

GUIDELINES FOR 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 identify - and to design experiments to test - ideas at the limits of current knowledge in one of the major areas of pharmacology. Students should also learn to analyze, interpret and communicate effectively the results of their thoughts and their experiments to other scientists.

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 the solution of pharmacological problems, journal clubs and seminars. The department also maintains a library. Students are expected to use this library as well as other university libraries for independent reading in order to enrich their understanding of current research advances.

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 in order to complete important experiments. Students are allowed to arrange for vacation time of approximately one month each year. Doctoral training is planned to require approximately four years for completion and is completed 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 three years of their program. These University assistantships provide a stipend plus full tuition credit along with a health care plan. Stipend support for the years needed for completion of thesis research must come from sources other than the Graduate Assistantship. The thesis advisor may provide this support from research grant funds; other available sources include the Thomas Rumble University Fellowships, University Professional Scholarships, the Pharmaceutical Manufacturers Association Fellowships, the NIH Cancer Biology Training Grant, Walz Graduate Research Assistantships, Office of Neuroscience Programs, and NSF 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 and one minor area of 8 or more credit hours. Thirty hours not including Candidate Status must be at a level of 7000 courses or above.

A listing of required courses and a selection of available elective courses can be found on the last two pages of this guideline. 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 OFFICER AND GRADUATE COMMITTEE

The Graduate Officer acts as academic advisor for the student until the major advisor has been selected. The student should consult with the Graduate Officer before selecting courses; the signature of the Graduate Officer is required on University registration materials. After the Plan of Work has been approved by the University (see below), approval and signature by the Graduate Officer are no longer necessary.

The Graduate Committee oversees student progress in the program. Approval by the Graduate Committee is required for the following: selection of rotation advisors, selection of major advisor, Plan of Work, Doctoral Committee composition, and off-campus academic activities before the major advisor is chosen. The Graduate Committee also functions to determine continuing academic eligibility of students in the doctoral program.

V. ROTATIONS

A. DEFINITION

Rotations are projects carried out by beginning graduate students under the supervision of a full-time Pharmacology faculty member in that faculty member's laboratory. A rotation should have defined objectives which can be accomplished within the allocated time span.

Since most laboratories in Pharmacology use radioisotopes, all students must take and pass the Radiation Safety Course offered by Health Physics in their first month on campus.

B. PURPOSES

The rotations exist to serve at least three purposes:

- (1) The student gains training and experience in laboratory research
- (2) The student gains an appreciation of the varieties of techniques and philosophies which can be applied to pharmacological research
- (3) The student is provided with a basis for choosing a specific faculty member to direct her/his research

C. NUMBER AND CHARACTER OF ROTATIONS

Each graduate student will complete three rotations within the first year and a half of the graduate program.

D. DURATION

The rotation will normally extend through one semester (or summer) during which time the student is expected to carry out laboratory work for a minimum of 16 hours per week. During the summer, the student is expected to expend full-time effort in the rotation project.

E. SELECTION OF ROTATION ADVISOR

During the first two weeks of his/her program, each student is required to talk to all full-time Pharmacology faculty members to learn about each laboratory and available rotation projects. This is to insure that students have an adequate basis for the selection of the rotation advisor. A

faculty list will be provided by the Graduate officer. The faculty member will place her/his initials on the student's faculty list to indicate that a meeting has taken place. Before the start of each rotation, the student will indicate his/her first three preferences for advisor by submitting a list to the Graduate Officer for approval by the Graduate Committee. Faculty selection is limited to full time Pharmacology faculty members for the first rotation. Succeeding rotation projects may be carried out with adjunct faculty members as well as full-time faculty members.

The Graduate Committee will match student preferences with faculty preferences for the rotations. The student's first preference may not always be granted, depending on the judgment of the Graduate Committee as to adequacy of the variety of the student's previous experiences and availability of advisor's time and resources.

