long-term storage of non-plant materials

*Use of facilities by multiple faculty for collaborative projects or shared equipment use will enhance the priority.

**A shift from externally funded to non-funded research occurs when additional external funds for continuing the research are not obtained, normally within a 2 year period.

Only at times when research investigations require less than 75% of the facilities will additional space be allocated for organisms needed for teaching (in the Department of Biology or any other department on campus).

The greenhouses will be used primarily for the growth of plants. Exceptions may be made by the chairperson of the department or a majority vote of the faculty.

At the beginning of each academic year it will be the responsibility of the Greenhouse Supervisor to solicit new space requests for usage of the greenhouse and preparation area for the coming year. These will be acted upon by the end of the second full week of classes. Special short-term requests will be considered as needed during the year. Since space assignments are ultimately the responsibility of the department chairperson, all decisions concerning space will be made in consultation with the department chairperson. Following approval of this policy all existing space allocations shall be confirmed in writing by the chairperson to the greenhouse supervisor.

No personal plants or other materials will be kept in any form in the departmental greenhouse facility.
The departmental greenhouse facility may be used for studies involving radioactive labeling following approval by the greenhouse supervisor, department chairperson, and other appropriate university-level committee(s).

Guidelines for Greenhouse Use

Access

1. Chairperson
2. Greenhouse Supervisor
3. Greenhouse Technician and weekend aide
4. Appropriate faculty and aides
5. Stockroom Manager

Space Allocation

1. Greenhouse - as assigned based on departmental policy
2. Greenhouse Preparation Room - Not normally allocated for faculty/graduate student use. Use of plant carts (requested in advance) and assigned by supervisor - allowed. Growth chambers as assigned; if the chamber belongs to faculty member, permission to keep in headhouse necessary from department chairperson.

Plants

1. The greenhouses are to be used for departmental or research plants only. No personal plants are allowed.
2. Plant positioning: Every attempt should be made, whether by pruning or positioning, to keep plant habit within the confines of each bench. This is necessary to prevent undue transfer of insects from bench-to-bench and greenhouse-to-greenhouse by technician or assistants during daily waterings, etc. Also included are plants grown on the greenhouse floor. These should be positioned allowing space between mature plants for free access for watering, sweeping, etc. and so that insect transfer be minimized.

Maintenance

1. All greenhouse (departmental) systems shall be "maintained" by the greenhouse technician where possible. Ordering parts shall be the responsibility of the technician through greenhouse funds. Preventive maintenance shall be carried out on an ongoing basis by the greenhouse technician.
2. The systems and equipment of each individual faculty member shall remain the responsibility of the individual. Technician assistance in maintaining/operating this equipment shall be at the discretion of the technician and should be requested in writing to the greenhouse supervisor if the technician deems appropriate - at other times, oral requests will suffice.

3. Headhouse and greenhouse cleaning shall be the responsibility of the technician (except that normally handled by custodians). Cleaning of other areas shall become the responsibility of the faculty member assigned to them.

4. Maintenance of the teaching collection and other departmental plants shall be the responsibility of the greenhouse technician. Research plants may be maintained by the technician only if requested by faculty member - such requests should be in writing and include complete instructions as to watering, feeding, re-potting, and pest control. Plants on carts are considered the same as research plants.

5. All spraying, drenching, systemics, etc. for control of insects and disease shall be the responsibility of the greenhouse technician, and shall be carried out at his discretion. Since the nature and degree of these problems varies by season and plant susceptibility, communication/consultation between the technician and faculty should be frequent to maintain plant health and proper growth. The greenhouse technician shall be responsible for proper notification of dangers, safety procedures, disposal, etc. for chemicals used, as per federal regulations. Chemicals (excluding fumigators) having an LD$_{50}$ of less than 500 normally will not be used in the greenhouse facility to help preserve the safety of all associated with the area.

6. The responsibilities of the greenhouse technician are primarily with the greenhouse and field stations. Other duties or jobs in the department requiring more than 30 minutes (based on judgement of the greenhouse technician) will require approval by the greenhouse supervisor. Faculty may request approval from the department chairperson when the greenhouse supervisor is absent or when the request has been denied.

Materials

All materials obtained with greenhouse funds by the greenhouse technician shall be dispensed at the discretion of same, and remain the property of the greenhouse unless arrangements are made (in advance) to replace or reimburse said materials. Projected usage by faculty should be submitted (in writing) when requested by greenhouse supervisors, said requests occurring each spring at the time supply requests are solicited. Unforeseen usage will be handled as greenhouse materials/funds allow on a
first come - first serve basis. Projected usage shall include soil and soil additives in addition to hardware.

Stockroom

The stockroom is the centralized location for supplies and equipment. All items will be checked out from that room. Items of general interest will be inventoried in that room and loaned out to staff members on a temporary basis. Permanent loans will be made rarely and only if there is not another claim for the items.

