

GRADUATE PROGRAM HANDBOOK

College of Pharmacy University of Oklahoma Health Sciences Center

The **mission** of the graduate program of the University of Oklahoma College of Pharmacy is to provide advanced education and to conduct research in the pharmaceutical sciences through multidisciplinary programs in a wide array of scholarly pursuits.

The **goals** of the graduate program of the University of Oklahoma College of Pharmacy are to:

- Train high quality researchers with a sound theoretical background from which scientific approaches and methods can be applied to their field of study
- Provide outstanding training and experience in teaching
- Contribute to the advancement and dissemination of new scientific knowledge

1. INTRODUCTION

This document is designed to supplement the Graduate College Bulletin (<http://graduate.ouhsc.edu/CurrentStudents/GraduateCollegeBulletin.aspx>) and to inform graduate students and faculty of the requirements and policies of the Department of Graduate Pharmaceutical Sciences.

1.1 Organization of the Graduate Program

The Department of Graduate Pharmaceutical Sciences is chaired by the Director of the Graduate Program, who also serves as graduate liaison to the Graduate College. All policies and regulations of the graduate department are governed by the Graduate Affairs Committee, which is appointed annually by the Dean of the College of Pharmacy. Advisory subcommittees for the basic pharmaceutical sciences and the social/administrative sciences provide individual guidance for students and faculty.

1.2 Graduate Faculty

Faculty members who contribute to graduate education are required to obtain a graduate faculty appointment from the Graduate College. Faculty with unmodified titles are eligible for full membership in the graduate faculty, while faculty with modified titles may be appointed as associate members. Temporary graduate faculty appointments may be obtained for service on committees of specific students. Members of the graduate faculty are appointed to differing levels of responsibility in graduate education, which are determined on the basis of the faculty member's training and current research. Meetings of the graduate

faculty in the College of Pharmacy may be scheduled as required by the Director of the Graduate Program.

1.3 Specializations within Graduate Pharmaceutical Sciences

Graduate students may train with faculty who hold regular or adjunct appointments in Department of Pharmaceutical Sciences, or the Department of Pharmacy: Clinical and Administrative Sciences. Because the research emphasis differs substantially between these two academic departments, the course requirements for students may also be quite varied. Training emphasis in a variety of areas (e.g., nuclear pharmacy, pharmacology, health policy, pharmacoconomics, marketing, etc.) is available for students within these academic departments.

2. APPLICATION AND ADMISSION TO THE GRADUATE PROGRAM

2.1 Admission Requirements

Applicants for the Doctor of Philosophy and Master of Science programs in Graduate Pharmaceutical Sciences must submit a completed OUHSC application with all required supporting documents and payment of fees. In order to be considered for admission with full standing, the applicants should have: (1) a baccalaureate degree or equivalent in pharmacy or a related field; (2) a grade point average of at least 3.0 [B] over the last 60 hours of undergraduate coursework; (3) Graduate Record Examination (GRE) scores of at least 150 in both the verbal and quantitative sections; and (4) three letters of recommendation from prior college instructors that address qualifications to pursue graduate study. In addition, foreign nationals who have a native language other than English must present a TOEFL score of at least 79 on the Internet Based Test (IBT) or its equivalent in other versions of the TOEFL examination. The Graduate College also requires evaluation of international transcripts by the World Education Services, which must be provided at the time of the application.

2.2 Admission Process

The Graduate Affairs Committee serves as the admissions committee for the graduate program. Applications are first reviewed by full members of the graduate faculty in the applicant's proposed academic department, and interviews (personal or telephone) are scheduled with the highest rated applicants. Recommendations for admission are made to the Dean of the College of Pharmacy, who makes the final decision on applicant admission. Students are normally admitted only in the fall semester. Conditional admission (for example, to allow applicants to improve GRE or TOEFL scores) is not allowed by the graduate program.

Students may also enter the Graduate program in Pharmaceutical Sciences after completing the first year curriculum of the Graduate Program in Biomedical

Sciences (GPiBS) on the OUHSC campus. Students in the first year of the GPiBS program will have the opportunity to enroll in research rotations in the laboratories of Graduate Pharmaceutical Sciences faculty who have opted to serve as GPiBS mentors. Upon mutual consent of the faculty member and student, and approval by the Graduate Advisory Subcommittee, these students will be transferred into the Graduate program in Pharmaceutical Sciences beginning the fall semester of the second year of graduate studies. Once transferred, these students will be subject to the same policies and procedures applicable to direct admits, as outlined in this handbook.

