

## **HANDBOOK ON GRADUATE PROGRAMS**

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

Dr. Margarita Dubocovich, Chair  
Dr. Satpal Singh, Director of Graduate Studies

2012

*REV 08/2012*

<http://medicine.buffalo.edu/pharmtox>

**DEPARTMENTAL GUIDELINES FOR GRADUATE STUDIES  
IN PHARMACOLOGY AND TOXICOLOGY**

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# 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. Please visit <http://medicine.buffalo.edu/departments/pharmtox/research/areas.html> for specialized areas of research interest within the department.

**General requirements for all graduate students are described in the Graduate School Policies and Procedures <http://www.grad.buffalo.edu/policies/index.php>. Students are urged to refer to this website in addition to the present Departmental Guidelines.**

**It is the responsibility of the students to follow the policies and procedures for graduate students outlined in the Departmental and the Graduate School 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 applicants 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 they are applying for the BS/MS Program). Incoming BS/MS students with failing grades in required courses will be required to retake those courses and attain at least a B grade or better. 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 a 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

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 Chair, the Director of Graduate Studies, the Graduate Education Subcommittee 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 that 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 Education Subcommittee, 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.

#### C. Graduate Education Subcommittee of the Education Committee (GES)

The Graduate Education Subcommittee is a subcommittee of the Education Committee of the Department. Its Mission is: *To provide graduate students with the necessary knowledge, skills, and training to excel in their chosen scientific careers.*

The subcommittee will be responsible for oversight of all graduate students. This subcommittee 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 subcommittee will be composed of:

1. Departmental Chair
2. Director of Graduate Studies, who will serve as chair of the subcommittee
3. Three or more faculty members who will be appointed by the Department Chair

The charges of the subcommittee are:

1. Develop a graduate curriculum that uses innovative teaching techniques and assessment tools and reflects the specific skills, training and knowledge we want our students to have.
2. Develop strategies for optimal, individualized student advisement that will evaluate student progress and help them to realize their career goals.
3. Monitor the progress of graduate students in their coursework and other aspects of their performance, and advise them on courses and other issues.
4. Fulfill requirements of the Graduate School in relation to the running of the program in general, and with respect to changes being implemented in the program in particular.
5. Develop and compile materials for website and take initiative to provide timely, updated information to the PMY office staff as it becomes available. Ideally, the subcommittee should submit updated information for the website well in advance of deadlines and events.

#### 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 the advisor sign the letter. The Department Chair must approve the choice of advisor and communicate this information to the GES 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 GES 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 GES for semester reviews.

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

#### E. Thesis Committee

The Thesis Committee is comprised of at least three faculty members of the Graduate School for the Master's degree and at least four faculty members of the Graduate School for the Ph. D. degree. These include 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 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 the 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 (<http://www.grad.buffalo.edu/policies/index.php>) and promptly respond to all administrative requests from the department. 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 GES.

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. In general, it is the responsibility of the student to follow the policies and procedures of the Department as well as the Graduate School and ensure the completion of all requirements throughout the program in a timely manner.

#### **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://gseu.buffalo.edu/>). Students who receive full stipends and tuition scholarship awards are expected not 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 GES.

##### **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 to 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. degree through the Ph.D. Program in Biomedical Sciences (PPBS), and direct admission into the Department. The course sequences satisfying the various curricula are available at <http://medicine.buffalo.edu/departments/pharmtox/education.html>.

##### **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 must approve the choice of topics for these seminars. Students must complete these two seminars and receive passing grades for the course.

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 requirements for 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 GES, 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. VACATION LEAVE

Students must adhere to the calendar set forth by the Department. No vacations may be taken during coursework or rotations. Students may take up to two (2) weeks of vacation after completion of the Spring semester. Students with compelling reasons for taking a longer vacation or leave or who are unable to meet the requirements of the Departmental calendar must receive explicit written permission from the Director of Graduate Studies or the Department Chair. The request for this, in writing, must be made in a timely fashion, i.e., prior to making airline or other arrangements, to allow review by the Director of Graduate Studies and the Department Chair. Failure to receive prior approval may result in loss of financial support and/or termination from the Program.

