Graduate Handbook

Department of Entomology

Virginia Tech

Revised September 2011

TABLE OF CONTENTS

FINANCIAL SUPPORT ____ 3
SCHOLARSHIPS AND LOANS ____ 3
NON-DISCRIMINATION STATEMENT ____ 3
FACULTY PARTICIPATION ON GRADUATE STUDENT ADVISORY COMMITTEES ____ 3
THE GRADUATE ADVISORY COMMITTEE ____ 4
PLAN OF STUDY ____ 4
SEMINAR ATTENDANCE AND PRESENTATION ____ 9
SATISFACTORY PROGRESS ____ 9
ACADEMIC ELIGIBILITY ____ 10
TEACHING EXPERIENCE ____ 11
SCIENTIFIC MEETINGS ____ 11
THE W. B. ALWOOD ENTOMOLOGICAL SOCIETY (ENTOMOLOGY CLUB) ____ 11
ENTOMOLOGICAL SOCIETY OF AMERICA ____ 12
RESEARCH GRANTS FOR GRADUATE STUDENTS ____ 12
DEPARTMENT FACILITIES ____ 12
THESIS/ DISSERTATION RESEARCH PROPOSAL ____ 17
SUGGESTED FORMAT FOR THESIS / DISSERTATION RESEARCH PROPOSAL ____ 18
THESIS / DISSERTATION PREPARATION AND PRESENTATION REQUIREMENTS ____ 19
THESIS / DISSERTATION TENTATIVE APPROVAL FORM ____ 20
THESIS / DISSERTATION RECOMMENDATIONS ____ 21
EXAMINATIONS ____ 21
TIME LIMITS FOR GRADUATE PROGRAMS ____ 23
OWNERSHIP OF DATA ____ 23
MISCELLANEOUS POLICIES AND SUGGESTIONS ____ 24
GENERAL TIME SEQUENCE IN A GRADUATE PROGRAM ____ 26
GRADUATE PROGRAM CHECKLIST ____ 27
FINAL SEMESTER CHECKLIST ____ 28
DAY OF FINAL EXAM ____ 29
RESUME PREPARATION ____ 30
GRADUATE STUDENT ANNUAL PROGRESS REPORT ____ 31
GRADUATE STUDENT EVALUATION FORM ____ 33

VirginiaTech
College of Agriculture
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Dear New Graduate Student:

Welcome to the Virginia Tech Department of Entomology! We are delighted that you have decided to join us. To make the most of your time here, you should recognize that graduate school will be significantly different from your experience as an undergraduate. Grades should not be your primary motivation. Although you must maintain grades of B or above, most of your thought, effort and time should be devoted to your thesis or dissertation research project. Upon graduation, your published research will mean much more to potential employers than will your grades.

You should expect to spend most of your time on research, keeping up with current literature and course work. You will also be expected to participate in the day-to-day workings of the department, such as serving on departmental standing and *ad hoc* committees, be involved in new faculty hires, and participate in the various outreach efforts conducted by the department. Please view this participation as an opportunity to understand the workings of the department. Our students have usually found this experience to be extremely valuable.

Before leaving Virginia Tech, at least one manuscript should be submitted for publication by MSLFS students and Ph.D. students should submit two manuscripts. You should also plan to attend at least one professional meeting where you will present your research to your peers in person. This will be considered the *minimum* level of productivity at these levels. These papers are important for your future employment, for your professor (who has acquired funds to support you and is therefore responsible for accounting for how they were spent), and for the department. Publishing your research is not "extra" work. Rather, publishing is the last step required in a successful research project. Your research is not complete until it has been published. All data collected during your time as a graduate student is the **property of Virginia Tech**, and will remain in the department after you have graduated.

Finally, please realize that you are responsible for meeting administrative deadlines and requirements for graduation, not your advisor or your committee. The various requirements are listed and explained in the graduate student handbook. You and your major professor should discuss all of the various requirements, but meeting them is your responsibility.

We wish you the best of luck and hope that your time with us proves to be stimulating, challenging, and quite rewarding!

Yours truly,

Loke T. Kok, Head

FINANCIAL SUPPORT

Financial support is offered to students on a competitive basis. Such assistance is usually in the form of a Graduate Research Assistantship (GRA). GRA stipends vary according to the availability of funds. Students supported by grant or project funds (GRAs) generally are expected to select a research problem which contributes to the grant or project. For all students on full-time assistantships an effort will be made to have their in-state tuition paid. Partial Teaching Assistantships are sometimes available to help supplement student expenses.

SCHOLARSHIPS AND LOANS

A limited amount of funds are available for student scholarships and loans. All University-wide scholarships are highly competitive, but several entomology students have been recipients in recent years. Information regarding application for these funds is available from the Graduate Student Coordinator. Information about other scholarships and loans may be obtained from the University Financial Aid Office in Burruss Hall. The Department also has a loan fund which can provide a small amount of short-term emergency assistance.

NON-DISCRIMINATION STATEMENT

Virginia Tech does not discriminate against employees, students, or applicants on the basis of race, color, sex, sexual orientation, disability, age, veteran status, national origin, religion, or political affiliation. Anyone having questions concerning any of those regulations should contact the Equal Opportunity / Affirmative Action Office.

FACULTY PARTICIPATION ON GRADUATE STUDENT ADVISORY COMMITTEES

The mission of the Department of Entomology is to provide professional expertise concerning arthropods to the Commonwealth, the nation, and the world. This includes teaching and training graduate students. The Department of Entomology Post Tenure Review document dated 3/27/97 lists the following reasonable expectations related to graduate student advising:

- tenured faculty should be available for assistance on a regular basis that is accessible to most of their students.

- tenured faculty should be involved in the direction and supervision of graduate programs by serving as Major Professors and members of student committees.

THE GRADUATE ADVISORY COMMITTEE

The Graduate Advisory Committee is selected by the student with the approval of the Major Professor. Once a suggested professor is approved by the Major Professor, the student should personally meet with and request that the professor serve on his or her committee. There must be a minimum of 3 members at the MSLFS level and 5 members at the Ph.D. level. The Ph.D. Advisory Committee must include at least one professor from outside the Department. Both MSLFS and Ph.D. Committees should include the Department Head as an *ex-officio* member. Students with a major professor located off-campus should select an on-campus faculty member to act as a co-chairperson or co-advisor of the Committee to administer routine, on-campus procedures. While any faculty member may offer advice in his or her area of expertise, it is the prime responsibility of the Committee to provide guidance to the student, to approve the Plan of Study and the Thesis/Dissertation, and to administer Preliminary Ph.D. and Final Examinations.