2.3 Degree Programs

The doctoral degree is preferred in most career fields requiring graduate education in the pharmaceutical sciences. Completion of the degree requirements, and particularly a high quality dissertation, requires full-time effort. Accordingly, the College gives precedence for admission to those individuals who are highly qualified and interested in completing the doctor of philosophy program as full-time students. Admission of students into the master of science program, and/or as part-time students, is considered on a case-by-case basis. The College will not admit individuals when insufficient resources are available to fund their research.

The Department of Graduate Pharmaceutical Sciences also provides training in a dual degree, Doctor of Pharmacy/Master of Science (Pharm.D./M.S.) program. This dual degree option is open only to students who have already been admitted to the Doctor of Pharmacy program. The admissions guidelines are similar to those for the traditional graduate program, except that the GRE examination is not required, and applicants who do not have a baccalaureate degree may be admitted as accelerated dual degree students. Separate admission forms and criteria are developed annually by the Graduate Affairs Committee.

3. STUDENT INFORMATION

3.1 Faculty Advisor

Students who are admitted into the graduate program may be assigned to a faculty advisor, or may be initially supervised by an advisory subcommittee in the student's academic department until an advisor is selected. In most cases, the faculty advisor will continue to work with the student as the chair of the student's thesis/dissertation committee. Each student should meet frequently with his/her faculty advisor to select courses for enrollment, develop research skills, and to discuss other situations affecting their training. The primary responsibility for generating research funds lies with the advisor, but graduate students share the responsibility to apply for fellowships to support their graduate education.

3.2 Full-Time vs. Part-Time Enrollment

Because graduate education is demanding and time-consuming, full-time enrollment is encouraged. However, the College of Pharmacy recognizes that health professionals may be able to expand their capabilities and career opportunities with a graduate degree, and part-time admission is also allowed. The Graduate College Bulletin includes timelines for completion of graduate degrees, which must be met by all students.

3.3 Graduate Assistant Appointments

Graduate students may be appointed as Graduate Assistants, according to guidelines published in the Graduate College Bulletin. In most cases, the graduate assistants will be full-time students in the doctoral program. Graduate assistant appointments are normally renewed annually for four years, contingent upon satisfactory progress in the student's assigned responsibilities and coursework. The appointment may be renewed beyond four years if needed, following approval by the Graduate Affairs Committee.

Graduate assistants receive an annual stipend, tuition waivers, payment of fees, and student health insurance (if needed). The amounts of the stipend and tuition waivers are established by the College of Pharmacy administration, and the graduate assistants will be assigned responsibilities in teaching, research, or service according to policies established by the Graduate Affairs Committee and the needs of the student's academic department.

Because graduate assistants are required to maintain full-time enrollment and to perform other duties in the College, they are expected to restrict outside employment in order to focus on their graduate education.

Graduate assistants who desire vacation time in addition to OUHSC holidays must request this in writing from their faculty advisor, the chair of their academic department, and the Director of the Graduate Program. Written approval must also be obtained from faculty members to whom they have been assigned as teaching assistants if they will be absent during or within one week of the start or end of a semester.

3.4 Course Enrollment

Courses available in Graduate Pharmaceutical Sciences are listed in Section 7 of this handbook. Students are encouraged to select courses outside of the College of Pharmacy to fulfill specific requirements that will best support their thesis/dissertation research and their ultimate career development.

Graduate students are required to pre-enroll before the start of each academic session. The student should meet with her/his faculty advisor or advisory committee to select courses that will be taken during the next session. The enrollment request must be returned to the Director of the Graduate Program by

the indicated deadline so that enrollment and applicable tuition waiver requests can be completed.

3.5 Enrollment Requirements

The Graduate College Bulletin defines full-time enrollment for graduate students as 9 hours in the fall and spring semesters, and 4 hours in the summer session. Full-time enrollment for graduate assistants is defined as 6 hours during the fall and spring semesters, and 3 hours in the summer session.

3.6 Tuition Waivers

Each academic year, the College of Pharmacy receives a tuition waiver allowance from the Graduate College. The tuition waivers are administered by the Director of the Graduate Program, according to policies established by the Graduate Affairs Committee and College of Pharmacy administration. Priority for tuition waivers is given to graduate assistants. In the event that the waiver allowance exceeds the tuition expenses of the graduate assistants, full or partial waivers may be granted for graduate coursework of Pharm.D./M.S. students and registered pharmacists seeking a graduate degree as a part-time student.

