DEPARTMENTAL GUIDELINES FOR GRADUATE STUDIES

IN PHARMACOLOGY AND TOXICOLOGY

Doctor of Philosophy
Doctor of Medicine/Doctor of Philosophy
Master of Arts in Pharmacology
Combined Bachelor of Science/Master of Science in Pharmacology and Toxicology

Department of Pharmacology and Toxicology
School of Medicine and Biomedical Sciences
University at Buffalo

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Dr. Richard A. Rabin, Director of Graduate Studies

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CONTENTS

GRADUATE PROGRAM

Department of Pharmacology and Toxicology
University at Buffalo

I. INTRODUCTION

The Department of Pharmacology and Toxicology offers a program of didactic course work and research training leading to the degree of Doctor of Philosophy. Additional programs are offered leading to the Master of Arts in Pharmacology and a BS/MS in Pharmacology and Toxicology. The programs are structured to provide the candidate with a broad training in basic areas of pharmacology as well as a degree of expertise in one area. There are specialized areas of research interest within the department. These encompass:

(1) *Neuropharmacology*, including research on central and peripheral neurotransmission, the effects of drugs on electrophysiological processes, nerve growth factors signal transduction, and neural cytoskeletal elements;
(2) *Psychopharmacology*, including the study of psychoactive drugs, behavioral pharmacology and the pharmacology of abused drugs, and drug addiction and alcohol dependence;
(3) *Toxicology*, including analyses of environmental and clinical aspects, effects of xenobiotics on metabolism, the toxicity and mechanisms of action of dioxins and other halogenated aromatic hydrocarbons, heavy metals, cyclic ethers and other environmental pollutants, and toxicological effects on development, renal and pulmonary function, neural activity, and immune responses;
(4) *Molecular and Cellular Pharmacology* including research of drug-receptor interactions, signal transduction mechanisms, calcium and calmodulin-dependent processes, protein phosphorylation, membrane transport, drug-enzyme interactions, pharmacology of antibiotics and immune responses, regulation of gene expression, and molecular determinants of growth and differentiation of cells; and
(5) *Clinical Pharmacology* including treatments of neurological, psychiatric, and infectious diseases, and drug effects on oral tissues.

General requirements for all graduate students are described in the Graduate School Policies and Procedures (http://www.grad.buffalo.edu/grad-docs/policies/**). Students are required to follow the policies and procedures for graduate students outlined in these documents. Students are urged to refer to this website in addition to the present Departmental Guidelines.**

II. REQUIREMENTS FOR ADMISSION

Students are admitted to the graduate programs of the Department of Pharmacology and Toxicology on the basis of a number of criteria. These include, but are not limited to, undergraduate and any postgraduate grade point averages, scores on the Graduate Record Examination general test, and a particular subject test (which is optional). A minimum of three letters of recommendation from qualified individuals is also required, as well as a personal statement from the applicant outlining the basis of their interest in research and their career objectives. Applicants should have a B average or better in their undergraduate courses and have completed a Bachelor's degree prior to matriculation (unless he/she is a candidate for the BS/MS Program). All foreign applicants must submit recent TOEFL scores. Applicants who wish to be considered for fellowships or scholarships must submit all application materials by February 1.

The personal interview is an important part of the evaluation process for applicants. The interview also provides the applicants with the opportunity to meet with faculty and students and determine whether they find the Department a favorable environment to continue their education. Thus, by policy of this department, a personal interview will be seriously considered for all candidates in the following categories:

- persons for whom an interview has been requested by a present or former member of the faculty or staff of the department,
- persons for whom an interview has been requested by a graduate of the department, and
- persons identified as relatives of present or former faculty, staff, or students of the department.

III. PROGRAM ORGANIZATION

A. Department Faculty

The faculty members of the Department of Pharmacology and Toxicology are committed to assist students in the academic and research aspects of graduate education.

The conduct of the graduate program in pharmacology and toxicology is the responsibility of the faculty of the Department of Pharmacology and Toxicology. The faculty decides on program policies, curriculum, and upon the continuation of students in the program. Between meetings of the faculty, the responsibility for conduct of the graduate program is vested in the Department Chairman, the Director of Graduate Studies, the Graduate Affairs Committee and, where that person has been identified, the student's thesis advisor.