## VIII. 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 GES, the Director Graduate Studies, the Department Chair, 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 Education Subcommittee (GES) 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 the 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 his/her cumulative grade point average falls below 3.0 or if s/he receives 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.

## **IX. PROPOSITION EXAMINATION**

The Proposition Examination is designed to test a student’s potential for carrying out independent research. Students must pass the examination before submitting an Application to Candidacy. Students will start the process for the Proposition Examination at the beginning of the Spring semester of their second year (i.e., their fourth semester) in the Ph.D. program, and complete it before the end of July that year. Guidelines for the Proposition Examination are given at [<link TBD>](#).

## **X. 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, no later than the submission of the Application to Candidacy. The Dissertation Committee consists of the thesis advisor as Chair and at least two (for the Master’s degree) or at least three (for the Ph. D. degree) other Committee members selected by the Advisor and the 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 proposed project 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. The graduate school provides detailed formatting guidelines for preparing the thesis

(<http://www.grad.buffalo.edu/etd/etdguide.pdf>). 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 creative 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.**

## **XI. 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/>).**

### A. Application to Candidacy Form - (Statement of Program)

This 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.

### B. 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.

The Department Chair or the Graduate Director will sign the 'M' Form only after all corrections to the thesis and requests by the committee have been met. The student should bring a copy of the final thesis to the chair and/or the Graduate Director together with the form for signature. Students should then submit the form and the thesis before the deadline to the Graduate School.

### C. Electronic Dissertation, Survey and Graduate School Billing Form

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 these 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. or Master's thesis by July 31 of that year. Before the student's name is forwarded to the School of Medicine and Biomedical Sciences for his/her participation in the commencement exercises, the major professor has to provide a written assurance to the Director of Graduate Studies that the student would defend the thesis by July 31.

## **XII. 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 10 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.**

# Proposition Examination Guidelines

## I. Proposition Examination Overview

The Proposition Examination is designed to test PhD graduate students' potential for carrying out independent research by demonstrating his/her ability:

- 1) To collect and integrate diverse scientific information on a selected topic;
- 2) To organize sound and creative experimental approaches in solving significant questions related to the topic;
- 3) To formulate original specific aims and experimental procedures in the development of the selected topic in a written document and;
- 4) To 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 of a research proposal and its subsequent oral defense. *The written portion must be an original document that reflects the student's independent thinking and is appropriately referenced.* Evidence of plagiarism will constitute grounds for failure without opportunity for re-examination. Successful completion of the Proposition Examination is required for continuation in the doctoral program.

Students will start the process for the Proposition Examination at the beginning of the Spring semester of their second year (i.e., their fourth semester) in the Ph.D. program, and complete it before the end of July that year. The examination will be linked to a two-credit course (PMY540) with an S/U grade to be assigned at the end of the examination.

Students would be eligible to file Application To Candidacy (ATC) if they have obtained 'S' (Satisfactory) grade in PMY540, and have fulfilled other requirements. Approval of ATC by the Graduate School would allow the student to request full time status while pursuing research on their dissertation project.

## II. Selection of Research Topic

The research topic will be selected by the student, and it may either be on the work that the student expects to pursue for his/her dissertation (recommended) or be related to it. In addition to serving the purpose mentioned in Overview, this will prepare the student for submitting a proposal for a pre-doctoral fellowship to a funding agency. The selected title should be of sufficient specificity to be appropriate for a major grant proposal. The Chair of the Proposition Examination Committee will decide the appropriateness of the topic.

