

**Dutta, Lakshmi**

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**From:** Elliot Slotnick [slotnick.1@gradsch.ohio-state.edu]  
**Sent:** Wednesday, April 02, 2008 12:59 PM  
**To:** Dutta, Lakshmi  
**Cc:** Tim Watson; Dena Myers  
**Subject:** FW:  
**Attachments:** Slotnick re Specializations 3.doc

Lakshmi,

Attached is a proposal from the College of Pharmacy which wishes to establish Graduate Specializations in their program for the eventual receipt of transcript designations for their students completing these curriculum tracks. This proposal has been approved by our Curriculum Committee and is now ready for CAA review. I will forward the (limited!) number of additional e-mails that I have on this subject.

Best,  
elliot

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**From:** William Hayton [mailto:hayton.1@osu.edu]  
**Sent:** Tuesday, April 01, 2008 12:28 PM  
**To:** Elliot Slotnick  
**Subject:** Re:

Dear Elliot,

Attached is the revision requested - I also added the units for the courses listed under the Pharmacology specialization.

Thanks for your help with this,

Regards,  
Bill

At 04:01 PM 3/31/2008, you wrote:

Dear Bill,

Our Curriculum Committee returned to your proposal for the creation of Graduate Specializations in the Pharmacy program at today's meeting. Everything is now in order and, in principle, ready to go forward for CAA review save for one item. Particularly since each of the specializations differs significantly in its requirements, could you please insert the credit hours for the courses in the Medicinal Chemistry and Pharmacognosy specialization track. Once we have that in the proposal, I will send it on to CAA for its final review.

Best,  
elliot

4/2/2008

MEMORANDUM

TO: Elliot Slotnick, Associate Dean, Graduate School

FROM: William L. Hayton, Associate Dean for Graduate Studies and Research

DATE: March 13, 2008

SUBJECT: Graduate Specializations

The Graduate and Research Committee (serves as the Graduate Studies Committee) of the College of Pharmacy recommends the following six Graduate Specializations for graduate students in the College of Pharmacy:

Health-System Pharmacy Administration	MS
Medicinal Chemistry and Pharmacognosy	MS and PhD
Pharmaceutics	MS and PhD
Pharmacology	MS and PhD
Pharmaceutical Administration	MS and PhD
Translational Science	PhD

These designations are widely recognized divisions in the field of Pharmacy and, except for Translational Science, they mirror the names of the divisions of the college, namely the Division of Medicinal Chemistry and Pharmacognosy, the Division of Pharmaceutics, the Division of Pharmacology, and the Division of Pharmacy Practice and Administration. The Translational Science specialization may enroll students advised by graduate faculty from any of the divisions, and the remaining specializations are appropriate for students advised by graduate faculty associated with the division of the same name.

Each proposed specialization has its own required cluster of coursework, shown on the attached pages. One proposed specialization, Pharmacology, is also a department in the College of Medicine. Dr. Sadee, Chair of the Department of Pharmacology, has written in support of the use of "Pharmacology" as a specialization in the College of Pharmacy (email from Dr. Sadee is attached).

## AREAS OF SPECIALIZATION

### Ph.D. Medicinal Chemistry & Pharmacognosy

Three tracks are available (Biochemical, Synthetic Medicinal Chemistry, and Natural Products), and each track has different course requirements although there is considerable overlap among the tracks. Students select a track early in their program of study and in consultation with their advisor and the approval of the division chair prospectively select the course work portion of their program.

<u>Biochemical Track graduate course requirements:</u>	<u>Units</u>
Biochemistry 613, 614 and 615	4,4,4
Pharmacy 735 – Drug Discovery and Drug Design	3
Pharmacy 789 – Isolation Techniques in Research	5
Chemistry 730 – Intermediate Organic Chemistry	3
Two 700-level or higher course in Biochemistry or Molecular Biology	6
<b>Three electives from the following:</b>	
Ph 800 - Radioisotope Tracer Techniques and Radiopharmaceuticals	3
Ph 835 - Advanced Medicinal Chemistry, Autumn Quarter	3
Ph 836 - Advanced Medicinal Chemistry, Winter Quarter	3
Ph 837 - Chemotherapy of Infectious Diseases	3
Ph 851 - Advanced Pharmacognosy	3
Ph 836 - Structure-Based Computer-Aided Molecular Design, Spring Quarter	3
Ph 737- Advanced Pharmaceutical Analysis	5
Chemistry 632 - Spectroscopic Methods in Organic Chemistry	3

#### Synthetic Medicinal Chemistry Track graduate course requirements:

Biochemistry - 613, 614 and 615	4,4,4
Chemistry 632 - Spectroscopic Methods in Organic Chemistry	3
Chemistry 730 - Intermediate Organic Chemistry	3
Chemistry 832 - Advanced Organic Chemistry	3
Chemistry 833 - Advanced Organic Chemistry	3

For students specializing in molecular modeling, Chemistry 832 and 833 can be substituted by two other courses, for example, from:

Chemistry 944 - Computational Chemistry	3
Chemistry 880 - Statistical Thermodynamics	3
IBGP 730 - Biomedical Informatics	3
Pharmacy 789 - Isolation Techniques in Research	5
Pharmacy 735 - Drug Discovery and Drug Design	3
Pharmacy 737 - Advanced Pharmaceutical Analysis	5

#### **Two electives from the following:**

Ph 835 - Advanced Medicinal Chemistry	3
Ph 836 - Advanced Medicinal Chemistry, Winter Quarter	3
Ph 837 - Advanced Medicinal Chemistry	3
Ph 851 - Advanced Pharmacognosy	3
Ph 836 - Structure-Based Computer-Aided Molecular Design, Spring Quarter	3

**Natural Products Track graduate course requirements:**

Biochemistry - 613, 614 and 615	4,4,4
Chemistry 632 - Spectroscopic Methods in Organic Chemistry	3
Chemistry 730 – Intermediate Organic Chemistry	3
Pharmacy 789 - Isolation Techniques in Research	5
Pharmacy 735 - Drug Discovery and Drug Design	3
Pharmacy 737 - Advanced Pharmaceutical Analysis	5
Pharmacy 851 - Advanced Pharmacognosy	3

**Two electives from the following**

Ph 835 - Advanced Medicinal Chemistry	3
Ph 836 - Advanced Medicinal Chemistry, Winter Quarter	3
Ph 837 - Advanced Medicinal Chemistry	3
Ph 839 - Problem Solving in Natural Product Chemistry	2
Ph 836 - Structure-Based Computer-Aided Molecular Design, Spring Quarter	3
Chemistry 942 – Natural Product Chemistry	3

**M.S. Medicinal Chemistry & Pharmacognosy**

Students may receive the M.S. as a terminal degree when the advisor, in consultation with the student and the Advisory Committee, recommends to the GRC that the student should proceed towards the M.S. degree (rather than the Ph.D. degree) and the GRC concurred with the adviser's recommendation. A minimum of 45 graduate credit hours, a M.S. thesis based on laboratory work, and passing an oral thesis examination are the minimum requirements for the completion of a terminal M.S. program in Medicinal Chemistry & Pharmacognosy. Under extenuating circumstances, the major adviser, in consultation with the Advisory Committee and in concurrence with the student, may petition the GRC to complete the terminal M.S. program under a non-thesis option.

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**Ph.D. Pharmaceutical Administration**

**COURSEWORK:**

A. Required of all students:

1. Core Courses: at least 16 credit hours from the following list:

Medication Use System Management	Pharm 816	4
Research Methods and Literature Evaluation	Pharm 821	4
Economic Evaluation of Health Care Programs and Services	Pharm 824	4
Drug Distribution and Public Policy	Pharm 825	4
Pharmaceutical Outcomes Evaluation	Pharm 827	4
Pharmaceutical Health Services Research	Pharm 828	4

2. Seminar

B. Electives:

1. Foundation Field (27 hours minimum)

Courses are taken in Health Services Management and Policy, Economics, Marketing, Epidemiology, Public Health, Business, Sociology, Psychology, Communication and

Agricultural Education. Students consult with their adviser and prospectively plan the courses to be taken for the foundation electives. The course work plan requires the approval of the Pharmaceutical Administration Specialization Coordinator.

2. Research Methods and Statistics (33 hours)

The biostatistics series in public health (PH Bio 701, 702, and 703) is required. Other research methods and statistics courses from various departments are selected to complete the minimum requirement of 33 units.

C. Second Field of Specialization (15 hour minimum)

The purpose of this field is to allow students to develop specialization in an area outside but complementary to the field of pharmaceutical administration. Courses are selected prospectively in consultation with the adviser and the plan requires the approval of the Pharmaceutical Administration Specialization Coordinator. Example second fields are: Consumer Behavior, Marketing, Cognitive Psychology, Economics, Psychology, Biometrics, and Epidemiology.

## MS Pharmaceutical Administration

A. Required of all students:

1. Core Courses: at least 16 credit hours from the following list:

Medication Use System Management	Pharm 816	4
Research Methods and Literature Evaluation	Pharm 821	4
Economic Evaluation of Health Care Programs and Services	Pharm 824	4
Drug Distribution and Public Policy	Pharm 825	4
Pharmaceutical Outcomes Evaluation	Pharm 827	4
Pharmaceutical Health Services Research	Pharm 828	4

2. Seminar

B. Electives (minimum of 22 hours)

A minimum of one statistics course and one research methods course is required.

C. Total Credit Hours (45 hours minimum)

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## MS Health-System Pharmacy Administration

A. Core Courses:

Medication Use System Management	Pharm 816	4
Pharmacy Management in Health-Systems	Pharm 817	4
Research Methods and Literature Evaluation	Pharm 821	4
Economic Evaluation of Health Care Programs and Services	Pharm 824	4
Drug Distribution and Public Policy	Pharm 825	4
Health Services Organizational Management	HSMP 815	4
Health Services Finance I	HSMP 820	4
Health Services Finance II	HSMP 821	4
Strategic Management and Program Development	HSMP 831	4

Operations Management for Health Service Organizations	HSMP 880	4
Information Systems	HSMP 882	4
Statistics (3 credit hours)	(various)	3

B. Seminar: Required of all students

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### Ph.D. Pharmaceutics

Each student plans the specific course work to be taken early in their program, in consultation with the adviser and the approval of the division chair.

Required courses:

		Units
Seminar	Pharmacy 850.01	3
	Five courses taught by division faculty from the following list (15-17 units):	
Biomedical Proteomics and Mass Spectrometry	Pharmacy 801	3
Pharmacokinetics	Pharmacy 802	4
Disposition of Xenobiotics	Pharmacy 803	3
Drug Transport	Pharmacy 804	3
Pharmaceutical Biotechnology	Pharmacy 805	3
Advanced Bioanalysis	Pharmacy 806	4,2
Drug Equilibria in Biological Systems	Pharmacy 807	3
Pharmacokinetic-Pharmacodynamic Models	Pharmacy 808	3
Delivery Systems	Pharmacy 809	3

Electives, to make a total of at least 54 units of graded graduate-level courses.

### MS Pharmaceutics with Thesis

Each student plans the specific course work to be taken early in their program, in consultation with the adviser and the approval of the division chair.

		Units
Seminar	Pharmacy 850.01	1
	Three courses taught by division faculty from the following list (9-11 units):	
Biomedical Proteomics and Mass Spectrometry	Pharmacy 801	3
Advanced Pharmacokinetics	Pharmacy 802	4
Disposition of Xenobiotics	Pharmacy 803	3
Drug Transport	Pharmacy 804	3
Pharmaceutical Biotechnology	Pharmacy 805	3
Bioanalytical Methods	Pharmacy 806	4
Drug Equilibria in Biological Systems	Pharmacy 807	3
Pharmacokinetic-Pharmacodynamic Models	Pharmacy 808	3
Delivery Systems	Pharmacy 809	3

Electives and thesis research (Pharmacy 993) to make a total of 48 units.

### MS Pharmaceutics without Thesis

Under extenuating circumstances, the advisor, in concurrence with the student, may petition the GRC to complete the program under the nonthesis option. A minimum of 48 quarter hour credits of graduate level course work is required. Each student presents one seminar per year, beginning with the second year of study.

Program

Same courses as for the Ph.D. Program.

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### Ph.D. Pharmacology

SUBJECT	NUMBER (Units)	TITLE
Physiology	Physiology 601 and 602	Advanced Mammalian Physiology
Biochemistry	Biochemistry 613 , 614, and 615 (12) or two of the following: Biochemistry 761 (3) Biochemistry 762 (3) Biochemistry 763 (2) Biochemistry 765 (3) Biochemistry 766 (3)	Biochemistry and Molecular Biology Proteins Enzymes Membranes and Bioenergetics Physical Biochemistry Nucleic Acid Chemistry & Structure
Statistics	Molecular Genetics 650 (5)	Analysis and Interpretation of Biological Data
Pharmacology	Pharmacy 747, 748, and 749 plus one of 750, 751, 752 (3,3,3,3) Pharmacy 870 (3)	Pharmacology Drug Receptor Theory
Laboratory	Pharmacy 871 and 872 (4,3)	Methods in Pharmacology
Seminar	Pharmacy 850 (V)	Pharmacology Seminar

### M.S. Pharmacology

The Division of Pharmacology does not typically accept students into a Masters of Science program. Under special circumstances and with the consent of the Division of Pharmacology faculty, students may opt out of the Ph.D. program and pursue a Master of Science degree. Core course requirements for MS degree students are less extensive than those outlined for doctoral students. They include Pharmacy 747, 748, 749, 870, 871, 872, and Genetics 650, if there are no prerequisite deficiencies. In addition to course work, MS degree candidates must complete a research thesis based on laboratory work and pass a "defense of thesis" examination in order to satisfy the requirements for the degree.

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## Translational Science Ph.D.

(This is a Combined Pharm.D./Ph.D. Program. Students must be concurrently enrolled in the Pharm.D. Program or have completed the Pharm.D. degree prior to matriculation.)

### Required Courses for the Ph.D. Program:

Physiology 601 and 602	Advanced Mammalian Physiology	10
Pharmacy 733	Pharmacokinetics	3
Pharmacy 778-782	Pathophysiology and Therapeutics	21
Pharmacy 724	Clinical Pharmacogenomics	3
Vision Science 796	Ethics in Biomedical Research	2
Pharmacy 894	Translational Science Research Problem Solving	3
Pharmacy 850	Graduate Seminar	

### Elective Courses

In consultation with their adviser students are required to prospectively select a minimum of 23 credit hours from at least two of the following areas of study. The selection of elective courses should occur early in the student's program of study, and the plan must be approved by the Translational Science faculty coordinator.

#### General/Translational Science

Public Health 701	Design and Analysis of Studies in the Health Sciences I	4
Public Health 702	Design and Analysis of Studies in the Health Sciences II	4
Integrated Biomedical Science 707	Fundamentals of Grant Writing I	2
Integrated Biomedical Science 708	Fundamentals of Grant Writing II	2
Integrated Biomedical Science 709	Statistical Aspects of Grant Writing	1

#### Medicinal Chemistry and Pharmacognosy

Chemistry 730	Intermediate Organic Chemistry	3
Chemistry 632	Spectroscopic methods in organic chemistry	3
Pharmacy 735	Drug Discovery and Drug design	3
Pharmacy 737	Advanced Pharmaceutical Analysis	5
Pharmacy 789	Isolation Techniques in Research	5
Pharmacy 800	Radioisotope Tracer Techniques and Radiopharmaceuticals	3,2
Pharmacy 835	Advanced Medicinal Chemistry	3
Pharmacy 836	Advanced Medicinal Chemistry	3
Pharmacy 837	Chemotherapy of Infectious Diseases	3
Pharmacy 839	Problem solving in natural products chemistry	
Pharmacy 851	Advanced Pharmacognosy	3

#### Pharmaceutics

Pharmacy 701	Advanced Physical Pharmacy	3
Pharmacy 802	Advanced Pharmacokinetics	4
Pharmacy 803	Disposition of Xenobiotics in Biological Systems	3
Pharmacy 804	Drug Transport	3
Pharmacy 805	Controlled Drug Delivery	3
Pharmacy 806	Bioanalytical Methods (lecture; lab)	4,2
Pharmacy 807	Drug Equilibria in Biological Systems	3
Pharmacy 808	Pharmacodynamic Models	3



Pharmacology

Pharmacy 870	Drug Receptor Theory	3
Pharmacy 871	Experimental Methods in Pharmacology	4
Pharmacy 872	Advanced Methods in Pharmacology	3
Pharmacy 873	Contemporary Pharmacology	1

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Letter of support for the "Pharmacology" specialization from the chair of the Department of Pharmacology, College of Medicine.

X-Original-To: hayton@tetraknot.pharmacy.ohio-state.edu  
 Delivered-To: hayton@tetraknot.pharmacy.ohio-state.edu  
 Date: Fri, 01 Feb 2008 13:16:13 -0500  
 From: "Sadee, Wolfgang " <Wolfgang.Sadee@osumc.edu>  
 Subject: RE: Graduate Specializations  
 To: William Hayton <hayton.1@osu.edu>  
 Dear Bill.