B. Director of Graduate Studies

The Director of Graduate Studies is a member of the Department faculty appointed to that position by the Department Chair.

The Director of Graduate Studies is available to assist students with all aspects of graduate education. He/she will guide students in their course registration to insure they are taking the required sequence of courses. This includes recommending any substitution of courses in the required sequence. The Director of Graduate Studies will inform students of actions by the Department faculty, by the Graduate Affairs Committee, or by the Department Chairperson and will informally mediate disputes when requested to assist in this manner by a student. The Director of Graduate Studies will serve as the departmental representative to the Health Sciences Divisional Committee.

With regard to the administration of the Proposition Examination, the Director of Graduate Studies in conjunction with the Chairperson of the Proposition Examination will review the student's selection of a proposal title to ensure that it is of significance as well as being dissimilar to the student’s research activities.

C. Graduate Affairs Committee (GAC)

The Graduate Affairs Committee will be responsible for Ph.D. admissions and oversight of all graduate students. This committee will meet at least twice a year to consider the progress of each graduate student and will take appropriate action and make needed recommendations to the faculty. The committee will be composed of:

1. Departmental Chair
2. Director of Graduate Studies, who will serve as Chair of the Committee
3. Three faculty members who will be appointed by the Chair and will serve a two-year term

D. Thesis Advisor

The thesis advisor is a member of the Department of Pharmacology and Toxicology and the Graduate Faculty with the rank of Assistant Professor or above. It is the responsibility of the student to identify an advisor, which is formalized by the transmittal of a letter to the Chairperson of the Department. Both the student and advisor sign the letter. The Department Chair must approve the choice of advisor and communicates this information to the GAC and faculty. Once a student selects a thesis advisor, that faculty member assumes responsibility for the student's program of study and progress in meeting degree requirements.

The advisor should preferably be a permanent member of the Departmental faculty with an active research program. However, in certain instances, the advisor may be a member of another department who holds an adjunct appointment in the Department of Pharmacology and Toxicology. After the thesis advisor has been selected, he/she will take the major role in advising the student in the preparation of a program of elective coursework. This program should develop in-depth knowledge of the student's research area, yet give the student the necessary breadth for a career in teaching and research. Thus a student's program may be individualized by the selection of certain electives or substitutions to the required sequence of courses. The GAC must approve any substitutions. The thesis advisor will guide the student in the selection of a feasible thesis research project, with emphasis on the development of the student's capability for independent and self-critical research. The advisor will also have the responsibility to ensure that the student is making normal progress in meeting the requirements of the graduate program. The thesis advisor is also responsible for assembling and presenting the student's record to the GAC for semester reviews.

The thesis advisor for doctoral students is responsible for the disposition of the student's stipend and tuition.

E. Thesis Program Committee

The Thesis Program Committee is comprised of at least three faculty members of the Graduate School, specifically the thesis advisor, at least one additional member of the Department faculty, and at least one faculty member from another department. The thesis advisor and the student select the members of the Committee. The Thesis Program Committee is initially responsible for determining whether the thesis proposal is acceptable. The acceptability of the thesis proposal is documented by signatures of the members of the Thesis Committee on the Application to Candidacy form. The thesis advisor and student are to meet with the Committee on a regular basis, approximately every 6 months. Upon completion of the thesis research and submission of the final draft of the thesis document, the student defends the thesis before the Committee and the Department.

F. The Student

All students should be aware of and follow the regulations not only of this Department but also of The Graduate School and promptly respond to all administrative requests from the department (please consult http:/www.grad.buffalo.edu/grad-docs/). Students and faculty are expected to attend all departmental seminars and seminars co-sponsored by this department. All graduate students are required to meet with the Director of Graduate Studies prior to registering for courses each semester. This meeting will ensure proper advisement and avoid unwanted tuition costs (there is no registration for the summer session). Required courses are graded on a standard four-point scale. Students can elect to be graded for up to 10 credit hours on an S/U basis, subject to the approval of the thesis advisor and the Director of Graduate Studies. Exemption from courses in the required sequence by the student may be granted when justified. The petition must be addressed to the Director of Graduate Studies and approved by the GAC.

The Department of Pharmacology and Toxicology has no formal requirements for its graduate students to teach, but strongly encourages them to gain teaching experience. Every effort will be made to provide students interested in gaining teaching skills with a quality teaching experience.

