

## GUIDELINES FOR THE PH.D. GRADUATE PROGRAM IN PHARMACOLOGY

### **I. GOALS OF GRADUATE TRAINING IN PHARMACOLOGY**

Doctoral training in pharmacology is designed to prepare students to think critically concerning problems involving biochemical, physiological, and molecular aspects of pharmacology. Successful students should, by the completion of their graduate training, be able to develop testable hypotheses at the limits of current knowledge in one of the major areas of pharmacology. Students should also learn to analyze, interpret, and effectively communicate the results of their thoughts and their experiments to both scientific and lay audiences.

To help students achieve these goals, the Department of Pharmacology has designed a program of study that involves required and elective graduate courses, laboratory rotations involving various approaches to pharmacological problems, journal clubs and seminars.

Graduate study is a full-time responsibility and demands a sustained effort on the part of students. Laboratory studies may require that students be in the laboratory at night, on weekends or on holidays to complete important experiments. Students are allowed to arrange for approximately one month of vacation each year. Doctoral training generally requires approximately five years for completion and ends when the student submits an approved dissertation embodying the results and discussion of original research on an acceptable subject.

### **II. FINANCIAL SUPPORT OF GRADUATE STUDENTS**

The Department of Pharmacology endeavors to provide financial support to all students accepted into the doctoral program. Normally, students will be supported on Graduate Assistantships provided by the University for the first two years of their program. These University assistantships provide a stipend plus full credit for tuition and fees along with a health care plan. Stipend support for subsequent years must come from sources other than the Graduate Assistantship. The thesis advisor may provide this support from research grant funds or from other available sources including: the Thomas Rumble University Fellowships, Graduate Research Assistantships, NIH T32 training grants awarded to WSU graduate programs, and competitively awarded external graduate fellowships.

### **III. COURSE REQUIREMENTS**

It is expected that doctoral students will meet all of the University degree requirements as printed in the Wayne State University Graduate Division Bulletin. The course requirements for the doctoral degree total 90 semester credit hours. These are divided into two subdivisions: (1) 30 semester credit hours of Ph.D. Candidate Status, and (2) 60 semester credit hours of course work. The course work should include at least 30 credit hours in the student's major area. Thirty hours, not including Candidate Status, must be at a level of 7000 courses or above.

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A listing of required courses and a selection of available elective courses can be found on the last page of this document. Additional elective courses can be found in the University catalog under both the School of Medicine and the College of liberal Arts.

#### **IV. ROLE OF DEPARTMENTAL GRADUATE STUDENT OFFICER**

The Graduate Student Officer/Director acts as academic advisor for the student until the major advisor (PhD thesis mentor) has been selected. The student should consult with the Graduate Student Officer before selecting courses until the Plan of Work has been approved by the University (see below). The Graduate Student Officer will also advise and approve decisions on placement for laboratory rotations.

#### **V. ROTATIONS**

##### **A. DEFINITION**

Rotations are projects carried out by beginning graduate students under the supervision of a faculty member associated with the Department of Pharmacology in that faculty member's laboratory. Faculty member affiliation/association with the Department of Pharmacology comprises adjunct, fractional, or full-time appointment with the Department. A rotation should have defined objectives that can be accomplished within the allocated time span.

##### **B. PURPOSES**

The rotations exist to serve at least three purposes:

- (1) Training and experience in laboratory research
- (2) An appreciation of various techniques and philosophies which can be applied to pharmacological research
- (3) A basis for choosing a specific faculty member to direct her/his PhD thesis research

##### **C. NUMBER OF ROTATIONS**

Students will typically complete three rotations within Year 1 of the graduate program. Exceptions can be made at the discretion of the Graduate Affairs Committee for students with extensive previous laboratory experience who wish to do fewer rotations or for students requesting a fourth rotation. Students should select their primary advisor and laboratory ideally by the beginning of the summer of Year 1 but no later than the start of Year 2.

##### **D. DURATION**

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The rotation will normally extend through approximately 10 weeks during which time the student is expected to carry out laboratory work. This timeline will allow students to complete three rotations in two semesters.