There is no objection on our part to the designation 'pharmacology' as a specialization in the graduate program "Pharmacy". A concern would only arise if Pharmacology would be the main designation, rather than Pharmacy, as this would be in potential conflict with our program as part of the IBGP. It is highly desirable to permit designation of specialization for the students to recognize their interests and achievements.  
 Regards,  
 Wolfgang

Wolfgang Sadee, Dr.rer.nat.  
 Felts Mercer Professor of Medicine and Pharmacology  
 Professor, Pharmacy, Medical Genetics, Psychiatry  
 Chair, Department of Pharmacology  
 Director, Program in Pharmacogenomics  
 College of Medicine and Public Health  
 Ohio State University  
 5072 Graves Hall  
 333 West 10th Avenue  
 Columbus OH 43210-1239  
 tel. 614-292 5593  
 fax. 614-292 7232  
 e-mail. wolfgang.sadee@osumc.edu

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**From:** William Hayton [mailto:hayton.1@osu.edu]  
**Sent:** Friday, February 01, 2008 11:28 AM  
**To:** sadee.1@osu.edu  
**Subject:** Graduate Specializations

Dear Wolfgang,

Our graduate studies committee wants to make available to our graduate students the option to

add a graduate specialization to their transcript. A graduate specialization "represents a significant, widely recognized division of an overall field of study". The Diploma for the MS and PhD degrees does not indicate the area of study. The grade transcript generally shows the graduate program name only, which in our college is "pharmacy". By identifying areas of specialization, the Graduate School Handbook and the Graduate School Bulletin would list them and students if they elected to do so, could have the specialization designated on their grade transcript.

Part of the procedure for requesting specializations is to include a letter of concurrence from other programs "when the specialization involves core subject matter from another discipline." Our request for the "pharmacology" designation therefore will need agreement from your department.

A letter of concurrence with our proposal (a reply to this email would probably be sufficient) would be much appreciated. Let me know if there are issues to discuss (2-1288).

Thanks for your help,  
Bill

**Dutta, Lakshmi**

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**From:** Elliot Slotnick [slotnick.1@gradsch.ohio-state.edu]  
**Sent:** Wednesday, April 02, 2008 1:03 PM  
**To:** Dutta, Lakshmi  
**Subject:** FW:

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**From:** Elliot Slotnick  
**Sent:** Wednesday, February 27, 2008 4:18 PM  
**To:** 'William Hayton'  
**Cc:** Dena Myers; 'Smith, Randy'; Lakshmi Dutta  
**Subject:**

Dear Bill,

The Curriculum Review Committee in the Graduate School discussed your proposal to offer graduate specializations at its meeting earlier this week and the proposal has been approved "in principle." There are a number of (mostly) stylistic changes that the Committee requests be attended to in a revised proposal submission prior to our forwarding the proposal on to CAA for final review and approval. I think that the requested changes all flow from the likelihood that the original proposal submission resulted from cutting and pasting from a program handbook or similar document. As a consequence of that, several facets of the proposal were a bit unclear and disjointed and the Committee felt it important to address this concern prior to moving the proposal forward. Specifically, Bill, can a revised proposal be sent to me with the following changes made? I'll look the revision over without the necessity of taking it back to Committee and, if their concerns have been satisfied, I'll send it on to Randy Smith and CAA for final review without further delay.

1. Please number the pages in the proposal
2. In the cover page could you please annotate which of the programs will be offering these specializations at the Master's level, which at the Doctoral level and which at both levels? The way the proposal is presently organized (by program section) makes this a bit unclear.
3. Substantively, the Committee was concerned that too much discretion/responsibility/etc. was in the hands of a student's advisor in determining whether students met the criteria for the specialization, and that much of this discretion and responsibility was being exercised at the back end of student programs when it is too late to fix something that has gone off the tracks. The Committee would like to see the GSC Chair have the responsibility of signing off on student programs that seek the various specializations and to have programs run by the GSC Chair up front so that any curriculum problems can be resolved before enrollment errors are made. Naturally, the advisors can remain the "primaries" in working with students to design their specialization programs, but having the GSC check should be a useful safeguard. Making this change in the proposal will necessitate going back to the text and altering any of the prose that discusses the role of the advisors.
4. Under MS-System Pharmacy Administration, the 24 "electives in has" are really required courses, right? If so, please make that change.

As a general matter, anything that you can do to make this "flow" better and to minimize the cut and paste feel would be very helpful as we move to CAA. Thanks so much...

Best,  
elliot

**Dutta, Lakshmi**

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**From:** Elliot Slotnick [slotnick.1@gradsch.ohio-state.edu]  
**Sent:** Wednesday, April 02, 2008 1:01 PM  
**To:** Dutta, Lakshmi  
**Subject:** FW:

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**From:** Elliot Slotnick  
**Sent:** Friday, February 01, 2008 10:35 AM  
**To:** 'William Hayton'  
**Cc:** Dena Myers; Tim Watson; 'Smith, Randy'; Lakshmi Dutta; Robert Brueggemeier  
**Subject:**

Dear Bill,

I suspect that Craig has told you this already (apologies for this delayed "formal" notice) but your proposal to add a Translational Science track to your Ph.D. program has been approved by our Curriculum Review Committee and is ready for implementation. Since this is not, in any sense, a new degree but, rather, a new curriculum option within an established degree program that lies within your discretion for curriculum review and revision, no further review of this proposal will be necessary. As we understand it, this new emphasis, along with your existing Ph.D. tracks, will likely be the basis for a forthcoming request to create formal Graduate Specializations in your program that would lead to recognition as transcript designations on student records. The Committee was enthusiastic about the prospect of seeing such a related proposal in the future.

Best,  
elliot

4/2/2008

MEMORANDUM

TO: Elliot Slotnick, Associate Dean, Graduate School

FROM: William L. Hayton, Associate Dean for Graduate Studies and Research

DATE: March 13, 2008

SUBJECT: Graduate Specializations

The Graduate and Research Committee (serves as the Graduate Studies Committee) of the College of Pharmacy recommends the following six Graduate Specializations for graduate students in the College of Pharmacy:

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Pharmaceutics	MS and PhD
Pharmacology	MS and PhD
Pharmaceutical Administration	MS and PhD
Translational Science	PhD

These designations are widely recognized divisions in the field of Pharmacy and, except for Translational Science, they mirror the names of the divisions of the college, namely the Division of Medicinal Chemistry and Pharmacognosy, the Division of Pharmaceutics, the Division of Pharmacology, and the Division of Pharmacy Practice and Administration. The Translational Science specialization may enroll students advised by graduate faculty from any of the divisions, and the remaining specializations are appropriate for students advised by graduate faculty associated with the division of the same name.

Each proposed specialization has its own required cluster of coursework, shown on the attached pages. One proposed specialization, Pharmacology, is also a department in the College of Medicine. Dr. Sadee, Chair of the Department of Pharmacology, has written in support of the use of "Pharmacology" as a specialization in the College of Pharmacy (email from Dr. Sadee is attached).

## AREAS OF SPECIALIZATION

### Ph.D. Medicinal Chemistry & Pharmacognosy

Three tracks are available (Biochemical, Synthetic Medicinal Chemistry, and Natural Products), and each track has different course requirements although there is considerable overlap among the tracks. Students select a track early in their program of study and in consultation with their advisor and the approval of the division chair prospectively select the course work portion of their program.

<b><u>Biochemical Track graduate course requirements:</u></b>	<b>Units</b>
Biochemistry 613, 614 and 615	4,4,4
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Pharmacy 789 – Isolation Techniques in Research	5
Chemistry 730 – Intermediate Organic Chemistry	3
Two 700-level or higher course in Biochemistry or Molecular Biology	6
<b>Three electives from the following:</b>	
Ph 800 - Radioisotope Tracer Techniques and Radiopharmaceuticals	3
Ph 835 - Advanced Medicinal Chemistry, Autumn Quarter	3
Ph 836 - Advanced Medicinal Chemistry, Winter Quarter	3
Ph 837 - Chemotherapy of Infectious Diseases	3
Ph 851 - Advanced Pharmacognosy	3
Ph 836 - Structure-Based Computer-Aided Molecular Design, Spring Quarter	3
Ph 737- Advanced Pharmaceutical Analysis	5
Chemistry 632 - Spectroscopic Methods in Organic Chemistry	3

#### **Synthetic Medicinal Chemistry Track graduate course requirements:**

Biochemistry - 613, 614 and 615	4,4,4
Chemistry 632 - Spectroscopic Methods in Organic Chemistry	3
Chemistry 730 - Intermediate Organic Chemistry	3
Chemistry 832 - Advanced Organic Chemistry	3
Chemistry 833 - Advanced Organic Chemistry	3

For students specializing in molecular modeling, Chemistry 832 and 833 can be substituted by two other courses, for example, from:

Chemistry 944 - Computational Chemistry	3
Chemistry 880 - Statistical Thermodynamics	3
IBGP 730 - Biomedical Informatics	3
Pharmacy 789 - Isolation Techniques in Research	5
Pharmacy 735 - Drug Discovery and Drug Design	3
Pharmacy 737 - Advanced Pharmaceutical Analysis	5

#### **Two electives from the following:**

Ph 835 - Advanced Medicinal Chemistry	3
Ph 836 - Advanced Medicinal Chemistry, Winter Quarter	3
Ph 837 - Advanced Medicinal Chemistry	3
Ph 851 - Advanced Pharmacognosy	3
Ph 836 - Structure-Based Computer-Aided Molecular Design, Spring Quarter	3

**Natural Products Track graduate course requirements:**

Biochemistry - 613, 614 and 615	4,4,4
Chemistry 632 - Spectroscopic Methods in Organic Chemistry	3
Chemistry 730 – Intermediate Organic Chemistry	3
Pharmacy 789 - Isolation Techniques in Research	5
Pharmacy 735 - Drug Discovery and Drug Design	3
Pharmacy 737 - Advanced Pharmaceutical Analysis	5
Pharmacy 851 - Advanced Pharmacognosy	3

**Two electives from the following**

Ph 835 - Advanced Medicinal Chemistry	3
Ph 836 - Advanced Medicinal Chemistry, Winter Quarter	3
Ph 837 - Advanced Medicinal Chemistry	3
Ph 839 - Problem Solving in Natural Product Chemistry	2
Ph 836 - Structure-Based Computer-Aided Molecular Design, Spring Quarter	3
Chemistry 942 – Natural Product Chemistry	3

**M.S. Medicinal Chemistry & Pharmacognosy**

Students may receive the M.S. as a terminal degree when the advisor, in consultation with the student and the Advisory Committee, recommends to the GRC that the student should proceed towards the M.S. degree (rather than the Ph.D. degree) and the GRC concurred with the adviser's recommendation. A minimum of 45 graduate credit hours, a M.S. thesis based on laboratory work, and passing an oral thesis examination are the minimum requirements for the completion of a terminal M.S. program in Medicinal Chemistry & Pharmacognosy. Under extenuating circumstances, the major adviser, in consultation with the Advisory Committee and in concurrence with the student, may petition the GRC to complete the terminal M.S. program under a non-thesis option.

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**Ph.D. Pharmaceutical Administration**

**COURSEWORK:**

A. Required of all students:

1. Core Courses: at least 16 credit hours from the following list:

Medication Use System Management	Pharm 816	4
Research Methods and Literature Evaluation	Pharm 821	4
Economic Evaluation of Health Care Programs and Services	Pharm 824	4
Drug Distribution and Public Policy	Pharm 825	4
Pharmaceutical Outcomes Evaluation	Pharm 827	4
Pharmaceutical Health Services Research	Pharm 828	4

2. Seminar

B. Electives:

1. Foundation Field (27 hours minimum)

Courses are taken in Health Services Management and Policy, Economics, Marketing, Epidemiology, Public Health, Business, Sociology, Psychology, Communication and

Agricultural Education. Students consult with their adviser and prospectively plan the courses to be taken for the foundation electives. The course work plan requires the approval of the Pharmaceutical Administration Specialization Coordinator.

2. Research Methods and Statistics (33 hours)

The biostatistics series in public health (PH Bio 701, 702, and 703) is required. Other research methods and statistics courses from various departments are selected to complete the minimum requirement of 33 units.

C. Second Field of Specialization (15 hour minimum)

The purpose of this field is to allow students to develop specialization in an area outside but complementary to the field of pharmaceutical administration. Courses are selected prospectively in consultation with the adviser and the plan requires the approval of the Pharmaceutical Administration Specialization Coordinator. Example second fields are: Consumer Behavior, Marketing, Cognitive Psychology, Economics, Psychology, Biometrics, and Epidemiology.

## MS Pharmaceutical Administration

A. Required of all students:

1. Core Courses: at least 16 credit hours from the following list:

Medication Use System Management	Pharm 816	4
Research Methods and Literature Evaluation	Pharm 821	4
Economic Evaluation of Health Care Programs and Services	Pharm 824	4
Drug Distribution and Public Policy	Pharm 825	4
Pharmaceutical Outcomes Evaluation	Pharm 827	4
Pharmaceutical Health Services Research	Pharm 828	4

2. Seminar

B. Electives (minimum of 22 hours)

A minimum of one statistics course and one research methods course is required.

C. Total Credit Hours (45 hours minimum)

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## MS Health-System Pharmacy Administration

A. Core Courses:

Medication Use System Management	Pharm 816	4
Pharmacy Management in Health-Systems	Pharm 817	4
Research Methods and Literature Evaluation	Pharm 821	4
Economic Evaluation of Health Care Programs and Services	Pharm 824	4
Drug Distribution and Public Policy	Pharm 825	4
Health Services Organizational Management	HSMP 815	4
Health Services Finance I	HSMP 820	4
Health Services Finance II	HSMP 821	4
Strategic Management and Program Development	HSMP 831	4



Operations Management for Health Service Organizations	HSMP 880	4
Information Systems	HSMP 882	4
Statistics (3 credit hours)	(various)	3

B. Seminar: Required of all students

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### Ph.D. Pharmaceutics

Each student plans the specific course work to be taken early in their program, in consultation with the adviser and the approval of the division chair.

Required courses:

		Units
Seminar	Pharmacy 850.01	3
Five courses taught by division faculty from the following list (15-17 units):		
Biomedical Proteomics and Mass Spectrometry	Pharmacy 801	3
Pharmacokinetics	Pharmacy 802	4
Disposition of Xenobiotics	Pharmacy 803	3
Drug Transport	Pharmacy 804	3
Pharmaceutical Biotechnology	Pharmacy 805	3
Advanced Bioanalysis	Pharmacy 806	4,2
Drug Equilibria in Biological Systems	Pharmacy 807	3
Pharmacokinetic-Pharmacodynamic Models	Pharmacy 808	3
Delivery Systems	Pharmacy 809	3

Electives, to make a total of at least 54 units of graded graduate-level courses.

### MS Pharmaceutics with Thesis

Each student plans the specific course work to be taken early in their program, in consultation with the adviser and the approval of the division chair.

		Units
Seminar	Pharmacy 850.01	1
Three courses taught by division faculty from the following list (9-11 units):		
Biomedical Proteomics and Mass Spectrometry	Pharmacy 801	3
Advanced Pharmacokinetics	Pharmacy 802	4
Disposition of Xenobiotics	Pharmacy 803	3
Drug Transport	Pharmacy 804	3
Pharmaceutical Biotechnology	Pharmacy 805	3
Bioanalytical Methods	Pharmacy 806	4
Drug Equilibria in Biological Systems	Pharmacy 807	3
Pharmacokinetic-Pharmacodynamic Models	Pharmacy 808	3
Delivery Systems	Pharmacy 809	3

Electives and thesis research (Pharmacy 993) to make a total of 48 units.

## MS Pharmaceutics without Thesis

Under extenuating circumstances, the advisor, in concurrence with the student, may petition the GRC to complete the program under the nonthesis option. A minimum of 48 quarter hour credits of graduate level course work is required. Each student presents one seminar per year, beginning with the second year of study.

Program

Same courses as for the Ph.D. Program.

---

## Ph.D. Pharmacology

SUBJECT	NUMBER (Units)	TITLE
Physiology	Physiology 601 and 602	Advanced Mammalian Physiology
Biochemistry	Biochemistry 613 , 614, and 615 (12) or two of the following: Biochemistry 761 (3) Biochemistry 762 (3) Biochemistry 763 (2) Biochemistry 765 (3) Biochemistry 766 (3)	Biochemistry and Molecular Biology  Proteins Enzymes Membranes and Bioenergetics Physical Biochemistry Nucleic Acid Chemistry & Structure
Statistics	Molecular Genetics 650 (5)	Analysis and Interpretation of Biological Data
Pharmacology	Pharmacy 747, 748, and 749 plus one of 750, 751, 752 (3,3,3,3) Pharmacy 870 (3)	Pharmacology  Drug Receptor Theory
Laboratory	Pharmacy 871 and 872 (4,3)	Methods in Pharmacology
Seminar	Pharmacy 850 (V)	Pharmacology Seminar

## M.S. Pharmacology

The Division of Pharmacology does not typically accept students into a Masters of Science program. Under special circumstances and with the consent of the Division of Pharmacology faculty, students may opt out of the Ph.D. program and pursue a Master of Science degree. Core course requirements for MS degree students are less extensive than those outlined for doctoral students. They include Pharmacy 747, 748, 749, 870, 871, 872, and Genetics 650, if there are no prerequisite deficiencies. In addition to course work, MS degree candidates must complete a research thesis based on laboratory work and pass a "defense of thesis" examination in order to satisfy the requirements for the degree.