## III. Faculty Composition of the Proposition Examination Committee

The Proposition Examination Committee (PEC) will consist of:

- A. The Department Chair.
  - *If the student's research advisor is the Department Chair, an alternative member will be appointed by the Chair of the PEC.*
- B. A member of the Department of Pharmacology & Toxicology faculty, appointed by the Department Chair in consultation with the Director Graduate Studies. An attempt will be made to select a member who is relatively familiar with the area of the proposal topic.
  - *The appointed member will serve as the Chair of the Proposition Examination Committee.*
- C. The student's Dissertation Committee. The Dissertation Committee consists of the thesis advisor as Chair of the Dissertation Committee, and at least three other Committee members selected by the Advisor and the 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 student's research advisor will be a non-voting member of the Proposition Examination Committee. He/she will attend the student's presentation but will not be present during the discussions.

#### **IV. Procedure for the Proposition Examination**

The procedure to be followed for the Proposition Examination is detailed below and outlined in a diagram at the end of this document.

1. The first step in the process will be a 40-50 minute long pre-proposal Seminar presented by the student (week 0 in the diagram). In this presentation, the student should discuss:
  - a. The background leading to the question/hypothesis of the proposed project. This may include published papers, feasibility data from the student's lab and/or his/her own data.
  - b. Question(s) to be addressed
  - c. Overall hypothesis
  - d. Specific Aims proposedFor each proposed Specific Aim:
  - o The hypothesis
  - o The approach to follow
  - o The expected outcome

The student may include preliminary data from his/her work or from the laboratory to support the feasibility of the proposed work and to emphasize its significance. This presentation will be open to the Department faculty.

At least 2 days prior to the pre-proposal seminar, the student will provide the following to the members of the PEC:

- a) A copy of the PowerPoint presentation
  - b) A two-page pre-proposal outlining the aspects of the research proposal mentioned under item 1 above
  - c) A review article and 1-2 original research articles that provide the background to the proposed project
2. The PEC will meet with the student following the pre-proposal seminar to discuss the presentation and to make suggestions for modifying the proposed project.
  3. After the pre-proposal presentation, the student will prepare a full written proposal. The proposal must include an Introduction (maximum of one page) that clearly explains specific changes made in response to each specific item of critique provided to the student by the PEC, or the rationale behind not incorporating any particular changes suggested. 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, faculty are urged only to focus the student and not to help in writing or rewriting the proposal.

Two weeks after the pre-proposal presentation (week 2 in the diagram), the Proposition Examination Committee will meet with the student to discuss the progress and the direction of the proposal being prepared by the student. The Committee will provide further feedback to the student to channel him/her in the appropriate direction for the project.

4. Within four weeks of the pre-proposal presentation (week 4 in the diagram), the student will present the written proposal and submit both a hard copy and an electronic file (PDF, or Word document) to the Committee members.

## V. Recommended Proposal Format

It is recommended that the written proposal follow a format similar to that required for grant proposals submitted to the National Institutes of Health for the F31 pre-doctoral fellowship awards. The proposal should include the following:

**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). Format each Specific Aim so that it describes the rationale/hypothesis for the Aim, the approach to be followed, expected results and the significance of pursuing the Aim.

### 2. Research Strategy

**A. Significance:** Briefly sketch the background to the proposed research, 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.

**B. Innovation:** Explain how the project challenges current ideas and brings new ideas or approaches to the field, or how it develops or uses new concepts or methodologies to address important questions in the field. Describe how the project will take the field in a new or more desirable direction.

**C. Approach:** Discuss in detail the experimental design and procedures to be followed 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. Discuss potential problems, alternative strategies and benchmarks for having achieved the Specific Aims.

**3. References:** A reference section in the format of *The Journal of Pharmacology and Experimental Therapeutics* should include primary reference sources. 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.*

**NOTE:** Use single spaced text, with at least ½ inch margin on all sides of the paper. Use at least size 11 Arial or Helvetica font. Specific Aims (item 1 above) should not exceed one page. Research Strategy (items 2A-2C), starting on a new page, should not exceed six pages. References (item 3) do not count towards these page limits. No appendices are allowed. Please add a cover page to the proposal with the name of the student, the name of the thesis supervisor and the topic of the proposal. Please number all the pages.