#### **E. SELECTION OF ROTATION ADVISOR**

During the first two weeks of his/her program, each student is required to meet with Pharmacology faculty members to learn about each laboratory and available rotation projects. This is to ensure that students have an adequate basis for the selection of the rotation advisor. A faculty list will be provided by the Graduate Student Officer and is also available online through the Department of Pharmacology website.

#### **F. ACADEMIC CREDIT FOR ROTATIONS**

Students will sign up for one or more credits of PHC 7710: Individual Studies each semester during rotations. The faculty advisor will be responsible for assigning the rotation grade.

#### **VI. SELECTION OF MAJOR ADVISOR**

Students are urged to select a major advisor as soon as possible so that the advisor can provide guidance on which additional course work would benefit their thesis research. In general, experiences derived from the rotation projects will provide the basis for this selection. The decision to join a lab will require agreement between the student, faculty member, and Graduate Student Officer. Selection of the advisor should be completed by the start of the Year 2.

For thesis work carried out in the laboratory of a faculty member not affiliated with the Department of Pharmacology, a faculty member with affiliation (i.e. adjunct, fractional or full appointment) with the Pharmacology Department must serve as Co-Advisor. The Co-Advisor shares academic responsibility for the student's program.

#### **VII. DEPARTMENTAL SEMINAR AND JOURNAL CLUB**

The departmental seminars are presentations and discussions of research work given by invited faculty members and other researchers. These seminars are normally scheduled on Friday afternoons during the Fall and Winter semesters. Students are required to attend seminars. Students will also be expected to meet as a group with external speakers. This provides an opportunity to gain additional perspectives on potential career paths as well as to discuss research specifics.

Journal Club consists of student presentations of current research papers. Students are required to register for 1 credit of PHC 7700 each semester, starting with the Winter semester of their first year and continuing through the fourth year of the program. Attendance is required of all students. Each

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semester a grade will be assigned based on attendance, their presentation performance, and their critiques of other student presentations.

## VIII. ACADEMIC REQUIREMENTS

All students are required to maintain at least a "B" grade point average (3.0 GPA). If a student's GPA drops below 3.0, that student cannot be supported by a Graduate Assistantship and is placed on academic probation for the next semester. Failure to raise the grade point average to the minimum 3.0 level in the subsequent semester is grounds for dismissal from the program. A grade lower than "B" in any of the required Pharmacology courses is grounds for dismissal from the program. A failure (grade lower than "B", an Unsatisfactory or a Fail) in any other course may be grounds for dismissal from the program. A grade of "B-" is considered a failing grade by the Graduate School at Wayne State University.

## IX. ADVANCEMENT TO CANDIDACY

The second year in the Pharmacology Program entails the student's **Advancement to Ph.D. Candidacy**. This significant step depends on the prior successful completion of the following tasks:

1. Submission/approval of the **Plan of Work**.
2. Selection of a **Doctoral Committee**.
3. Passing the **Written Qualifying Exam**.
4. Submission/approval of the **Recommendation of Candidacy Status** form.

Each of these tasks is described below in its own separate section.

## X. PLAN OF WORK

The University **Plan of Work** form should be prepared in conjunction with the major advisor by December 15 of Year 2. The Doctoral plan of work requires the signed approval of the student's advisor and the Departmental Graduate Student Officer.

Forms are available from the Graduate Programs Office online at <https://gradschool.wayne.edu/students/phd/forms>

## XI. SELECTION OF DOCTORAL COMMITTEE

The doctoral applicant, together with his/her advisor, should select a Doctoral Committee during the Winter semester of Year 2. This committee shall consist of five members, including the student's advisor. At least three committee members must hold graduate faculty appointments with affiliations in the Department of Pharmacology. At least one member (up to two) must be an external member who broadens the dissertation committee to represent a different perspective by virtue of their field,

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location, or knowledge application. The external member cannot hold any salaried or contractual appointment, tenure line or retreat rights in the Department of Pharmacology and may be from within or outside Wayne State. The committee must be approved by the Departmental Graduate Student Officer.

The Doctoral Committee both administers the Oral Examination, which is part of the Prospectus Presentation, and further serves to monitor the student's dissertation progress at subsequent meetings. Finally, this committee serves as the Doctoral Dissertation Defense Committee. Additions or deletions from the original committee must be approved by the Departmental Graduate Student Officer and Graduate School.