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**Translational Science Ph.D.**

(This is a Combined Pharm.D./Ph.D. Program. Students must be concurrently enrolled in the Pharm.D. Program or have completed the Pharm.D. degree prior to matriculation.)

**Required Courses for the Ph.D. Program:**

Physiology 601 and 602	Advanced Mammalian Physiology	10
Pharmacy 733	Pharmacokinetics	3
Pharmacy 778-782	Pathophysiology and Therapeutics	21
Pharmacy 724	Clinical Pharmacogenomics	3
Vision Science 796	Ethics in Biomedical Research	2
Pharmacy 894	Translational Science Research Problem Solving	3
Pharmacy 850	Graduate Seminar	

**Elective Courses**

In consultation with their adviser students are required to prospectively select a minimum of 23 credit hours from at least two of the following areas of study. The selection of elective courses should occur early in the student's program of study, and the plan must be approved by the Translational Science faculty coordinator.

General/Translational Science

Public Health 701	Design and Analysis of Studies in the Health Sciences I	4
Public Health 702	Design and Analysis of Studies in the Health Sciences II	4
Integrated Biomedical Science 707	Fundamentals of Grant Writing I	2
Integrated Biomedical Science 708	Fundamentals of Grant Writing II	2
Integrated Biomedical Science 709	Statistical Aspects of Grant Writing	1

Medicinal Chemistry and Pharmacognosy

Chemistry 730	Intermediate Organic Chemistry	3
Chemistry 632	Spectroscopic methods in organic chemistry	3
Pharmacy 735	Drug Discovery and Drug design	3
Pharmacy 737	Advanced Pharmaceutical Analysis	5
Pharmacy 789	Isolation Techniques in Research	5
Pharmacy 800	Radioisotope Tracer Techniques and Radiopharmaceuticals	3,2
Pharmacy 835	Advanced Medicinal Chemistry	3
Pharmacy 836	Advanced Medicinal Chemistry	3
Pharmacy 837	Chemotherapy of Infectious Diseases	3
Pharmacy 839	Problem solving in natural products chemistry	
Pharmacy 851	Advanced Pharmacognosy	3

Pharmaceutics

Pharmacy 701	Advanced Physical Pharmacy	3
Pharmacy 802	Advanced Pharmacokinetics	4
Pharmacy 803	Disposition of Xenobiotics in Biological Systems	3
Pharmacy 804	Drug Transport	3
Pharmacy 805	Controlled Drug Delivery	3
Pharmacy 806	Bioanalytical Methods (lecture; lab)	4,2
Pharmacy 807	Drug Equilibria in Biological Systems	3
Pharmacy 808	Pharmacodynamic Models	3

Pharmacology

Pharmacy 870	Drug Receptor Theory	3
Pharmacy 871	Experimental Methods in Pharmacology	4
Pharmacy 872	Advanced Methods in Pharmacology	3
Pharmacy 873	Contemporary Pharmacology	1

---

Letter of support for the “Pharmacology” specialization from the chair of the Department of Pharmacology, College of Medicine.

X-Original-To: hayton@tetraknot.pharmacy.ohio-state.edu  
 Delivered-To: hayton@tetraknot.pharmacy.ohio-state.edu  
 Date: Fri, 01 Feb 2008 13:16:13 -0500  
 From: "Sadee, Wolfgang " <Wolfgang.Sadee@osumc.edu>  
 Subject: RE: Graduate Specializations  
 To: William Hayton <hayton.1@osu.edu>  
 Dear Bill.

There is no objection on our part to the designation 'pharmacology' as a specialization in the graduate program "Pharmacy". A concern would only arise if Pharmacology would be the main designation, rather than Pharmacy, as this would be in potential conflict with our program as part of the IBGP. It is highly desirable to permit designation of specialization for the students to recognize their interests and achievements.

Regards,  
 Wolfgang

Wolfgang Sadee, Dr.rer.nat.  
 Felts Mercer Professor of Medicine and Pharmacology  
 Professor, Pharmacy, Medical Genetics, Psychiatry  
 Chair, Department of Pharmacology  
 Director, Program in Pharmacogenomics  
 College of Medicine and Public Health  
 Ohio State University  
 5072 Graves Hall  
 333 West 10th Avenue  
 Columbus OH 43210-1239  
 tel. 614-292 5593  
 fax. 614-292 7232  
 e-mail. wolfgang.sadee@osumc.edu

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**From:** William Hayton [mailto:hayton.1@osu.edu]  
**Sent:** Friday, February 01, 2008 11:28 AM  
**To:** sadee.1@osu.edu  
**Subject:** Graduate Specializations

Dear Wolfgang,

Our graduate studies committee wants to make available to our graduate students the option to

add a graduate specialization to their transcript. A graduate specialization "represents a significant, widely recognized division of an overall field of study". The Diploma for the MS and PhD degrees does not indicate the area of study. The grade transcript generally shows the graduate program name only, which in our college is "pharmacy". By identifying areas of specialization, the Graduate School Handbook and the Graduate School Bulletin would list them and students if they elected to do so, could have the specialization designated on their grade transcript.

Part of the procedure for requesting specializations is to include a letter of concurrence from other programs "when the specialization involves core subject matter from another discipline." Our request for the "pharmacology" designation therefore will need agreement from your department.

A letter of concurrence with our proposal (a reply to this email would probably be sufficient) would be much appreciated. Let me know if there are issues to discuss (2-1288).

Thanks for your help,  
Bill

**PHARMACY GRADUATE HANDBOOK  
COLLEGE OF PHARMACY  
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## 1.0 PREAMBLE

### 1.1 Purpose of Handbook

The Graduate and Research Committee (GRC) prepared this handbook for graduate students and graduate faculty in the College of Pharmacy:

- To provide information specific to graduate programs offered in the College of Pharmacy.
- To list and describe college policies, rules and procedures related to graduate programs.
- To supplement the statement of policies and procedures related to graduate programs in the Graduate School Handbook (GSH) published by the Graduate School.

The Pharmacy Graduate Handbook (PGH) is a companion volume to the Graduate School Handbook (GSH) and specific Graduate School policies, rules, or statements published in the GSH are generally not repeated here. However, cross-references are provided to assist in locating essential information. Graduate students and graduate faculty members should become thoroughly familiar with the GSH and the PGH. Program area specific rules and procedures must be approved by the GRC and also are contained in this handbook.

### 1.2 Goals

The major goals of graduate education in the College of Pharmacy are:

- To encourage original and creative thinking about topics related to pharmaceutical sciences through formal and informal instruction, research activities, and laboratory and field experiences
- To promote scholarship and to contribute to the knowledge base in pharmaceutical sciences through identification, understanding, and resolution of contemporary problems.
- To prepare graduates to function as independent scholars, who are capable of contributing to the body of knowledge in their areas of specialization through original research.

## 2.0 THE COLLEGE OF PHARMACY GRADUATE AND RESEARCH COMMITTEE (GRC)

### 2.1 Relationship between the Graduate School and the College

Each academic unit in the university authorized to offer a graduate degree is required to form a departmental Graduate Studies Committee to fulfill the responsibilities outlined in the GSH. Although four divisions in the College of Pharmacy offer areas of study -- Medicinal Chemistry and Pharmacognosy, Pharmacy Practice and Administration, Pharmaceutics, and Pharmacology --, the College of Pharmacy is viewed as a single academic department by the Graduate School. Hence, the College of Pharmacy has one Graduate and Research Committee that acts as a formal liaison with the Graduate School.

### 2.2 Roles and Functions

The college GRC coordinates and facilitates the graduate program in the College of Pharmacy in accordance with the policies and procedures of the Graduate School and the college graduate faculty. The GRC is the only committee responsible for the functions outlined in the GSH. Actions taken by the GRC are subject to approval, modification, or reversal by the college graduate faculty. Since the college GRC is responsible for both graduate and research programs, specific responsibilities pertaining to each of these areas are outlined below.

#### 2.2.1 Graduate Programs

Responsibilities: In addition to the functions outlined by the GSH, the GRC.

- Reviews, monitors and recommends to the college graduate faculty any alteration, deletion or addition to the contents contained in this Handbook (i.e., PGH), or its supplements developed by the divisions in the college. The college graduate faculty then discusses and approves/disapproves the changes.
- Reviews, monitors, proposes changes and carries out all operations related to graduate programs in cooperation with the Of-

Office of Graduate Studies and Research in the College of Pharmacy.

- Shares jurisdiction with the BSPS Program Committee and the Pharm.D. Program Committee for approval of undergraduate and professional courses that also carry graduate credits.
- Coordinates nominations of graduate students for University Fellowships and other fellowships or awards offered by the college.
- Arbitrates any grievance related to graduate programs or topics contained in the GSH, or PGH or its supplements.
- Prepares and distributes the Pharmacy Graduate Handbook (PGH) and oversees procedures for evaluation of Graduate Associate performance.
- Responds to any petition from any faculty member or graduate student related to some aspect of graduate study.
- Calls an annual meeting (and other meetings as needed) of the College of Pharmacy graduate faculty to present the report on committee's activities and to discuss relevant issues related to graduate education in the College of Pharmacy. (The chairperson of the college GRC will chair this meeting. All graduate faculty members of the College of Pharmacy will be eligible to vote at this meeting or any other graduate faculty meeting.)

### 2.2.2 Research Program

The GRC is also responsible to the Graduate Faculty and the Executive Committee of the college for the following functions:

- It fosters research and interdisciplinary collaboration within the college.
- It studies and recommends policies with respect to research activities, facilities, personnel, and plans for future development.
- It makes recommendations to the Dean regarding the expenditure of college funds in support of research and effective utilization of facilities and equipment used in research.
- It recommends to the Dean policies and procedures for the acquisition, maintain-

ance, and improvement of facilities and equipment used in research.

## 2.3 Composition

The GRC is composed of a maximum of nine members: Five regular faculty members, one from each division and program area, who hold Category M or P graduate faculty status; a graduate student representative who is in good academic standing and who is enrolled in the graduate programs within the college; Associate Dean of Graduate Studies and Research; the college faculty representative (if any) to the Council of Research and Graduate Studies (ex-officio).

### 2.3.1

All ex-officio members to the GRC are non-voting members.

### 2.3.2

The graduate student representative is appointed by the Dean after recommendation by the Graduate Students enrolled in the college's graduate programs.

### 2.3.3

Faculty members are appointed on an annual basis by the Dean after recommendation by the Committee on Committees. Members of the GRC will be appointed or elected by August 31<sup>st</sup> of each year for the following academic year. The Associate Dean for Graduate Studies and Research in the College of Pharmacy will call the first meeting of the Committee during September. At this first meeting, the members of the GRC will elect a chairperson from its membership for the academic year. All members, with the exception of the ex-officio members and the graduate student representative, may be considered for the chairperson's position of the GRC.

## 2.4 Distribution Procedures for the Graduate Program Handbook

The GSH and the PGH are available to graduate students and faculty from the Graduate School and the Office of Graduate Studies and Research in the College of Pharmacy. The PGH is distributed to all graduate faculty members and graduate students enrolled in



graduate programs in the College of Pharmacy, and it is available on the college web site.

### 3.0 GRADUATE FACULTY MEMBERSHIP

#### 3.1 Categories, Functions and Eligibility Requirements:

Graduate faculty categories, functions and eligibility requirements are outlined in the GSH, Section III.3.

The appropriate category level is determined by the faculty member's qualifications and by the functions the faculty member is expected to perform in the graduate program. The GRC appoints Category M Graduate Faculty members and notifies the Graduate School of its actions. The GRC submits nominations for Category P membership of the Graduate Faculty to the Policy and Standards Committee of the Council on Research and Graduate Studies and certifies by appropriate documentation that those nominated meet published university-wide criteria.

Regarding Category P status, the publication record will be the major evidence for meeting the requirement of engagement in an active program of research or scholarship or significant promise of establishing such a program. It is expected that new faculty recruited into tenure track positions in the College of Pharmacy in program areas involved with Ph.D. education will have the skills and experience for nomination to Category P status.

Since faculty members holding adjunct, visiting, or clinical auxiliary titles are not eligible to serve as advisers of master's or doctoral students or as chairs of master's or doctoral committees, no faculty members holding these titles will be appointed to the graduate faculty.

#### 3.2 Procedures for Appointment

Faculty seeking appointment to Category M or P should submit to the GRC a letter indicating the intended involvement in advising MS or PhD students, a copy of the curriculum

vitae, and a letter of support from the division chair.

#### 3.3 Review

Appointments to the graduate faculty will be reviewed at least every five years. Fulfillment of any one of the following criteria will determine continuation as graduate faculty:

- Service as a graduate student adviser during the last five years.
- Service to the graduate program such as participation on master's and Ph.D. examination and advisory committees or teaching graduate level courses during the last five years.
- Publication and/or funding record during the last five years that documents an ongoing research program in which graduate students could participate.

Performance of adviser roles (Section 5.2) will also be considered in the review. On a case by case basis, the GRC may allow continuance on the graduate faculty based on a petition.

### 4.0 ADMISSION

All the guidelines, rules and procedures related to the admission of students to the Graduate School are outlined in the GSH. Only those sections where the College of Pharmacy standards differ from those described in the GSH are described in this section.

#### 4.1 Admission Criteria (see GSH)

- An applicant must have an earned baccalaureate or professional degree from an accredited college or university by the expected date of entry. A cumulative point-hour ratio above 3.0 (4 point scale) or the equivalent is required in all previous undergraduate and graduate work.
- All applicants are required to submit GRE scores, and applicants from countries where the first language is not English are required to submit TOEFL scores un-

less a bachelor's degree or higher was earned in an English-speaking country.

## 5.0 ADVISER

### 5.1 Assignment

The following procedure will be followed to expedite the placement of graduate students in an area and in a research program which best suits their personal interest and aptitudes:

- On the basis of his or her expressed or apparent field of interest, the newly enrolled student will be assigned by the Division Chair to a temporary general adviser in that field for guidance in scheduling courses for the initial quarters. The advisor will recommend courses on the basis of the student's past record, performance on the GRE, and background. In most cases this will be a "core" program of courses in the student's area of interest. In some cases, where the student's background is deficient, the adviser will recommend courses to bolster those deficiencies and prepare the student to take the core courses.
- During the initial quarters, the student must visit faculty members in his or her areas of interest to identify research interests and problems of mutual interest to both the faculty member and the student. Each faculty member will discuss topics such as his or her own research interests, possible research problems, and requirements for completion of the research program. This procedure is expected to assist the student in his or her selection of a field of specialization and a permanent adviser in an open and informed environment.
- Before the end of the first year, the student will indicate his or her choice of a permanent major adviser to the Division Chair. If the selected faculty member is both willing and able to accept the responsibility, the Division Chair will assign the student to that adviser who will provide guidance for both the graduate program and research.

- The permanent adviser for each student will be reported to the Office of Graduate Studies and Research by the Division Chair
- Should the student or adviser believe that a change of adviser is appropriate, the student (or adviser) must notify in writing both the current adviser (or student) and Division Chairperson of the intended change. The student and current adviser are required to discuss the need for the change with each other and the Division Chairperson prior to the change. The Division Chairperson should also consult with the new adviser. Once a change in adviser is made, the GRC and the Office of Graduate Studies and Research should be informed in writing within seven days of the change.

### 5.2 Role of Adviser

The master's or doctoral adviser serves the following primary roles for graduate students:

- Assists a graduate student in planning the program of study.
- Apprises a graduate student of policies and procedures of the graduate program.
- Apprises a graduate student of policies and procedures of the Office of Responsible Research Practices (Appendix D of GSH and Appendix III of this handbook).
- Serves as chair of a graduate student's advisory and examination committees.
- Provides guidance to a graduate student for the examinations.
- Counsels a graduate student in research matters.
- Monitors quarterly advising reports and performs the annual review of progress toward the degree (Section 8.3).

## 6.0 AREAS OF STUDY

### 6.1 Degrees Offered

The College of Pharmacy offers programs of study and research leading to the degrees of Master of Science (M.S.) and Doctor of Philosophy (Ph.D.). Areas of study include: medicinal chemistry and pharmacognosy, (in the Division of Medicinal Chemistry and Phar-

macognosy); Pharmaceutics (in the Division of Pharmaceutics); pharmacology (in the Division of Pharmacology) and pharmaceutical administration (in the Division of Pharmacy Practice and Administration). Admission to the Ph.D. program does not first require application to the M.S. program; preference is given to applicants to the Ph.D. program. In addition, the college offers the M.S. in health-system pharmacy administration (M.S. only).

### 6.2 Program Requirements

A core curriculum is required for each area of specialization; see Appendix I for detailed descriptions of curriculum requirements, candidacy examination policies, and other specific policies for each area of specialization.

The advisor must be a member of the graduate faculty of the division offering the area of study, and for the two examination committees (candidacy and final) at least one member other than the advisor shall be a regular faculty member with at least a 50% appointment in the division.