The stockroom is to be manned and open while laboratories are in session.

Copying

Current copyright laws must be followed. Copy services are available for departmental personnel at the following locations:

Duplicating Services

This is the most economical means of copying and must be used when making large numbers of copies. The document to be copied can be physically sent over (a Copy Request Form must be filled out and accompany the project). Additionally, Duplicating Services will accept electronic submissions of PDF files.

Duplicating Services requires a three-hour minimum turn-around time for completion of a project (from the time it reaches their office).

Convenience Copier Machine

The convenience copy machine is located in Starcher Hall room 102 and is accessed by inputting a 4-digit access code. Access codes are assigned to each faculty member, facility or course as needed. Office personnel are authorized to set up access codes.

Normally, the convenience copier should be used when fewer than 10 copies are needed.

Faculty will do their own copying of materials, including class materials.

Faculty sharing their access code with graduate student advisees will be responsible for the costs associated with his/her access code.

Cost per copy is set annually by Duplicating Services.
There will no no copying of reprints or journal articles except:

1. Charged to research grant
2. Exclusively to be used for class purposes and essential to that class.

Each individual with an access code will receive a monthly statement of usage. They must then provide a breakdown of charges (per allocation/class/facility) or provide a grant number to be charged.

**Departmental Property**

All items of equipment and supplies ordered by the Biology Department from funds allocated to the Biology Department are for the use of all staff members of the department and in all courses of the department.

Equipment purchased on research grants becomes the property of the Biology Department. These items shall be on permanent loan to the individual involved as long as he or she shall remain at the University. Requests for use of this equipment shall be directed to the staff members involved.

**Key Assignment**

Graduate Students - GTA's will be authorized keys to specific teaching facilities on recommendations of the individual in charge of the facility. All graduate students will be authorized outside doors, corridor door, copy room, conference room and specific office/lab door keys.

Note: Current university policy states that individuals can be issued only one key to each room.

**Use of Departmental Office Equipment**

Use of departmental office equipment by the secretaries or others after office hours for the typing of theses, reports and personal projects for non-faculty members is prohibited, except in unusual circumstances and only with the authorization of the chairperson.
APPENDIX I – LIST OF COURSES

Always consult the Graduate Catalog for a current list. Not all courses are offered every semester. Students are encouraged to check the course schedule on-line and check with instructors about scheduling of offerings.

Undergraduate Courses Eligible for Graduate Credit

These courses can be taken for graduate credit but will involve some extra work above and beyond that for the undergraduate students. Graduate students wishing to take undergraduate courses for graduate credit must inform the instructor at the beginning of the class that they wish to take the course for graduate credit.

Biol 312. Evolution. 3 credits.
Biol 315. Genetics. 3 credits.
Biol 332. General Ecology. 3 credits.
Biol 332L. General Ecology Lab. 1 credit.
Biol 333. Population Biology. 3 credits.
Biol 336. Systematic Botany. 4 credits.
Biol 341. Cell Biology. 3 credits.
Biol 341L. Cell Biology Lab. 1 credit.
Biol 350. Plant Biology. 3 credits.
Biol 363. Entomology. 4 credits.
Biol 364. Parasitology. 2 credits.
Biol 364L. Parasitology Lab. 2 credits.
Biol 369. Histology. 2 credits.
Biol 369L. Histology Lab. 2 credits.
Biol 376. Animal Biology. 3 credits.
Biol 378. Developmental Biology. 3 credits.
Biol 410. Molecular Biology Techniques. 4 credits.
Biol 415. Genomics. 4 credits.
Biol 416. Ecological Genomics. 3 credits.
Biol 425. Ichthyology. 3 credits.
Biol 426. Birds and Mammals. 4 credits.
Biol 431. Wildlife Management. 4 credits.
Biol 432. Wildlife Techniques in Population Assessment. 3 credits.
Biol 433. Aquatic Ecology. 3 credits.
Biol 438. Fisheries Management. 3 credits.
Biol 439. Conservation Biology. 3 credits.
Biol 442. Physiology of Organs and Systems. 3 credits.
Biol 442L. Physiology of Organs and Systems Laboratory. 1 credit.
Biol 450. Molecular Genetics. 2 credits.
Biol 470. Biometry. 3 credits.
Graduate Courses

Biol 503. Seminar. 1 credit. Discussion of selected topics in advanced biology, a different topic each semester.

Biol 509. Scientific Writing. 2 credits. Prerequisite: consent of instructor. Writing is an essential part of the scientific enterprise. In this course, students will develop their scientific writing skill through readings and discussion on the nature of effective writing, and through critique of writing projects produced by each student. Course can be repeated up to four credits for different writing projects.