## **XII. WRITTEN QUALIFYING EXAMINATION**

During the Winter semester of the second year the student writes and submits her/his Written Qualifying Exam by June 1 of Year 2. This will be a three-page, fully referenced mini-review of their chosen field of study. This approach encourages the student to deeply dive into the relevant scientific literature, providing thus, solid footing for subsequent dissertation research. The written qualifying exam will be graded by the Graduate Student Officer plus two other faculty, chosen by the Graduate Student Officer.

## **XIII. RECOMMENDATION TO CANDIDACY STATUS**

After completing the three above tasks, the student submits the Recommendation of Candidacy Status form for approval by the University Graduate School. This form requires signatures of the Doctoral Committee members, indicating their willingness to serve, and the Pharmacology Graduate Student Officer. Following University Graduate School approval, the student advances to Ph.D. candidacy, allowing her/him to begin registering for the required 30 credits of dissertation research (7.5 credits over four semesters). This form should be submitted by August 1 of Year 2.

## **XIV. THE PROSPECTUS**

The Prospectus, which provides an overview of the dissertation research, is written in the form of an NIH F31 predoctoral proposal.

1. The F31 proposal will be written in close consultation with the advisor but should represent the work of the student.
2. The Prospectus should be completed during the summer of Year 2; exceptions can be made at the discretion of the Graduate Student Officer.
3. It is expected that the student's advisor would complete the relevant portions of the application and that the grant will be submitted (if the student is either a U.S. citizen or U.S. permanent resident).

## **XV. PROSPECTUS PRESENTATION and ORAL EXAMINATION**

The student should set a date/time for their Oral Presentation of the Prospectus that is convenient to all Dissertation Committee members, with a copy of the Prospectus being made available to Committee members at least two weeks prior to this date. At the Prospectus meeting, the student will present the key aims of their proposal, along with any relevant preliminary data collected during their research in the mentor's laboratory. This presentation, which is expected to be 30-60 min, will be followed by a 1-2 hr question and answer period, during which the student will be asked not only about details of the project, but also about general aspects of their field of study. Thus, the faculty committee will judge both the feasibility of the proposed dissertation project and the student – does the student have a broad understanding of the key scientific issues in the chosen field of study? Satisfactory performance will be determined by having no more than one dissenting vote on passing. Students may be asked to revise the prospectus as a condition for passing. In the event of failure, the Committee may recommend to the Graduate Student Officer either (a) that a second examination be taken no sooner than one (1) term, yet within 12 months, or (b) dismissal of the student.

Following this meeting, the **Prospectus and Record of Approval Form** should be completed and signed by members of the Dissertation Committee, by the student and the Graduate Student Officer. The completed form, together with the student's Prospectus (F31 application) must be submitted to the WSU Graduate Office for approval. The Prospectus process will typically be completed prior to the beginning of the Fall semester of Year 3.

## **XVI. STUDENT RESPONSIBILITY FOR DOCTORAL COMMITTEE MEETINGS**

To ensure that the student's Doctoral Committee is kept informed of progress in thesis research, each doctoral candidate is responsible for convening meetings of his/her Doctoral Committee approximately twice per year. Prior to such meetings, the student will provide a written summary of progress to all members of the Doctoral Committee. No more than one committee member may be absent from these meetings. After the meeting has taken place, the student and the thesis advisor will prepare and submit a brief report to the Graduate Student Officer within two weeks of meeting. This brief report should include the following information:

- Date of meeting
- Attendance
- Summary of progress
- Plans for the coming year
- Signatures of all the committee members

During Year 4, the student should present and discuss a proposed timeline towards Dissertation and Final Defense. Students should consult with committee members 3-4 months before their anticipated defense to verify that all expectations have been met.