Inclusion of committee members from outside Virginia Tech is requested by the student's Advisory Committee Chair using the "Graduate Program Faculty and Additional Committee Member Registration" form found on the Graduate School's web site.

PLAN OF STUDY

All graduate students must prepare and submit a Plan of Study that is specific to the student's background and area of desired specialization. The Plan of Study must be approved by the student's Advisor and Advisory Committee, and the Department Head. After approval by the student's Advisory Committee and Department Head, the Plan of Study should be submitted to the Graduate Program Staff Coordinator to be entered and sent electronically to the Graduate School for approval. This form can be found on the department's website. For all students, the Plan of Study must be approved by the end of the second academic semester. A Thesis/Dissertation proposal is due by the end of the second academic semester. For a graduate student, the university degree requirements are those identified in the *Graduate Policies and Procedure and Course Catalog* available from the Graduate School) effective for the academic year in which the student files the Plan of Study. The Department of Entomology allows for both doctoral and master's (thesis and non-thesis) degrees. For each degree type, the student's Plan of Study must meet the semester credit hours requirements shown below. Graded course work on the Plan of Study must be taken for an A/F grade unless the course is only offered P/F. The M.S. thesis degree requires completion of a research-based thesis. Doctoral degrees must include a dissertation that involves original research/scholarship.

Advisory committees may add specific requirements needed for an individual student's academic development. All graduate students are required to demonstrate competency in basic insect biology and statistics. University requirements concerning the preparation of a Plan of Study are contained in the *Graduate Policies and Procedure and Course Catalog*. Refer to this document for specific policies about the transfer of graduate credits for use on the Plan of Study.

Master's in Life Sciences (MSLFS) With successful completion of both course work and research (thesis) requirements, students will receive an MS in Life Sciences with a Concentration in Entomology.
Minimum total credits: 30 credit hours
Minimum graded credits: 20 credit hours

- May include a maximum of 6 credits of Virginia Tech 4000 level undergraduate course work
    - The 6 credits of Virginia Tech 4000 level course work may include Special Study (4984) courses but may not include Undergraduate Independent Study (4974) or Undergraduate Research (4994) courses. Entomology students may include ENT 4264, 4354, and 4524 but may not include ENT 4254.
- All other graded course work must be 5000 level or higher (i.e., graduate course work)
    - The graded course work may include;
        - a maximum of 9 credits total in 4984, 5974, 5984, and 6984 courses.
        - 1 credit of seminar. Students are expected to attend all seminars, but they can only use 1 credit of seminar in the Plan of Study.

Minimum research credits: 10 credit hours of Master's Research (5994) taken at Virginia Tech.
Minimum MSLFS requirements: At least one course in each of three core areas: (1) *Biochemistry/Molecular and Cell Biology* (Biochemistry for Life Sciences, Insect Physiology or Insecticide Toxicology*);* (2) *Statistics* (Biometry, Statistics in Research, or approved substitute); and (3) *Information Management* (Research and Information Systems in the Life Sciences or approved substitute).
Minimum credits for GRA/GTA support: 12 credit hours/academic semester

Non-thesis Master's Students in the Non-Thesis MSLFS Program are required to complete an internship and a project in addition to course work. The Advisory Committee will supervise the selection and conduct of the internship and project, and will conduct a Final Oral Examination. *Note that a Non-Thesis Masters Degree is intended to be a terminal degree and is not a satisfactory prerequisite for continuing on toward a Ph.D.*
Minimum total credits: 30 credit hours
Minimum graded credits: 24 credit hours

- May include a maximum of 6 credits of Virginia Tech 4000 level undergraduate course work

    - The 6 credits of Virginia Tech 4000 level course work may include Special Study (4984) courses but may not include Undergraduate Independent Study (4974) or Undergraduate Research (4994) courses. Entomology students may include ENT 4264, 4354, and 4524 but may not include ENT 4254.
- All other graded course work must be 5000 level or higher (i.e., graduate course work)
    - The graded course work may include;
        - a maximum of 9 credits total in 4984, 5974, 5984, and 6984 courses.
        - 1 credit of seminar. Students are expected to attend all seminars, but they can only use 1 credit of seminar in the Plan of Study.

Maximum project and report or research credits:

- May include a maximum of 6 credits of Project and Report (5904) or Master's Research (5994) credits taken at Virginia Tech.

<u>Doctor of Philosophy (Ph.D.)</u>
Minimum total credits: 90 credit hours
Minimum graded credits: 30 credit hours

- At least 27 graded credits must be at the 5000 level or higher (i.e., graduate course work).
    - The 5000-level course work may include a maximum 18 credits total in 5974, 5984, and 6984 courses and 1 credit of seminar. Students are expected to attend all seminars, but they can only use 1 credit of seminar in the plan of study.
    - 1 credit of seminar. Students are expected to attend all seminars, but they can only use 1 credit of seminar in the Plan of Study.
- The Plan of Study may include a maximum of 6 credits of Virginia Tech graded 4000 level undergraduate course work only as supporting courses.
    - The 6 credits of Virginia Tech 4000 level course work may include Special Study (4984) courses but may not include Undergraduate Independent Study (4974) or Undergraduate Research (4994) courses. Entomology students may include ENT 4264, 4354, and 4524 but may not include ENT 4254.

Minimum research credits: 30 credit hours of Doctoral Research (7994).
Minimum credits for GRA/GTA support: 12 credit hours/academic semester

Supporting Courses

Entering students are expected to have completed courses in calculus, organic chemistry, and physics upon admission to Graduate School. If any of these courses are lacking, the student will be required to correct the course deficiency. Supporting courses are ones the student's Advisory Committee considers necessary to provide missing background for taking the key courses required for the student's degree program. Courses numbered lower than 4000 can only be used on the Plan of Study as Supporting Courses if offered

by another department. All courses listed on the Plan of Study, including Supporting Courses, are requirements for the degree and must be completed with a grade of "C" or better. However, supporting courses do not count toward the minimum number of credit hours required for the degree.

Language Requirement

Students are expected to demonstrate proficiency in written and spoken English, the language of instruction at Virginia Tech. English proficiency is evaluated by the academic unit, and students deemed unsatisfactory in this area may be required to complete remedial instruction.