Biol 512. Advanced Evolutionary Analysis. 2 credits. Prerequisite: consent of the instructor. This course will focus on methods that reconstruct evolutionary histories of populations, species and higher-level taxa. The course will also discuss the evolution of specialized traits using appropriate analyses.

Biol 533. Grassland Ecology. 2 credits. Prerequisite: Biology 332 or equivalent. Phytogeography, environmental influences, and community dynamics of grassland ecosystems with emphasis on herbage production, ecosystem modeling, and ecological characteristics of major grass species.


Biol 535. Physiological Ecology. 3 credits. Prerequisites: Biol 442 or consent of the instructor. Critical evaluation and synthesis of selected theoretical topics in physiological ecology.

Biol 536. Advanced Population Biology. 3 credits. Prerequisite: consent of the instructor. In this course we will examine current thinking on a range of topics in population ecology, population genetics and the links between ecological and evolutionary dynamics. Students will build on background reading by developing their own models of some aspect of population biology (ecological and/or genetic).

Biol 571. Advanced Biometry. 3 credits. Prerequisite: an introductory course in statistics. Advanced topics in the analysis of biological data using statistical software.

Biol 572. Design of Biological Experiments. 1 credit. Corequisites: Biol 470 or consent of the instructor. Topics in designing biological experiments including the role of experimentation, inference, sampling, replication, controls, and power analysis.
**Biol 590. Special Topics.** 1 to 4 credits. Prerequisites: Graduate status or upper division status with consent of instructor. Important and current topics in biology not covered by other courses. Repeatable when topics vary. Examples include: Aquaculture, Big Game Biology, Biorhythms, Conservation Biology, Fire Ecology, Molecular Techniques, Plant-Animal Interactions, Sex Determination and Speciation.

**Biol 592. Directed Studies.** 1 to 4 credits. Designed to meet the needs of individual and small groups of students in areas of faculty specialization. May be repeated to a total of 12 credits.

**Biol 593. Advanced Topics in Plant Biology.** 1 to 4 credits. Prerequisites: Graduate status or upper division status with consent of instructor. Advanced topics in plant biology. Repeatable when topics vary. Examples include: Plant Development, Plant Biochemistry, and Plant Genetics.

**Biol 594. Advanced Topics in Genetics.** 1 to 4 credits. Prerequisites: Graduate status or upper division status with consent of instructor. Advanced topics in genetics. Repeatable when topics vary. Examples include: Biochemical Genetics, Cytogenetics, and Human Medical and Population Genetics.

**Biol 595. Advanced Topics in Fisheries, Wildlife, and Conservation.** 1 to 4 credits. Prerequisites: Graduate status or upper division status with consent of instructor. Advanced topics in fisheries, wildlife, and conservation biology. Repeatable when topics vary. Examples include: Natural Resource Policy, Waterfowl Biology and Management, and Wetland and Prairie Ecology.

**Biol 596. Advanced Topics in Parasitology.** 1 to 4 credits. Prerequisites: Graduate status or upper division status with consent of instructor. Advanced topics in parasitology. Repeatable when topics vary. Examples include: Arthropod Borne Diseases, Helminthology, Disease Biology, and Medically Important Arthropods.

**Biol 597. Advanced Topics in Physiology and Development.** 1 to 4 credits. Prerequisites: Graduate status or upper division status with consent of instructor. Advanced topics in physiology and development. Repeatable when topics vary. Examples include: Comparative Endocrinology, Vascular Development, Embryonic Physiology, and Neural Physiology.

**Biol 599. Research.** Credits arranged. Maximum of 15 credits per semester. Intended for students conducting original research in consultation with staff. S/U grading only.

**Biol 997. Independent Study.** 2 credits.

APPENDIX II – GRADUATE STUDENT TEACHING EVALUATION FORM

To be completed by the course coordinator and/or course instructor

Student’s Name___________ Course #_________

Evaluator’s Signature ___________________________ Date _________________

A. Do you feel qualified to evaluate the above named individual (circle one)

YES      NO   If yes, then answer B through D

B. Please mark any and all of the following responsibilities that were required of the above named student:

_____ Attend the course lectures
_____ Give lectures in the laboratory
_____ Design laboratory experiments
_____ Run the laboratory
_____ Attend laboratory preparation sessions
_____ Write and grade quizzes and/or exams
_____ Other (Specify)__________________________

C. Rate the student in each of the following categories:

E-Exceeds expectations;   M-Meets expectations;   D-Does not meet expectations

(NOTE: Any student receiving one or more D ratings will automatically receive an unsatisfactory evaluation and will be dealt with as prescribed by 3.b.2)c)[p.82 Biology Faculty Handbook] of the evaluation policy.)

JUSTIFICATION FOR AN E OR D MUST BE PROVIDED IN WRITING.