## **XVII. ANNUAL INDIVIDUAL DEVELOPMENT PLAN**

Individual Development Plans (IDPs) are documents designed to support doctoral students and postdoctoral trainees in developing career plans and trajectories. The IDP provides a structure to identify concrete steps towards long-term goals and a framework for constructive conversation between students and their mentors/advisors. Because of the importance of an IDP in a trainee's career development and recent mandates from federal agencies, an annual IDP is required for all doctoral students and postdoctoral trainees regardless of funding status. IDPs must be completed by October 1 each year. A link to the IDP form can be found with other important forms here: <https://gradschool.wayne.edu/students/phd/forms>

## **XVIII. DISSERTATION**

Once a student has received permission from their Doctoral Committee and has completed the required 90 credits, they may begin preparing the written Dissertation. The Dissertation must be prepared according to the formatting guidelines provided by the Graduate School. Two weeks before the Final Defense, students should submit the Dissertation to the members of the Doctoral Committee, to the Pharmacology Graduate Student Officer, and to the Graduate School. Detailed information from the Graduate School regarding formatting guidelines and submission steps can be found here: <https://gradschool.wayne.edu/students/phd/requirements#defense>

The Final Defense will consist of two parts. First, the candidate will publicly present their research findings in the form of an approximately one-hour seminar. In the second part, immediately after the public presentation, the candidate will meet privately with the Doctoral Committee for a final examination. The committee will then discuss the candidate's performance and make a final recommendation. Revisions to the Dissertation may be required for final approval.

## EXAMPLE COURSEWORK for Ph.D. PROGRAM

### COURSE (SEMESTER CREDIT HOURS)

#### YEAR-1:

**Fall:** IBS 7015: Cell & Molecular Biology (6)  
PHC 7710: Laboratory Rotation (2)  
PHC 7650: Human Physiology for Pharmacology Students (2) – Counts towards IBS 10 total requirement

*Total 10 credits; Course credits = 10; PHC course credits = 10*

**Winter:** IBS Systems Biol. Course (4 credits required; variety of available courses)  
PHC 7010: General Pharmacology (4)  
PHC 7700: Journal Club (1)  
PHC 7710: Laboratory Rotation (1)

*Total 10 credits (20); Course credits = 10 (20); PHC course credits = 10 (20)*

**Summer:** PHC 7710: Laboratory Rotation (2)

*Total 2 credits (22); Course credits = 2 (22); PHC course credits = 2 (22)*

*During this year, either in the Winter or Fall semester, every student must also complete the Responsible Conduct of Research course, offered by the Graduate School  
<https://gradschool.wayne.edu/phd/research-conduct>*

*Choose major advisor at end of Summer of year 1*

#### YEAR-2:

**Fall:** PHC 7700: Journal Club (1)  
PHC 7650: Minicourses (0-2)  
PHC 7996: Research (1-5)\*\*  
Biostatistics or Elective: (X: for 10 max total hours)

*Total 10 credits (32); Course credits = 10 (32); PHC course credits = 7 (29); PHC 7996 tot=1-5*

\*\*Maximum total allowed for PHC 7996 = 20 credits.

**Winter:**       PHC 7650: Minicourses (0-2)  
                  PHC 7700: Journal Club (1)  
                  Biostatistics or Elective (X: for 10 max total hours)  
                  PHC 7996: Research (2-9)  
*Total 10 credits (42); Course credits = 10 (42); PHC course credits = 4-10 (33-39);  
PHC 7996 total = 3-13*

**ADVANCEMENT TO PHD CANDIDACY:**

1. File PLAN OF WORK form with WSU Graduate School (by December 1, Year 2)
2. Successfully pass WRITTEN QUALIFYING EXAM (by May 1, Year 2)
3. Choose members of DOCTORAL EXAMINATION COMMITTEE (by May, Year 2)
4. File RECOMMENDATION FOR CANDIDACY STATUS form with WSU Graduate School (June, Year 2)

*Once the student advances to CANDIDACY STATUS, he/she is eligible to register for dissertation credits.*

**PRESENTATION OF THE DISSERTATION PROPECTUS to DOCTORAL EXAMINATION COMMITTEE (Summer of Year 2)**

File PROPECTUS AND RECORD OF APPROVAL form with WSU Graduate School)

**Summer:**       PHC 7996: Research (2)  
*Total 2 credits (44); Course credits = 2 (44); PHC course credits = 2 (35-41)*