Scientific Writing Skills

Students are expected to demonstrate proficiency in scientific writing. Submission of an adequate thesis/dissertation proposal is the first step in acquiring such skills, and will be evaluated by the graduate advisory committee. Students deemed unsatisfactory in this area may be required to undergo remedial instruction early in their degree program.

Course Recommendations and Options

For students without a previous course in statistics, Biometry (STAT 5605 & 5606) is recommended. Students with some background in statistics should consider Statistics in Research (STAT 5615 & 5616). Additional coursework may be required to help with the student's research. Other recommended courses are Experimental Design (STAT 4204), Contingency Table Analysis (STAT 4514), Sample Survey Methods (STAT 4524), and Nonparametric Statistics (STAT 5404).

In addition to formal courses, students may take advantage of experiential learning opportunities such as museum insect collection curatorship, extension apprenticeship, or development of multimedia teaching materials. Credit can be obtained by enrolling in Project and Report (ENT 5904) or Advanced Topics in Entomology (ENT 6004). Experiential learning credits will count toward graduation, but cannot be used to replace core courses. As with all coursework, experiential learning credits must be approved as part of the student's Plan of Study.

Students with appropriate interests may also participate in the Molecular Cell Biology Program while pursuing their studies in Entomology. The Molecular Cell Biology Program is designed to emphasize the interdisciplinary nature of modern biology and provide students with the background necessary to apply molecular approaches to their research. An integrated core curriculum, to be taken by all students, consists of three parts: (1) Principles of Molecular Cell Biology, (2) Topics in Molecular Cell Biology and (3) Seminar in Molecular Cell Biology. This core curriculum will be taken in addition to all departmental course requirements.

Bioinformatics Option in Entomology

Overview

The objective of the Bioinformatics option is to provide an opportunity for students to pursue graduate research in a rapidly growing field of insect genomics. The Bioinformatics Option will be offered within existing M.S. and Ph.D. degree programs. The department has expanded its research programs in medical and molecular entomology, vector-borne infection diseases, and insect bioinformatics. The instructional choices available to the students reflect the changing program needs. Students will be trained in the use of computational tools for searching and analyzing the genomes of insects of medical importance.

Course Recommendations

Students are encouraged to take at least two courses related to Bioinformatics. Specific course recommendations will be dependent on the background of the student and the research plan. Below is a list of Bioinformatics related courses available on campus:

CS 5124: Algorithms in Bioinformatics
PPWS 5984: Biological Paradigms for Bioinformatics
BCHM 5024: Computational Biochemistry for Bioinformatics
BIOL 5075-5076: Bioinformatics Methods in Research
CS 5045-5046: Computation for Life Sciences
STAT 5564: Statistical Genetics
CS 6104: Advanced Topics Course on Systems Biology and Drug Discovery
CS 5984: Computational Systems Biology
GBCB 5874: Problem Solving in Genetics, Bioinformatics and Computational Biology
GBCB 5004: Seminar in Genetics, Bioinformatics and Computational Biology

Graduate Committee Requirement

At least one member of the Graduate committee must be from the Interdisciplinary Ph.D. Program in Genetics, Bioinformatics, and Computational Biology. The list of members is available at http://www.grads.vt.edu/academics/programs/gbcb/faculty.html

Entomology Department Participating Faculty

Zach N. Adelman - *Genetically modified mosquitoes, bioinformatics of mosquito gene/promoter families, engineering pathogen resistance, gene drive, and RNAi*

Kevin M. Myles - *Molecular genetics of innate antiviral immune responses (RNAi) and virus-mediated immune modulation in the mosquito*

Sally L. Paulson - *Behavioral and environmental risk factors for La Crosse encephalitis virus and factors influencing the vector competence of mosquitoes*

Igor V. Sharakhov - *Genome rearrangements in malaria mosquitoes; comparative genomics; bioinformatics*

SEMINAR ATTENDANCE AND PRESENTATION

It is a departmental policy that students and faculty attend Entomology seminars on a regular basis, unless there are course conflicts or seasonal research obligations. Attendance at seminars provides the student with a broader perspective of the field of entomology and of research in the Department and the University.

Students are also expected to present at least two departmental seminars. One will be given at the beginning of their degree program, and include an outline of their research problem and any preliminary results that may be available. The second seminar covers the results of their thesis or dissertation research and will be given immediately before the Thesis/Dissertation defense. A Non-Thesis MSLFS student may give a seminar to describe their project, but will not present a seminar as a part of their Final Oral Examination. Seminars are open to all students and faculty.

Departmental seminars and other presentations (such as to classes, growers, etc.) are excellent occasions for students to obtain speaking experience and learn how to develop and organize oral presentations. They are of great value in preparing the student for a career as a professional entomologist.

SATISFACTORY PROGRESS

Each student's committee shall meet at least once a year to review the student's overall progress in their degree program and advise the student accordingly. Prior to the meeting, the student must present the committee with a report on his/her academic and research accomplishments. After the meeting, the Major Professor must prepare a written summary of the committee recommendations and submit this evaluation to the Department Head by May 15. Copies of the evaluation will be given to the student and placed in the student's file. The graduate student annual progress report and graduate student evaluation forms are included in this documentor can be found on the department’s website.

The purpose of the annual report is to ensure that potential problems a student may encounter are identified early so they can be corrected. The Graduate Advisory Committee will work with the student to develop a plan to rectify any deficiencies and facilitate his/her progress toward finishing their degree program. The annual meeting is a required minimum; students are encouraged to visit with their committee members more frequently. A student receiving an unsatisfactory evaluation must meet with the Department Head. The Graduate Advisory Committee will make recommendations to the student for improvement and another committee meeting will be held in 6 months. This will allow the student sufficient time to implement the suggestions provided by the committee and demonstrate good progress.

It is the student's responsibility to initiate the scheduling of the annual meeting and to prepare the annual report. Failure to demonstrate satisfactory progress may result in the loss of financial support and/or dismissal from the program.

Change of Degree Status

Upon the recommendation of the major advisor, and with the approval of the full graduate advisory committee and Department Head, an exceptional student may transfer to the Ph.D. program without completing a Master's degree. The following steps are required for a change of degree status:

1. Student should meet with full graduate advisory committee regarding the change in degree status.

2. With the approval of each member of the graduate advisory committee, the major professor should submit a written request for transfer and the ***Change of Degree Status Form*** to the Department Head. It is the student's responsibility to obtain the ***Change of Degree Status Form*** from the Graduate School website and to return the completed form to the Graduate School after obtaining the relavant signatures.