1. Attendance and Promptness
   Lectures, labs, prep sessions, paperwork

2. Knowledge, Preparedness, and Classroom Skills
   Giving lectures, running labs, prep session participation, assuming responsibilities

3. Communicative Skills
   Getting across information

4. Attitude
   Towards students and responsibilities

Written Comments. Continue on back if necessary
APPENDIX III – DEPARTMENTAL ASSESSMENT FORMS

Attachment 1 – Initial Review of Student Background/Knowledge and Program of Study Recommendations

Attachment 2 - Annual Summary of Student Progress - Research

Attachment 3 – Assessment Rubric: Summary of Student Performance on Comprehensive Exam

Attachment 4 – Assessment Rubric: Thesis/Dissertation Proposal

Attachment 5 - Assessment Rubric: Thesis/Dissertation Departmental Seminar

Attachment 6 – Assessment Rubric: Final Thesis/Dissertation

Attachment 7 – Assessment Rubric: Thesis/Dissertation Defense
Attachment 1: Initial Review

Student Name ________________________________ Date __________________

Degree Program (circle one) M.S. (thesis) M.S. (non-thesis) Ph.D.

Graduate Advisory Committee
1. _________________________________ (advisor)
2. _________________________________ 3. _________________________________
4. _________________________________ 5. _________________________________

Student Background:
Undergraduate degree, year, school, major:

Graduate degree, year, school, major (include thesis title):

Relevant undergraduate and graduate coursework (indicate U=undergraduate, G=graduate coursework)

<table>
<thead>
<tr>
<th>Ecology</th>
<th>Genetics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evolution</td>
<td>Cell Biology</td>
</tr>
<tr>
<td>Statistics</td>
<td></td>
</tr>
</tbody>
</table>

GRE scores

|--------|--------------|------------|-------------------|----------------------|----------------|

Research or relevant work experience, including publications:
### Background knowledge (interview):

<table>
<thead>
<tr>
<th>Subject Area</th>
<th>Substantial Deficiency</th>
<th>Slight Deficiency</th>
<th>Acceptable</th>
<th>Good - Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecology</td>
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<tr>
<td>Evolution</td>
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<td>Genetics</td>
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<td>Cell Biology</td>
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<td>Statistics</td>
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</table>

Committee Recommendations to Address Deficiencies:
Attachment 2: Annual Evaluation

Student’s Academic and Research Progress towards the **Master of Science** Degree
To be completed by the Student’s Graduate Advisory Committee

Student’s Name ____________________________________________
Advisor’s Signature ________________________________________ Date __________
________________________________________________________

_____ Year in which student was admitted to current degree program.
_____ Number of semesters of T.A. support to date (including current semester).
_____ GPA at end of previous semester based on _____ credit hours.

Place an “X” where applicable:
_____ Committee appointed BY THE DEAN
_____ Program of Study approved BY THE DEAN
_____ Outline of thesis approved BY THE DEAN

Progress on Thesis:
_____ Field/lab work begun
_____ Field/lab work finished
_____ Data analysis begun
_____ Data analysis finished
_____ Thesis writing begun
_____ Thesis writing finished
_____ Program of Study completed

_____ Comprehensive Exam passed
_____ Departmental Seminar presented
_____ Thesis defended
_____ Application for degree submitted

Anticipated date of completion (if known) ________________________

List any professional scholarly activity, such as papers published, manuscripts submitted, technical reports, presentations at meetings, etc. Use additional space as needed.
<table>
<thead>
<tr>
<th>To date:</th>
<th>Unsatisfactory</th>
<th>Marginally satisfactory</th>
<th>Satisfactory</th>
<th>no basis or N.A.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Performance in Coursework</strong></td>
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<tr>
<td>If unsatisfactory, what course(s) are the source of this judgement?</td>
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</tbody>
</table>

| **Performance in Teaching** | | |
| Basis for judgement? (e.g. student evaluations, instructor evaluations) | | |

| **Performance in Research** (Evaluate the following. Consider in the evaluation that students are at different stages of project development). | | |
| Good understanding of conceptual / theoretical foundations | | | |
| Has read and understood relevant primary literature | | | |
| Has developed scientifically sound research plan, including methods for data analysis | | | |
| Has generated suitable data | | | |
| Has analyzed data correctly using appropriate methods | | | |
| Is making adequate progress in written presentation of research results (note manuscripts, reports, thesis/dissertation) | | | |
| Has presented results at a meeting (note local, regional, national, and oral or poster) | | | |
| Has demonstrated grasp and appropriate application of ethical considerations | | | |
| Is making progress towards degree | | | | |

**Written comments:** Use additional space as needed.
Student’s Academic and Research Progress towards the Doctor of Philosophy Degree
To be completed by the Student’s Graduate Advisory Committee

Student’s Name___________________________________
Advisor’s Signature________________________________ Date____________
Committee Member Signatures (sign and print name)

____________________________________ ____________________________________
____________________________________ ____________________________________
____________________________________ ____________________________________
____________________________________ ____________________________________

_____ Year in which student was admitted to current degree program.
_____ Number of semesters of T.A. support to date (including current semester).
_____ GPA at end of previous semester based on _____ credit hours.