Since stipend support for the completion of thesis research will normally be supplied from the major advisor's research grant funds, each faculty member should indicate to the student the prospects for student financial support in future years during the initial meeting when potential rotation projects are discussed. Students should also keep in mind that distinct advantages with respect to learning the highly useful techniques may result from rotations in laboratories where the funding outlook is unclear.

F. PROSPECTUS AND REPORT

Upon assignment by the Graduate Committee of the rotation advisor, the student and the advisor will jointly draft a one page prospectus which specifies the following:

(1) Objectives of the project. Examples: successful mastery of a technique such as single cell electrophysiological recording; determination of the effect of drug or toxin treatment on enzyme activity; cloning or sequencing nucleotides.

(2) Student time commitment each week to the project. Both the student and the advisor will sign one copy of this prospectus which is to be submitted to the Graduate Committee before the student begins work in the laboratory. The advisor and student are responsible for timely submission of the rotation prospectus. Within one week of completing the rotation, the student will prepare a final report which summarizes the methods, data, and conclusions of the project.

One copy each will be submitted to the advisor and to the Graduate Committee for approval. The Graduate Committee will not approve requests for subsequent rotations or for major advisor until the final report has been submitted.

G. ACADEMIC CREDIT FOR ROTATIONS

Students will sign up for one or more credits of PHC 7710, Individual Studies, for each rotation. The Summer rotation credit will be given in the following fall semester if it cannot be given in the Summer. The faculty advisor will be responsible for assigning the grade (Satis/Unsatis) associated with the rotation.

H. EXEMPTIONS

The student may petition the Graduate Committee for an exemption from the third rotation. Documentation of prior research experience must be presented as part of the justification for such a proposed exemption. The Graduate Committee will base its judgment upon the variety of experiences and maturity of the student.

IV. DEPARTMENTAL SEMINAR AND JOURNAL CLUB

The departmental seminars are presentations and discussions of research work given by faculty members and invited speakers from other institutions. These seminars are normally scheduled on Friday afternoons during the Fall and Winter semesters. All students should register for 1 credit of PHC 7890 (Seminar) per semester.

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 semester a grade will be assigned based on attendance and performance in presentation and critique.

VII. 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 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.

VIII. SELECTION OF MAJOR ADVISOR

Students are urged to select a major advisor as soon as possible so that additional course work which will benefit thesis research can be selected with the aid of the advisor. In general, experiences derived from the three rotation projects will provide the basis for this selection. A student may choose an additional rotation if more experience is needed. Selection of the advisor should be completed by the end of the Fall semester in the second year.

By September 1 of the second year in the program (or December 1 for students electing a fourth rotation), each student will have submitted to the Graduate Committee a list of three choices ranked from 1 to 3 for his/her major advisor. The Graduate Committee will confer with the faculty member(s) involved before assigning the major advisor.

For thesis work carried out in the laboratory of an adjunct faculty member, a full time Pharmacology faculty member must serve as Co-Advisor. The Co-Advisor shares academic responsibility for the student's program.

IX. PLAN OF WORK

The doctoral applicant must complete the University Plan of Work Form at the time of scheduling of the Oral Ph.D. Qualifying Exam. This document should be prepared with the major advisor before the end of the Fall semester of the second year. The Doctoral plan of work requires the signed approval of the student's advisor and the Graduate Officer of the Department after it has been formally approved by the Departmental Graduate Committee. Forms are available from the Graduate Programs Office or online at http://www.gradschool.wayne.edu/forms/plan_of_work.html.

X. SELECTION OF DOCTORAL COMMITTEE

The doctoral applicant, together with his/her advisor, should select a Doctoral Committee during the Winter semester of the second year. This committee shall consist of five members of the Graduate Faculty. One member of the committee should be chosen from either the student's minor department or other appropriate department. The other members must include the student's advisor and three other departmental faculty members. The committee must be approved by the Departmental Graduate Committee.

The purpose of the Doctoral Committee is to administer the oral qualifying examination, to act as the thesis committee in guiding the student's progress, and to act as the Doctoral Dissertation Defense Committee. Additions or deletions from the original committee must be approved by the departmental Graduate Committee and Graduate School.