ACADEMIC ELIGIBILITY

Students must maintain a 3.00 GPA overall. All courses on the approved plan of study, including prerequisites and supporting courses must be completed with a grade of 'C-' or better. Students holding a graduate assistantship must maintain a minimum 3.00 GPA on all work attempted to continue to be eligible for financial assistance. The Graduate Program Director and the Major Professor receive a report on the student's grades at the completion of each semester. One semester is normally allowed to remedy grade deficiencies.

The Graduate School does not adhere to a rigid academic eligibility schedule. However, students whose cumulative GPA fall below 3.00 are placed on probation. Enrollment for one semester of probation is normally permitted to remedy an unsatisfactory GPA. If, in the judgement of the faculty and the Dean of the Graduate School, the student is incapable of making satisfactory progress, permission to continue in the graduate program will be denied and the student will be dismissed from the University.

TEACHING EXPERIENCE

Graduate Teaching Assistantships (GTAs) are available for some students in the Department of Entomology. Students obtaining GTAs are expected to take on a major responsibility in teaching. Whether or not students are awarded a GTA, all students must obtain teaching experience by assisting in at least one course in the Department before completing a Ph.D. Previous teaching experience of a similar nature can be used to meet this requirement if desired by the student. This experience will be appreciated later when seeking a professional position.

All Entomology students who will be serving as GTAs for the first time should attend a *GTA Training Workshop* offered by the Division of Research and Graduate Studies as a part of their Training the Future Professoriate program. GTAs who have taught before are also encouraged to attend to further develop their teaching skills. Well before the beginning of course, the GTA should begin meeting with the professor they will be assisting and if possible with a previous GTA for that course. These discussions should include teaching techniques, the course structure and syllabus, responsibilities and expectations, and the available teaching materials. These discussions between the GTA and professor should continue throughout the semester.

SCIENTIFIC MEETINGS

Students are encouraged to attend and present papers at scientific meetings. These meetings are of considerable value to their graduate training. Insofar as funds are available, students presenting papers at meetings may be provided with financial aid to help defray the expense of attending the meetings. Students should use opportunities to present papers at meetings, including the Virginia Academy of Science and, when feasible, the Entomological Society of America National meeting and Eastern Branch Meeting.

THE W. B. ALWOOD ENTOMOLOGICAL SOCIETY (ENTOMOLOGY CLUB)

While the Entomology Club is open to membership by any member of the University community, it has evolved into the Department's graduate student organization. In this capacity, the Entomology Club functions as a forum for discussion and participation by graduate students in appropriate affairs at the Department, University, and professional society levels. The graduate students are given considerable autonomy in these and other endeavors in which they are involved.

The Club places great importance on outreach programs. For example, they organize and handle “Departmental” tours to greater than 1400 elementary school students per year. The Club has always had a high level of participation which has earned the Department a

reputation for constructive involvement in University and Entomological Society of America business.

ENTOMOLOGICAL SOCIETY OF AMERICA

The Entomological Society of America is the primary professional organization for entomologists in the United States. Students may become members of the Society at reduced rates. Benefits include receipt of the following publications: *The American Entomologist* (published quarterly), the *ESA Newsletter* (published monthly) and one of the society's science journals (published bi-monthly). Further benefits include: publication in society journals, presentation of papers at meetings, and representation of entomologists' interests before the public. We strongly encourage all entomology students to become members.

RESEARCH GRANTS FOR GRADUATE STUDENTS

Modest grants are available from Sigma Xi, the scientific research society and from the University Graduate Student Assembly. Proposals concerning any area of entomological research may be funded. Application forms may be obtained from the departmental Sigma Xi representative or the Graduate Student Assembly. Graduate students are encouraged to participate in writing grant proposals to other granting agencies to support their research. This usually takes the form of preparing selected sections of proposals stemming from their major professor's research program.

DEPARTMENT FACILITIES

General

Microscopes, insect nets, Schmidt boxes, and other insect collecting equipment may be checked out by students. Dr. Fell and Stephen Hiner are in charge of these pieces of equipment.

Genetic Stock Center and Research Laboratories

The Genetic Stock Center houses mutant stocks of the German cockroach and approximately 30 other cockroach species. It also contains equipment necessary to perform routine procedures such as sexing and phenotyping. A phase contrast photomicroscope and materials requisite to chromosome studies are also available. Students desiring to use these facilities or to obtain cockroach stocks should contact Dr. Mullins.

Insectaries and Greenhouses

The Department's on-campus insectary and greenhouse facilities are located at the junction of Washington Street and West Campus Drive (next McComas Hall and Schiffert Health Center). Students in need of greenhouse space or equipment should discuss their needs with Ryan Mays. Additional insectary facilities at Prices Fork Research Center are available for Medical and Veterinary, Apiculture and Forest Entomology research. These are under the supervision of Drs. Paulson, Fell, and Salom, respectively.

Physiology Laboratories

These laboratories provide the opportunity for research using spectrophotometry, spectrofluorometry, respirometry, chromatography (HPTLC, HPLC, and GLC), centrifugation, radioisotopes, microscopy, and many other techniques. Environmental chambers are available for use. Facilities allow for the study of histology, fine structure and neurophysiology. These facilities include equipment for tissue sectioning, photomicroscopy and electrophysiology. Both scanning and transmission electron microscopes are also accessible on campus. Students desiring to use these facilities should contact Drs. Fell or Mullins.

Computer Facilities

A computer classroom is located in Room 301A Price Hall. The classroom contains state-of-the-art personal computers and projecting equipment. The room is run by the Computing Center and is open for university-wide use. Access to the Library System (VTLS) and the internet is available through each computer. Check with the main office on room availability. Special workshops, classes, or meetings overide open-access use. These events can be scheduled in the Entomology main office. Classes are generally scheduled at the beginning of each semester. If there are any problems noticed in the operation of the equipment, please notify the main office.

There are also several Apple and Intel-based computer work stations available for instruction and research in Room 300B. These facilities are available on a first come-first served basis.

Dodson Urban Pest Management Laboratory

Located on Glade Road, there are laboratories devoted to research on the biology and management of household cockroaches, insecticide application technology, structural-wood protection, insecticide resistance management, and large scale urban pest management programs. Equipment includes gas chromatography, drop-on-demand applicators, teaching collections of insects and insect damage, and computers. Contact Dr. Miller for further information.