Attendance at Candidacy and Final Examinations is limited to the committee members and the student. Prepared materials may not be used at the examinations, particularly at the Candidacy Exam. A brief presentation (15 minutes) of the dissertation research is allowed at the Final Examination.

Each doctoral student is required to present an exit seminar for the college community, based upon the dissertation. The GRC chair will not approve the Application to Graduate until the seminar has been presented or scheduled. The seminar is presented during the final quarters of enrollment, after completion of dissertation research. The seminar may be presented as part of the division's Pharmacy 850 seminar or separate from it. It should be about 45 minutes in length and advertised to the college faculty and students at least one week beforehand.

### 6.3 Summary of Ph.D. Degree Graduation requirements

- Satisfactory completion of the Candidacy Examination and submission of the Candidacy Examination Report form to the Graduate School
- Registration for at least three credit hours during the quarters when the Candidacy and Final Oral Examinations are taken and during the quarter in which graduation is expected
- Submission of the Application to Graduate form to the Graduate School no later than the second Friday of the quarter in which graduation is expected.
- Completion of a minimum of 135 graduate credit hours, at least 90 of which must be completed beyond the master's degree.
- Completion of the following residence requirements after the master's degree has been earned or after the first 45 hours of graduate credit have been completed:
  - a minimum of 45 graduate credit hours at this university.
  - a minimum of three out of four consecutive quarters with an enrollment of at least ten graduate credit hours per quarter at this university.
  - a minimum of 20 graduate credit hours over a period of at least two quarters after admission to candidacy.
  - graduate cumulative point-hour ratio of at least 3.0.
- Approval of dissertation draft by the Dissertation Committee members and submission of the Draft Approval form and the dissertation draft to the Graduate School by the published deadline for the quarter of graduation.
- Presentation of an Exit Seminar based upon the dissertation research.
- Satisfactory completion of the Final Oral Examination and submission of the Final Oral Examination Report form to the Graduate School no later than Wednesday two weeks prior to commencement.
- Electronic submission of the approved dissertation and abstract by the published deadline for the quarter of graduation.

- Submission of Final Approval form, and Survey of Earned Doctorates after electronic submission of and acceptance of dissertation.
- Completion of the Ph.D. degree requirements within five years after being admitted to candidacy.
- Receipt of final grades in the university Registrar's Office by the deadline published in the Master Schedule of Classes.
- Completion of the Ph.D. requirements established by the Graduate Studies Committee.
- Payment of doctoral hood and microfilm processing fees by the published deadline for the quarter of graduation.

## 7.0 SPECIAL GRADUATE PROGRAMS

For information on special graduate programs, see the GSH, Part II, Section 7. Special graduate programs include Combined Programs, Graduate Certificate Programs, Experimental Interdisciplinary Programs, One-of-a-Kind Doctoral Programs, and Graduate Minors and Graduate Interdisciplinary Specializations. The college policy on Combined Programs follows; for information about the other special graduate programs, see the GSH, Part II, Section 7.

### 7.1 Combined Pharm.D. / Graduate Programs

#### 7.1.1 Rationale

The combination of advanced professional (Pharm.D.) and research (Ph.D.) education in pharmacy and the pharmaceutical sciences prepares outstanding students for careers in academic pharmacy and pharmaceutical research.

In the combined program, highly motivated students earn the Pharm.D. and Ph.D. degrees in less time than completion of the degrees separately. Some course work is credited toward both degrees, and the calendar year is fully utilized for completion of degree requirements; e.g., summer quarters are devoted to research. Both degrees can be completed after seven years of dedicated effort.

#### 7.1.2 Application

A separate application must be submitted to the Pharm.D. Program, the Ph.D. Program, and the Combined Program; i.e., three applications. Applications to the Pharm.D. and Ph.D. Programs should contain a notice affixed to the cover page indicating that an application has been submitted to both programs, for future application to the combined program. Applicants for the Combined Program must first be admitted both by the Ph.D. Program and by the Pharm.D. Program prior to seeking the approval for the combined program. Students who have not yet been admitted separately to both programs should contact the Admissions Office (Room 150 Parks Hall for Pharm.D.; Room 217C Parks Hall for Ph.D.) to obtain the relevant admission applications. Students currently enrolled in one of the programs must apply for admission to the other program; application should be made early to optimize the time saving advantage of the combined program.

Once the applicant has been admitted to both the Pharm.D. and the Ph.D. Programs, application is then made to the Combined Program, which simply entails completion of the top portion of the "**Combined Graduate / Undergraduate or Professional Program**" Form. The form must then be approved and signed by the Graduate Research Committee Chairperson and by the Pharm.D. Admissions Committee Chairperson, and submitted to the Graduate School.

**Pharm.D. Application.** Students must have completed prerequisites and a general education (liberal education) curriculum. Admission to the Pharm.D. program is competitive based on a faculty committee review of the following:

- Performance in prerequisite course work and overall GPA
- Cumulative and math/science grade-point averages
- Pharmacy College Admission Test (PCAT) scores
- Competency in English for non-native English speakers (refer to current re-

- quirements for Pharm.D. Program admission)
- Full disclosure of prior misdemeanor or felony convictions
  - Personal statements completed by the applicant
  - Extracurricular leadership and work experience
  - Letters of recommendation (three required)
  - Personal interviews

Applications for admission in the subsequent year (Autumn Quarter) are available in August. The deadline for the submission of applications is January 1. Early submission of application materials will permit the Admissions Committee to make a decision about an interview invitation. Applications must be submitted via the centralized application service. Please visit [www.pharmcas.org](http://www.pharmcas.org) to apply or obtain more information.

**Ph.D. Application.** The minimum academic criteria for admission include:

- Credentials documenting prerequisite academic work that gives evidence of ability to pursue a graduate program in one of the pharmaceutical sciences
- An earned 4-year baccalaureate or higher degree from an accredited college or university prior to beginning graduate studies
- A cumulative grade point average equivalent to at least 3.0 on a 4.0 scale in all prior undergraduate college level course work. A 3.0 graduate GPA is required for completed graduate- and graduate-professional-level work or a graduate degree.
- GRE ([Graduate Record Exam](#)) scores are required of all applicants.
- International Applicants and those who have held the status of U.S. Permanent Resident for less than one year must meet the current division and Graduate School minimum English proficiency requirements.

### 7.1.3 Admission

Students accepted into the Combined Pharm.D. / Ph.D. Program are admitted by the Graduate School, the Graduate Studies Committee and designated division, and the Pharm.D. Admissions Committee. The University Admissions Office receives application material, determines when the application is complete, calculates the official GPA, and notifies the applicant of the admission decision. For additional information, see Section II-7 of the Graduate School Handbook, accessible via the following link:

[www.gradsch.ohio-state.edu/Depo/PDF/Handbook/Handbook.pdf](http://www.gradsch.ohio-state.edu/Depo/PDF/Handbook/Handbook.pdf).

### 7.1.4 Adviser

At the time of admission to the Combined Program, a Graduate Faculty member is appointed to advise the student, following the guidelines of the individual graduate program. The graduate adviser may be the same as the student's Pharm.D. Program adviser.

### 7.1.5 Monitoring Progress

The Pharm.D. Program Committee is responsible for monitoring progress of the student toward the Pharm.D. degree (see Student Manual ([www.pharmacy.ohio-state.edu/services/students/smanual.html](http://www.pharmacy.ohio-state.edu/services/students/smanual.html))). The Graduate Studies Committee and the student's graduate adviser are responsible for monitoring progress toward the Ph.D. degree. A statement describing the student's goals, objectives, and general plan for completing both degrees must be deposited in the Graduate School by the end of the first quarter of enrollment in the Combined Program.

**Course Load.** The number of credit hours a Combined Program student attempts each quarter is determined by the student and the adviser(s) and must be consistent with the course loads described in Section II.2.1 of the Graduate School Handbook and by the Pharm.D. Program.

**Schedule Approval.** Students may access the University Registrar's web site to obtain information about online registration. The student consults with the adviser(s) about course selection.

**Withdrawal.** Students who are denied further registration in, or who withdraw from, the graduate portion of their combined program may either retain their graduate credit in the Graduate School should they reenroll at a later time, or transfer that graduate credit earned to the Pharm.D. program, subject to the rules of the Pharm.D. Program.

**Course Credit.** The student’s advisor(s) must designate the courses to be completed for graduate credit only, the courses to be completed for Pharm.D. degree credit only, and the courses counted for credit in both programs.

**Cumulative Point-Hour Ratio.** A student enrolled in the Combined Program has two cumulative point-hour ratios, one including all credit counted toward the Ph.D. degree and one including all credit counted toward the Pharm.D. degree.

**Academic Standards.** The academic standards stated in Section II.4 of the Graduate School Handbook apply to Combined Program students.

### 7.1.6 Doctoral Degree Requirements

A student enrolled in the Combined Program must submit the Application to Graduate form to the Graduate School no later than the second Friday of the quarter in which graduation is expected. All doctoral degree requirements apply to students enrolled in the Combined Program (Sections II.5 and II.6 of the Graduate School Handbook).

#### 7.1.6.1 Curriculum

During the first four years the focus is on the requirements for the Pharm.D. degree. During academic years 1-3 (designated as P1-P3 in the Pharm.D. Program), the required course work for the Pharm.D. degree is completed. This rigorous series of courses will fully occupy the effort of most students. During academic years 1-3 a limited number of

Year	Quarter			
	Autumn	Winter	Spring	Summer
1	Pharm D Courses	Pharm D Courses	Pharm D Courses	Research <sup>a</sup>
2	Pharm D Courses	Pharm D Courses	Pharm D Courses	Research <sup>a</sup>
3	Pharm D Courses	Pharm D Courses	Pharm D Courses	Research <sup>a</sup>
4	Pharm D Experiential <sup>b</sup>	Pharm D Experiential <sup>b</sup>	Pharm D Experiential <sup>b</sup> <b>Pharm D Degree</b>	Research
5	PhD Courses	PhD Courses	PhD Courses	Research & PhD Courses
6+ <sup>d</sup>	<b>Candidacy<sup>c</sup> Exam</b>	Research & PhD Courses	Research & PhD Courses	Research & PhD Courses
7+ <sup>d</sup>	Dissertation Research	Dissertation Research	Dissertation Research	Final Exam for <b>PhD degree</b>

<sup>a</sup>Students may hold a GRA appointment which requires enrollment, or may be compensated for time worked (hourly employee) which does not require enrollment.

<sup>b</sup>Up to two months may be non-patient contact, and a research rotation is encouraged for two months of the experiential component of the Pharm.D. program.

<sup>c</sup>For example; the exam may be scheduled during any quarter after completion of graduate program course work.

<sup>d</sup>These “years” are flexible in length and depend on rate of progress on dissertation research and preparation of the Ph.D. dissertation.

Shaded cells represent quarters during which students would generally receive financial support.

courses for the Ph.D. Program may be taken as Pharm.D. Program electives. Summer quarters during years 1-3 may be used to complete courses for the Ph.D. Program and for research. Experiential course work for the Pharm.D. degree is completed during year 4 and the Pharm.D. degree is awarded at the end of Spring Quarter, year 4. Experiential training for the Pharm.D. degree may include up to two months of “non-patient contact” experience, and a research rotation is appropriate for combined-program students.

Course work toward the Ph.D. degree is completed typically during years 5 and 6, and the Ph.D. candidacy exam is taken upon completion of course work. Dissertation research and preparation of the Ph.D. dissertation are then completed followed by the final examination and awarding of the Ph.D. degree. While the Pharm.D. curriculum is completed in a lock-step fashion, the time to complete the Ph.D. Program is necessarily variable due to alternate-year availability of some courses and the variability in the time required to complete the dissertation. The table outlines the requirements for the two degrees and their coordination over time.

#### 7.1.6.2 Example Programs

See [www.pharmacy.ohio-state.edu/programs/degreeprograms.cfm](http://www.pharmacy.ohio-state.edu/programs/degreeprograms.cfm) and click on the link "PharmD.PhD Combined Program (PDF)" for example programs.

## 8.0 STIPEND APPOINTMENTS

For rules and information related to appointments, see the GSH, Part II, Section 8. The following sections highlight policies and procedures in addition to those described in the GSH.

### 8.1 General Rules for Graduate Students with Stipend Appointments

Most pharmacy graduate students hold stipend appointments in the form of teaching associateships, research associateships, health-system pharmacy administration residencies, fellowships, etc. Stipend appointments are normally made for a period of 12 months.

#### 8.1.1 GA Appointments

Graduate Associates (GTAs, GRAs, and GAAs) are selected for their appointments on the basis of factors such as previous academic performance, letters of recommendation, English language ability, and experience. Normally, such appointments are for a 50% time commitment. Occasionally, special requirements may justify more or less than a 50% time commitment. Appointment at less

than 50% requires permission of the Dean of the Graduate School. For the college policy related to 25% GA appointments, see Appendix II. Subject to the availability of funds, reappointment to a GA position will depend on the student's academic performance, performance in the position, and for students so required progress toward completion of spoken English proficiency for appointment as a GTA (GSH II.1.8), and ESL proficiency (GSH II.1.7).

#### 8.1.2 Service Requirements

Students on appointment should be present in the college and available to perform assigned duties during their period of appointment. Service required will average not more than 20 hours per week during the period of the appointment. Students holding GA appointments should register for 12 hours of course work per quarter; students supported by fellowship or trainee appointments should register for 15 hours per quarter. When GAs are absent from their duties, including the time between quarters, their request for leave of absence must be approved in advance by the major adviser and the division chair. Documentation must be submitted to the office of the Associate Dean for Graduate Studies and Research.

#### 8.1.3 GA Employment Benefits and Procedures

GAs are usually paid on a 50% time basis; stipends are directly deposited to the student's bank account. Resident and non-resident fees are waived for students on stipend appointments, and health insurance is provided. Domestic students on stipend appointments should apply for in-state residency status to reduce their tuition expense; see [www.ureg.ohio-state.edu/ourweb/more/Content/Residency/main.htm](http://www.ureg.ohio-state.edu/ourweb/more/Content/Residency/main.htm) for information on attaining residency status. Up to two weeks paid vacation are allowed per year; guidelines are in Appendix IV and vacation request forms are available in Parks Hall 217C. Other benefits are described in the GSH ([www.gradsch.ohio-state.edu](http://www.gradsch.ohio-state.edu)).

## 8.2 Outside Employment

Outside employment is discouraged. Students are expected to make progress through the program as expeditiously as possible. Students holding an appointment and considering outside employment must first consult their adviser. Evaluation of the impact of outside employment on a student's academic progress and responsibilities should be made by the adviser, in consultation with the division faculty.

## 8.3 Performance Evaluation

Progress in research and course work is evaluated for all students on an annual basis by the faculty advisor, in consultation with other appropriate faculty.

GTA teaching performance is evaluated quarterly by the course instructor to whom the GTA is assigned. A copy of each evaluation is placed in the student's file in the Office of Graduate Studies and Research (Room 217C Parks Hall). Evaluation forms are available at: [www.pharmacy.ohio-state.edu/services/admin/cbo/forms.cfm](http://www.pharmacy.ohio-state.edu/services/admin/cbo/forms.cfm). If at any time a student receives a second "U" grade for research study (Pharmacy 993 or 999), the adviser will discuss the student's progress with division faculty and the annual review form will be used by the adviser for discussion of progress with the student.

## 8.4 Termination of GA Appointment

Termination of an appointment may occur because of factors such as: the student is no longer enrolled; the student is carrying less than the minimum credit hour load; mutual agreement between the division and the student; a grievance hearing that such action is justified; lack of funds; early completion of a graduate program; academic probation; lack of progress toward a degree; violation of drug abuse policy by the student; poor performance as a Graduate Associate; and for GTA appointments to international students, failure to complete the spoken English requirement in a timely manner. The Spoken English and ESL proficiency requirements (GSH II.1.7-8) should be completed within the first four quarters of enrollment.

## 9.0 GRADUATE STUDENT REPRESENTATION

A graduate student from the College of Pharmacy serves on the GRC. Graduate students interested in serving on university and college committees / councils may inquire with the Office of Graduate Studies and Research (Room 217-C or 217-A) of the college.

## 10.0 MISCELLANEOUS RULES AND PROCEDURES

### 10.1 Grievance Procedure for Graduate Students

Graduate students who feel they have a grievance with respect to the terms and conditions of their appointment or to other matters should follow the procedure as outlined:

- Discuss the problem informally with the faculty member who is the source of the student's grievance. If this does not result in a satisfactory resolution, the student should consult his/her adviser and Division Chairperson in that order.
- When recourse to these persons does not provide for a solution to the grievance, the student should transmit his/her complaint in writing to the Chair of the GRC of the College of Pharmacy (with copies to the faculty member who the student feels is the source of his or her grievance and the Division Chair). The faculty member is required to respond in writing to the Graduate Committee within 10 working days and the Committee, in turn, must convene within 10 working days of the receipt of all of the documents. Both student and faculty member may be asked to discuss the matter with the Committee and to provide supporting evidence deemed relevant to the issue. Upon conclusion of all appropriate and necessary deliberations, the Committee shall vote to uphold or deny the student's statement of grievance and may recommend a course of action.