**YEAR-3:**

**Fall:**           Electives or Minicourse / PHC 7650, or Research /PHC7996 (3)  
                  \* PHC 9991: Doctoral Candidacy: (7.5)  
*Total 10.5 credits (54.5); Course credits =3 (47); PHC course credits = 3 (38-44)*

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**Winter:** Electives or Minicourse / PHC 7650, or Research /PHC7996 (2)  
Research Presentations (1)  
\* PHC 9992: Doctoral Candidacy: (7.5)  
*Total 10.5 credits (65); Course credits = 3 (50); PHC course credits = 3 (41-47)*

**Summer:** PHC 7996: Research (2)  
*Total 2 credits (67); Course credits = 3 (53); PHC course credits = 3 (44-50);  
PHC 7996 total = 6-16*

**YEAR-4:**

**Fall:** Electives or Minicourse / PHC 7650, or Research /PHC7996 (3)  
\* PHC 9993: Doctoral Candidacy: (7.5)  
*Total 10.5 credits (78.5); Course credits = 3 (56); PHC course credits = 3 (47-53);  
PHC 7996 total = 7-17*

**Winter:** Electives or Minicourse / PHC 7650, or Research /PHC7996 (2)  
Research Presentation (1)  
\* PHC 9994: Doctoral Candidacy: (7.5)  
*Total 10.5 credits (89); Course credits = 3 (59); PHC course credits = 3 (50-56);  
PHC 7996 total = 8-18*

**Summer:** PHC 7996: Research (2)  
*Total 1 credit (90); Course credits = 1 (60); PHC course credits = 1 (51-57)*

**YEAR-5+ (all semesters):**

PHC 9995 Maintenance Status (0)

\*Student must attain doctoral candidacy to take these credits.

<b>REQUIRED COURSES</b>	<b>CREDITS</b>	<b>SEMESTER</b>
IBS 7015 Cell and molecular biology	6	F
PHC 7650 Human physiology for pharmacology students	2	F
PHC 7010 general pharmacology	4	W
IBS xxxx ibs systems biology (variety of topics)	3	W
PHC 7650 pharmacology minicourses (variety of topics; minimum 2 additional credits)	1-3	F/W
PHC 7700 Recent developments (journal club, 3 credits total)	1	F/W
Research presentations (2 credits total)	1	W
Biostatistics	3-4	F/W
PHC 7710 Individual studies (rotations)	1-3	F/W/S
PHC 999X Dissertation research (30 total)	4 semesters X 7.5	
<b>ELECTIVES COURSES</b>	<b>CREDITS</b>	<b>SEMESTER</b>
PHC 7410 Toxicology	3	F
CB 7210 Fundamentals of Cancer Biology	3	W
CB 7240 Principles of cancer biology	2	W
PHC 7220 Cell/mol. Biol. Of cancer	3	
PHC 7230 Breast cancer	2	
PHC 7240 Cancer chemotherapy	2	
PHC 7996 Research variable (20 max. Total)	3	
BCH 7310 Adv. Biochem. Mol. Biol.	3	W
BCH 7320 Adv. Biochem. Proteins	2	W
BCH 7660 Bioenergetics	3	W
MBG 7010 Mol. biol.	3	
PSL 7640 Cell & mol. physiol	3	W
PSL 7660 Neurophysiol.	3	Alt Yrs
PSL 7820 Membrane biophysics	3	
CHM 8690 Chemical carcinogenesis		
PYC 7010 Neurobiology I	3	F
PYC 7020 Neurobiology II	3	W
PYC 7510 Neurochem. monoamine-containing	3	Alt Yrs
PYC 7520 Mol. biol. approaches in neurobiol.	3	Alt Yrs
MBG 7010 Mol. biol.		

## Notes:

1. All Pharmacology graduate students are required to attend all departmental seminars and first and second year students are required to attend Journal Club presentations.
2. There is no foreign language requirement for the doctoral degree.
3. Students must complete 90 semester hours for graduation including: 30 in Pharmacology lectures, seminars and Individ. Studies; 8 in the minor (usually Physiology or Biochemistry); 30 in Ph.D. Candidate Status (Dissertation Research)