Quarantine Laboratory

A Beneficial Insect Quarantine Laboratory with an adjacent greenhouse is located at Prices Fork. It is used to screen insects with potential as biological control agents. This is a federally approved facility consisting of a single-story building with unique features which meet the specifications of USDA and APHIS (Animal and Plant Health Inspection Services). This building is *restricted* to personnel directly involved in the on-going research and to authorized personnel. Visits to the Quarantine Laboratory may be arranged through Tom McAvoy.

Agricultural Experiment Station Facilities

Access to heavy machinery and test plots of various crops is possible at Blacksburg and other experiment stations throughout the state. Field studies are also done on land owned by cooperators not associated with the University. In all cases arrangements for use of these facilities are made through the Major Professor. Success of such arrangements depends upon good will, responsibility, and commitment of all concerned parties.

Insecticide Storage Building

A storage building located adjacent to the Entomology Service Building on Glade Road serves as a facility of safe storage of large supplies of insecticides needed for field studies.

Department Shop

Mr. Scotty Bolling is a highly skilled technician who builds and maintains many pieces of equipment needed for teaching and research. Scotty's services are accessible through the student's Major Professor.

Insect Collections

The departmental insect collections include slide-mounted, dry and alcohol-preserved specimens and a herbarium of insect and mite damage. The specimens are available for teaching and for research. Before using these collections, students should check with Eric Day as to which specimens are available for each of these areas.

Teaching Preparation Room

This room is located behind Room 221. It houses a large portion of the Department's teaching collection and is a work area for specimen preparation used for instruction. Check with Stephen Hiner for access and use of the facilities.

State-Owned Vehicles

Several trucks are assigned to faculty members of the department; other vehicles may be rented from the fleet services by the faculty. The following are guidelines for vehicle use:

(1) You must have a valid driver's license with at least 2 years driving experience and be an employee of or be specifically authorized by the Department Head to drive a state-owned vehicle.

(2) Always observe speed limits and traffic laws. The driver is liable for any penalties resulting from traffic violations. The driver is also responsible for damage to vehicles resulting from negligence, misuse or abuse.

(3) If you have an accident, report it immediately to the State Police for off-campus accidents and to the Virginia Tech Police for on-campus accidents. Also, you must report the accident to the Main Office.

(4) State-owned vehicles may not be used for personal transportation or hauling.

(5) Keep vehicles clean and lock them after use.

(6) Do not leave equipment in vehicles.

(7) Report mechanical malfunctions to the person in charge of the vehicle.

(8) Try to share rides and avoid unnecessary trips to maximize efficiency of vehicle use.

(9) The research program for which the vehicle was purchased has priority, but vehicles may be borrowed for other appropriate uses.

Photocopier

The photocopier is located in the mailroom. It is for official business and not for personal use.

Mail

Each student is provided with a mailbox in the mailroom (Room 217). Mailboxes should be checked frequently for notices and messages. Both U. S. mail and campus mail may be addressed to individual students in care of the Entomology Department, 216A Price Hall, MC 0319, Blacksburg, VA 24061. Campus mail personnel pick up and deliver mail each weekday.

University and Departmental messages are often sent through e-mail. You can access e-mail on computers in Rooms 301A and 300B by using your PID, which is provided when you officially register.

Study Desks

There is space in Room 301B Price Hall for graduate student study areas. Check with the main office to be assigned a desk and study area.

Administrative Staff Assistance

The administrative staff are not authorized to work directly for students. Students are expected do their own word processing. If a student needs to mail something that requires an account number, it should be handled through the major professor. The departmental offices should not be an area used for socializing; faculty, staff and students should conduct their business and leave. The telephones in the main office are not for general use. Access to local telephone service is provided in Room 301B. Long distance calls required for professional work should be arranged through your major professor.

Security

Graduate students will be provided a "General Access" key which provides access to the mailroom and Grayson Library (305 Price Hall) and a key to access Price Hall. It may also be necessary to have access to certain labs, offices, and outbuildings. All keys may be obtained from the main office. A deposit of $5 per key will be required. When a student no longer needs a key, it must be returned. ***The mailroom, classrooms, labs, offices, and outbuildings should be locked by the last person to leave, especially after 5:00 p.m. weekdays and on weekends.***

THESIS/ DISSERTATION RESEARCH PROPOSAL

A graduate student working toward the MSLFS or Ph.D. Degree should form his/her Advisory Committee and hold a meeting of the Committee before the end of the second academic semester in which the student is enrolled at Virginia Tech.

The planning and organization of the first Advisory Committee meeting is primarily the responsibility of the student, with the help of his/her Major Professor. The Committee Members should be given adequate notice of the time and place of the meeting, and receive a copy of the Thesis/Dissertation Research Proposal, transcripts of previous degrees, as well as proposed courses to be taken by the student. While the role of the Committee is to help guide and evaluate the work and progress of the student, the function of the first meeting is to approve the Plan of Study and more importantly the presentation of the student's research plans with discussion of these plans by the Committee.

The actual presentation may take any form and be as formal or informal as the student and Major Professor wish. However, the research proposed for the Thesis/Dissertation must be formally presented to the Committee, the Graduate Coordinator, and the Department Head, in the form of a Thesis/Dissertation Research Proposal. The Thesis/Dissertation Research Proposal should be prepared by the student, with appropriate help from his/her Major Professor. The format for the proposal is on the following page. This format should be followed as closely as possible. The preparation of the Thesis/Dissertation Research Proposal and the Committee meeting are important steps in a student's career; they should be handled accordingly. The student is also required to present a departmental seminar covering this material (usually 20-25 minutes) early in his/her tenure of their degree program.

SUGGESTED FORMAT FOR THESIS / DISSERTATION RESEARCH PROPOSAL

Title Page

- Tentative title of the thesis/dissertation
- Name of graduate student
- Date
- List of Graduate Advisory Committee Members, and their academic departments

Introduction and Literature Review

- Briefly present the appropriate background information that will acquaint the Committee Members with your project and its place with respect to the "known information" on the subject

Objectives of Proposed Research

- Briefly list the objectives of the proposed research (projects)
- Follow the list with a more thorough coverage of each objective (be concise)

Experimental Methods

- Briefly outline the methods and experimental design (e.g. a randomized complete block) which you plan to use to obtain data relative to each objective
- Show the kind of data you expect to collect and how it will be presented in the thesis
- Include statistical tests and what will be inferred from the data

Literature Cited

Teaching Experience (for Ph.D.)