XI. WRITTEN QUALIFYING EXAMINATION

Students will be expected to write an F31 predoctoral support grant that is suitable for submission as a written qualifying examination.

1. The F31 proposal will be written entirely by the student although he/she will be able to consult with experts in the field including their advisor.
2. All portions of the grant that are relevant to the student including the forms and addenda will be completed according to the accompanying instructions. Although the grade will be based on the Research Plan, the examination will not be graded unless forms and addenda are complete.
3. The month of May in the second year will be set aside for this task. Of course, exceptions can be made when necessary.
4. The proposal will be evaluated by a committee of three. One will be selected by the student and two by the graduate officer. Each of these faculty members must be members of the Department and one will be chosen by the graduate officer for her/his expertise in grant writing.
5. Each examiner will score the Research Plan for its scientific merit (75%) and the clarity of its presentation (25%). Their scores will be averaged and totaled. A score of 85% will be required for a conditional pass.
6. 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 citizen or permanent resident).

XII. ORAL QUALIFYING EXAMINATION

An oral examination based on a grant proposal covering the research proposed for the dissertation and constructed by the applicant is due in the Winter semester of the second year. A copy of the format to be followed will be provided by the Graduate Officer during the Fall semester of the second year. The oral examination will be scheduled for two (2) weeks after submission of the grant proposal. Prior to the oral qualifying examination, the department shall submit the names of the applicant's Doctoral Examination committee to the Graduate School for approval.

The Doctoral Committee will administer the examination. Satisfactory performance will be determined by having no more than one dissenting vote on passing. In the event of failure, the

committee may recommend to the Graduate Committee either (a) that a second examination be taken no sooner than one (1) term, yet within 12 months, or (b) dismissal of the student.

XIII. DISSERTATION OUTLINE

After successful completion of the oral qualifying examination, the written document used for the examination along with a summary as indicated on the Graduate School Dissertation Outline Form will be submitted to the Graduate School for Approval.

XIV. ACHIEVEMENT OF DOCTORAL CANDIDACY

The student achieves Doctoral candidacy status after completing the following requirements:

- A) Satisfactory completion of two years of graduate training in the department.
- B) Satisfactory completion of both the written and oral qualifying examination.
- C) Filing and approval of the Plan of Work with the Graduate School.
- D) Filing of the application form for Doctoral Candidacy.
- E) Filing and approval of the Dissertation Outline with the Graduate School.

For those students supported on Graduate Assistantships, achievement of doctoral candidacy status will result in an increase in the stipend level. Attainment of doctoral candidacy will normally occur at the end of the summer in the second year of the program.

XV. STUDENT RESPONSIBILITY FOR DOCTORAL COMMITTEE MEETINGS

To insure 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 at six month intervals. Prior to such meetings, the student will provide a written summary of progress to all members of the Doctoral Committee. At least three members of the committee must be in attendance at these meetings. After the meeting has taken place, the student will submit a copy of this summary to the Graduate Officer by December 20 and June 30 as evidence that the semiannual meeting has taken place. Failure of the student to comply with these deadlines may result in suspension of pay by the Department.

XVI. ANNUAL EVALUATION

Students will be provided with a written evaluation of progress annually each August.

XVII. DISSERTATION

To give members of a student's dissertation committee adequate time to review the dissertation, students should give their dissertation committee members their dissertation *at least 2 weeks* before the committee signs the "Final Report: Dissertation Public Lecture Presentation-Defense" form (Green Form), which allows the student to schedule his/her Ph.D. dissertation defense. This form should then be given to the Graduate Officer to turn in to the Graduate School *at least 2 weeks* prior to the date that the committee agrees on to schedule the defense.