## VI. Evaluation of the written proposal by the PEC:

1. Within one week (week 5 in the diagram) of the submission of the written proposal, each voting member of the Committee must grade the proposal as satisfactory (S) or unsatisfactory (U). Students will be given a written critique from the Committee Chairperson. The critique will include a summary of each committee member's comments.
  - a. Students receiving three or more S grades have the option either of revising the proposal or advancing to the oral examination. On choosing to proceed to the oral examination, they will do so within a week (week 6 in the diagram) to defend the proposal orally.
  - b. Students receiving three or more U grades will be required to rewrite the proposal. The revised proposal will be submitted to the Committee within one week (week 6 in the diagram) of receiving the Committee' comments.
2. The revised written proposal will be graded within a week after submission and will again be assigned a grade of S or U by each Committee member.

- a. Students receiving three or more S grades on the revised proposal will advance to the oral examination within a week (week 7 in the diagram) to defend the proposal orally.
- b. A student receiving three or more U grades on the revised proposal will not proceed to the oral examination, and may be subject to dismissal from the Ph. D. program by a vote of the Department faculty. Advancement to the oral portion will be allowed only under unusual circumstances.
- c. Students who receive three or more U grades can entertain a petition to the faculty requesting a terminal Masters Degree.
- d. A copy of the written proposal will be placed in the student's file in the departmental office.

Every effort will be made to adhere to this schedule; however unforeseen circumstances or unavoidable scheduling conflicts may cause a deviation from this timetable.

## **VII. The Oral Portion of the Examination**

1. A copy of the final proposal will be made available to the Proposition Examination Committee for review one week prior to the oral portion of the examination.
2. Participants in the oral examination will include the student, the five voting members of the PEC, the student's advisor, and any other departmental faculty members who wish to attend.
3. The oral examination will begin with a 15-20 minute presentation, during which the student will summarize the significance, innovation, approach and Specific Aims of the proposed work as outlined above in the section on Recommended Proposal Format.
4. This will be followed by questions to the student. The student's research advisor will not be present during this part of the oral examination. Questions to the student will be restricted to Committee members. The questions will explore all aspects of the proposal including its rationale, choice of experiments and experimental design, possible short-comings of the experimental protocols and possible alternative, negative, or false positive results. Questions will also evaluate the student's knowledge of the general area of the proposal, as well as of general principles of Pharmacology.
5. The objective of the Oral Examination is not simply to have the student recite orally what has been presented in writing but to examine the student's overall grasp of the research area and of the basic principles of Pharmacology.
6. After the Committee members have completed asking their questions, other faculty members attending the examination 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.

## **VIII. Evaluation of the Proposition Examination Performance**

The Committee will meet in an executive session just prior to the examination to ensure 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 the oral portions of the examination and make specific recommendations to the student on the basis of the perceived strengths and weaknesses of the performance.