It is the responsibility of each student to contact the Graduate School and Student Response Center prior to deadlines for degree conferral to be sure that all the requirements and paperwork for the degree have been completed.

IV. FINANCIAL SUPPORT

It is departmental policy to provide financial support and tuition scholarship for doctoral students during their tenure in this program. The terms of this support are determined by the department Chairperson and by the Thesis Advisor. Certain limits are also specified by the Graduate Student Employees Union (GSEU)/NYS Agreement (See http://www.grad.buffalo.edu/grad-docs/). All students who receive stipends and tuition scholarship awards are not expected to hold jobs outside of the University.

V. COURSE SEQUENCE

The graduate programs are designed to allow flexibility in order to meet the diverse requirements of graduate students. Nevertheless, the programs are structured to ensure that all graduate students receive outstanding training to prepare them for professional careers. Therefore, a core curriculum containing several Pharmacology and other Biomedical Science courses is required. Exemptions may be obtained only by special permission. A petition for such exemption must be made to the Director of Graduate Studies and be approved by the GAC.

A. Curricula for Graduate Studies in Pharmacology and Toxicology

Specified curricula are available for students admitted into approved graduate programs. These programs include those leading to the Ph.D. in Pharmacology, to the M.A in Pharmacology, and the combined B.S./M.S. in Pharmacology and Toxicology. Programs leading to the Ph.D degree include the M.D./Ph.D. degrees, the Ph.D. program through the Interdisciplinary Program in Biomedical Sciences, and direct admission into the Department. The course sequences satisfying the various curricula are detailed on the following pages:

INTERDISCIPLINARY GRADUATE PROGRAM IN BIOMEDICAL SCIENCES
Ph.D. IN PHARMACOLOGY
CURRICULUM

FIRST YEAR

FALL REQUIRED COURSES

BMS 501 Cell Biology I (4 cr)
BMS 503 Principles of Biochemistry (4 cr)
BMS 509A Laboratory Rotation (2 cr)
BMS 511 Interdisciplinary Seminar (2 cr)

SPRING REQUIRED COURSES

BMS 505 Cell Biology II A (First l/2 semester) (2 cr)
AND BMS 506 Cell Biology IIB (Second l/2 semester) (2cr)
BCH 507 Protein Structure/Function (2 cr)
OR BCH 508 Gene Expression (2 cr)
BMS 510A Laboratory Rotation (2 cr)
BMS 510B Laboratory Rotation (2 cr)
BMS 512 Seminar (2 cr)
ELECTIVE (2-4 cr)

SUMMER SESSION
Ph.D. Thesis Research

SECOND YEAR

SEMESTER III

STA 527 Statistics (4 cr)
PMY 503 Mechanisms of Drug Action (4 cr)
PMY 505A Pharmacology Seminar (2 cr)
PMY 751 Thesis Research (1-5 cr)

+ PMY 550 Receptor Pharmacology (2 cr)
OR
*+ PMY 626 Toxicology Principles and Practice (2 cr)
OR
***+** PMY 627 Target Organ Toxicity (2 cr)

SEMESTER IV

*PMY 517 Autonomic/Cardiovascular Pharmacology (2 cr)
*PMY 518 CNS/Sensory Pharmacology (2 cr)
PMY 525 Advanced Pharmacology (4 cr)
PHI 640 Graduate Research Ethics (2 cr)
PMY 752 Thesis Research (1-5 cr)
PMY 506A Pharmacology Seminar (2 cr)

+ OR an elective approved by the Director of Graduate Studies
*** Denotes half-semester course**

SUMMER SESSION
Proposition Examination

THIRD YEAR

SEMESTER V

PMY 751 Thesis Research (1-9 cr)

SEMESTER VI

PMY 752 Thesis Research (1-9 cr)

N.B. After filing the Application to Candidacy, the student should register for the minimum credit number

FOURTH YEAR

SEMESTER VII

PMY505B Pharmacology Seminar (2 cr, S or U)
PMY 751 Thesis Research (1-9 cr)

SEMESTER VIII

PMY 752 Thesis Research (1-9 cr)

MEDICAL SCIENTIST TRAINING PROGRAM
M.D./Ph.D.
CURRICULUM

In addition to years 1 and 2 of the Medical School curriculum the following sequence is required:

SEMESTER V

PMY 505A Pharmacology Seminar (2 cr)
PMY 751 Thesis Research (1-9 cr)

\+ PMY 550 Receptor Pharmacology (2 cr)
OR
*+PMY 626 Toxicology Principles and Practice (2 cr)
OR
*+PMY 627 Target Organ Toxicity (2 cr)

SEMESTER VI

PMY 506A Pharmacology Seminar (2 cr)
PMY 525 Advanced Pharmacology (4 cr)
PMY 751 Thesis Research (1-9 cr)

+ OR elective approved by the Director of Graduate Studies
*** Denotes half-semester course**

SUMMER SESSION
Proposition Examination

SEMESTER VII

PMY 751 Thesis Research (1-9 cr)
PMY 505B Pharmacology Seminar (2 cr, S or U)

SEMESTER VIII

PMY 752 Thesis Research (1-9 cr)

Usually clinical rotations are completed in years 7 and 8

MASTERS PROGRAM IN PHARMACOLOGY
CURRICULUM

SEMESTER I

BMS 501 Cell Biology I (4 cr)
BCH 503 Biochemical Principles (4 cr)
PMY 751 Thesis Research (1-4 cr)

SEMESTER II

BMS 505 Cell Biology IIA (2 cr)
BMS 506 Cell Biology IIB (2 cr)
*****PMY 517 Autonomic/Cardiovascular Pharmacology (2 cr)
*PMY 518 CNS/Sensory Pharmacology (2 cr)
PMY 752 Thesis Research (1-4 cr)

SUMMER SESSION
Masters Thesis Research

SEMESTER III

STA 527 Statistics (3 cr)
PMY 503 Mechanisms of Drug Action (4 cr)
PMY 751 Thesis Research (1-4 cr)

+ PMY 550 Receptor Pharmacology (2 cr)
OR
#*+PMY 626 Toxicology Principles and Practice (2 cr)
OR
#*+PMY 627 Target Organ Toxicity (2 cr)

SEMESTER IV

PHI 640 Graduate Research Ethics (2cr)
PMY 752 Thesis Research (1-4 cr)

+OR an elective approved by the Director of Graduate Studies
*** Denotes half-semester course**
# ***Students interested in the Toxicology Program are required to take these courses***

University policy requires 30 credit hours for masters degrees. Masters thesis research will be conducted throughout the entire program in one or more laboratories. A thesis document is mandatory. No laboratory rotations are required.

COMBINED BACHELOR OF SCIENCE/MASTER OF SCIENCE IN PHARMACOLOGY AND TOXICOLOGY CURRICULUM

Students in the Combined BS/MS program complete the first three years of the BS curriculum as listed in the Undergraduate Catalog (http://undergrad-catalog.buffalo.edu). Once admitted into the combined BS/MS program, the following sequence is required:

SEMESTER VII

PMY455 Toxicology Fundamentals (2 cr)
PMY 511 Pharmacology (4 cr)
BIO 302 Biochemical Principles (4 cr)
PMY 751 Thesis Research (2 cr)

SEMESTER VIII

PMY 512 Principles of Pharmacology (4 cr)
PHI 640 Graduate Research Ethics (2cr)
PMY 752 Thesis Research (1-4 cr)

SUMMER SESSION
Masters Thesis Research

SEMESTER IX

BMS 501 Cell Biology I (4 cr)
Graduate Science Elective
PMY 751 Thesis Research (2-6cr)

SEMESTER X

* BMS 505 Cell Biology IIA (2 cr)
* BMS 506 Cell Biology IIB (2 cr)
PMY 506 Pharmacology Seminar (2 cr)
PMY 752 Thesis Research (1-4 cr)

*** Denotes half-semester course**

University policy requires 30 credit hours for masters degrees. Masters thesis research will be conducted throughout the entire program in one or more laboratories. A thesis document is mandatory. No laboratory rotations are required.

B. Student Seminars

Each student is expected to give three seminars (PMY 505-506) to fulfill the requirements for the Ph.D degree. The first two seminars will be presented in the second year of matriculation. The faculty member directing PMY 505-506 and the Director of Graduate Studies must approve the choice of topic for these seminars. Students must complete these two seminars and receive passing grades for the course before taking the Proposition Examination.