- If the student is still aggrieved, he or she may file a formal petition with the Dean of the Graduate School.

### 10.2 Access to the Pharmacy Buildings

Graduate students may obtain keys to outside and inside doors of buildings in which their presence is authorized. Key request cards can be prepared by the appropriate faculty member and are signed by the Business Services Officer. Graduate students usually have in their possession one key which opens the outer building doors, and one which gives access to one or more laboratories. Under no circumstances are these keys to be given to unauthorized persons to use. Upon termination of appointment, keys must be returned to the Business Services Officer.

### 10.3 Computer and IT Policies

The Ohio State University College of Pharmacy, its employees and students, are subject to the University's Policies on Information Technologies. See: [cio.osu.edu/policies/](http://cio.osu.edu/policies/) for guidelines on acceptable uses as well as prohibited activities. Specific information on computer use in the College of Pharmacy is posted on the College website (<http://www.pharmacy.ohio-state.edu/services/comp/comptech.cfm>). It is the responsibility of all students to be familiar with computer use policies of the college.

The University Office of Information Technology provides an email account for all students at The Ohio State University. Students may elect to forward mail sent to this account to another address (useful for students who already have an email account and do not wish to change it).

Each faculty and graduate student is allowed access to the College of Pharmacy computer network services (email and internet access) and the PCs in the computer laboratory (Room 203 Parks). Unless reserved for a course activity, the PCs are available on a first-come, first-served basis. Students are asked to be efficient in their use of these machines during times of peak demand.

*No device will be connected to the College's computing networks without prior registration with the College Technology Support Group. Owners with registered personal equipment will notify the Support Group on their departure from the College. Devices include but are not limited to: computers, notebooks, tablets, PDA's, access points, printers and routers. Anything which can receive or transmit data over our Ethernet networks must be registered.*

### 10.4 Vivarium Access and Animal Research

Some research projects in the College of Pharmacy involve the use of animals. The Animal Welfare Act and Public Health Service policy established regulations that must be followed in all research involving animals. In order to participate in any research involving animals, a student must comply with the following: provide anticipated exposure data in the Occupational Health Registry, complete the Animal Usage Orientation Course, complete the Occupational Health and Safety Training, and submit a personnel form to associate the student with each active animal use protocol. Additional information can be found on the animal care and use website ([orrrp.osu.edu/animalsubjects/index.cfm](http://orrrp.osu.edu/animalsubjects/index.cfm)).

Research animals must be housed in one of the University Laboratory Animal Resources (ULAR) housing sites. All ULAR animal housing sites are limited access. It is important that limited access be maintained in order to minimize the spread of disease between animals and humans and in order to maintain the safety of the animals. Students who will be working with animals may obtain access to one of the ULAR housing sites by contacting the facility adviser. No access will be permitted until all of the criteria listed in the previous paragraph are fulfilled.

### 10.5 Matters of General Safety

In general, students should be aware of sound laboratory practices at all times. Students should familiarize themselves with the appropriate responses to emergency situations. Those who work in laboratories are required

to take laboratory safety courses and should become familiar with the laboratory Chemical Hygiene Plan. Specific information on policies and appropriate training for working with biohazards, radioactive materials, and other potential hazards is available at the Environmental Health and Occupational Safety website ([www.ehs.ohio-state.edu/](http://www.ehs.ohio-state.edu/)) and on the College of Pharmacy's safety pages (<http://www.pharmacy.ohio-state.edu/services/safety/index.cfm>).

Do not use the elevators when there is an emergency evacuation, including fire drills. If someone sees smoke and/or fire, that person should activate the closest fire alarm switch, exit the building, proceed to the appropriate assembly point, and report the location of the problem to a Building Coordinator.

**All employees are covered by Worker's Compensation if injured while working.** If an accident does occur, the employee should be taken to the OSU Hospitals' Emergency Department. It is the responsibility of the employee to explain that he/she is an employee and the injury occurred while working. See your division coordinator to obtain workmen's compensation forms.

Students who are in the labs after "normal" working hours (and this is not discouraged) have a special responsibility to make certain that all doors are closed and locked when they leave and that lights and other utilities are turned off. The presence of both expensive, portable equipment and street marketable drugs can be attractive incentives for theft and vandalism.

University buildings are locked evenings and weekends, and the Ohio State University Police Department can remove persons whose presence is not authorized after hours. Identification cards should be carried when in the building outside of normal business hours. Students working outside of normal hours may wish to utilize the student escort service. More information on this service is available

through the OSU Department of Public Safety ([www.ps.ohio-state.edu/sss/escort\\_in-fo/](http://www.ps.ohio-state.edu/sss/escort_in-fo/)).

### **10.6 Exit Requirements and Procedures**

Before their departure from the college, all personnel, including graduate students, must get clearance from the facilities coordinator, major professor, key control unit, computer department, and librarian. At the time of graduation, graduate students should also complete an exit survey form in Room 217C.

Ideas for improving our operations and procedures related to our graduate programs are needed and appreciated. Please submit suggestions to the attention of the Office of Graduate Studies and Research, Room 217-A, College of Pharmacy.

## APPENDIX I AREAS OF STUDY

### Ph.D. Medicinal Chemistry & Pharmacognosy

The graduate program in Medicinal Chemistry & Pharmacognosy is designed as a Ph.D. degree program. All the guidelines, rules, and procedures related to the Ph.D. program are outlined in the GSH (<http://www.gradsch.ohio-state.edu>). It is the responsibility of each student to know and meet all Graduate School requirements. Only highlights of the Graduate School requirements and those sections where the standards of the Division of Medicinal Chemistry & Pharmacognosy differ from those outlined in the GSH are described in this section.

The components of the doctoral program in the Division of Medicinal Chemistry & Pharmacognosy are as follows:

- Completion of the core curriculum requirements.
- Dissertation research resulting in a thesis.
- The candidacy examination.
- The final oral examination.

The Division of Medicinal Chemistry & Pharmacognosy permits students to receive the M.S. as a terminal degree when the advisor, in consultation with the student and the Advisory Committee, recommends to the GRC that the student should proceed towards the M.S. degree (rather than the Ph.D. degree) and the GRC concurred with the adviser's recommendation. A minimum of 45 graduate credit hours, a M.S. thesis based on laboratory work, and passing an oral thesis examination are the minimum requirements for the completion of a terminal M.S. program in Medicinal Chemistry & Pharmacognosy. Under extenuating circumstances, the major adviser, in consultation with the Advisory Committee and in concurrence with the student, may petition the GRC to complete the terminal M.S. program under a non-thesis option.

### Core Curriculum Requirements in the Division of Medicinal Chemistry & Pharmacognosy

Each student may take slightly different paths (Biochemical Track, Synthetic Medchem Track, Natural Products Track) to complete the necessary minimum core of important courses by the end of the second year, and also take appropriate electives during years 2 and 3 necessary for research specialization. Most students will complete the core courses in a two-year period. However, some students may need three years because they may have to take additional prep courses, including calculus and physical chemistry (e.g. Chem 531, 532 and 533). A student must maintain a minimum cumulative grade point average of 3.0 after the first year to remain in the program.

#### **Biochemical Track graduate course requirements:**

##### **Biochemistry/Molecular Biology courses\***

Biochemistry 613, 614 and 615

Two 700-level or higher course in Biochemistry or Molecular Biology, which could include but is not limited to:

Biochem 706 – Advanced Biological Chemistry Lab

Biochem 708 – Protein and Enzyme Lab

Biochem 710 - Molecular Biology Laboratory

Chemistry 733 – Chemistry of Bio-Organic Catalysts and Enzymes  
Chemistry 990 - Protein Targeting, Translocation, and Transport  
Mol. Genetics 880.06 – Transcriptional Regulation of Gene Expression  
Mol. Genetics 880.07 - Post-transcriptional Regulation of Gene Expression  
Microbiology 723 - Immunology and Immunochemistry  
Microbiology 750 -Molecular Basis of Microbial Biodiversity  
Microbiology 760 - Advanced Microbial Biochemistry  
MVIMG 747 - Molecular Biology of Eucaryotic Microbial Pathogens  
MVIMG 754 - Fundamentals of Molecular Virology  
OSBP 701 - Molecular Genetics: DNA Transactions  
OSBP 702 - Regulation of Gene Expression  
OSBP 761 - Proteins  
OSBP 762 - Enzymes  
OSBP 763 - Membranes & Bioenergetics  
OSBP 764 - Intermediary Metabolism

### **Medicinal Chemistry**

Ph 735 – Drug Discovery and Drug Design  
Ph 789 – Isolation Techniques in Research

Three electives from the following:

Ph 800 - Radioisotope Tracer Techniques and Radiopharmaceuticals  
Ph 835 - Advanced Medicinal Chemistry, Autumn Quarter  
Ph 836 - Advanced Medicinal Chemistry, Winter Quarter  
Ph 837 - Chemotherapy of Infectious Diseases  
Ph 851 - Advanced Pharmacognosy  
Ph 836 - Structure-Based Computer-Aided Molecular Design, Spring Quarter  
Ph 737- Advanced Pharmaceutical Analysis  
Chemistry 632 - Spectroscopic Methods in Organic Chemistry

### **Organic Chemistry**

Chemistry 730 – Intermediate Organic Chemistry

#### Summary

Eleven courses will be required (five in Pharmacy, five in Biochemistry/Molecular Biology, and one in Organic Chemistry). Students and advisors will have the option to undertake more coursework if desired.

\*If the student has already taken coursework equivalent to these courses, two upper-level Biochemistry/Molecular Biology courses will be substituted to meet the requirement

### **Synthetic Medchem Track graduate course requirements:**

**Biochemistry** – 613, 614 and 615

#### **Organic Chemistry**

Chemistry 632 - Spectroscopic Methods in Organic Chemistry  
Chemistry 730 - Intermediate Organic Chemistry  
Chemistry 832 - Advanced Organic Chemistry  
Chemistry 833 - Advanced Organic Chemistry

If students' interest is in molecular modeling, Chemistry 832 and 833 can be substituted with 2 other courses, for example, from:

Chemistry 944 - Computational Chemistry  
Chemistry 880 - Statistical Thermodynamics  
IBGP 730 - Biomedical Informatics

### **Medicinal Chemistry**

Ph 789 - Isolation Techniques in Research  
Ph 735 - Drug Discovery and Drug Design  
Ph 737 - Advanced Pharmaceutical Analysis

### **Two electives from the following:**

Ph 835 - Advanced Medicinal Chemistry  
Ph 836 - Advanced Medicinal Chemistry, Winter Quarter  
Ph 837 - Advanced Medicinal Chemistry  
Ph 851 - Advanced Pharmacognosy  
Ph 836 - Structure-Based Computer-Aided Molecular Design, Spring Quarter

### **Natural Products Track graduate course requirements:**

**Biochemistry** – 613, 614 and 615

### **Organic Chemistry**

-Chemistry 632 - Spectroscopic Methods in Organic Chemistry  
-Chemistry 730 – Intermediate Organic Chemistry

### **Medicinal Chemistry**

- Ph 789 - Isolation Techniques in Research  
- Ph 735 - Drug Discovery and Drug Design  
- Ph 737 - Advanced Pharmaceutical Analysis  
- Ph 851 - Advanced Pharmacognosy

### **Two electives from the following**

- Ph 835 - Advanced Medicinal Chemistry  
- Ph 836 - Advanced Medicinal Chemistry, Winter Quarter  
- Ph 837 - Advanced Medicinal Chemistry  
- Ph 839 - Problem Solving in Natural Product Chemistry  
- Ph 836 - Structure-Based Computer-Aided Molecular Design, Spring Quarter  
- Chemistry 942 – Natural Product Chemistry

### **Seminars**

Each graduate student in the Division of Medicinal Chemistry & Pharmacognosy is required to give three seminars. The first two seminars will be given prior to the oral candidacy exam. An exit seminar, based on the student's completed dissertation research, will also be given. Attendance at the seminars given by students, postdocs, and outside speakers is mandatory.

### **Advisory-, Candidacy Examination-, Dissertation-, and Final Oral Examination Committees**

It is recommended that the student selects a major adviser within the first 3 quarters. Until that time, the division chair will serve as the student's provisional advisor. Before making a decision regarding the ma-

major advisor. The student must talk with each faculty member of the Division of Medicinal Chemistry & Pharmacognosy. This is a course requirement (993, individual studies). It is also recommended that the student is rotating in various research groups of the division to facilitate the decision process. The major advisor, in consultation with the student, will propose an Advisory Committee consisting of at least four authorized faculty members (including the major advisor). The student's advisor serves as the chair of the Advisory Committee. At least one member of the Advisory Committee other than the student's advisor shall be a regular faculty member with at least a 50% time appointment in the Division of Medicinal Chemistry & Pharmacognosy. One of the functions of this committee is to consult at least once a year with the advisor and the student on the student's progress in dissertation research and course work (see also section 8.3. 'Performance Evaluation'). The Advisory Committee may also serve as part of the Candidacy Examination Committee, the Dissertation Committee, and the Final Oral Examination Committee. The composition of the examination committees must be approved by the GRC of the college; names of proposed committee members must be submitted to the office of the chair of the GRC at least two weeks before submission of the "Doctoral Notification of Candidacy Examination" form or the "Application to Graduate" form to the graduate school.

### The Candidacy Examination

**A. Written Examination.** The Qualifying Examination must be taken following completion of the student's core coursework program, usually before the end of the third year of the program. The responsibility for the written portion of the Candidacy Examination rests with the student's Advisory Committee. The written portion of Candidacy Examination consists of an independent research proposal developed by the student. The proposal should not be in the dissertation research area of the student. Limited discussion with the advisor is allowed, especially with respect to the format of the proposal. In general, the proposal format should be consistent with the style of a National Institute of Health (NIH) proposal and should be limited to 10-12 pages. The completed proposal will be evaluated by the members of the Advisory Committee. The Committee must unanimously agree that the proposal meets their expectations. If the written proposal is not unanimously approved, the Advisory Committee will meet with the student to discuss improvements that should be made to the document. A second and final proposal will be prepared by the student and evaluated by the Advisory Committee. Based on the evaluation of the second proposal, the Advisory Committee may advise the student to waive the right to take the oral part of the Candidacy Examination.

**B. Oral Examination.** The oral part of the Candidacy Examination must occur within four weeks of the approval of the written proposal by the Advisory Committee. The oral exam consists of a defense of the research proposal, prepared by student as the written portion of the Candidacy Examination, as well as answering questions concerning the student's course work and research. The oral examination will take a maximum of two hours. If an oral presentation of the proposal is prepared (not required), it must be given directly before the oral examination and should not exceed 15 minutes. The responsibility for the oral portion of the Candidacy Examination rests with the student's Candidacy Examination Committee, which is composed of the student's Advisory Committee (plus one Graduate Faculty Representative in the case of a re-examination). Upon recommendation by the Candidacy Examination Committee, a student failing the oral exam will be permitted to retake the oral exam. A maximum of two oral examinations will be allowed. A second failure of the oral examination disqualifies a student from advancing to doctoral candidacy status. The oral portion of the Candidacy Examination is open only to the members of the Candidacy Examination Committee.

### **The Final Oral Examination**

The Final Oral Examination includes but may not be limited to discussion of the dissertation. The examination is scheduled for two hours. The Final Oral Examination Committee is composed of the student's Dissertation Committee, plus a Graduate Faculty Representative. The student's Dissertation Committee is composed of at least 3 authorized faculty members. The student's adviser serves as chair of the Dissertation Committee and selects the committee members in accordance with the rules of the GRC. At least one member of the Dissertation Committee other than the student's adviser shall be a regular faculty member with at least a 50% time appointment in the Division of Medicinal Chemistry & Pharmacognosy. A unanimous affirmative vote from the Final Oral Examination Committee members is required for the student to successfully complete the Final Oral Examination. The Final Oral Examination is open only to the members of the Final Oral Examination Committee.

**APPENDIX I CONTINUED****Ph.D. Pharmaceutical Administration****OBJECTIVES**

The Ph.D. program is designed to provide students with research skills and education in problem solving and decision making as applied to pharmaceutical and health care sectors of the economy. The Ph.D. program in pharmaceutical administration prepares each student with:

1. A common background in basic decision-making tools.
2. A rigorous training in research methodology and statistical tools necessary to conduct research.
3. A thorough review of various aspects of pharmaceutical administration.
4. A specialization through intensive coursework in a field of interest to the student in addition to the major field of pharmaceutical administration.
5. Training for conducting original research through writing and presentation of results of research on an important problem in pharmacy under the direction of a faculty adviser and the dissertation committee.

**ADMISSION REQUIREMENTS**

This is the primary program in the Pharmaceutical Administration graduate program. All students should apply directly to the Ph.D. program.

All applicants will be considered on a competitive basis. Applicants with a pharmacy degree are especially encouraged. Admission criteria consist of such items as: undergraduate grade point average; graduate grade point average (if applicable); GRE scores; goals and objectives statement; past experience; reference letters; student's maturity, interpersonal skills, analytical skills, initiative, drive and ability to conduct research; and performance during personal interviews with the faculty. The final admission decision is made by the graduate faculty in the Division of Pharmacy Practice and Administration. Students usually begin in the program Autumn quarter.