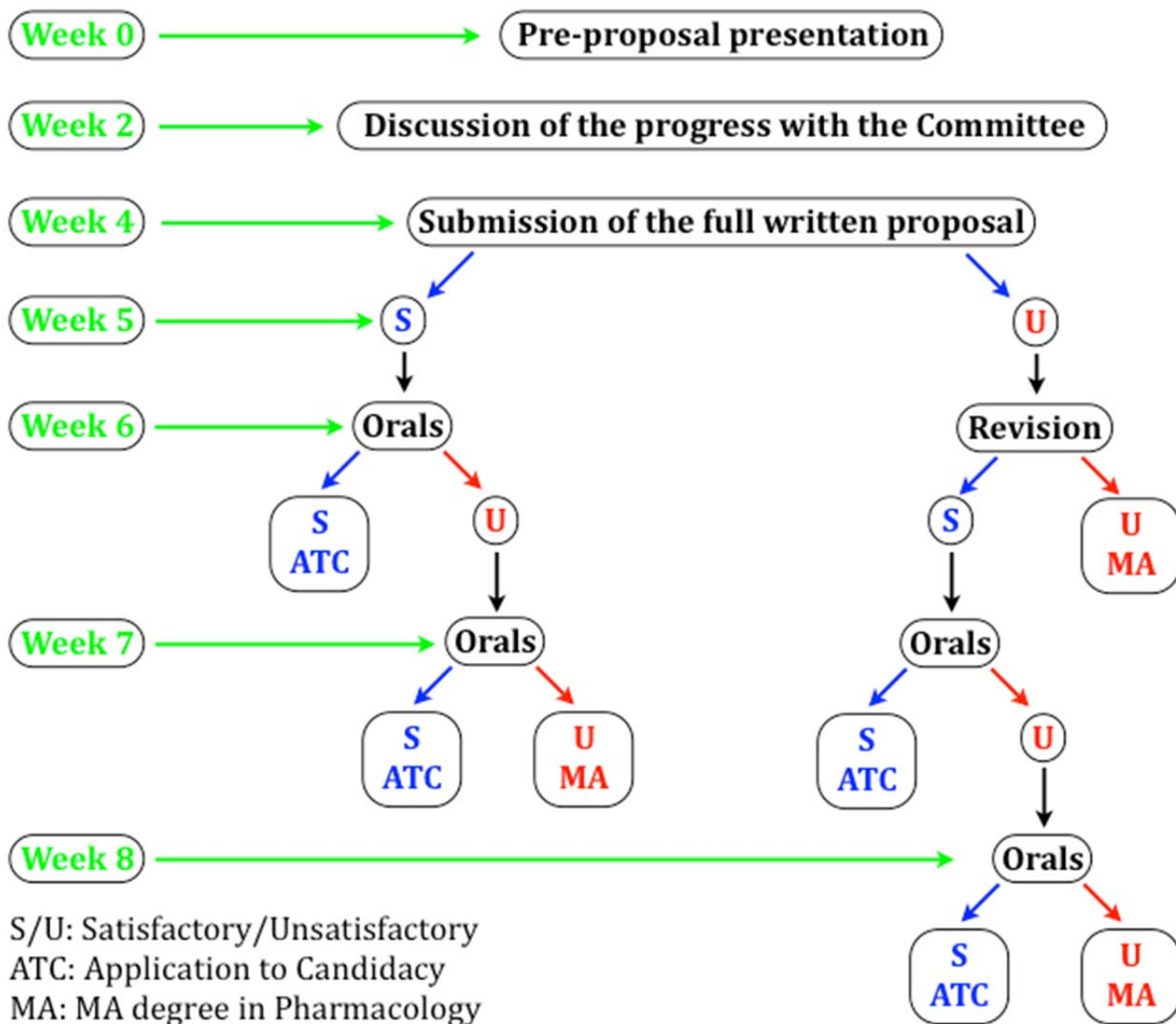
The Committee will establish whether or not the student has accomplished the following:

1. Developed the fundamental background to make correlations and pursue 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/pharmacological/toxicological context.



**IX. After the Oral Examination:**

1. Each voting member of the Committee must grade the performance at the oral examination as satisfactory (S) or unsatisfactory (U).
  - a. Students receiving three or more S grades would pass the oral examination.
  - b. Students receiving three or more U grades will be allowed to take the oral examination once more, which must be conducted within a week (week 7 or week 8 in the diagram, depending upon whether the first oral examination took place on week 6 or week 7).
2. Not passing the examination may constitute grounds for dismissal from the Ph.D. program.
3. A copy of the final written proposal must be submitted to the department office to be included in the student's file.
4. Students who do not pass the examination can entertain a petition to the faculty requesting a terminal Masters Degree.