MODEL Ph.D. PROGRAM

COURSE

SEMESTER CREDIT HOURS

YEAR-1:

Fall: Radiation Safety Course Taken in September of First Year
IBS 7010: Molecular Biology (5)
IBS 7020: Cell Biology (5)

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

Winter: IBS Systems Biol. (minimum 4 required)
PHC 7010: "Principles of 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)

Choose major advisor at end of Summer

YEAR-2:

Fall: PHC 7700: Journal Club (1)
PHC 7890: Seminar (1)
PHC 7650: Minicourses (0-3)*
PHC 7996: Research (1-5)**
Elective: (3)

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

*A minimum total of 6 credits of PHC 7650 (1-credit minicourses) are required over the course of study.

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

Winter: PHC 7650: Minicourses (0-3)
PHC 7700: Journal Club (1)
PHC 7890: Seminar (1)
Elective (2-4)
PHC 7996: Research (2-8)

*Total 10 credits (42); Course credits = 10 (42); PHC course credits = 4-10 (33-39)
PHC 7996 total = 3-13*

Choose Doctoral Examination Committee

WRITTEN QUALIFYING EXAM (May)

ORAL QUALIFYING EXAM (June-August)

File Plan of Work

Summer: PHC 7710: Laboratory Rotation (2)
Total 2 credits (44); Course credits = 2 (44); PHC course credits = 2 (35-41)

YEAR-3:

Fall: PHC 7650: Minicourses (1)
PHC 7700: Journal Club (1)
PHC 7890: Seminar (1)
*Doctoral Candidacy: (7.5)
Total 10.5 credits (54.5); Course credits = 3 (47); PHC course credits = 3 (38-44)

Winter: PHC 7650: Minicourses (1)
PHC 7700: Journal Club (1)
PHC 7890: Seminar (1)
*Doctoral Candidacy: (7.5)
Total 10.5 credits (65); Course credits = 3 (50); PHC course credits = 3 (41-47)

Summer: PHC 7996: Research (3)
*Total 3 credits (68); Course credits = 3 (53); PHC course credits = 3 (44-50);
PHC 7996 total = 6-16*

YEAR-4:

Fall: PHC 7700: Journal Club (1)
PHC 7890: Seminar (1)
PHC 7996: Research (1)
*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: PHC 7700: Journal Club (1)
PHC 7890: Seminar (1)
PHC 7996: Research (1)
*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 (1)
Total 1 credit (90); Course credits = 1 (60); PHC course credits = 1 (51-57)

YEAR-5+ (all semesters):

Maintenance Status

*Student must attain doctoral candidacy to take these credits.

| REQUIRED COURSES | | | Credits | Semester Offered |
|--|------|--|------------------------------|--------------------------|
| IBS | 7010 | Molecular Biology | 5 | F |
| IBS | 7020 | Cell Biology | 5 | F |
| IBS | 7030 | Systems Biology | 4 | W |
| PHC | 7010 | Pharmacology Lecture | 4 | W |
| PHC | 7650 | Adv. Topics. Pharmacology (Minicourses) | Variable; min. 6 required | F,W |
| PHC | 7700 | Recent Developments (Journal Club) | 7 | |
| PHC | 7710 | Indiv. Studies (Rotations) | 5 | |
| PHC | 7890 | Seminar | 6 | |
| Candidate Status Dissertation Research | | | 30 total (4 semesters x 7.5) | |
| ELECTIVES (List is not all inclusive) | | | | |
| PHC | 7190 | Neuroscience Survey | 3 | F |
| PHC | 7410 | Toxicology | 3 | F |
| PHC | 7210 | Cancer Biology | 3 | |
| 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) |
| BCH | 7310 | Adv. Biochem. Mol. Biol. | 3 | W |
| BCH | 7320 | Adv. Biochem. Proteins | 3 | W |
| BCH | 7660 | Bioenergetics | 2 | 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 Neurons | 3 | Alt. Yrs. |
| PYC | 7520 | Mol. Biol. Approaches in Neurobiol. | 3 | Alt. Yrs. |

Notes:

1. All Pharmacology graduate students are required to attend all departmental seminars and 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 Indiv. Studies
 - 8 in the minor (usually Physiology or Biochemistry)
 - 30 in Ph.D. Candidate Status (Dissertation Research)