3.7 Academic Progression

Graduate students are expected to maintain a minimum grade point average of 3.0 in their graduate coursework, or they will be subject to probation (see Graduate College Bulletin). Students may also be placed on probation if they are not making satisfactory progress in their research program at the time of their annual review. Students who are placed on probation may be subject to loss of the graduate assistant appointment and/or tuition waivers, following review of the circumstances by the Graduate Affairs Committee.

The annual review of graduate students required by the Graduate College is conducted during the summer session. The Graduate Affairs Committee will determine guidelines for the review, which is to be initiated by each student and her/his faculty advisor. The advisory subcommittee from the student's academic department will complete the review process and report the results to the Director of the Graduate Program, who will forward a report to the Graduate College.

3.8 Ethics

The Graduate College requires that all students take coursework in ethics prior to enrolling in thesis or dissertation research. Students in Graduate Pharmaceutical Sciences may fulfill this requirement through enrollment in BMSC 5001 (Integrity in Scientific Research), BSE 5111 (Scientific Integrity in Research) or NURS 6101 (Responsible Conduct in Research).

3.9 Seminar Requirements

Graduate students are required to participate in graduate program seminars (PHSC 6970). Students in the masters program must present at least one seminar, and students in the doctoral program must present at least two

seminars. Students should enroll for one hour of credit in the semester that they will present a seminar. However, all students are required to attend graduate program seminars, and to participate in a critique of the presentations. Sanctions may be levied against students who fail to attend the graduate program seminars.

3.10 Academic Appeals

Any student who feels unfairly evaluated in any academic exercise (course, qualifying examination, dissertation, etc.) has the right to appeal the evaluation. Such appeals must be filed in writing and given to the Graduate Dean within 60 days of the disputed incident.

3.11 Graduate Student Association

Graduate students in the College of Pharmacy participate in a Graduate Student Association (GSA), which typically meets monthly during the fall and spring semesters. The GSA considers issues which impact graduate students in the College, administers the graduate student fee account, and elects representatives to other student organizations on the campus.

3.12 Graduation

Upon completing their degree requirements, students are encouraged to participate in the College of Pharmacy commencement activities, which are held after the end of the spring semester. Interested students may also participate in commencement activities held on the Norman campus.

4. THE DOCTOR OF PHILOSOPHY PROGRAM

4.1 Requirements for the Doctor of Philosophy Degree

The doctoral degree in Graduate Pharmaceutical Sciences requires completion of a minimum of 90 credit hours of approved coursework with a minimum grade point average of 3.0 and a dissertation. Full-time students must complete the degree requirements within seven years of initial enrollment in the graduate program, and part-time students must complete the degree requirements within five years of being admitted into candidacy.

4.2 Departmental Advisory Committee and Subcommittees

The Departmental Advisory Committee required by the Graduate College is comprised of faculty members of the Graduate Affairs Committee, the majority of whom are authorized to chair doctoral committees. The membership of the Graduate Affairs Committee will be reported annually to the Graduate Dean.

Separate Advisory Subcommittees have been established in the basic sciences, clinical sciences, and social/administrative sciences. These subcommittees will help new students complete enrollment, guide students in selection of a faculty

advisor, conduct the annual review of graduate students, and will continue in an advisory role until a Dissertation Committee is formed.

4.3 Plan of Study

During the first year in the graduate program, students must complete the “Report of the Doctoral Advisory Committee”, a plan of study listing all coursework to be taken for the doctoral degree. A maximum of 44 hours of graduate coursework completed at another university with an accredited graduate program (including web-based courses), with a minimum grade of B may be accepted as transfer credit if approved by the appropriate advisory subcommittee. Individual programs of study should be modeled after sample curricula outlined in Section 8 of this handbook. After approval of the “Report of the Doctoral Advisory Committee”, any changes to the plan of study must be justified in writing to the Graduate College.

4.4 General Examination

When the student has completed nearly all of the non-dissertation coursework listed in the plan of study, he/she may apply to take the General Examination. An Examining Committee will be appointed for each student, with approval of the Graduate Dean. The members of the Examining Committee must hold graduate faculty appointments with authority to serve on dissertation committees. The majority of the committee members must have a primary appointment in the College of Pharmacy, but at least one of these individuals must hold a primary appointment outside the College of Pharmacy

The General Examination will include a written and an oral component, and the student must perform satisfactorily in both. All members of the Examining Committee must be present for the oral component. The Examining Committee is responsible for determining the scope of the examination and for its evaluation. Students who do not pass the General Examination on their first attempt may be allowed to reschedule the examination, but the Examining Committee may require completion of remedial coursework to correct specific weaknesses before the second attempt. Students who do not pass the General Examination on the second attempt will be dismissed from the doctoral program, but may be offered the opportunity to complete a masters thesis. General oversight for the examination process will be provided by the advisory subcommittee for the student’s academic department.