The minimum criteria to receive consideration for admission to the graduate programs in Pharmaceutical Administration are:

- A. an earned bachelor's, graduate, or graduate professional degree from an accredited college of university;
- B. 3.0 cumulative grade point average (on a 4 point scale);
- C. Acceptable GRE scores; and
- D. Acceptable results on Test of English as a Foreign Language (TOEFL; score of 250 CBT, or 80 IBT or better) and the Test of Spoken English (TSE; score of 230 or better) for applicants with a degree from a foreign college or university.

Students are expected to have a strong interest in research. Some courses in the graduate program have prerequisites which can be satisfied by equivalent courses taken at the student's undergraduate institution. Students deficient in these areas may be required to take additional courses to satisfy these course prerequisites.



Program

It is the responsibility of each student to know and meet all requirements. The Doctor of Philosophy in Pharmaceutical Administration is governed by general rules established by the Graduate School (see Graduate School Handbook, [www.gradsch.ohio-state.edu](http://www.gradsch.ohio-state.edu)) and by specific requirements established by the faculty and approved by the Graduate School. To satisfy the minimum academic requirements for the Ph.D. degree, students must:

1. Satisfy stipulations pertaining to residency, courses, credit hours, grade-point average and examinations established by the Graduate School (see Graduate School Handbook). While 135 hours of graduate work beyond the Bachelor's is required by the University, this requirement should be viewed as a minimum. In addition, students may find it necessary to take certain prerequisites for which graduate credit may not be authorized.
2. Pass written examinations in two areas: Pharmaceutical Administration (Major Field) and Second Field of Specialization. The major field examination will include contents from the following areas: 1) Pharmaceutical Administration, and 2) Research Methodology.
3. Upon satisfactory completion of the written examinations, the student is required to pass an oral examination, as a part of the Candidacy Examination, prior to admission to Ph.D. candidacy.
4. Conduct original research on an important problem in the field of pharmaceutical administration under the direction of an adviser and dissertation committee. The student should register for a minimum of 36 credit hours of Pharmacy 999 for the dissertation.
5. Successfully defend the dissertation in a formal oral defense.

COURSEWORK:

Each student and their advisor are responsible for the timely completion of all didactic course requirements. Progress towards course completion will be evaluated annually as part of the review of "normal progress for doctoral students" as described below.

Transfer students will have their previous coursework reviewed by their adviser and the program director. An assessment will be made as to which didactic course requirements have been completed based on previous courses.

A. Required of all students

1. Core Courses: select a minimum of 16 credit hours from the following list:

Medication Use System Management	Pharm 816	4
Research Methods and Literature Evaluation	Pharm 821	4
Economic Evaluation of Health Care Programs and Services	Pharm 824	4
Drug Distribution and Public Policy	Pharm 825	4
Pharmaceutical Outcomes Evaluation	Pharm 827	4
Pharmaceutical Health Services Research	Pharm 828	4

2. Seminar

Seminar	Pharmacy 850.01
Seminar	Pharmacy 850.02

Enrollment in Pharmacy 850.01 is required one quarter per academic year throughout the program of study; enrollment in Pharmacy 850.02 is required for all other quarters of enrollment, when offered.

There are two seminar series offered by the Division of Pharmacy Practice and Administration. One seminar is designated for the MS in Health-System Pharmacy Administration students, one other is designated for the Pharmaceutical Administration (MS or PhD) students. Each student is required to register for the seminar in their program of study each quarter of full-time enrollment in the program. Part-time students should enroll as their schedule permits in consultation with their adviser.

*B. Electives:*

1. Foundation Field (27 hours minimum)

The intent of the foundation requirement is to add breadth to the student’s program of study. Some departments that students have taken courses from in the past have included Health Services Management and Policy, Economics, Marketing, Epidemiology, Public Health, Business, Sociology, Psychology, Communication and Agricultural Education. Students should consult with their adviser as to the acceptability of courses for the foundation electives.

2. Research Methods and Statistics (33 hours)

The purpose of research methods and statistics is to provide the tools necessary for successful design, analysis and interpretation of a research study. Broadly, any research methods or statistics course from various departments may satisfy this requirement. However, all students must complete the biostatistics core in public health (PH Bio 701, 702, and 703). Examples of courses students have taken in the past include:

Ag Ed 885	Research Methods.....	3
Ag Ed 886	Research Design .....	3
Ag Ed 888	Instrumentation and Procedures for Data Collection.....	3
Ag Ed 995	Seminar in Research .....	3
PH Bio 701	Design and Analysis of Studies in Health Sciences I .....	4
PH Bio 702	Design and Analysis of Studies in Health Sciences II.....	4
PH Bio 703	A Problem-Oriented Approach to Biostatistics .....	4
PH Bio 605	Applied Survival Analysis	
PH Bio 606	Applied logistic regression	
PH Bio 651	Survey Sampling Methods	
PH Bio 786	Biometrics Laboratory .....	4
Psych 820	Fundamentals of Factor Analysis.....	4
Psych 827	Analysis of Variance.....	4
Psych 828	Correlational Analysis .....	4
Psych 830	Covariance Structure Models.....	4

Other courses that could be taken to complete the requirements for this field include research methods and statistics courses offered in Business, Economics, Sociology, and Statistics.

C. Second Field of Specialization (15 hour minimum)

The purpose of this field is to allow students to develop specialization in an area outside the field of pharmaceutical administration. The selection of a second field should be based upon individual student interests and future career and research goals. It is advisable that students select a second field that is complementary, and not unrelated, to the field of pharmaceutical administration. It is the student's re-

sponsibility to establish the relationship to the satisfaction of his/her adviser and the faculty members. Thus, it is advisable that the student select the second field in consultation with his/her adviser.

Some of the suggested second fields are: Consumer Behavior, Marketing, Cognitive Psychology, Economics, Psychology, Biometrics, and Epidemiology. In addition to these suggested fields, a student may develop an individualized second field in consultation with his/her adviser which may transcend the boundaries of various traditional areas of studies.

#### D. Individual Studies

Pharmacy 993 (pre-candidacy exam research) and Dissertation Research, Pharmacy 999, are taken to make a total of 135 units total beyond the baccalaureate degree or 90 units beyond the masters degree.

#### ADVISER SELECTION

Each Ph.D. student will select a major adviser for the purpose of designing a program of study that will assist the student in preparing for the Candidacy Examination. If an adviser is not selected by the student by the end of the first quarter, a provisional adviser will be assigned to the student by the graduate studies in pharmaceutical administration committee. A student should typically select their permanent adviser within four quarters of entering the program.

#### NORMAL PROGRESS FOR GRADUATE STUDENTS IN DOCTORAL PROGRAM

1. Each student will be evaluated by their adviser, and if formed, members of the examination or dissertation committee for satisfactory progress and performance. This evaluation will occur annually and will be reviewed by the graduate program director.
2. Students holding graduate associate appointments are expected to complete an average of 9 units of course work (excluding S/U graded courses) per quarter until the program of coursework is completed. Grades of B or better are expected in required courses. Prior to candidacy, students must complete a minimum of 27 graded credits each academic year to maintain eligibility for graduate associate appointment. These credits are exclusive of Pharmacy 850.02, Pharmacy 993, Pharmacy 999 or other independent study courses.
3. Students are expected to make progress on their dissertation research. Evidence of such progress includes publication of papers and abstracts, written research reports, and presentations at local, regional and national scientific meetings.
4. Students not making normal progress, determined during the annual review process, will be considered by division graduate faculty at a faculty meeting for reassessment of status in the graduate program. Possible changes in status include enrollment in the M.S. degree program or discontinuation of enrollment. If the student is supported by division funds (GTA or fellowship), a determination will be made as to whether support will be continued.

#### CANDIDACY EXAMINATION

The Candidacy Examination is a single examination consisting of two portions, written and oral. The written portion of the Candidacy Examination for students consists of examinations in two areas: Pharmaceutical Administration Major Field (including Pharmaceutical Administration and Research Methodology sections) and the Second Field of Specialization.

For the purpose of the candidacy examinations, the adviser shall appoint an Advisory Committee composed of at least four authorized graduate faculty members, including the adviser. The committee must include one faculty member from outside the College of Pharmacy in the student's second field of specialization. The adviser will solicit questions from the examination committee. Content of the exam

will include questions covering pharmaceutical administration, research methodology and the second field of specialization.

For the written examination in the Major Field, committee members will grade each question. The results will be reported as pass or non-pass. A non-passing score for either of the two sections (pharmaceutical administration, research methods) will result in a reexamination for that section. The reexamination on those topic areas will take place one week from receipt of feedback from the first exam.

Example exam schedule for candidacy:

Day 1	In class exam
Day 2	Receive take home exam
Day 8	Return take home exam
Day 8	Committee receives student's responses to the exam
Day 15	Student receives examination results
Day 16-20	Rewrite (if necessary)
Day 28	Oral examination

**A copy of the final written exam and notification of a passing grade on the candidacy examination should be filed with the division coordinator.**

#### FINANCIAL ASSISTANCE

Every attempt is made to provide financial assistance to students through graduate associateships (research associate, teaching associate or fellow). Prospective students should indicate their interest in being considered for financial aid on the application for admission which should be received by February 1. The decision regarding the awards is normally made in May, however, earlier or later notification may be possible. Normally, all stipend positions are awarded to students for an academic year. Summer stipend positions are not guaranteed and are based on availability of funds.

#### Graduate Teaching Associate Appointments

All graduate teaching associateships are formally reviewed annually and are contingent upon normal progress through the program. Typically students are not expected to serve as graduate teaching associates for more than two years. Teaching assignments are made by the director of the division's graduate program in consultation with division faculty. Students are expected to participate in instructional activities each quarter during teaching associate appointments. Each teaching associate is evaluated by the faculty member supervising their teaching on a quarterly basis. Review of the teaching reviews will occur during the annual reviews of each graduate student as outlined above in "normal progress for graduate students in the doctoral program".

#### RESPONSIBLE CONDUCT OF RESEARCH

All students must receive Institutional Review Board approval for any research project prior to beginning data collection (see: [orpp.osu.edu/humansubjects/index.cfm](http://orpp.osu.edu/humansubjects/index.cfm)). When patient data is required, HIPAA review is also necessary (see: [orpp.osu.edu/humansubjects/HIPAA.cfm](http://orpp.osu.edu/humansubjects/HIPAA.cfm)). Student must complete the CITI Basic Course in Biomedical or Social and/or Behavioral Research training module available from the OSU Research Foundation prior to initiating any research project (see: [orpp.osu.edu/humansubjects/citi.cfm](http://orpp.osu.edu/humansubjects/citi.cfm)).

## DISSERTATION REQUIREMENTS

After being admitted to Ph.D. candidacy, each student must be enrolled for at least three hours of Pharmacy 999 and receive S grades; and conduct an original research investigation and develop an acceptable dissertation. The dissertation allows the student to demonstrate independent scholarly activity.

The dissertation research is completed under the guidance of the Dissertation Committee, composed of the adviser (in the division of Pharmacy Practice and Administration) and at least two other authorized graduate faculty members. The student must receive written approval of his/her dissertation proposal from the Dissertation Committee before engaging in the actual dissertation research.

The dissertation research should be of publishable quality, and the candidate is expected to prepare research articles from the dissertation for submission to peer-reviewed journals. Dissertation research must be either approved or exempted by the OSU Office for Responsible Research Practices. The completed dissertation is defended in the Final Oral Examination. The Final Oral Examination Committee is composed of the Dissertation Committee members and a Graduate School Representative.

**APPENDIX I CONTINUED**

**MS Pharmaceutical Administration**

PROGRAM DESCRIPTION

The primary graduate program in pharmaceutical administration is the PhD program. In certain circumstances, an MS in pharmaceutical administration may be earned.

A minimum of 45 quarter credit hours are required for the completion of the Master of Pharmaceutical Administration program. The specific program requirements with courses and credit hours are outlined below.

In order to meet the diverse career objectives of the students, the program offers the options of a Master's thesis or field experience (non-thesis) in pharmaceutical administration. Students selecting the thesis option must register for up to 9 credit hours of Pharmacy 999 (Thesis), complete an acceptable thesis and pass an oral thesis examination in order to satisfy the requirements for the degree. Specific requirements governing the preparation of the thesis and the oral thesis examination are established by the Graduate School of The Ohio State University. These requirements are published in the Graduate School Handbook ([www.gradsch.ohio-state.edu](http://www.gradsch.ohio-state.edu)).

CURRICULUM:

A course of study is determined in consultation with the adviser.

A. Core Courses: Required of all students

Core Courses: select a minimum of 16 credit hours from the following list:

Medication Use System Management	Pharm 816	4
Research Methods and Literature Evaluation	Pharm 821	4
Economic Evaluation of Health Care Programs and Services	Pharm 824	4
Drug Distribution and Public Policy	Pharm 825	4
Pharmaceutical Outcomes Evaluation	Pharm 827	4
Pharmaceutical Health Services Research	Pharm 828	4

B. Seminar: Required of all students

Seminar	Pharmacy 850.01
Seminar	Pharmacy 850.02

Enrollment in Pharmacy 850.01 is required one quarter per academic year throughout the program of study; enrollment in Pharmacy 850.02 is required for all other quarters of enrollment, when offered.

C. Electives (minimum of 22 hours)

A minimum of one statistics course and one research methods course is required. Suggested courses include:

PH Bio 701	Design and Analysis of Studies in Health Sciences I .....	4
PH Bio 702	Design and Analysis of Studies in Health Sciences II .....	4
PH Bio 703	A Problem-Oriented Approach to Biostatistics .....	4
Ag Ed 885	Research Methods.....	3
Ag Ed 886	Research Design .....	3
Ag Ed 887	Analysis and Interpretation of Data .....	3

Ag Ed 888      Instrumentation and Procedures for Data Collection..... 3

D. Total Credit Hours (45 hours minimum)

***A copy of the final written exam and notification of a passing grade on the Master's examination should be filed with the division coordinator.***

All other policies for the Ph.D. program apply to the Master's program.

**APPENDIX I CONTINUED**

**MS Health-System Pharmacy Administration**

The MS in Health-System Pharmacy Administration is offered in conjunction with the ASHP accredited residency programs at one of the five participating Columbus hospitals (Columbus Children’s Hospital, Grant Hospital, Mount Carmel Medical Center, The Ohio State University Hospitals, and Riverside Methodist Hospital) involved in leadership training in health-system pharmacy administration.

The residency training serves as a valuable laboratory experience to complement, and provide the opportunity to apply knowledge gained in the graduate study courses to actual practice situations. As a practicing resident pharmacist, the student is given the opportunity to develop competence in all facets of comprehensive health-system pharmacy services including professional, scientific, administrative, technical, and clinical practice.

Applications are considered on a competitive basis. The minimum criteria to receive consideration for admission to the MS in Health-System Pharmacy Administration program include:

1. an earned professional degree from an ACPE accredited college of pharmacy;
2. a 3.0 cumulative grade point average (on a 4.0 scale) or a 3.0 cumulative grade point average (on a 4.0 scale) on graduate studies;
3. GRE scores;
4. eligibility for licensure to practice pharmacy in the State of Ohio. (Detailed description of the requirements for licensure to practice pharmacy in the State of Ohio may be obtained by contacting the Ohio State Board of Pharmacy, 77 S. High Street, 17<sup>th</sup> floor, Columbus, OH 43266-0320);
5. Acceptance into one of the five ASHP accredited residency programs at one of the participating Columbus Hospitals.

*Applicants are also evaluated based on performance during interviews.* Visit the College of Pharmacy’s website at [www.pharmacy.ohio-state.edu/services/academics/grdapply.html](http://www.pharmacy.ohio-state.edu/services/academics/grdapply.html) for application information.

**CURRICULUM**

A. Core Courses: Required of all students

Medication Use System Management	Pharm 816	4
Pharmacy Management in Health-Systems	Pharm 817	4
Research Methods and Literature Evaluation	Pharm 821	4
Economic Evaluation of Health Care Programs and Services	Pharm 824	4
Drug Distribution and Public Policy	Pharm 825	4

B. Seminar: Required of all students

Seminar	Pharmacy 850.02
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Enrollment in Pharmacy 850.02 is required for all quarters of enrollment, when offered.

There are two seminar series offered by the Division of Pharmacy Practice and Administration. One seminar is designated for the MS in Health-System Pharmacy Administration students, one other is designated for the Pharmaceutical Administration (MS or PhD) students. Each student is required to register for the seminar in their program of study each quarter of full-time enrollment in the program.



C. Statistics (3 credit hours)

Students must take at least one course in statistics. Many options exist that will satisfy this requirement and students should consult with their adviser and the director of the MS in Health-System Pharmacy Administration program.

D. Electives in health services administration (24 hours)

Students should gain an excellent understanding of health services administration. The following courses are strongly recommended. Any variations must be approved by the student's adviser and the director of the MS in Health-System Pharmacy Administration program.