## Curricula for Graduate Programs

### B.S./M.S. Curriculum Pharmacology & Toxicology

<b>Semester 7</b>		
<i>PMY 455</i>	<i>Toxicology Fundamentals</i>	2
<i>PMY 503</i>	<i>Principles of Pharmacology I</i>	4
<i>BIO 302</i>	<i>Introduction to Molecular Biology</i>	3
<i>PMY 751</i>	<i>Thesis Research</i>	≥1

<b>Semester 8</b>		
<i>PMY 516</i>	<i>Principles of Pharmacology II</i>	4
<i>PHI 640</i>	<i>Graduate Research Ethics</i>	2
<i>PMY 752</i>	<i>Thesis Research</i>	≥1

<b>Summer I</b>		
	<i>Thesis Research</i>	

<b>Semester 9</b>		
<i>STA 527</i>	<i>Statistics</i> (not required if Statistics was already taken)	4
<i>PMY 751</i>	<i>Thesis Research</i>	≥1
	<i>Graduate Level Elective</i> (Optional)	4

<b>Semester 10</b>		
<i>PMY 752</i>	<i>Thesis Research</i>	≥1

<b>Summer II</b>		
	<i>Thesis Research and Defense</i>	

Students must complete a minimum of **30 credits** of graduate study in order to graduate

<i>Suggested Electives *</i>		
<i>* Electives are not limited to these and should be chosen in consultation with and approval from the faculty advisor</i>		
<i>PMY 527</i>	<i>Translational Pharmacology</i>	2
<i>PMY 505</i>	<i>Pharmacology Seminar</i>	
<i>PMY 626</i>	<i>Toxicology - Principles &amp; Practice</i>	2
<i>PMY 627</i>	<i>Target Organ Toxicity</i>	2
<i>BMS 501</i>	<i>Cell Biology I</i>	4
<i>BCH 507</i>	<i>Protein Structure/Function</i>	2
<i>BCH 508</i>	<i>Gene Expression</i>	2
<i>NRS 520</i>	<i>Neuroscience I</i>	4

**M.A. Curriculum  
Pharmacology & Toxicology**

<b>Semester 1</b>		
<i>PMY 503</i>	<i>Principles of Pharmacology I</i>	4
<i>BMS 501</i>	<i>Cell Biology I</i>	4
<i>BCH 503</i>	<i>Biochemical Principles</i>	4
<i>PMY 751</i>	<i>Thesis Research</i>	$\geq 1$

<b>Semester 2</b>		
<i>PMY 516</i>	<i>Principles of Pharmacology II</i>	4
<i>PMY 752</i>	<i>Thesis Research</i>	$\geq 1$
	<i>Graduate Level Electives</i> (Optional)	$\geq 2$

<b>Summer I</b>		
	<i>Thesis Research</i>	

<b>Semester 3</b>		
<i>STA 527</i>	<i>Statistics</i>	4
<i>PMY 751</i>	<i>Thesis Research</i>	$\geq 1$
	<i>Graduate Level Electives</i> (Optional)	$\geq 2$

<b>Semester 4</b>		
<i>PHI 640</i>	<i>Graduate Research Ethics</i>	2
<i>PMY 752</i>	<i>Thesis Research</i>	$\geq 1$

<b>Summer II</b>		
	<i>Thesis Research and Defense</i>	

Students must complete a minimum of **30 credits** of graduate study in order to graduate

<i>Suggested Electives *</i>		
<i>* Electives are not limited to these and should be chosen in consultation with and approval from the faculty advisor</i>		
<i>PMY 505</i>	<i>Pharmacology Seminar</i>	
<i>PMY 527</i>	<i>Translational Pharmacology</i>	2
<i>PMY 626</i>	<i>Toxicology - Principles &amp; Practice</i>	2
<i>PMY 627</i>	<i>Target Organ Toxicity</i>	2
<i>BCH 507</i>	<i>Protein Structure/Function</i>	2
<i>BCH 508</i>	<i>Gene Expression</i>	2
<i>NRS 520</i>	<i>Neuroscience I</i>	4