4.4 Dissertation Committee

A student who has passed the General Examination will be advanced into candidacy for the doctoral degree by the Graduate Dean. At this time, the student and her/his faculty advisor should form a Dissertation Committee, which will guide the student through the dissertation research phase and conduct the final examination.

The Dissertation Committee must consist of at least 5 members of the graduate faculty who are authorized to serve on doctoral dissertation committees. The majority of the committee members must have a primary appointment in the College of Pharmacy, but at least one of these individuals must hold a primary appointment outside the College of Pharmacy. If the student's advisor is an adjunct faculty member, a co-chair with a regular faculty appointment in the College of Pharmacy must be designated.

4.5 Prospectus

Prior to the first meeting of the Dissertation Committee, the student must develop a prospectus describing the proposed dissertation project, and present it to the Committee. Doctoral students are encouraged to start preparing the prospectus early in their graduate training, but it must be completed within three months of passing the General Examination. The prospectus should be titled, and include an abstract, specific aims, background and significance, research design and methods, anticipated results, and experimental sequence. Specific guidelines for developing the prospectus can be obtained from the Director of the Graduate Program.

4.6 Dissertation Defense

Meetings of the Dissertation Committee should be held at least semi-annually. After the Dissertation Committee is satisfied that the student has completed all phases of the dissertation project, the student will distribute a reading copy of the dissertation to members of the Committee. Guidelines for the preparation of the dissertation and scheduling of the final oral examination are available from the Graduate College.

5. THE MASTER OF SCIENCE PROGRAM

5.1 Requirements for the Masters Degree

The master of science degree in Graduate Pharmaceutical Sciences requires completion of a minimum of 30 credit hours of approved coursework with a minimum grade point average of 3.0 and a thesis. The College of Pharmacy does not offer a non-thesis Master of Science program. All requirements for the Master of Science degree must be completed within six years of initial enrollment in the graduate program. The advisory subcommittee in the student's academic department will advise the student until a faculty advisor has been identified.

5.2 Plan of Study

During the first year in the graduate program, students must complete the "Outline of Graduate Work", a plan of study listing all coursework to be taken for the Master of Science degree. Coursework from a previous graduate degree may not be included in the plan of study, but up to 8 hours of graduate coursework from other institutions may be transferred with approval of the advisory subcommittee and the Graduate Dean. The required 30 hours must

include at least 4 credit hours of thesis research, 1 hour of ethics, and 1 hour of seminar. Courses from accredited graduate programs outside the University of Oklahoma (including web-based courses) may be included in the plan of study if approved by the advisory subcommittee. After approval of the "Outline of Graduate Work", changes to the plan of study must be justified in writing to the Graduate College.

5.3 Thesis Committee

A Thesis Committee must also be formed during the first year in the graduate program. This Committee will consist of at least four members of the graduate faculty with authority to serve on a masters thesis committee. The majority of the committee members must have a primary appointment in the College of Pharmacy, but at least one member must hold a primary appointment outside of the College of Pharmacy. If the student's advisor is an adjunct faculty member, a co-chair with a regular faculty appointment in the College of Pharmacy must be designated.

At the first meeting of the Thesis Committee, the student should present a prospectus of the proposed research (see section 4.5 for instructions). The Committee should meet at least semi-annually.

5.4 Thesis Defense

At the beginning of the last semester in the graduate program, students must file the "Admission to Candidacy" form with the Graduate College. This form includes the title of the thesis and a date for the final oral examination. Guidelines for completion of the thesis and scheduling of the oral examination are available from the Graduate College. The Thesis Committee will conduct the thesis defense.

6. THE DOCTOR OF PHARMACY/MASTER OF SCIENCE (PHARM.D./M.S.) DUAL DEGREE PROGRAM

6.1 Eligibility for the Dual Degree Program

Students in the Doctor of Pharmacy program at the University of Oklahoma College of Pharmacy may apply for admission to the graduate program as dual degree students. Admission criteria will be established annually by the Graduate Affairs Committee.