Health Services Organizational Management	HSMP 815	4
Health Services Finance I	HSMP 820	4
Health Services Finance II	HSMP 821	4
Strategic Management and Program Development	HSMP 831	4
Operations Management for Health Service Organizations	HSMP 880	4
Information Systems	HSMP 882	4

E. Supervised Project (36 hours)

Supervised project in Health-System Pharmacy	Pharm 970	9
Independent Study	Pharm 993	27

Each student is encouraged to develop individual areas of expertise and pursue those areas of particular interest. This skill and knowledge development is achieved by synthesizing the academic and residency experiences.

While a thesis is not required, the student is expected to engage in supervised scholarly activity and supervised research under the guidance of their adviser and graduate committee. This academic research is distinct from residency projects. The results of this scholarly activity should be grant-supported (if necessary) and should be published in a peer-reviewed journal.

The focus of the scholarly project is primarily determined by the areas of current inquiry and expertise of the graduate faculty with consideration of the interests of the student. Current topics of research among the faculty include, but are not limited to, patient safety, medication-use system management, technology assessment and leadership.

**RESPONSIBLE CONDUCT OF RESEARCH**

All students must receive Institutional Review Board approval for any research project prior to beginning data collection (see: [orpp.osu.edu/humansubjects/index.cfm](http://orpp.osu.edu/humansubjects/index.cfm)). When patient data is required, HIPAA review is also necessary (see: [orpp.osu.edu/humansubjects/HIPAA.cfm](http://orpp.osu.edu/humansubjects/HIPAA.cfm)). Student must complete the CITI Basic Course in Biomedical or Social and/or Behavioral Research training module available from the OSU Research Foundation prior to initiating any research project (see: [orpp.osu.edu/humansubjects/citi.cfm](http://orpp.osu.edu/humansubjects/citi.cfm)).

**MASTER'S EXAMINATION**

Students are required to successfully complete a comprehensive Master's examination in the Spring quarter of their second year. The purpose of this examination to test the student's ability to synthesize and apply the material learned during the required coursework. The examination is coordinated by

the Director of the Master's of Science in Health-System Pharmacy Administration program. Each year, all eligible students will receive the same assignment, and are given seven days to complete this examination. The examination is evaluated by the student's committee. **A copy of the final written exam and notification of a passing grade on the Master's examination should be filed with the division coordinator.**

**APPENDIX I CONTINUED**

**Ph.D. Pharmaceutics**

A minimum of 54 quarter hour credits of graduate level course work is required for the Ph.D. degree. Each student is required to take a common core of courses with the remainder of the program consisting of approved electives. Each student is required to present one seminar per year, beginning with the second year of study. Enrollment in Pharmacy 850.01 Seminar is required one quarter per academic year throughout the program of study beginning in Year 2; enrollment in Pharmacy 850.02 is required for all other quarters of enrollment (except for those summer quarters when the course is not offered).

**Background and Prerequisites**

One year of college-level calculus and analytic geometry

Course work in the statistical analysis of data is required (5 units minimum). There are multiple pathways by which this requirement may be met. Courses available at Ohio State include Molecular Genetics 650 (5 units), Statistics 528/529/530 (3/3/4 units), Public Health 701/702/703 (4/4/4 units).

Course work in biological science appropriate to the program of study is required (6 units minimum). Courses in Biochemistry, Molecular Biology, Cell Biology or Molecular Genetics are appropriate. Possibilities include: Chemistry 761/762 (3/3 units), Advanced Biochemistry; Biochemistry 613/614 (4/4 units), Biochemistry & Molecular Biology; Molecular Genetics 607/608 (3/3 units), Cell Biology/Genes & Development.

Course work in physical chemistry is required (6 units minimum): Chemistry 530/531 (3/3 units) Physical Chemistry, or Biochemistry 721.01/721.03 (3/3 units) Physical Biochemistry I/III or similar courses in Physical Chemistry are acceptable.

**Program**

*A. Required of all students:*

Seminar*	Pharmacy 850.01	V*
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*B. Five courses taught by division faculty from the following list (15-17 units):*

		Units
Biomedical Proteomics and Mass Spectrometry	Pharmacy 801	3
Pharmacokinetics	Pharmacy 802	4
Disposition of Xenobiotics	Pharmacy 803	3
Drug Transport	Pharmacy 804	3
Pharmaceutical Biotechnology	Pharmacy 805	3
Advanced Bioanalysis	Pharmacy 806	4,2
Drug Equilibria in Biological Systems	Pharmacy 807	3
Pharmacokinetic-Pharmacodynamic Models	Pharmacy 808	3
Delivery Systems	Pharmacy 809	3

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\*V = variable; all 850.01 units may be applied. Enrollment in Pharmacy 850.01 is required one quarter per academic year throughout the program of study beginning in Year 2; enrollment in Pharmacy 850.02 is required for all other quarters of each year.

*C. Electives, to make a total of at least 54 units of graded graduate level courses. Any graduate level science course is acceptable upon discussion with the student's advisor. Some possibilities:*

	Units
Additional Division Courses	
Biochemistry and Molecular Biology	4
Molecular Genetics: Regulation of Gene Expression	3
Molecular Biology Laboratory	5
Physical Biochemistry	3
Advanced Biochemistry: Proteins	3
Advanced Biochemistry: Enzymes	3
Advanced Biochemistry: Membranes and Bioenergetics	2
Advanced Biochemistry: Physical Biochemistry	3
Advanced Biochemistry: Nucleic Acids	3
Biological Transport	3
Biomedical Informatics I	3
Biomedical Informatics II	3
Spectroscopic Methods in Organic Chemistry	3
Advanced Organic Chemistry I	3
Chemical Kinetics I	3
Chemical Kinetics II	3
Thermodynamics	3
Statistical Thermodynamics	3
Kinetics and Diffusion	4
Partial Diff. Eqns. and Boundary Value Problems	3
Introductory Virology	3
Animal Cell Culture Techniques	5
Molecular Immunology Lecture	3
Molecular Immunology Laboratory	3
Molecular Genetics: DNA Transactions	3
Advances in Cell Biology	3
Fundamentals of Oncology	4
General Pharmacology	3
Isolation Techniques in Research	5
Principles of Radioisotope Tracer Techniques	3
Laboratory in Radioisotope Tracer Techniques	2
Advanced Medicinal Chemistry	3
Molecular Pharmacology of Drug Receptor Interaction	3
Organ System Physiology I	5
Organ System Physiology II	5
Humane Preparation and Use of Animals for. Physiologic Investigation	3

*D. Dissertation research, Pharmacy 999, to make a total of 135 units total beyond the baccalaureate degree or 90 units beyond the master's degree.*

#### *Committees*

Committees involved in each students doctoral program are the Advisory Committee, the Candidacy Examination Committee, the Dissertation Committee, and the Final Oral Examination Committee. All of the committees are composed of the adviser, who must be a Category P graduate faculty member, and at least three or four authorized graduate faculty members who must be either Category M or Category P. The adviser must be a member of the graduate faculty of the Division of Pharmaceutics and, for the two examination committees, at least one member other than the adviser shall be a regular faculty mem-

ber with at least a 50% time appointment in the Division of Pharmaceutics (minutes of graduate faculty meeting, May 27, 1993). The composition of the examination committees must be approved by the GRC of the college; names of proposed committee members must be submitted to Kathy Brooks' office at least two weeks before submission of the "Doctoral Notification of Candidacy Examination" form or the "Application to Graduate" form to the graduate school.

### **Candidacy Examination**

The purpose of the candidacy examination is to determine whether graduate students have achieved the competency level and capacity to carry out pharmaceutical research at the doctoral level. The exam tests for a broad knowledge base in the area of pharmaceutics and the capability for critical thinking about pharmaceutical problems. This includes the ability of the student to analyze experimental data, to form hypotheses and design experiments to test them, and to critically review the pharmaceutical literature. The candidacy exam generally does not test recall of specific information presented in course work, although students are presumed to have mastered knowledge and concepts presented in courses. The candidacy examination must be completed by the end of the third year of full-time study.

The candidacy examination is composed of a written part and an oral part. The written part must be passed before the oral part can be taken. Both parts of the Candidacy Examination will be conducted by the student's Candidacy Examination Committee. The committee must be composed of four graduate faculty (not counting the Graduate School Representative) and at least three members of the committee shall be regular faculty members with at least a 50% time appointment in the Division of Pharmaceutics. The student's advisor will chair the Committee and committee members will be selected by the student in consultation with the advisor.

#### ***Written Part***

To be eligible to take the examination, students generally should have completed all course work and have a cumulative grade point average of 3.00 or higher. The written examination requires the student to prepare an original research proposal in the area of pharmaceutics. The proposal may, but does not have to, be in the dissertation research area. Instructions for preparation of the proposal:

Include sufficient information to permit an effective review without reviewers having to refer to the literature. Brevity and clarity are considered indicative of an applicant's approach and ability. Sections (1) through (3) are not to exceed 11 pages including all tables and figures (reference list excluded). Adhere to the following format limits: use 1" margins for top, bottom and sides; letter height must not be smaller than 11 point; type density must be no more than 15 characters per inch (cpi); no more than 6 lines of type must be within a vertical inch. References should be cited by number in the text and listed at the end in the order of appearance in the text. Each reference must include the title, names of all authors, book or journal, volume number, page numbers, and year of publication. The reference should be limited to relevant and current literature; it is important to be concise and to select only those literature references pertinent to the proposed research.

Follow the format below:

1. **Specific Aims.** State the specific purposes of the research proposal and the hypotheses to be tested. In general, this section of the document should be 0.5 to 1 page in length.
2. **Background and Significance.** Sketch briefly the background to the proposal. State concisely the importance of the research described by relating the specific aims to broad, long-term objectives. Be sure to summarize your progress if any to date. This section should be concise, directed toward the aims of the project, and no more than 5 pages in length.
3. **Research Design and Methods.** This section is the most critical portion of the proposal and should be 5 to 7 pages in length. Extensive experimental detail (e.g., buffer components, sources of equipment and chemicals, injection volumes) is not required. Emphasis on ratio-

nale for the chosen model(s), experimental groups, positive and negative controls, data analysis, and possible outcomes is essential. Provide a description of:

- Research design and the procedures to be used to accomplish the specific aims;
- Tentative sequence for the investigation;
- Statistical procedures by which the data will be analyzed;
- Potential experimental difficulties should be discussed together with alternative approaches that could achieve the desired aims.

The proposal must be the product of the student; limited discussion with the advisor is allowed. The completed proposal will be evaluated by the members of the Candidacy Examination Committee; the Committee must unanimously agree that the proposal meets their expectations. If the written proposal is not unanimously approved, the Candidacy Examination Committee will meet with the student to discuss improvements that should be made to the document. A second and final proposal will be prepared by the student and evaluated by the original Committee. The second proposal may be a new proposal or a revision of the first proposal. Failure of the second proposal to gain the approval of the Committee disqualifies a student from advancement to doctoral candidacy status.

### *Proposal Evaluation Criteria*

Significance Does this study address a scientifically important problem? If the aims of the proposal are achieved, how will scientific knowledge be advanced? How would the proposed studies add to the existing concepts or methods in the field? Does the proposal employ novel concepts, approaches or methods?

Approach Are the conceptual framework, design (including composition of study population), methods, and analyses adequately developed, well-integrated, and appropriate to the aims of the project? Are problem areas acknowledged and alternative tactics considered?

### *Oral Part*

The oral part of the examination must occur within one month of approval of the written proposal. The purpose of the oral exam is to further evaluate the student's knowledge and capacity for critical thinking about pharmaceutical problems. While the written proposal may function as a starting point for the examination, questions from examiners will not be constrained to the proposal. If a prepared oral presentation of the proposal is made to the examination committee (not required), it must be made prior to the oral examination. Questioning of the student should occupy the entire period of the examination. Upon recommendation by the Candidacy Examination Committee, a student failing the oral exam will be permitted to retake the oral exam, which must be taken during the subsequent quarter; a maximum of two examinations will be allowed. A second failure of the oral examination disqualifies a student from advancing to doctoral candidacy status.

### *Graduate School Policy*

See Section II.6.4, Graduate School Handbook, for important information about the candidacy examination.

**Normal Progress for Graduate Students in Doctoral Program**

1. Students holding half-time associateship appointments are expected to complete an average of 9 units of course work (excluding S/U graded courses) per quarter during the initial quarters of enrollment until their program of study is completed. Grades of B or better are expected in required courses.
2. Students are expected to schedule the candidacy examination promptly after completion of course work. The candidacy examination should be completed by the end of the third year of study.
3. Students are expected to make progress on their dissertation research. Evidence of such progress includes publication of papers and abstracts, written research reports, and presentations at local, regional and national scientific meetings.
4. Students are expected to complete all requirements for the Ph.D. degree within 20 quarters.
5. Students not making normal progress, determined during the annual review process, will be considered by division faculty at a faculty meeting for reassessment of status in the graduate program. Possible changes in status include enrollment in the M.S. degree program and/or discontinuation of enrollment. If the student is supported by division funds (GTA or Fellowship), determination will be made of whether support will be continued.

**APPENDIX I CONTINUED**

**MS Pharmaceutics with Thesis**

A minimum of 48 quarter hour credits of graduate level course work is required for the MS degree. Each student presents one seminar per year, beginning with the second year of study.

Background and Prerequisites

Same as for the Ph.D. Program.

Program

A. *Required of all students:*

Seminar*	Pharmacy 850.01	V
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B. *Three courses taught by division faculty from the following list (9-11 units):*

		Units
<i>Biomedical Proteomics and Mass Spectrometry Pharmacy 801</i>	3	
Advanced Pharmacokinetics	Pharmacy 802	4
Disposition of Xenobiotics	Pharmacy 803	3
Drug Transport	Pharmacy 804	3
Pharmaceutical Biotechnology	Pharmacy 805	3
Bioanalytical Methods	Pharmacy 806	4
Drug Equilibria in Biological Systems	Pharmacy 807	3
Pharmacokinetic-Pharmacodynamic Models	Pharmacy 808	3
Delivery Systems	Pharmacy 809	3

C. *Electives and thesis research (Pharmacy 993) to make a total of 48 units.*

D. *Final oral examination as described in the Graduate School Handbook.*

**MS Pharmaceutics without Thesis**

Under extenuating circumstances, the advisor, in concurrence with the student, may petition the GRC to complete the program under the nonthesis option. A minimum of 48 quarter hour credits of graduate level course work is required. Each student presents one seminar per year, beginning with the second year of study.

Background and Prerequisites

Same as for the Ph.D. Program.

Program

Same courses as for the Ph.D. Program.

A final written examination as described in the Graduate School Handbook will be prepared by the student's advisor and by one other member of the pharmaceutics graduate faculty.



**APPENDIX I CONTINUED**

**Ph.D. Pharmacology**

**I. Goal of the Program**

Pharmacology involves multidisciplinary approaches that exploit emerging molecular biological, biochemical and biophysical tools to uncover disease-relevant signal transduction pathways. The graduate program in pharmacology offered by the Division of Pharmacology has the goal of providing students with a broad perspective on the field of pharmacology and an in depth training in a particular research specialty/interest. The broad perspective on the field is obtained through completing the required course work and participating in seminars and journal club. The in depth research training is accomplished through completing an intensive laboratory-based research experience and writing a dissertation document describing the research.

**II. Core Program**

The core program consists of several courses whose contents are considered essential as a foundation for training in all areas of pharmacology. Regardless of the area in which one may ultimately specialize, all doctoral students must demonstrate competence in the subject matter embraced by the "core". Students who enter with adequate background in some of these subjects are considered to have satisfied those portions of the core requirements. Students are expected to complete all core requirements by the end of their second year of residence. The following courses (or their equivalent) constitute the core:

SUBJECT	NUMBER	TITLE
Physiology	Physiology 601 and 602	Advanced Mammalian Physiology
Biochemistry	Biochemistry 613 , 614, and 615 or two of the following: Biochemistry 761 Biochemistry 762 Biochemistry 763 Biochemistry 764 Biochemistry 765 Biochemistry 766	Biochemistry and Molecular Biology Proteins Enzymes Membranes and Bioenergetics Integration of Metabolism Physical Biochemistry Nucleic Acid Chemistry & Structure
Statistics	Genetics 650	Analysis and Interpretation of Biological Data
Pharmacology	Pharmacy 747, 748, and 749 plus one of 750, 751, 752 Pharmacy 870	Pharmacology Drug Receptor Theory
Laboratory	Pharmacy 871 and 872	Methods in Pharmacology
Seminar	Pharmacy 850	Pharmacology Seminar

Pharmacy 850 (Seminar) must be taken during each of the Fall, Winter and Spring Quarters in residence. Each graduate student is required to present one seminar per year. Students should enroll in Pharmacy 850.01 in the quarter that they have been assigned a seminar and Pharmacy 850.02 in the remaining quarters. Attendance at scheduled seminars is mandatory.