- Explain how you will fulfill the Department's requirements for teaching experience

Timetable

- On a semester/year basis, present a tentative outline of your research schedule
- Include the projected semester for taking Preliminary and Final Exams; presenting papers at ESA Branch and National Meetings, etc

THESIS / DISSERTATION PREPARATION AND PRESENTATION REQUIREMENTS

(1) Completion date for studies and research should be estimated by the student in consultation with his/her Major Professor at least one semester in advance. Graduate Advisory Committee members should be informed as soon as the estimated completion date is known. Avoid a rigid timetable whenever possible, including short deadlines with a future employer regarding starting date. Every student should be aware that writing and editing a Thesis/Dissertation is a difficult and time consuming procedure. Thesis/Dissertation writing invariably takes much more time than anticipated.

(2) The Thesis/Dissertation manuscript should be reviewed by the Major Professor and corrections made before it is given to the Graduate Advisory Committee Members.

(3) The complete manuscript is to be printed in reasonable form and submitted in total **(including a Thesis/Dissertation Tentative Approval Form available on the following page or the department's website)** to the Committee four weeks prior to the tentative Final Exam. Committee Members should return the manuscript within 14 days after receipt. Committee Members may request that manuscript revisions be resubmitted to them. Major revisions are to be automatically returned to the Committee for review. This may take considerable time and the student frequently may find that the Final Exam date must be rescheduled. Submit a final copy of the Thesis/Dissertation to each member of the Committee one week before the Oral Exam. Ph.D. candidates are expected to publish their work in refereed scientific journals. As a condition of dissertation acceptance by the advisor and graduate committee, each candidate must prepare and submit at least one manuscript on the subject of his or her research for publication in a refereed journal. A favorable decision to publish the candidate's manuscript in a refereed journal may be included as an additional condition of dissertation acceptance at the discretion of the advisor and graduate committee. In general, multiple publications should result from research that leads to the awarding of a Ph.D.

(4) The Final Oral Exam and Thesis/Dissertation Defense date is to be set in consultation with the Committee after they are fully satisfied with the Thesis/Dissertation and have signed the Thesis/Dissertation Tentative Approval Form.

(5) The Thesis/Dissertation must be in final form (all graphs, etc.) at the Final Examination.

(6) It is required that Theses and Dissertations be submitted electronically to the Graduate School. Contact the Graduate School for specifics on handling this. It is important that students and their advisors do this early in preparation of submission of the Electronic Thesis/Dissertation to avoid formatting and other problems. Special seminars are held by the Graduate School to assist in this process.

THESIS / DISSERTATION TENTATIVE APPROVAL FORM

(To be attached to the thesis draft when submitted to each advisory committee member)

TO: _____
Committee Chairperson

THESIS / DISSERTATION TITLE:_____

_____

STUDENT AUTHOR: _____

DATE RECEIVED BY ADVISORY COMMITTEE MEMBER_____

DATE RETURNED TO STUDENT _____

I have read the above Thesis/Dissertation.

_____ I approve without major changes.

_____ I approve with the modifications suggested (see attached list and/or notations on Thesis/Dissertation); I do not wish to see it again before the final draft is made.

_____ I suggest changes (see attached list and/or notations on Thesis/Dissertation), and do wish to see it again before the final draft is made before giving tentative approval.

_____ Approved after changes made. Date: _____

Committee Member's initials: _____

_____ I disapprove (attach reasons).

_____
Signature of Committee Member

THESIS / DISSERTATION RECOMMENDATIONS

(1) Read and rely on the *Council of Biology Editors Style Manual* (available in the Grayson Library), rather than on old Thesis/Dissertations. A Thesis/Dissertation should be precise, concise, and readable. An appendix may be used to show computer models, data, site descriptions, etc. The Thesis/Dissertation should include all of the following: Abstract, Introduction, Literature Review, Methods and Materials, Results, Discussion, and Literature Cited; but the format may be varied so as to be most appropriate to the subject matter. Some students use chapters which can be easily modified to publishable units.

(2) The student should plan to submit one Electronic Thesis/Dissertation to the Graduate School, one hard copy for his/her Major Professor, and at least one personal hard copy. Members of the Advisory Committee may also desire copies.

(3) Presentation of at least one potentially publishable manuscript at the time of the final examination is desirable. It is advisable to write Theses/Dissertations in the form of one or more independent publications, with a common Introduction, Conclusions and Literature Cited, versus a more classical single document approach.

EXAMINATIONS

Examination Parameters

Prior to any examination, the student should consult with his or her major professor and review **the *Graduate Policies and Procedures and Course Catalog*** for guidence on the general procedures to be followed. The student should also seek guidance from each member of the graduate advisory committee several weeks before the exam. Following an exam, the student may consult with any member of the graduate advisory committee and the major professor regarding his or her performance and recommendations for remedying deficiencies.

Ph.D. Preliminary Examination

A student is admitted to candidacy for a Doctor of Philosophy by passing a comprehensive preliminary examination. The preliminary examination is a rigorous test of the candidate's entire program of study consisting of a written and oral portion. The exam is administered by the student's graduate advisory committee with the major professor serving as chair. The preliminary exam should be administered no later than the end of the third year, but student's are encouraged to complete the exam at the end of the second year or early in the third year. Intent to hold a preliminary exam must be formally declared. Examinations should be scheduled through the graduate school at least two weeks prior to the exam. It is the student's responsibility to obtain the ***Request to Admit Candidate to Preliminary Exam Form*** from the Graduate School website and to return

the completed form to the Graduate School after obtaining the relavant signatures. All graduate examinations are open to the faculty and faculty members are encouraged to attend and participate in such meetings. The student must be registered during the semester in which any examination required by Graduate School Policies is taken.

The preliminary exam is not exclusively for testing factual information, but rather emphasizes critical thinking, analytical problem solving, and the ability to formulate and test hypotheses. In the written portion of the exam the student must work independently to prepare answers to written questions submitted by the graduate advisory committee members. The student will have one week to prepare written answers to questions, and the written portion of the exam must be completed at least one week before the oral portion of the exam is administered. The oral exam will include material from the written exam, as well as other areas in the student's program of study. An ***examination form/card*** will be sent electronically to the student and all members of the Examining Committee. It is the student's responsibility to return the completed ***examination form*** to the Graduate School within 1-2 days of the examination, with each committee member signifying whether the exam performance was Satisfactory or Unsatisfactory. To pass the examination, a graduate student is allowed at most one Unsatisfactory vote.