6.2 Requirements for the Masters Degree

The requirements for the masters degree in the dual degree program are identical to those indicated in Section 5 for the regular master of science program. Several graduate level courses have been specifically developed to supplement the graduate education of dual degree students, and should be included in the plan of study.

University policy allows students in dual degree programs to enroll in a limited number of hours that can count toward the requirements of both degrees. Students in the Pharm.D./M.S. program may enroll in the graduate equivalent courses of the professional curriculum in biotechnology (3 hours), clinical toxicology (3 hours), and research practicum (4 hours). Graduate coursework fulfills most of the requirements for electives in the professional curriculum. In order to complete both degrees in the minimum amount of time, dual degree students are required to enroll in summer sessions.

Dual degree students are expected to maintain grade point averages of at least 3.0 in both their professional and graduate curricula. Their academic progress is reviewed after the end of each semester by the Director of the Graduate Program.

7. COURSES IN GRADUATE PHARMACEUTICAL SCIENCES

Course numbers, credit hours, and course directors are shown for each of the courses that are currently listed in the OUHSC course catalog.

PHSC 5012 Clinical Pharmacology (2 hours)

A clinically oriented course in pharmacology with emphasis on those drugs most commonly used in dentistry. The clinical aspects, mechanisms, interactions, and contraindications of drugs taken by the dental patient are stressed. (Dr. Splinter)

PHSC 5031 Oral/Written Presentation Skills in the Social & Administrative Pharmaceutical Sciences (1 hour)

The course will provide training in the comprehensive and presentation of cutting-edge primary literature in the field of social & administrative pharmaceutical sciences, which include, but are not limited to applications in sociology, psychology, management, marketing, economics, finances, epidemiology, and public health: and at the same time in developing scientific literature evaluation and general writing skills. (Graduate Faculty)

PHSC 5042 Antimicrobial Chemotherapy (2 hours)

This course integrates basic information on the chemotherapy of infectious diseases with a special emphasis on resistance to antimicrobial chemotherapy and development of new antimicrobial agents. (Dr. Reinke)

PHSC 5103 Pharmaceutical Technology (3 hours)

Students will learn the basic technologies associated with pharmaceutical research. The course is designed to introduce fundamentals of working in a pharmaceutical, drug development and delivery research environment. The laboratory component is included in order to provide demonstration of the underlying principles associated with common techniques/equipment used in such research. (Dr. V. Awasthi)

PHSC 5133 Biotechnology and Protein Drugs (3 hours)

Recent developments in the synthesis, structure, and function of biologically active proteins and their relationship to the treatment of disease in man. (Dr. McShan)

PHSC 5153 Immunopharmacology (3 hours)

The purpose of this course is to provide an expanded understanding of immunopharmacology, beyond that presented in a basic immunology course, to include an understanding of the

mechanistic and research basis of the science. Basic principles of pharmacology, and development and use of immunotherapeutics will also be emphasized. (Dr. Gallucci)

PHSC 5232 Advanced Pharmacotherapy I (2 hours)

This course will provide advanced instruction in the pharmacology, medicinal chemistry, and therapeutic applications of drugs used to treat disorders of the cardiovascular, respiratory, renal and nervous systems. New concepts in the development of these disorders will also be included. (Dr. Reinke)

PHSC 5324 Radionuclide Methodology (4 hours)

Principles of radioactive tracer methodology used in health research. Basic radiation physics, radionuclide calculations, interactions of radiation with matter, methods of radiation detection and determination experimental design, radiological safety, and application of radionuclides to research. Laboratory included. (Dr. V. Awasthi)

PHSC 5332 Advanced Pharmacotherapy II (2 hours)

This course will provide advanced instruction in the pharmacology, medicinal chemistry, and therapeutic applications of drugs used to treat disorders of the endocrine system, rheumatologic and gastrointestinal diseases, and infectious diseases. New concepts in the development of these disorders will also be included. (Dr. Shankar)

PHSC 5334 Nuclear Pharmacy (4 hours)

Prerequisite: 5324 or permission. Introduction to the field of nuclear pharmacy. Topics include radiopharmaceutical quality control, stability, and labeling techniques. Laboratory included. (Dr. V. Awasthi)

PHSC 5412 Pharmacodynamics of Current Therapeutic Agents (2 hours)

Current developments in pharmacology from a clinical standpoint. May be repeated once with a change of topic. (Graduate faculty)

PHSC 5432 Advanced Pharmacotherapy III (2 hours)