The first two seminars are expected to present original data from two or three recent publications related to a topic of current interest in the field of pharmacology or toxicology. A seminar announcement, with abstract and references, should be distributed to faculty and students one week prior to the seminar date. The seminars are not to be presented in lecture format by merely summarizing a large body of information with little discussion or critical evaluation of the data. The seminar should begin with a general introduction that describes the relevance of the specific topic to the general field. The presentation should also state the goals of the research, describe the experimental design and methodology, and present original data from the articles. Students should not only present the data clearly, but also discuss and critically evaluate the experimental design, results, and methodologies presented in the papers. Each student is expected to not only evaluate whether the authors draw appropriate conclusions from their findings, but also to critique the authors by suggesting pitfalls in the work and potential areas for future investigations to strengthen the results. Grading will be based on the accomplishment of these goals.

The third student seminar will consist of an oral presentation of the student's research at a meeting outside of the Department, as for example, the City-Wide Pharmaceutical Sciences Day or at a National or International scientific meeting. Alternatively, a formal oral presentation to the Departmental faculty may fulfill the third seminar. The third seminar will be graded on an S/U basis.

VI. GRADING POLICIES

Within the Department of Pharmacology and Toxicology, the faculty evaluates student performance in courses on a standard four point grading system.

A	= 4.00 points	B-	= 2.67 points
A-	= 3.67 points	C+	= 2.33 points
B+	= 3.33 points	C	= 2.00 points
B	= 3.00 points	D	= 1.00 points

In order to encourage students to take elective courses outside of their concentration area, departmental electives may be graded on an S/U basis. However, the Director of Graduate Studies, the GAC, and the student’s thesis advisor must approve taking such courses on a pass/fail basis. The Ph.D. program cannot include more than 10 credit hours of S/U grades.

VII. STUDENT GUIDANCE AND PROGRESS REVIEW

In the selection process for admission of graduate students, constant efforts are made to identify and admit those students likely to succeed in completing all of the requirements for obtaining their graduate degree in Pharmacology and Toxicology. However, it is recognized that some students may not be successful in completing all of the requirements.

Necessary attributes for receipt of a graduate degree include intellectual ability, as well as fundamental talent for research and the scholarly attributes necessary for integrity and proper motivation. A student may be dismissed from the program for academic failure, disciplinary reasons, or clearly demonstrated unsuitability

for laboratory research. None of these criteria will be invoked without due deliberation by the GAC, Chair, Head of Graduate Program, and if identified, the Thesis Advisor. Dismissal must be approved by a majority vote of the entire faculty of the Department of Pharmacology and Toxicology.

A. Guidelines for Evaluation of Students' Progress

The Graduate Affairs Committee (GAC) will review the progress of each student at the end of each semester. This review is designed to develop a program most suitable for each student and to advise a student of any deficiencies.

1. Graduate students in all the Pharmacology and Toxicology graduate programs are required to maintain a GPA of 3.0 and obtain a grade of at least a "B" in all required courses to be in good academic standing.
2. Probation:
   a. *PROGRAM PROBATION*: A student will be placed on program probation whenever their cumulative grade point average falls below 3.0 or if they receive a grade of less than a "B" in a required course. A letter from the Director of Graduate Studies will inform the student of his or her program probation status. The student will have one semester in which to remove the probation status. Failure to do so will constitute grounds for dismissal from the program. A subsequent infraction of the academic requirements will constitute grounds for immediate dismissal. Students will be considered for immediate dismissal from the graduate program when a grade of less than a "C" is received in any course. Termination from the graduate program requires formal action by the department faculty. In the case of dismissal from the combined B.S./M.S. program, the student will be returned to the undergraduate B.S. program.
   b. *PROBATION WITH ADVICE TO WITHDRAW*: A student may be placed on Probation With Advice to Withdraw when, in the faculty's opinion, it is highly unlikely (for any of a variety of reasons) that the student could successfully complete the graduate program in Pharmacology and Toxicology. Under these situations, the student will be advised to withdraw from the program. This action will not be taken lightly. Advice to withdraw will include an explicit statement regarding the faculty's evaluation of the student's difficulties in order that the student can plan realistically for the future.