If a student fails an examination, one full semester (a minimum of 15 weeks) must elapse before a second examination is scheduled. Failure to pass the second examination will result in the student being dismissed from graduate studies by the Graduate School.

Final Examination

Each candidate for a master's or doctoral degree must pass a final oral examination. Examinations should be scheduled through the graduate school at least two weeks prior to the exam, but no earlier than six months after successful completion of the preliminary examination. The exam is administered by the student's graduate advisory committee with the major professor serving as chair. It is the student's responsibility to obtain the ***Request to Admit Candidate to Final Exam Form*** from the Graduate School website and to return the completed form to the Graduate School after obtaining the relavant signatures. The thesis or dissertation title, time, and place for the examination must be given to the Department's Graduate Program Staff Coordinator at least one week before the examination to permit announcements on campus. The student must be registered during the semester in which any examination required by Graduate School Policies is taken.

The first hour of the final examination is to consist of a seminar open to the entire faculty, student body, and staff. The remainder of the final examination will consist of oral questioning covering primarily the thesis or dissertation, but additional subject matter from the student's program of study may also be covered. All graduate examinations are open to the faculty and faculty members are encouraged to attend and participate in such meetings. An ***examination form/card*** will be sent electronically to the student and all members of the Examining Committee. It is the student's responsibility to return the completed ***examination form*** to the Graduate School within 1-2 days of the examination,

with each committee member signifying whether the exam performance was Satisfactory or Unsatisfactory. To pass the examination, a graduate student is allowed at most one Unsatisfactory vote.

If a student fails an examination, one full semester (a minimum of 15 weeks) must elapse before a second examination is scheduled. Failure to pass the second examination will result in the student being dismissed from graduate studies by the Graduate School.

The Non-Thesis MSLFS Final Exam is similar, though without defense of a thesis.

TIME LIMITS FOR GRADUATE PROGRAMS

Following successful completion of the Ph.D Preliminary Examination, yet before the dissertation is completed (coverpage of dissertation signed by all Advisory Committee Members), students absent from campus for 2 years or more must retake the oral portion of their Preliminary Examination. If successful, they can then proceed and complete their dissertation. No change is needed for doctoral students who have yet to take an oral exam or masters students whose final exam includes comprehensive coverage.

If a graduate student has received financial support in the Department of Entomology and has not completed the graduate program, including thesis and defense, after three years for a masters and four years for a doctoral program, the student must meet in person with the Graduate Program Director and Department Head to justify continued support. If, after consultation with the student's Major Professor, this committee judges that insufficient progress has been made or prospects for imminent completion are slim, financial support will be terminated.

OWNERSHIP OF DATA

As you progress through your degree program, you will collect a large amount of research data. These data will likely serve as the core of your Thesis/Dissertation. You might initially believe that these are 'your' data to do with as you see fit. That is not the case. Employment at Virginia Tech binds each student to the same standards of conduct as a faculty or staff member regarding ownership of data. That is:

> *"The university asserts its rights to the results of research, funded wholly or in part with university resources. In addition, university ownership of intellectual properties is covered in Policy 13,000, 'Policy on Intellectual Properties.' These ownership rights extend to all permanent and visiting faculty, research faculty, classified staff, wage employees,* ***and students.****"*

The intellectual property rights for any data collected by a graduate student using University supplies or equipment, receiving a stipend, or funded by a grant or contract, shall reside with Virginia Tech. That means that you are obligated to provide a copy of all of your original data before you leave, with enough descriptive information so that the Major Professor can interpret the raw data. Be prepared to provide these data to your Major Professor before you leave the Department.

MISCELLANEOUS POLICIES AND SUGGESTIONS

- Both the University, through the Graduate Honor Code, and the Department expect complete honesty. Review the constitution of the Graduate Honor System (Appendix II & III A in *Graduate Policies and Procedures and Course Catalog*).

- Prior to using space assigned to any professor or borrowing anything from him/her, check with that professor.

- Due to legal issues, students do not make pesticide recommendations. Questions from growers, homeowners, etc. should be referred to Extension specialists. If it is not clear who an appropriate specialist would be, refer questions to the Insect Identification Laboratory.

- Whenever equipment, books, reprints, etc. are borrowed, be sure to leave a note clearly describing the item borrowed, who borrowed it, and the date. Never borrow anything without first obtaining permission from the owner.

- Faculty members are available to confer with any student at any reasonable time concerning a problem in their area of expertise. The faculty attempts to maintain an informal, friendly relationship with graduate students.

- Maintain a photographic or electronic record of all research. This will be useful for seminars, papers, talks, and in the Thesis/Dissertation.

- Keep at least one extra copy of all data, important computer disk files, and manuscripts in a place other than Price Hall.

- Writing a scientific paper, especially a Thesis/Dissertation, takes 2-3 times as long as one would normally think it should. Plan accordingly.

- Statistical consulting is available from the Statistics Department. Take advantage of this in both the planning and evaluation stages of your research. However, do not expect these consultants to conduct your analyses. You are responsible for all aspects of your research. Discuss your proposed visit to consultants with your Major Professor prior to making an appointment with the Statistical Consulting Laboratory.

- While casual clothes are acceptable for classes and for doing research, there are occasions where more formal attire is appropriate. These occasions include seminar presentations, Preliminary Exams and Thesis/Dissertation Defenses. "Dressing up" lends more authority to presentations and provides you with an advantage which you lose by failure to be concerned about your personal appearance.

GENERAL TIME SEQUENCE IN A GRADUATE PROGRAM

1st Semester

- Select a Graduate Advisory Committee in consultation with the Major Professor
- In consultation with the Advisory Committee, prepare a Plan of Study
- Select a research project and begin preparation of the research proposal
- After completion of the 1st semester, M.S. students accepted under provisional status must be transferred to regular status or dropped from the University

2nd Semester

- Submit research proposal to the Advisory Committee, the Graduate Program Director, and the Department Head
- Meet with the Graduate Advisory Committee for approval of the Plan of Study and the research proposal
- Present departmental seminar on the research proposal

2nd Year

- Complete Plan of Study and satisfy all course deficiencies
- Develop plans for completing required research
- Ph.D. students should schedule their Preliminary Exam by the end of their second year of study and should expect to take the exam before the end of the next academic year

3rd Year

- Ph.D. students should complete their Preliminary Exam
- Continue to conduct required research studies
- M.S. students should complete their degree program and present their final seminar presentation

4th Year

- Ph.D. candidates should complete their degree program and present their final seminar presentation

Six months prior to completion of terminal degree (MSLFS and Ph.D.)