Place an “X” where applicable:
_____ First Scholarly Tool Requirement (reading knowledge of one foreign language or 5 credits of course work in supporting area)
_____ Second Scholarly Tool Requirement (reading knowledge of a second foreign language or 5 credits in supporting area)
_____ Committee appointed BY THE DEAN
_____ Program of Study approved BY THE DEAN
_____ Outline of thesis approved BY THE DEAN

Progress on Thesis:
_____ Field/lab work begun
_____ Field/lab work finished
_____ Data analysis begun
_____ Data analysis finished
_____ Thesis writing begun
_____ Thesis writing finished
_____ Program of Study completed

_____ Comprehensive Exam passed
_____ Departmental Seminar presented
_____ Final Examination passed
_____ Application for degree submitted

Anticipated date of completion (if known) ________________________
List any professional scholarly activity, such as papers published, manuscripts submitted, technical reports, presentations at meetings, etc. Use additional space as needed.

**Written Comments:** Use additional space as needed.
<table>
<thead>
<tr>
<th>Performance in Coursework</th>
<th>Un satisfactory</th>
<th>Marginally satisfactory</th>
<th>Satisfactory</th>
<th>no basis or N.A.</th>
</tr>
</thead>
<tbody>
<tr>
<td>If unsatisfactory, what course(s) are the source of this judgement?</td>
<td></td>
<td></td>
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</tbody>
</table>

| Performance in Teaching | | | | |
|-------------------------| | | | |
| Basis for judgement? (e.g. student evaluations, instructor evaluations) |

<p>| Performance in Research (Evaluate the following. Consider in the evaluation that students are at different stages of project development). | | | |
| Good understanding of conceptual / theoretical foundations | | | |
| Has read and understood relevant primary literature | | | |
| Has developed scientifically sound research plan, including methods for data analysis | | | |
| Has generated suitable data | | | |
| Has analyzed data correctly using appropriate methods | | | |
| Is making adequate progress in written presentation of research results (note manuscripts, reports, thesis/dissertation) | | | |
| Has presented results at a meeting (note local, regional, national, and oral or poster) | | | |
| Has demonstrated grasp and appropriate application of ethical considerations | | | |
| Is making progress towards degree | | | |</p>
<table>
<thead>
<tr>
<th>Rubric for Comprehensive Exam</th>
<th>High Pass</th>
<th>Pass</th>
<th>Low Pass</th>
<th>Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Breadth of Knowledge</strong></td>
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<tr>
<td>(range and accuracy of information)</td>
<td>demonstrates knowledge of an exceptional range of information, with a high level of accuracy and relevance</td>
<td>demonstrates knowledge of a reasonable range of information, with an adequate level of accuracy and detail</td>
<td>knowledge has minor gaps, or is often superficial, or answers have some minor inaccuracies</td>
<td>knowledge has major gaps, or multiple major errors in information or irrelevant detail</td>
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<tr>
<td>subsection: Ecology/Evolution</td>
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<tr>
<td>Organismal</td>
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<tr>
<td>Cellular/Subcellular</td>
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<tr>
<td><strong>Integration of Knowledge</strong></td>
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<tr>
<td>(relationships among levels of biological organization)</td>
<td>clearly understands the conceptual linkages among all levels of biological organization, with exceptional detail in all cases</td>
<td>understands the conceptual linkages among multiple levels of biological organization, with a reasonable level of detail</td>
<td>has a basic but superficial understanding of the linkages among at least some levels of biological organization</td>
<td>demonstrates a lack of understanding of how knowledge at one level of organization informs our view of other levels</td>
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<tr>
<td><strong>Depth of Understanding</strong></td>
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<tr>
<td>(comprehension and application)</td>
<td>demonstrates a thorough and exceptionally detailed understanding of important concepts, their significance, and application to understanding biological phenomena</td>
<td>demonstrates a general and reasonably detailed understanding of important concepts and their significance, and application to understanding biological phenomena</td>
<td>has a basic understanding of important concepts and a superficial understanding of their significance and application, possibly limited detail or some minor misunderstandings</td>
<td>does not understand important concepts or fails to comprehend their significance or the logic in applying concepts to understand biological phenomena</td>
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<tr>
<td><strong>Critical Thinking</strong></td>
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<tr>
<td>(analysis, synthesis, evaluation)</td>
<td>exhibits exceptional ability to analyze problems and information, identify original connections or insights, and demonstrates ability to evaluate critically in information, concepts, research studies, etc.</td>
<td>demonstrates a reasonable ability to analyze critically and evaluate problems, synthesize information and make connections</td>
<td>exhibits some critical thinking but often does not analyze problems and information deeply, makes connections, or evaluates critically</td>
<td>generally fails to exhibit critical thinking. Knowledge is mostly memorized without evaluation or synthesis. Or, the student is unable or logically incorrect</td>
</tr>
<tr>
<td><strong>Communication</strong></td>
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<td></td>
<td>writes speaks clearly, answers questions directly, well-organized with answers well-supported by specific information</td>
<td>writes speaks reasonably well, answers questions directly, most of the time, generally provides sufficient information in a logical order</td>
<td>writes speaks in an understandable manner while some of the time, but some lapses in clarity, organization, or relevance of supporting information</td>
<td>writes speaks unclearly much of the time, does not answer the question asked, makes frequent unsupported claims</td>
</tr>
</tbody>
</table>