PROPOSITION EXAMINATION

A. Definition

The Proposition Examination is designed to test a student's potential for carrying out independent research by demonstrating his/her ability to: (1) collect and integrate diverse scientific information on a selected topic; (2) organize sound and creative experimental approaches in solving significant questions related to the topic; (3) formulate original specific aims and experimental procedures in the development of the selected topic in a written document and; (4) demonstrate the acquired knowledge and defend the proposed research program in an oral presentation. These attributes must be clearly demonstrated for successful completion of the Proposition Examination.

The Proposition Examination includes the submission and oral defense of a designated proposal. *The written portion must be an original document that is composed in the student's own words and appropriately referenced.* Any deviation from this requirement constitutes grounds for failure without opportunity for re-examination. Successful completion of the Proposition Examination is required for continuation in the doctoral program.

B. Selection of Topic

The topic will be selected by the student from a list prepared from titles submitted by Departmental faculty members in various areas of pharmacology and toxicology. The selected title should be of sufficient specificity to be appropriate for a major grant proposal. The Director of Graduate Studies and the Chairperson of the Proposition Examination Committee will decide the appropriateness of the topics. Each faculty member is expected to submit one title for each of two lists (total of two titles). The primary list will be presented to students at 9:00 a.m. on the second Monday following the last final examination of the fourth semester. The student will select a title by 4:00 p.m. on Wednesday of that week. The same topic may not be selected by more than one student. The order of selection of titles by students will be determined by random number draw. A student may not select a topic submitted by his/her thesis advisor. In addition, the Chairperson of the Proposition Examination Committee in conjunction with the Director of Graduate Studies may also designate as inappropriate titles too similar to the student's intended or actual thesis research activities. The secondary list will be used in the case of a repeat of the examination.

C. Proposition Examination Committee Composition

Five faculty members compose the voting members of each committee:

- Department Chairperson
- Director of Graduate Studies
- Faculty member who proposed the chosen topic
- Two additional faculty members appointed by the Departmental Chairperson
  (These two additional committee members serve for two year periods, rotating one member off per year; the longer standing member is Chairperson of the Proposition Examination Committee.)
- First alternate member (This member is required if the faculty member who proposed the chosen topic is already a member of the committee. This person will become a member of the committee the following year.)
- Second alternate member (This member is required if the faculty advisor and faculty member who proposed the chosen topic are already members of the Committee. This person will become the first alternate member the following year.)

The faculty advisor of the student serves as a non-voting member of the committee.

D. Examination Timetable

Day 1 - Second year students are presented with a list of potential topics (1 topic from each faculty member).
Day 3 - Students select topics. The Chair of the Proposition Committee and Director of Graduate Studies will decide whether the topic chosen is too closely related to the thesis topic. This may require that the student choose another topic.
Day 30 - The student will present a written proposal AND an electronic version to the committee members. The proposal must include a discussion of the pharmacological and/or toxicological implications of the proposed research. In writing the proposal, the student may seek help from other students and faculty. However, it is emphasized that the nature of this assistance should be limited and serve only to direct the student in a general approach to the topic. The student is required to write the proposal independently. For this process to be successful, the faculty is urged only to focus the student and not to help to write or rewrite the proposal.

E. Recommended Examination Format

It is recommended that the written document follow a format similar to that required for grant proposals submitted to the National Institutes of Health. This format should comprise the following:

Research Plan

1. Specific Aims:
   State concisely and realistically what the research is intended to accomplish and/or what hypothesis is to be tested (do not exceed one page, single spaced).
2. Significance:
   Briefly sketch the background to the present proposal, critically evaluate existing knowledge, and specifically identify the knowledge gaps that the project is intended to fill. State concisely the importance of the research described by relating specific aims to longer-term objectives (do not exceed three pages).
3. Methods:
   Discuss in detail the experimental design and procedures to be used to accomplish the specific aims. Describe the protocols to be used and the sequence of the overall study. Include the means by which the data will be analyzed and interpreted.
4. References:
   A reference section in the format of ***The Journal of Pharmacology and Experimental Therapeutics*** should include primary reference sources and proper attribution of ideas, materials, and passages should be made whenever needed. *Under no circumstances should any portion of an author's writings be taken verbatim from a reference source without appropriate attribution.*

Two weeks after submission of the proposal, students will be given a written critique from the Committee Chairperson. The critique will include a summary of each committee member's comments. Each voting member of the Committee must grade the proposal as satisfactory (S) or unsatisfactory (U). Those students receiving three or more S grades have the option either of revising the proposal or advancing to the oral examination. Those students receiving three or more U grades will be required to rewrite the proposal. The revised proposal will be resubmitted to the Committee within two weeks.