**Ph.D. Curriculum**  
(Direct Admission)  
**Pharmacology & Toxicology**

<b>Semester 1</b>	<b>(Fall)</b>	
<i>BMS 501</i>	<i>Cell Biology I</i>	4
<i>BMS 503</i>	<i>Principles of Biochemistry</i>	4
<i>PMY715</i>	<i>Research</i>	2
<i>TBD</i>	<i>PPBS Seminar</i>	2

<b>Semester 2</b>	<b>(Spring)</b>	
<i>PMY752</i>	<i>Research</i>	2
<i>TBD</i>	<i>Advanced Pharmacology Seminar II</i>	2
<i>PMY 516</i>	<i>Principles of Pharmacology II</i>	4

	<i>Graduate Level Electives</i>	$\geq 2$
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<b>Summer I</b>		
	Thesis Research	

<b>Semester 3 (Fall)</b>		
<i>STA 527</i>	<i>Statistics</i>	4
<i>PMY 503</i>	<i>Principles of Pharmacology I</i>	4
<i>PMY 505</i>	<i>Pharmacology Seminar</i>	2
<i>PMY 751</i>	<i>Thesis Research</i>	$\geq 1$
	<i>Graduate Level Electives</i>	$\geq 2$

<b>Semester 4 (Spring)</b>		
<i>PHI 640</i>	<i>Graduate Research Ethics</i>	2
<i>PMY 506</i>	<i>Pharmacology Seminar</i>	2
<i>PMY 752</i>	<i>Thesis Research</i>	$\geq 1$
	<i>Graduate Level Electives</i>	$\geq 2$
<i>PMY 540</i>	<i>Pharmacology Research Proposal (Proposition Exam Journal Club)</i>	2

<b>Semester 5 (Fall)</b>		
<i>PMY 751</i>	<i>Thesis Research</i>	$\geq 1$

<b>Semester 6 (Spring)</b>		
<i>PMY 752</i>	<i>Thesis Research</i>	$\geq 1$

<b>Semester 7 (Fall)</b>		
<i>PMY 751</i>	<i>Thesis Research</i>	$\geq 1$

<b>Semester 8 (Spring)</b>		
<i>PMY 752</i>	<i>Thesis Research</i>	$\geq 1$

Students must complete at least **72 credits** of graduate study in order to graduate graduate

<i>Suggested Electives</i>		
<i>PMY 527</i>	<i>Translational Pharmacology</i>	<i>2</i>
<i>PMY 626</i>	<i>Toxicology - Principles &amp; Practice</i>	<i>2</i>
<i>PMY 627</i>	<i>Target Organ Toxicity</i>	<i>2</i>
<i>BCH 507</i>	<i>Protein Structure/Function</i>	<i>2</i>
<i>BCH 508</i>	<i>Gene Expression</i>	<i>2</i>
<i>NRS 520</i>	<i>Neuroscience I</i>	<i>4</i>

**Ph.D. Curriculum**

PPBS

**Pharmacology & Toxicology**

<b>Semester 1</b>	<b>(Fall)</b>	
<i>BMS 501</i>	<i>Cell Biology I</i>	4
<i>BMS 503</i>	<i>Principles of Biochemistry</i>	4
<i>BMS 509A</i>	<i>Laboratory Rotation</i>	2
<i>BMS 511</i>	<i>PBBS Seminar</i>	2

<b>Semester 2</b>	<b>(Spring)</b>	
<i>BMS 510 A</i>	<i>Laboratory Rotation</i>	2
<i>BMS 510 B</i>	<i>Laboratory Rotation</i>	2
<i>BMS 512</i>	<i>Seminar</i>	2
PMY 516	<i>Principles of Pharmacology II</i>	4
	<i>Graduate Level Electives</i>	≥2

<b>Summer I</b>		
	Thesis Research	

<b>Semester 3 (Fall)</b>		
<i>STA 527</i>	<i>Statistics</i>	4
<i>PMY 503</i>	<i>Principles of Pharmacology I</i>	4
<i>PMY 505</i>	<i>Pharmacology Seminar</i>	2
<i>PMY 751</i>	<i>Thesis Research</i>	≥1
	<i>Graduate Level Electives</i>	≥2