Note: The Ph.D. written exam will also have individual grades for each question and section.
Attachment 4: Rubric for Thesis/Dissertation Proposal

| Student Name: ______________________________ | Date: __________________________ |
| Degree program (circle one):               | M.S. Ph.D.                      |
| Graduate Advisory Committee: ___________________________ (chair) |

| Research question is well-defined and objectives and hypotheses are clearly stated | high pass | pass | low pass | fail | no basis |
| Research question provides a basis for making a significant contribution to the field. | |
| Literature review is current, comprehensive, and provides the relevant context for proposed research | |
| Proposal clearly and explicitly identifies and justifies the data requirements for answering the proposed question. | |
| The research plan is technically correct and adequate for collecting and analyzing the necessary data. The plan is sufficiently detailed and provides adequate justification for: sampling design | ☐ | ☐ | ☐ | ☐ | ☐ |
| methods of data acquisition | ☐ | ☐ | ☐ | ☐ | ☐ |
| methods of data analysis | ☐ | ☐ | ☐ | ☐ | ☐ |
| inference | ☐ | ☐ | ☐ | ☐ | ☐ |
| The proposal applies a critical perspective to this project and prior research in this area with regard to strengths, weaknesses, technical limitations, limits to inference. | |
| The written proposal is formatted in a manner appropriate to the discipline, uses citations correctly and effectively, and is written in a professional style. | |
| The oral arguments are clearly stated and convey a sufficient understanding of the research plan and the significance of the research to the field. | |
| Use of literature and proposed conduct of research meets ethical standards. | |
Attachment 5: Rubric for Thesis/Dissertation Seminar

Student Name: ______________________________ Date: ______________________

Degree program (circle one): M.S. Ph.D.

Graduate Advisory Committee: ___________________________ (chair)

_______________________________, _____________________________________

___________________________________, _____________________________________

<table>
<thead>
<tr>
<th>Item</th>
<th>high pass</th>
<th>pass</th>
<th>low pass</th>
<th>fail</th>
<th>no basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professionalism.</td>
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<tr>
<td>Speaks clearly and at a suitable pace.</td>
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<tr>
<td>Uses appropriate media effectively to aid communication.</td>
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<tr>
<td>Presentation is well-organized.</td>
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<tr>
<td>The research question, objectives, and hypotheses are clearly explained in a manner appropriate for the audience.</td>
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<tr>
<td>The research is placed in the context of other research conducted on this and related problems.</td>
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<td>Methods are explained adequately at an appropriate level of detail.</td>
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<tr>
<td>Results are presented in a clear and understandable manner.</td>
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<tr>
<td>Logical inference leading to conclusions is clearly explained and justified.</td>
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<tr>
<td>Applies a critical perspective to this project and prior research in this area with regard to strengths, weaknesses, technical limitations, limits to inference.</td>
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<tr>
<td>Answers questions competently and professionally.</td>
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</table>
Attachment 6: Rubric for Thesis/Dissertation

| Student Name: ______________________________ | Date: ____________________ |
| Degree program (circle one): M.S. Ph.D. |
| Graduate Advisory Committee: ___________________________ (chair) |

<table>
<thead>
<tr>
<th>The written thesis/dissertation is formatted in a manner appropriate to the discipline, uses citations correctly and effectively, and is written in a professional style.</th>
<th>high pass</th>
<th>pass</th>
<th>low pass</th>
<th>fail</th>
<th>no basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research question is well-defined and objectives and hypotheses are clearly stated.</td>
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<tr>
<td>Literature review is current, comprehensive, and provides the relevant context for the research.</td>
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<tr>
<td>The literature is synthesized and evaluated critically in a manner that demonstrates a comprehensive understanding of the research question and its significance.</td>
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<tr>
<td>Thesis/dissertation clearly and explicitly identifies and justifies the data requirements for answering the research question.</td>
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<tr>
<td>Methods are technically correct and adequate for collecting and analyzing the necessary data. Methods are described in sufficient detail with adequate justification for: sampling / experimental design methods of data acquisition methods of data analysis inference</td>
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<tr>
<td>Results are presented in a clear and understandable manner using appropriate format and level of detail.</td>
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<tr>
<td>Tables and Figures are used effectively.</td>
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<tr>
<td>Logical inference leading to conclusions is clearly explained and justified.</td>
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<tr>
<td>Thesis/dissertation applies a critical perspective to the results and conclusions with regard to strengths, weaknesses, technical limitations, limits to inference.</td>
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<tr>
<td>Conduct of research and use of literature meets ethical standards.</td>
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</tbody>
</table>
**Attachment 7: Rubric for Thesis/Dissertation Oral Defense**