This course will provide advanced instruction in the pharmacology, medicinal chemistry, and therapeutic applications of drugs used to treat cancer, hematologic and psychiatric disorders, and diseases of the skin. New concepts in the development of these disorders will also be included. (Dr. Hagemann)

PHSC 5433 Social and Behavioral Issues in the Medication Use Process (3 hours)

Introduction to psychosocial theories of patient and health provider behavior, evaluation of literature in which these theories are tested, and development of proposals to conduct theory-based research. Social and behavioral aspects of patient and health provider roles and relationships as they relate to medication use are emphasized. (Dr. Planas)

PHSC 5523 Clinical Toxicology (3 hours)

The clinical toxicology of common agents ingested in overdoses. The practical management, including stabilization of the patient, drug evacuation, drug elimination and prevention of damage. The evaluation of poison information literature and how to answer a poison question. (Dr. Reinke)

PHSC 5561 General Principles of Pharmacology: The ins and outs of drug action (1 hour)

This course will discuss the role of drug disposition (uptake, distribution, metabolism and elimination) on pharmacokinetics and efficacy. Principles and utility of reverse agonism, biased agonism and paradoxical pharmacology, methods of receptor quantification (in vivo and in vitro), effect of chronic drug treatment and immunosuppressant pharmacology also will be addressed. (Dr. Ihnat)

PHSC 5563 General Pharmacology (3 hours)

Coverage of basic principles of drug action, including in depth assessments of mechanism of action of drugs that influence the central and peripheral nervous systems, cardiovascular/renal system, endocrine system and immune system. (Dr. Standifer)

PHSC 5571 Neuropharmacology (1 hour)

This course will address the biochemical, molecular and physiological mechanisms of drugs affecting the central nervous system, potential new drug targets for each conditions, and methods of assessing the effectiveness of potential therapeutic agents. (Dr. Standifer)

PHSC 5572 Pharmacotherapeutic Considerations in Pediatrics (2 hours)

This course will provide students with the knowledge and skills for rational pharmacotherapy for pediatric patients. Instruction will primarily involve case-based learning, with an emphasis on evaluation of pertinent literature. (Dr. Hagemann)

PHSC 5581 Principles of Toxicology (1 hour)

General principles of toxicology and systemic sites of action of toxicants, to include an understanding of the mechanistic and research basis of the science. (Dr. Reinke)

PHSC 5591 Cardiovascular, Renal and Endocrine Pharmacology (1 hour)

Coverage of the mechanism and action of drugs that modulate cardiovascular, renal and endocrine systems as well as methods and relevant model systems in which these methods can be employed to answer basic science questions and screen for clinical efficacy. (Dr. Standifer)

PHSC 5643 Pharmacokinetics (3 hours)

Fundamental principles, mathematical models, and clinical applications of pharmacokinetics. (Dr. Woo)

PHSC 5703 Pharmacy Administration Research Methods (3 hours)

Prerequisite: BSE 5163 Biostatistics Methods I or equivalent. Research procedures in pharmacy administration including definition of the problem, scaling and measurement methods, sample size determination, questionnaire development, and selection of experimental or quasi-experimental designs. (Dr. Harrison)

PHSC 5713 Advanced Pharmacy Management (3 hours)

Principles of management in providing ambulatory pharmaceutical services with emphasis on the efficient management of a community pharmacy within the dynamics of the health care system. (Graduate faculty)

PHSC 5723 Pharmacy Service Evaluation (3 hours)

Principles of cost effectiveness analysis (CEA) and cost benefit analysis (CBA) applied to the evaluation of pharmacy services and related health care programs. (Dr. Farmer)

PHSC 5813 Interdisciplinary Geriatric Care (3 hours)

Cross listed: AHS 5813, GERC 5813, NURS 5813. This course is an introduction to interdisciplinary and multidisciplinary approaches to health care of the elderly. It shows the importance of working together, and how team work will benefit the patient. It considers current issues in geriatric care and how different professions can interact for better patient care. (Dr. Stratton)

PHSC 5980 Research for Master's Thesis (credit hours vary)

A minimum of 4 hours must be included for the Master of Science program. (Graduate faculty)

PHSC 5990 Special Studies in Pharmaceutical Sciences (credit hours vary)

May be repeated with change of subject matter; maximum credit twelve hours. Laboratory and

library work to give qualified students an opportunity to pursue an original investigation or an interest in a special problem. (Graduate faculty)

PHSC 6000 Research Rotations in Pharmaceutical Sciences (1-3 hrs)