- Bring your personal resume up to date and begin preparations for a job search

Prior to the Final Oral Exam

- Complete work on all research areas and, if appropriate, submit properly labeled voucher specimens for the Departmental collection to Eric Day. Return all borrowed books, research insects borrowed for study from other collections, and equipment. Make arrangements to return all keys. A public announcement of the time and place of the defense seminar **MUST** be made at least one week in advance

GRADUATE PROGRAM CHECKLIST

MSLFS

- Form a Graduate Advisory Committee
- Prepare and approve Graduate Plan of Study
- Submit research proposal to committee, Graduate Program Director, and Department Head
- Satisfy course deficiencies
- Complete Graduate Plan of Study
- Seminar attendance and 2 presentations (proposal and defense)
- Annual report to Graduate Advisory Committee
- Non-thesis MSLFS students must complete an internship and project in addition to coursework
- Pass Final Oral Exam

Ph.D.

- Form a Graduate Advisory Committee
- Prepare and approve Graduate Plan of Study
- Submit research proposal to committee, Graduate Program Director, and Department Head
- Satisfy course deficiencies
- Complete Graduate Plan of Study
- Seminar attendance and 2 presentations (proposal and defense)
- Must serve as a Teaching Assistant for at least one semester
- Complete Preliminary Exam
- Annual report to Graduate Advisory Committee
- Pass Final Oral Exam

FINAL SEMESTER CHECKLIST

The final semester of a M.S. or Ph.D. Program is very hectic. A student must plan his/her time and program the events of this period very carefully. The checklist presented below is intended to help with this planning. If problems or questions arise allow extra time.

- Register for the semester in which the M.S. or Ph.D. final exam is to be taken. If you are not taking course work, you only have to sign up for 3 credit hours, unless you have an assistantship or fellowship, then register for 12 credits.
- Type the rough draft copy of the thesis or dissertation, keep a backup copy on a diskette.
- Review and obtain approval of the rough draft of the manuscript with your Major Professor before passing it to other Advisory Committee Members. You may be required to prepare several rough drafts.
- Secure approval of the manuscript from each Committee Member (via the Thesis/Dissertation Tentative Approval Form). The Thesis/Dissertation Tentative Approval Form is available from main office or photocopy that page from page 19 of this handbook.
- After checking with the Committee Members, schedule the time and date of the Final Exam. Prepare the Request to Admit Candidate to Exam Form, which are available on the Graduate School's website.
- Review your Plan of Study to ensure all courses and hours are satisfied
- Submit the Request to Admit Candidate to Exam Form to Graduate School at least 2 weeks before the Final Exam. It takes the Graduate School about 2 weeks to check a student's records. Your final Examination Card will be emailed to you and your committee.
- Submit the Application for Degree online through Hokie Spa.
- Prepare a final copy of the manuscript for each Committee Member at least 1 week before the final exam
- Allow one week to review the final copy with the Major Professor. Make necessary changes.
- Note that additions and corrections can still be required by your Committee.
- Study for the Final Exam, and prepare for the Final Seminar.

DAY OF FINAL EXAM

- Appear for the Final Exam on time
- Take the exam
- Have all Advisory Committee Members sign the Final Exam Card. Make sure to bring card to the Main Office for signature of Graduate Staff Coordinator & to retain a copy for the department files.
- Return the signed Final Exam Card to the Graduate School within 24 hours. After the exam, a student has 14 days to make changes as recommended by the committee, have the committee sign the Electronic Thesis/Dissertation Approval form and submit the Electronic Theseis/Dissertation to the Graduate School. The University Book Store offers a binding service for theses and dissertations. Inquire about this service at the Main Desk of the Newman Library

Congratulations! All is now complete! Relax; information about graduation is mailed to each student

RESUME PREPARATION

A well-prepared resume is the first step to locating a job. The resume outline shown here includes the primary information that is of interest to prospective employers. It is advisable for the student to prepare a resume early in his/her graduate career and annually bring it up to date.

RESUME

I. Name and Address

Office: Phone:

Home: Phone:

II. Education

Undergraduate:

Graduate:

M.S. and Ph.D. Thesis/Dissertation titles

III. Military Service

IV. Professional Experience (Chronological order)

V. Professional Societies

VI. Honors and Awards

VII. Research Activities and Interests

VIII. Publications and Paper Presentations

IX. Teaching Experience

X. Grants

XI. Other activities which may indicate leadership abilities, etc.

XII. Hobbies

(Use separate page for references)

Categories may be added or deleted as needed. Possible additional categories include: Committee Service, Research Grants, Other Work Experience, etc.

GRADUATE STUDENT ANNUAL PROGRESS REPORT

Name						
Degree Program (check one)	M.S.		Ph.D		Program Entry Date	
Major Professor						
Advisory Committee Members						
Date(s) of Committee Meetings						

RESEARCH

1. Thesis/Dissertation Title:

2. Experimental and Scholarly Progress (include attachments as needed):

3. Presentation(s):

4. Publication(s):

COURSE WORK

1. Remaining Entrance deficiencies (if any):

2. Courses taken this year (attach copies of transcript(s)):

3. Courses yet to be taken:

TEACHING

1. T.A. experience:

2. Courses to which you contributed (describe participation):

3. Evidence of efforts to improve teaching (workshops, etc.):

SERVICE

1. Teaching:

2. Departmental Committees:

3. Student Activities:

AWARDS

Signature of your Major Professor:

_____

Please send one copy of this report to the Graduate Coordinator and one copy to your Major Professor.

GRADUATE STUDENT EVALUATION FORM

Name _____ SSN _____ First Enrolled _____
Cumulative GPA _____ Date _____ MSLFS or Ph.D _____
Anticipated Completion Date _____ Semester _____ Year _____

Category	Excellent	Good	Marginal	Unsatisfactory	N/A
Academic Performance					
Thesis/Dissertation Progress					
Performance on GTA, GRA					
Professional Activities and Interaction					
Overall Performance					

Review of Progress to Date:

Anticipated Progress:

Suggestions for Improvement:

Chairperson _____

Co-Advisor _____

Committee Member _____

Committee Member _____

Committee Member _____

Committee Member _____

Student _____

Department Head _____