Student Name: ______________________________ Date: __________________

Degree program (circle one): M.S. Ph.D.

Graduate Advisory Committee: ___________________________ (chair)
__________________________________, _____________________________________
__________________________________, _____________________________________

<table>
<thead>
<tr>
<th>Category</th>
<th>high pass</th>
<th>pass</th>
<th>low pass</th>
<th>fail</th>
<th>no basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speaks clearly and answers questions directly</td>
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<tr>
<td>Demonstrates a comprehensive understanding of the research question, including:</td>
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<tr>
<td>knowledge of prior research</td>
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<td>ability to analyze the problem to identify data needs and logical connections</td>
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<td>critically evaluate available information</td>
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<tr>
<td>understand broader significance of research</td>
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<tr>
<td>Demonstrates mastery of the research techniques and statistical methods employed</td>
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<td>Provides sound and well-articulated arguments that conclusions are logical and well-justified</td>
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<tr>
<td>Understands and addresses weaknesses or limitations of methods and inference</td>
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APPENDIX IV – BIOLOGY FIELD STATION OPERATION & MANAGEMENT POLICY

Introduction

The University of North Dakota retains two parcels of land which have been operated as biological field stations used for the purpose of research and education. The parcels have been acquired by the University through either donation or purchase and are currently held without covenants or limitation on use other than those established by statute. The purpose of this policy is to establish the means and methods used by the institution to maintain each field station, ensure its safe use, and prioritize funding obligations. This policy is established by the university administration, and as such can be revoked or amended by the university administration without regard for future or present use.

Land Description

The field stations are described as the following tracts of land:

Forest River Field Station. A 160 acre tract of land described as the south half of the southwest quarter of section 11, township 154, near Inkster, North Dakota and adjacent to the Forest River.

Oakville Prairie Field Station. A combination of tracts including the northwest corner of section 9 – TWSP 151 (Oakville 1), the southwest quarter of section 9 – TWSP 151 (Oakville 2), all of section 16 – TWSP 151 (Oakville 3), and the west half of the southwest quarter of section 29 – TWSP 152 (Mekinok 1) all located within Grand Forks County and comprising approximately 1000 acres near Emerado, North Dakota.

In addition to the field station, the university also owns approximately 600 acres of agricultural land near Emerado, North Dakota which has been leased for cash rent, and is described within this policy as “Air Base Property.”

Authorized Use and Purpose

The field stations are considered land preserves to be used for education and research by all faculty and students of the University of North Dakota. The proposed uses of the field stations must receive unanimous approval by the members of the Field Station Committee (FSC), which will be comprised of two (2) appointees from the Biology Department, one (1) appointee from the office of the Vice President for Finance and
Operations who will chair the committee, one (1) appointee from the office of the Vice President for Research, and one (1) appointee by the Dean of the College of Arts and Sciences.

The FSC members will meet on an annual basis or as determined by the chairperson. All approved uses of the field stations will be recorded into meeting minutes produced by the chairperson, and will include the person(s) authorized to enter and use the site, the nature of the research or education, and the duration of the use. The purpose of the documentation will be to establish a protocol for the UND Police department to ascertain who is authorized to access the site for security control. Signs necessary to control and manage access to the site will be recommended by the FSC and approved by the Vice President for Finance and Operations.

The FSC may appoint subcommittees as necessary and appropriate to manage daily activities of the field stations. Authority granted to any subcommittee must be in writing and approved by the Vice President for Finance and Operations.

Property History and Use

The following narrative has been included to provide a background on the acquisition and prior use of the field station properties.

Forrest River Field Station

Originally donated to the University Memorial Corporation in 1952 by Ira and Freda Muir, fee title for this property now resides with the “University Fellows”, a similar not for profit corporation which replaced the University Memorial Corporation. The office of the Vice President for Finance and Operations is currently negotiating with The Fellows to transfer the property as a gift to the University of North Dakota.

The property includes the south half of the southwest quarter, of section number eleven in township 154 in Grand Forks County. The 80 acres described above is located two miles west and one mile north of Inkster, North Dakota. The Forest River flows through the property and bisects it approximately into two equal parts. It has been designated an approved area in the National Register of Natural Areas by the Society of American Foresters, and consists of natural riparian area and gallery forest.