If the Proposition Examination Committee deems a proposal so unsatisfactory that there would be only marginal improvement by rewriting it, then the student will be required to repeat the examination. In this case, the schedule as outlined below for retaking the examination will be followed:

Within a week after submitting a revised written proposal, it will again be assigned a grade of S or U by each Committee member. Students that pass the written portion of the Proposition Examination (by receiving three or more S grades) will proceed to the oral exam **within a week** to defend the proposal.

Every effort will be made to adhere to this schedule; however unforeseen circumstances or unavoidable scheduling conflicts may cause a deviation from this timetable. A copy of the proposal will be made available to the entire faculty for review prior to the oral portion of the examination.

A student receiving three or more U grades on the revised proposal will automatically fail the exam and be required to select a new topic and retake the proposition exam as outlined below. Advancement to the oral portion will be allowed only under unusual circumstances. A copy of the written proposal will also be placed in the student's file in the departmental office.

F. The Oral Portion of the Examination

Participants in the oral examination will include the student, the five voting committee members, plus the student's advisor, as well as any other departmental faculty members who wish to attend. The oral examination will begin with a 15-minute presentation, during which time the student will summarize the background and approaches to the research problem that was selected. This will be followed by a question and answer period restricted to Committee members. After the Committee members have completed asking

their questions, other faculty members attending the exam may be allowed to question the student. The Chair of the Committee may limit the time period for these questions to prevent the examination from becoming excessively long.

G. Evaluation of the Proposition Examination Performance

The Committee will meet in an executive session just prior to the examination to establish that each member understands the purpose and nature of the examination. After the examination is completed, the Committee will critically evaluate the student's performance on both the written and oral portions of the examination and make specific recommendations to the student on the basis of the perceived strengths and weaknesses of the performance. The Committee will establish whether or not the student has accomplished the following: (1) developed the fundamental background to make the correlations and approaches which are essential to the topic; (2) collected and interpreted the pertinent information in a clear and logical form; (3) developed sound and critical approaches directed to the hypothesis; and (4) understands the significance of the problem inherent in the proposal in a broad, biological context. Students will be informed by the Chair as to whether they have passed or failed, based upon majority vote of the Committee. A student failing the exam will be required to retake the Proposition Exam, using the secondary list of questions.

H. Outcomes

If unsuccessful in the first proposition examination, the student may repeat the examination by selecting another topic within one week after failing the first examination. The time schedule for the repeat examination will be the same as that used in the first attempt. The student will choose a title from the second list of titles provided by faculty members. If unsuccessful in the second examination, the student may be subject to dismissal from the Ph.D. program by a vote of the faculty members of the Department. At this time the faculty can entertain a petition by the student requesting a terminal Masters Degree.

A copy of the final written proposal must be submitted to the department office to be included in the student's file.

IX. DISSERTATION

A. Dissertation Committee

Evaluation of the dissertation (thesis) proposal is conducted by the Dissertation Committee. This Committee must be appointed well in advance of the thesis defense. The Dissertation Committee as outlined by the Graduate School consists of the thesis advisor as Chair and two or more other Committee members selected by the Advisor and student. Two members of the Committee must have appointments in the Department of Pharmacology and Toxicology, and at least one member must have a primary appointment in another department.

The Dissertation Committee is responsible for determining whether the proposal is acceptable and feasible, and whether the student is capable of carrying out the proposed thesis work. As the research progresses, the Committee will establish whether the student has developed fundamental laboratory skills, broad knowledge, and familiarity with the literature in the area of the thesis research. Importantly, the Committee must decide whether the student has planned a study based on feasible and sound approaches to a significant research problem, with an excellent opportunity for a favorable outcome.

B. Guidelines for the Committee

The Dissertation Committee is encouraged to meet frequently, preferably at least every six months. Moreover, the Committee members are expected to be available to help in resolving issues associated with the student's research. The Committee is also responsible for examining and approving the student's program and the scientific merit of the thesis.