This course provides the opportunity for students to learn and experience an in-depth knowledge and appreciation for scientific skills and emphasizes techniques, instrumentation, and experimental design in a specific discipline within a multidisciplinary research environment. (Dr. Standifer)

PHSC 6002 Pharmacogenomics: The Foundation of Personalized Medicine (2 hours) Cross listed with OCNS 6002 and GENC 6002. This course will prepare the graduate students to understand the influence of genetic variations among individuals and their contribution to differences in drug response. The students will learn basic principles of genetics and pharmacology and how genetic, environmental, lifestyle and nutritional factors affect drug response (Dr. Sanghera, Dr. Reinke)

PHSC 6042 Advanced Pharmacology (2 hours)

Prerequisites: PHSC 5563, General Pharmacology, or an equivalent course. This course provides instruction in drug transport and elimination, drug-receptor interactions, cancer chemotherapy, and immunopharmacology that are not addressed in introductory pharmacology courses. (Dr. Reinke)

PHSC 6103 General and Systemic Toxicology (3 hours)

General principles of toxicology and systemic sites of action of toxicants. (Dr. Reinke)

PHSC 6120 Advanced Topics in Pharmaceutical Sciences (1-4 hours)

This course provides advanced instruction in topics that were introduced in existing courses, or it may be used to teach emerging concepts that are not currently included in the curriculum. Topics for this course may be chosen from the basic pharmaceutical sciences, clinical sciences, or the social and administrative sciences. (Graduate faculty)

PHSC 6131 Journal Club in Pharmaceutical Sciences

The objectives of this course are for students to be able to critically analyze and appraise publications, organize and prepare a coherent presentation, and prepare a written critique of a selected article. This will help students interpret the relevance of findings in biological context and understand ethical responsibilities required for the scientific pursuit. (Dr. S. Awasthi)

PHSC 6133 Macromolecular Separation and Characterization Techniques (3 hours)

Macromolecular separation and characterization techniques with emphasis on immunological techniques. (Graduate faculty)

PHSC 6313 Design and Development of Radiopharmaceuticals (3 hours)

Prerequisite: PHSC 5324 and PHSC 5334. The essential properties of desired radionuclides and the chemical and biological factors involved in the design of new radiopharmaceuticals. The design concepts: empirical, semi-empirical, and mechanistic. (Dr. V. Awasthi)

PHSC 6663 Physical Pharmacy (3 hours)

Advanced theoretical applications of physical and chemical principles to pharmaceuticals. (Dr. Garcia-Contreras)

PHSC 6673 Biopharmaceutics (3 hours)

To study the factors which affect the absorption, distribution, and excretion of drugs from the body with emphasis on the optimization of drug effect. (Dr. Bourne)

PHSC 6712 Research and Educational Methods (2 hours)

Overview of research and educational methods for students in the pharmaceutical sciences. This

course will cover hypothesis development, grant writing, the patent process, course development, course assessment and grading. (Dr. Shankar)

PHSC 6960 Readings in Pharmaceutical Sciences (1-2 hours)

May be repeated with change in subject matter; maximum credit two hours. Discussion and reports on assigned readings relative to different divisions in pharmaceutical sciences. Subject areas are medicinal chemistry, pharmacognosy (natural products), nuclear pharmacy, pharmacodynamics/toxicology, hospital/clinical pharmacy, pharmaceuticals, and pharmacy management. (Graduate faculty)

PHSC 6970 Seminar in Pharmaceutical Sciences (1 hour)

May be repeated with change in subject matter; maximum credit four hours. A general seminar for all divisions of graduate study in pharmaceutical sciences. (Dr. Reinke)

PHSC 6980 Research for Doctoral Dissertation (credit hours vary)

May be repeated to maximum of 45 semester hours. A maximum of 16 hours per semester is allowed. (Graduate faculty)

8. SAMPLE CURRICULA IN GRADUATE PHARMACEUTICAL SCIENCES

Graduate training in the College of Pharmacy is interdisciplinary in nature because students may specialize in basic sciences or social/administrative sciences, each of which includes several areas of emphasis. Examples of core curricula in the broad areas of basic sciences and pharmacy administration are given in the following sections. Master of science programs include most of the courses shown for the doctor of philosophy degree, with PHSC 5980 (Research for Masters Thesis, 4-6 credit hours) substituted for PHSC 6980. In all cases, graduate electives that are most relevant to the student's area of specialization are taken to complete the degree requirements.