Records indicate that the property has supported a number of research projects, including a short term residence on the property which was accommodated by a cabin-like domicile which suffered repeated damage from vandals over a number of years. The structure has been razed, and currently there is no significant developed
infrastructure on the property. There exist no restrictions or covenants upon use of the property.

Oakville 1

Originally purchased by the University of North Dakota Foundation from private owners in 1958, fee title for this property was transferred to the University of North Dakota in February of 2004. There exist no covenants or restrictions upon the use of the land according to title documents. No record of the purchase value of this property remains extant.

Records indicate that the property has been used for a number of research projects by the Biology Department, including the use of radioactive isotopes. This research, combined with the disposal of contaminated sheep carcasses by the Biochemistry Department, may have created a hazardous waste site. Due to statutory limitations on operation and ownership of a hazardous waste disposal site, fee title of the property was transferred to the University of North Dakota on the date indicated above.

Approximately two-thirds of the total 160 acres are undisturbed prairie. The eastern one-third of the property was under cultivation prior to acquisition by the University of North Dakota Foundation. Since 1988, the University has installed a celestial observatory on approximately two acres of the site near the southwest corner of the property. This area is contained by a security fence and is used by the Space Studies Department.

Oakville 2

Purchased by The Fellows in July of 2004 from the Herschel L. Johnson Revocable Living Trust, negotiations for transfer of fee title to the University of North Dakota are currently being conducted by the office of the Vice President for Finance and Operations. There exist no covenants or restrictions upon the use of the land according to title records. Purchase value of the property was $34,229.25, which has not been restored to the trust and remains unavailable for future acquisitions.

The property consists of the northern most 120 acres of land within the quarter section, and is bordered on its southern reach by a 10 acre strip of land owned by the City of Emerado, North Dakota. This 10 acre parcel of property has been used by the municipality as an unregulated, unprotected land fill which has since been abandoned. Because of the exceptionally high water table on this site, there exists a high probability
that the landfill has contaminated the surrounding property to a large degree. The extent of contamination and its effect on both plant and animal life is undetermined.

Oakville 3

This property was purchased by the University of North Dakota through a title 15-09 acquisition from the North Dakota State Land Department in November, 2004. Prior to this time, the property was used by the Biology Department for a number of research projects, which continues to this day. Purchase value of the property was $74,258.00, which has not been restored to the trust and remains unavailable for future acquisitions.

The property consists of a full section of undisturbed prairie, save for two easement reaches that provide access for a high voltage transmission line and a buried petroleum pipeline. Both easements allow for access to service the utilities, including excavation and restoration of the soils. No record exists as to the preservation or restoration of the area other than a reference to the type of seed mixture required for the prairie grasses.

There exists a limitation on the use of the property as per NDCC 15-09 which stipulates that the property must be used for research and instruction purposes through 2009.

The northern reach of this property also borders the above mentioned landfill and may have the same issues of contamination.

Mekinock 1

Acquired as part of the “Air Base Property”, below, Mekinock 1 is undeveloped land with similar characteristics as the Oakville 1, 2, and 3. It consists of approximately 90 acres of undeveloped prairie which has been used for a limited number of field studies. The land is bordered on the west by a county road which acts to restrict natural drainage, and as a result creates a passive wetland during seasons with above average precipitation.

Air Base Property

This property was acquired by the University of North Dakota in February, 1965 as part of a grant award from the Department of Health, Education, and Welfare. It was acquired by the federal government in 1952 from private parties in order to construct the Grand Forks Air Force Base. The property was to be used for a second runway that was oriented on a northwest – southeast basis, but was later determined to be unnecessary. Subsequently the property was disposed of by soliciting a notice of
interest for which the University applied. Purchase value of the property was retired over a period of 20 years without cost to the University as a condition of the grant.

The property consists of 585.61 acres, along with a 17.35 acre easement on adjacent land that was reserved for a future drainage ditch that would have served the runway. The land is medium quality, tillable agricultural land suitable for row crops or small grains.

Transfer of the property to the University of North Dakota required a commitment to use the land for research and education. The original grant application specified research programs by both the Biology and Engineering Departments that would be conducted on the property. This covenant expired in 1984, and subsequently the land was leased for crop production. Revenue derived from the lease has been deposited in University accounts.

Summary

Biology Field Stations are important assets for both research and instruction. This policy is meant to establish a process where use of the field station can be regulated and maintained in the best interests of the University of North Dakota. Interpretation of this policy is remanded to the Vice President for Finance and Operations. This policy is placed into effect on the date below by the President of the University of North Dakota as granted by the State Board of Higher Education. The policy will remain in effect until terminated by the same authority.