C. Dissertation Defense and Format of the Dissertation Document

The dissertation defense is the examination required by the Graduate School and should consist of two components: individual meetings with each member of the Dissertation Committee and a formal presentation of the research by a departmental seminar. The written thesis will present the student's original experimentation in an integrated fashion with the following organization: abstract, introduction describing pertinent previous work in the area, complete description of the methods; complete presentation of the results; discussion relating the student's research findings to other published research, and a comprehensive list of references. Copies of the last draft, complete with figures and tables, should be circulated to the members of the Committee in a *timely fashion* prior to the anticipated defense date. *Committee members should read and critically evaluate the thesis prior to the thesis defense.* The candidate should arrange a private meeting with each member to consider any questions or criticisms the members might have regarding the thesis. In this context, it is the responsibility of each Committee member to read the thesis carefully and convey his/her specific comments to the student. In this way, the student should be provided with the necessary tools for acceptable creating scientific writing.

A copy of the thesis will be placed in the Departmental Office for review at least two weeks prior to the proposed date of the thesis defense.

Although not required by University policy, students are encouraged to have the doctoral dissertation evaluated by an outside reader. The outside reader is a qualified individual appointed outside of the student's department who reads and critiques the document. **Barring extenuating circumstances, it is expected that a student will defend his/her thesis prior to initiating employment at an outside agency or pursuing further research at another institution.**

X. DEGREE CONFERRAL REQUIREMENTS

It is the responsibility of each student to contact the Graduate School (645-2939) and the Student Response Center (645-2450) prior to the deadline dates to be certain that all of the requirements and paperwork for his/her degree have been completed.

Students are URGED to refer to the University at Buffalo Graduate School Website for a description of policies and procedures related to Graduate Study (http://www.grad.buffalo.edu/).

APPLICATION TO CANDIDACY FORM - (Statement of Program) is a multi-page document that includes a summary of courses to be applied toward a degree. The filing of this program with the Graduate School indicates that the student is entering the final stages of degree completion. This form must be completed and forwarded to the Graduate School as soon as possible following successful completion of the Proposition Examination.

M-FORM - (Multi-purpose Form) - As the name implies, the M-Form is used for several purposes. In relation to the thesis or dissertation, the form is submitted to the Graduate Office to certify that defense of the thesis was satisfactorily completed and that ALL requirements for the degree have been satisfied. This form must be signed by the major professor, the Dissertation Committee members, and by the Chair or the Director of Graduate Studies of the Department.

ELECTRONIC DISSERTATION, SURVEY AND GRADUATE SCHOOL BILLING FORMS – An electronic copy of the doctoral dissertation is required; copyrighting is optional. The doctoral candidate must sign a Graduate School Billing Form acknowledging that charges for cataloging will be paid prior to degree conferral. Diplomas will be mailed out directly from the Student Response Center. The Survey of Earned Doctorates Form is used to collect information from all candidates in the U.S.; the National Research Council publishes summaries of this data annually.

To qualify for degree conferral, students must fulfill the continuous registration requirement. They should submit an M-Form, an electronic copy of the dissertation or thesis, and the Survey of Earned Doctorates Form.

Graduation Policy - Students are expected to meet all requirements by university deadlines, but they may petition the Department to participate in commencement exercises of the School of Medicine and Biomedical Sciences if they plan to defend their Ph.D. dissertation by August 20th of that year. The approval of the major professor is required prior to submitting this petition to the Director of Graduate Studies.

XI. STUDENT GRIEVANCE PROCEDURES

The Graduate School grievance procedures as outlined in the Graduate School Website **(http://www.grad.buffalo.edu/)** apply to this program. Since the number of students in the Departmental Graduate Program and the number of faculty members in this Department are small; most, if not all, disputes can be resolved on an informal basis. The student may seek the assistance of the Departmental Chairperson or Director of Graduate Studies or other staff members as mediators in dealing with a dispute.

If the student feels the grievance is serious and has not been justly resolved on an informal basis, a request to the Department Chairperson may be made to appoint a committee of three, two faculty members and one graduate student, to hear the grievance and rule on its merit. The committee shall rule on the case within l0 academic days of receiving the grievance or stipulate in writing the reasons why this is not feasible.

If an appeal of the departmental ruling is desired, the student should file a written statement of the grievance with the Chairperson of the Health Sciences Division Grievance Committee according to the procedures established by the Graduate School.

NOTE: Specific aspects of the Guidelines may change as voted by faculty.