During the first four quarters in residence, every student must register for a total of six credits of Individual Studies in the Pharmaceutical Sciences (Pharmacy 993). This course registration accounts for the required initial laboratory research experience orientating the student to the research environment, and helping the student to choose their advisor and dissertation project area. After the first four quarters in resi-

dence, research credits are obtained through registering for Pharmacy 999. It is recommended that students enroll in Pharmacy 873, Contemporary Pharmacology. Depending upon the area in which the student wishes to specialize, other courses may be included in the program to satisfy individual needs.

### **III. *Faculty Adviser***

Students work very closely with their thesis faculty adviser. The adviser is the primary research trainer, and the student will become immersed in the type of research directed by the adviser. In addition, the adviser assists the student in planning a course of study, supervises the student's research activities, and monitors his or her progress through the program. As Chairman of the student's Advisory and Examining Committees, the adviser participates in certifying that the student has satisfied the various requirements for the graduate degree. The advisor makes recommendations to the Division Faculty, Graduate and Research Committee of the College of Pharmacy and the Graduate School necessary for the student's continued progress. Thus, it is important for a student to work closely with and cultivate good relations with the adviser.

Newly entering students are assigned the Graduate Program Coordinator (GPC) as their provisional advisor. After making an assessment of the student's background, experience and interest, the GPC prepares a program of course work for the first year. In most cases, the courses are part of a "core" program required for all pharmacology graduate students. By the end of the Spring Quarter of the first year of residency, the expectation is that newly entering graduate students will chose a faculty research advisor who will mentor them through their degree program. To facilitate this process, students will visit with each faculty member in the Division of Pharmacology during the first 2 weeks of residence for the purpose of discussing ongoing and projected research activities. In addition, beginning in their first quarter of residency, it is highly recommended that students do several (i.e., 1 to 3) research rotations, experiencing different research areas. These rotations are set up by mutual agreement of the student and the faculty member. When a student determines his or her research advisor, the GPC should be notified that the student will begin his or her dissertation research in the appropriate laboratory. The expectation is that some laboratory experience will occur during the first year of study.

### **IV. *MASTER OF SCIENCE DEGREE***

The Division of Pharmacology does not typically accept students into a Masters of Science program. Under special circumstances and with the consent of the Division of Pharmacology faculty, students may opt out of the Ph.D. program and pursue a Master of Science degree. Core course requirements for MS degree students are less extensive than those outlined for doctoral students. They include Pharmacy 747, 748, 749, 870, 871, 872, and Genetics 650, if there are no prerequisite deficiencies. In addition to course work, MS degree candidates must complete a research thesis based on laboratory work and pass a "defense of thesis" examination in order to satisfy the requirements for the degree.

### **V. *MONITORING THE PROGRAM OF STUDY***

Monitoring of graduate student progress is done at several levels. Primary responsibility rests on the student. Each student should be aware of the various requirements (courses, seminar presentations, candidacy examination, research accomplishments, and dissertation expectations) and work diligently to meet them on a timely basis. The faculty advisor also should be aware of each of these requirements and encourage the student. The advisor, during the summer of each year, reports progress of each student to the faculty of the Division of Pharmacology. Once the student has passed the candidacy examination, it is highly recommended that the student meet with his/her advisory committee every six months to keep them informed of progress and to obtain suggestions that might enhance the quality of the project.

The progress of all graduate students will also be evaluated annually by the Pharmacology Division faculty. An annual review provides graduate students with an opportunity to reflect on their accomplishments, to focus and plan for the upcoming year, and to elicit advice from those more experienced. The annual evaluation consists of a written and an oral portion. For the written portion, students will complete an evaluation form by the third Friday of August each year. For the oral portion, each student will attend a Division faculty meeting (15-30 minutes) to be held within the first two weeks of September. A student's advisor will not be present during the interview with his/her student. The student will be excused while the faculty discusses the student progress and reach a conclusion on evaluation of performance. The advisor will then rejoin the meeting at this time and provide a written and oral overview of his/her student. The meeting will be followed by a letter of evaluation from the Division Chair to each student.

## ***VI. THE Ph.D. CANDIDACY EXAMINATION***

The Candidacy Examination for the Doctor of Philosophy degree is designed to determine whether or not a graduate student may be admitted to candidacy for the doctorate. It is intended to be a comprehensive test of the student's mastery of the subject matter, his/her ability to think and express his/herself clearly and forcibly and the capacity to pursue independent research. " With this brief statement the Graduate School has described the goals of the Candidacy Examination. Matters of procedure, organization, operation and, ultimately, evaluation are left in the hands of the departmental faculty and are described below.

**A. Written Examination.** The written portion of the Ph.D. Candidacy Examination consists of the preparation of an original, independent research proposal evaluated by an Advisory Committee composed of the student's Advisor and at least 3 Graduate Faculty appointed by the Advisor, at least one of whom that must hold at least a 50% appointment in the Division of Pharmacology.

Approval of the Proposal. The student will provide the Advisory Committee with the tentative summary, hypothesis and specific aims of the proposal (not to exceed two pages, double spaced), and meet with the Advisory Committee to discuss the plan and seek its approval. The proposal can deal with a problem in the same or related area as the dissertation research, but cannot substantially overlap any previously written proposal.

Writing the Proposal. Within thirty days from the date of approval, the student will submit an original research proposal in the form outlined below. The proposal should be typed and double spaced (except section 6 below) with 0.75 inch margins. The proposal should be specific and informative and avoid redundancies. It should include sufficient but concise information to facilitate an effective evaluation of the proposal. Committee members often consider brevity and clarity in the presentation to be indicative of a focused approach to a research objective and the ability to achieve the specific aims of the project.

The research proposal should follow the National Institutes of Health (NIH) format outlined and described below:

1. Research Summary
2. Specific Aims
3. Background and Significance
4. Preliminary Results
5. Research Design and Methods
6. Literature Cited

1. Research Summary. An abstract (not to exceed two pages), which outlines the general area of the proposed research and contains the hypothesis and specific aims.

*Items 2-5 (see below) should be organized to answer these questions: (2) What do you intend to do? (3) Why is the work important? (4) What has already been done? (5) How are you going to do the work? You may use any page distribution within the overall page limitation; however, the following format and distribution are recommended:*

2. **Specific Aims.** State the hypotheses to be tested and list the broad, long-term objectives and describe concisely and realistically what the specific research described in this proposal is intended to accomplish. One to two pages are recommended.

3. **Background and Significance.** Briefly sketch the background to the present proposal, critically evaluate existing knowledge, and specifically identify the gaps which the project is intended to fill. State concisely the importance of the research described in this application by relating the specific aims to the broad long-term objectives. Five to seven pages are recommended.

4. **Preliminary Studies.** This section of the proposal is NOT required. You may use this section to provide an account of any preliminary studies pertinent to the proposal and/or any other information that will help to establish your experience and competence to pursue the proposed project.

5. **Research Design and Methods.** Describe the research design and the procedures to be used to accomplish the specific aims of the project. Include the means by which the data will be collected, analyzed and interpreted. Discuss the potential difficulties and limitations of the proposed procedures and alternative approaches to achieve the aims. Provide a tentative sequence or time-table for the investigation.

6. **Literature Cited.** Each literature citation must include the title, names of all authors, book journal, volume number, page numbers and year of publication. Make every attempt to be judicious in compiling a relevant and current list of literature citations. Single space this section.

Approval of the Written Proposal. The Advisory Committee will evaluate the written proposal within 2 weeks of its submission. Students who do not pass the written examination will be allowed to submit a revised proposal after a period of time set by the Advisory Committee, but not to exceed one academic quarter. If based on evaluating the written proposal, the advisor or another member of the Advisory Committee see no possibility for a satisfactory overall performance on the Candidacy Examination, the student may be advised to waive the right to take the Oral Examination.

**B. Oral Examination.** The oral portion of the Ph.D. Candidacy Examination will be scheduled to occur within 4 weeks after the decision of the Advisory Committee regarding the Written Proposal. The examination must be scheduled with the Graduate School no later than two weeks prior to the examination day. The oral portion of the Ph.D. Candidacy Examination consists of the defense of the Written Proposal in the presence of the Candidacy Examination Committee (Advisory Committee plus a Graduate Faculty Representative of the Graduate School). The examination, which lasts approximately 2 hours in addition to any introductory presentation by the student, is not limited to the subject of the research proposal, and the nature of the questioning is designed to elicit from the student evidence that he/she has a comprehensive understanding of the general discipline of Pharmacology. A student who fails this examination may, upon recommendation by the Candidacy Examination Committee, be eligible for reexamination at a later date. This may or may not require revisions of the written proposal. The nature of the second Candidacy Examination is determined by the Candidacy Examination Committee, but it must include a written and an oral portion. Students who do not pass the Candidacy Examination the second time will not be allowed to continue in the Doctoral Program in Pharmacology.

***VII. FINAL ORAL EXAMINATION (DISSERTATION DEFENSE)***

The Final Oral Examination includes but may not be limited to discussion of the dissertation. The examination is scheduled for two hours. The Final Oral Examination Committee is composed of the student's Dissertation Committee, plus a Graduate Faculty Representative. The student's adviser serves as chair of the Dissertation Committee and selects the committee members in accordance with the rules of the College of Pharmacy. At least one member of the dissertation Committee, other than the student's adviser, shall be a regular faculty member with at least a 50% time appointment in the Division of Pharmacology. A unanimous affirmative vote from the Final Oral Examination Committee members is required for the student to successfully complete the Final Oral Examination. The Final Oral Examination is open only to the members of the Final Oral Examination Committee.

**APPENDIX II****Policy Concerning 25% Graduate Associate Appointments**

The norm of graduate associate appointments in the College of Pharmacy is a 50 percent time appointment. However, students wishing to be considered for a 25% appointment should apply to the Graduate Studies Committee. The following policy should be noted before applications are made.

1. GAs holding 25 percent appointments will be entitled to one-half of a full fee authorization. If the GA changes his or her schedule, the amount charged or reimbursed will be divided equally between the GA and the fee authorization.
2. The number of 25 percent appointments must never exceed 10 percent of all GA appointments at any one time.
3. No GA who has started at 50 percent time or more may be cut to 25 percent time except at his or her own request.
4. GRAs who are working on their theses or dissertations as part of their GRA appointments may not be appointed for less than 50 percent time.
5. All GAs must be enrolled for at least twelve credit hours regardless of the percentage of their appointment.
6. The Graduate School is responsible for implementing and monitoring this proposal and for approving all 25 percent GA appointments. The Graduate Dean must report the distribution of GA appointments to the Provost on an annual basis at the time of budget considerations.

## APPENDIX III

### Graduate Student Code of Research and Scholarly Conduct

Graduate students and graduate faculty aspire to professional behavior that is consistent with the highest ethical and moral standards. The Graduate School at The Ohio State University expects that graduate students will demonstrate responsibility and integrity in pursuing their creative and scholarly interests. The academic enterprise is dependent upon such behavior. Graduate students are responsible for learning about appropriate standards for ethical research and scholarly conduct and for following all university policies related to ethical research and scholarly conduct (GSH II.4.15). When graduate students join the Ohio State community, they become members of disciplinary, scholarly, and professional communities that extend beyond the university. Graduate students are expected to learn, respect, and abide by the professional codes of ethics and responsibilities that are commonly accepted in their field of study or area of research. These codes include but are not limited to the following: a responsibility to contribute an original body of work to one's chosen discipline and the recognition that one's work is based on the work of others which must be respected and properly acknowledged. Graduate students also have the responsibility to treat university faculty, staff, and other students respectfully and professionally.

Graduate faculty, advisors, and graduate programs should actively encourage their students to participate as members of their chosen disciplinary, scholarly, and professional communities. Graduate students should be encouraged to seek and share knowledge wherever and whenever possible. Academic advisors and other faculty members should educate graduate students through example and discussion, addressing such issues as academic honesty, research, publication, recruitment, and hiring practices, and applicable fellowship and graduate associateship responsibilities. Disciplinary codes of ethics and norms should be discussed among graduate students and faculty. Such communication is a means of setting high standards of behavior in graduate study and beyond.

Graduate students are expected to be familiar with relevant policies and procedures at Ohio State, many of which are listed below. Graduate School staff may be contacted at (614) 292-6031 for additional assistance.

Web-based resources for student conduct, including academic and research misconduct

Code of Student Conduct

[studentaffairs.osu.edu/resource\\_csc.asp](http://studentaffairs.osu.edu/resource_csc.asp)

Office of Student Judicial Affairs

[studentaffairs.osu.edu/resource\\_csc.asp](http://studentaffairs.osu.edu/resource_csc.asp)

Committee on Academic Misconduct

[oaa.osu.edu/coam/home.html](http://oaa.osu.edu/coam/home.html)

University Research Committee Interim Policy and Procedures Concerning Misconduct in Research or Scholarly Activities

[www.orrp.ohio-state.edu/misconduct/misconpol/cfm](http://www.orrp.ohio-state.edu/misconduct/misconpol/cfm)

Alcohol and Other Drugs

[studentaffairs.osu.edu/safety\\_crime\\_alcohol.asp](http://studentaffairs.osu.edu/safety_crime_alcohol.asp)

Guidelines for the Review and Investigation of Allegations of Scholarly Misconduct by Graduate Students Available from the Graduate School, 250 University Hall.

**RESEARCH POLICIES AND RESOURCES**

The Office of Responsible Research Practices (ORRP) provides information on policies and procedures for research involving humans, animals, or potentially hazardous biological agents. The ORRP website also includes the conflict of interest policy, information about Institutional Review Board (IRB) processes, and access to training and workshop opportunities ( [orrrp.osu.edu](http://orrrp.osu.edu)). For additional information, contact the following related offices:

The Office of Research, [research.osu.edu/](http://research.osu.edu/)

Research Foundation, [rf.osu.edu/](http://rf.osu.edu/)

Office of Technology Licensing, [otl.osu.edu](http://otl.osu.edu)

Student Records and Privacy, FERPA (Family Educational Rights and Privacy Act)  
[www.ureg.ohio-state.edu/ourweb/more/Content/ferpa\\_pg1.html](http://www.ureg.ohio-state.edu/ourweb/more/Content/ferpa_pg1.html). Also see FERPA Basics, November 2003, [oaa.osu.edu/Reports/FERPA.html](http://oaa.osu.edu/Reports/FERPA.html).

Campus Climate, including nondiscrimination, sexual harassment, workplace violence, occupational health and safety, and nonsmoking [hr.osu.edu/policy/policyhome.htm](http://hr.osu.edu/policy/policyhome.htm)

Information Technology Policies and Resources, Office of the Chief Information Officer,  
[cio.osu.edu/policies/](http://cio.osu.edu/policies/)

Policy on Responsible Use of University Computing Resources  
[cio.osu.edu/policies/responsible\\_use.html](http://cio.osu.edu/policies/responsible_use.html)

Disability Policies and Resources Rights and Responsibilities of OSU Students and Employees,  
[ada.osu.edu/](http://ada.osu.edu/)

Office for Disability Services, [www.ods.ohio-state.edu](http://www.ods.ohio-state.edu)

Policy and Procedure Manual, Equal Employment for Individuals with Disabilities,  
[hr.osu.edu/policy/policyhome.htm](http://hr.osu.edu/policy/policyhome.htm)

Web Accessibility Center  
[www.wac.ohio-state.edu/](http://www.wac.ohio-state.edu/)



## APPENDIX IV

**Graduate Student Leave Guidelines  
College of Pharmacy**

Students who are supported with an appointment as a graduate teaching associate (GTA), a program-supported graduate research associate (GRA), or as a graduate fellow (GF) perform work and training activities that contribute to the mission of the university, including research, teaching, study for classes, and generally preparing for a professional career in science. While these activities are normally performed on campus, students may work at other locations and at home, when appropriate. During breaks between quarters, students are expected to engage in appropriate work and training activities.

A GA- or GF-supported student may take vacation leave for a maximum of 10 working days (two weeks) during the September 1 – August 30 academic year, in addition to official university holidays. Leave cannot be carried forward to following academic years; i.e., unused leave in one year may not be used the next year.

For GRA- and GF-supported students their faculty advisor may establish guidelines that may be more or less restrictive than these guidelines. Each student, self-supporting students included, should discuss with the advisor his or her leave guidelines at the initiation of the student-advisor relationship.

**A request to be absent must be submitted to the faculty advisor in writing prior to making travel arrangements and at least one month prior to departure.** The request should include the dates of absence. The request must be approved by the advisor and, when a student is supported by a GTA, the division chair and the instructor(s) supported by the GTA appointment.

Leave for sickness or family illness is not part of the annual 10 days' leave and will be considered on an individual basis with the division chair and faculty advisor. Please refer to the Graduate School's "Guidelines for Short-Term Absences and Leaves of Absence for Graduate Students Appointed as Gas, Fellows and Trainees".

Vacation leave is not allowed if it interferes in any way with GA/GF duties, including training sessions, recitation or workshop sections, development of final grades for an instructor, and laboratory research activities. Leave for a GTA during a quarter will only be allowed after suitable substitution arrangements have been approved by the instructor.

Beyond the 10 days in a given academic year additional leave may be allowed for special circumstances (e.g., important family gatherings overseas, weddings, etc.). Such leave will usually be negotiated as "leave of absence without pay" and must be approved by the division chair and faculty advisor. The graduate program coordinator must be informed of all such arrangements.