<b>Semester 4 (Spring)</b>		
<i>PHI 640</i>	<i>Graduate Research Ethics</i>	2
<i>PMY 506</i>	<i>Pharmacology Seminar</i>	2
<i>PMY 752</i>	<i>Thesis Research</i>	≥1
	<i>Graduate Level Electives</i>	≥2
<i>PMY 540</i>	<i>Pharmacology Research Proposal (Proposition Exam Journal Club)</i>	2

<b>Semester 5 (Fall)</b>		
<i>PMY 751</i>	<i>Thesis Research</i>	≥1

<b>Semester 6 (Spring)</b>		
<i>PMY 752</i>	<i>Thesis Research</i>	≥1

<b>Semester 7 (Fall)</b>		
<i>PMY 751</i>	<i>Thesis Research</i>	≥1

<b>Semester 8 (Spring)</b>		
<i>PMY 752</i>	<i>Thesis Research</i>	$\geq 1$

Students must complete at least **72 credits** of graduate study in order to graduate

<i>Suggested Electives</i>		
<i>PMY 527</i>	<i>Translational Pharmacology</i>	<i>2</i>
<i>PMY 626</i>	<i>Toxicology - Principles &amp; Practice</i>	<i>2</i>
<i>PMY 627</i>	<i>Target Organ Toxicity</i>	<i>2</i>
<i>BCH 507</i>	<i>Protein Structure/Function</i>	<i>2</i>
<i>BCH 508</i>	<i>Gene Expression</i>	<i>2</i>
<i>NRS 520</i>	<i>Neuroscience I</i>	<i>4</i>

## M.D./Ph.D. (MSTP) Curriculum

### Pharmacology & Toxicology

<b>Semester 5 (Fall)</b>		
<i>PMY 505</i>	<i>Pharmacology Seminar</i>	<i>2</i>
<i>PMY 503 A</i>	<i>Principles of Pharmacology I Recitation *</i>	<i>1</i>
<i>PMY 751</i>	<i>Thesis Research</i>	$\geq 1$
<i>MST 601</i>	<i>MSTP Seminar</i>	<i>1</i>

<b>Semester 6 (Spring)</b>		
<i>PMY 506</i>	<i>Pharmacology Seminar</i>	<i>2</i>
<i>PMY 516 A</i>	<i>Principles of Pharmacology II Recitation *</i>	<i>1</i>
<i>PMY 752</i>	<i>Thesis Research</i>	$\geq 1$
<i>PMY 540</i>	<i>Pharmacology Research Proposal (Proposition Exam Journal Club)</i>	<i>2</i>
<i>PHI 640</i>	<i>Graduate Research Ethics</i>	<i>2</i>
<i>MST 601</i>	<i>MSTP Seminar</i>	<i>1</i>

<b>Summer</b>		
	Thesis Research/ Proposition Exam	

<b>Semester 7 (Fall)</b>		
<i>PMY 751</i>	<i>Thesis Research</i>	$\geq 1$
<i>MST 601</i>	<i>MSTP Seminar</i>	<i>1</i>

<b>Semester 8 (Spring)</b>		
<i>PMY 752</i>	<i>Thesis Research</i>	$\geq 1$
<i>MST 601</i>	<i>MSTP Seminar</i>	<i>1</i>

\* Will be implemented in Fall 2011 and may be subject to some minor changes

<i>Suggested Electives</i>		
<i>Students have the option to take Graduate Level Electives. These are not required. Some suggested Electives are listed below.</i>		
<i>PMY 527</i>	<i>Translational Pharmacology</i>	<i>2</i>
<i>PMY 626</i>	<i>Toxicology - Principles &amp; Practice</i>	<i>2</i>
<i>PMY 627</i>	<i>Target Organ Toxicity</i>	<i>2</i>