8.1 Core Curriculum for Doctor of Philosophy Degree with Specialization in Basic Pharmaceutical Sciences

<u>Course Number</u>	<u>Hours</u>	<u>Course Title</u>
BMSC 5001*	1	Integrity in Scientific Research
PHSC 5103	3	Pharmaceutical Technology
BSE 5163	3	Biostatistics Methods I
PHSC 5563**	3	General Pharmacology
PHSC 5990	3-6	Special Studies in Pharm Sci
PHSC 6000***	2-6	Research Rotations in Pharm Sci
PHSC 6131	2	Journal Club in Pharm Sci
PHSC 6712	2	Research and Educational Methods
PHSC 6970	2	Seminar
Graduate Electives	≥ 24	(Courses relevant to area of emphasis)
PHSC 6980	≤ 45	Research for Doctoral Dissertation (To complete 90 hours for degree; 45 hours is maximum for plan of study)

- *May substitute NURS 6101, Responsible Conduct in Research
 **May be substituted by PHSC 5561+ 5571+ 5591
 ***May be substituted by BMSC 6100 for students entering through GPIBS

8.2 Core Curriculum for Doctor of Philosophy Degree with Specialization in Social/Administrative Sciences (Pharmacy Administration)

<u>Course Number</u>	<u>Hours</u>	<u>Course Title</u>
BSE 5111*	1	Scientific Integrity in Research
BSE 5113	3	Principles of Epidemiology
BSE 5163	3	Biostatistics Methods I
BSE 5173	3	Biostatistics Methods II
BSE 5643	3	Regression Analyses
BSE 5653	3	Non-Parametric Methods
HAP 5203	3	Health Economics
PHSC 5031	2	Oral/Written Communication Skills
PHSC 5433	3	Social/Behav. Issues Med. Use Process
PHSC 5703	3	Pharmacy Admin. Research Methods
PHSC 5713	3	Advanced Pharmacy Management
PHSC 5723	3	Pharmacy Service Evaluation
PHSC 5990	6	Special Studies Pharm Sci
To be determined**	3	Survey & Qualitative Research Methods
PHSC 6970	2	Seminar
Graduate Electives	≥ 12	(Courses relevant to area of emphasis)
PHSC 6980	25-45	Research for Doctoral Dissertation (To complete 90 hours for degree; 45 hours is maximum for plan of study)

- *May substitute NURS 6101, Responsible Conduct in Research
 **Under development, initially taught as PHSC 6120, Advanced Topics in Pharmaceutical Sciences

8.3 Core Curriculum for Doctor of Pharmacy/Master of Science (Dual Degree) with Specialization in Basic/Clinical Sciences

The plan of study may not include more than 6 hours of PHSC 5980, 6 hours of PHSC 5990, or 2 hours of PHSC 6960.

<u>Course Number</u>	<u>Hours</u>	<u>Course Title</u>
NURS 6101*	1	Responsible Conduct in Research
PHSC 5133 ^a	3	Biotechnology and Protein Drugs
PHSC 5232	2	Advanced Pharmacotherapy I
PHSC 5332	2	Advanced Pharmacotherapy II
PHSC 5432	2	Advanced Pharmacotherapy III
PHSC 5523 ^b	3	Clinical Toxicology
PHSC 5563	3	General Pharmacology

PHSC 5980 ^c	4-6	Research for Masters Thesis
PHSC 5990	3	Special Studies
PHSC 6131	1	Journal Club in Pharm Sci
PHSC 6970	1	Seminar
Graduate Electives	3-5	To complete 30 hours for degree

^aSubstituted for PHAR 7143, Biotechnology

^bSubstituted for PHAR 7523, Clinical Toxicology

^cSubstituted for PHAR 7090, Research Practicum

*May substitute BMSC 5001, Ethics in Scientific Research

9. GRADUATE STUDENT FORMS AVAILABLE FROM THE GRADUATE COLLEGE

The Graduate College website provides standardized forms for many of the requirements for students during their graduate education. The most recent versions of the forms listed below are available on the Graduate College website at <http://graduate.ouhsc.edu/CurrentStudents/FormsandGuidelines.aspx>

PhD Forms

- Doctoral degree timeline
- Doctoral advisory conference report
- Application for general exam
- Thesis/dissertation guidelines
- Request for approval of doctoral committee
- Committee approval of dissertation date
- Dissertation defense announcement
- Dissertation/thesis published material permission

Master's Thesis Forms

- Master's degree thesis timeline
- Outline of graduate work
- Thesis/dissertation guidelines
- Admission to candidacy
- Request for thesis defense
- Dissertation/thesis published material permission