

PHARMACEUTICAL SCIENCES, PH.D.

Learning Outcomes

1. Students will demonstrate knowledge and application of the theories, principles, and methods underlying the pharmaceutical sciences.
2. Students will be able to identify pertinent research problems and formulate a research plan.
3. Students will critically analyze relevant literature and communicate scientific findings through oral presentations.
4. Students will generate and analyze original research and communicate findings to the scientific community.

Degree Requirements

The Ph.D. in Pharmaceutical Sciences offers two areas of concentration: Drug Discovery and Biomedical Sciences (DDBS) and Pharmaceutical Outcomes Sciences (POS). Each concentration requires a minimum of 60 hours beyond the baccalaureate degree or a minimum of 30 hours beyond the master's degree (DDBS concentration) or a minimum of 34 hours beyond the master's degree (POS concentration) as approved by advisement. At least 12 credit hours of dissertation preparation are required. The Ph.D. degree requirements include an admission-to-candidacy examination, a comprehensive examination, and a dissertation.

In the Department of Drug Discovery and Biomedical Sciences

1. A research advisor must be chosen by the end of the first year.
2. Admission to candidacy must occur by the end of the second year, and includes the following:
 - a. Submission of a doctoral program of study form. Satisfactory completion of all coursework taken in the first two years will be evaluated by the committee.
 - b. Submission of a written initial research proposal, followed by an oral presentation and defense of the proposal to the dissertation committee.
3. The comprehensive written and oral examination must be completed by the end of the third year.
4. A written dissertation, along with an oral presentation and defense, is required for the completion of the Ph.D. degree

In addition to the general requirements listed above, candidates for the Ph.D. degree with a concentration in DDBS are required to complete four departmental seminar courses.

Ph.D. Drug Discovery and Biomedical Sciences (DDBS) Concentration (60 Hours Minimum Post-Baccalaureate)

Required Courses (24 hours)

Course	Title	Credits
PHAR 700	Principles of Pharmacology, Medicinal Chemistry, and Pharmaceutics	4
PHAR 701	Current Topics in Pharmaceutical Sciences	4
PHAR 712A	Seminar in Pharmaceutical Sciences ¹	1
PHAR 712B	Seminar in Pharmaceutical Sciences ¹	1
PHAR 712C	Seminar in Pharmaceutical Sciences ¹	1
PHAR 712D	Seminar in Pharmaceutical Sciences ¹	1

Select 12 hours of electives ²	12
Total Credit Hours	24

¹ A maximum of 4 hours credit can be earned for PHAR 712.

² Electives will be chosen based on the needs of the graduate student. Areas of emphasis include Biomedical Chemistry, Synthetic Medicinal Chemistry, Pharmaceutics, and Pharmacology. Electives will be chosen based on the area of emphasis and must be approved by the Ph.D. advisory committee and the Graduate Program Director. Electives must be 700 level and above, or any course approved by the Graduate School for Graduate Credit

Doctoral Directed Research (24 Hours)

Course	Title	Credits
PHAR 896	Doctoral Directed Research ¹	1-6
Total Credit Hours		1-6

¹ Other courses may be applied as electives toward the total credit hours required for PHAR 896 if approved by the Ph.D. advisory committee and the Graduate Program Director.

Dissertation Preparation (12 Hours)

Course	Title	Credits
PHAR 899	Dissertation Preparation	12
Total Credit Hours		12

In the Department of Clinical Pharmacy and Outcomes Sciences

The Ph.D. in Pharmaceutical Sciences with a concentration in Pharmaceutical Outcomes Sciences prepares the graduate for numerous careers in academia, health care consulting, and the pharmaceutical industry. The program is designed to meet the specific needs and objectives of the student and provide a strong foundation of coursework and experiences in the areas of pharmaceutical outcomes research. In addition to the core coursework, students select an area of specialization to develop additional expertise in pharmacoconomics, pharmacoepidemiology, or implementation science and health policy. The program has a strong emphasis on developing skills in quantitative and qualitative data analysis as well as large database management. The program uses a multidisciplinary approach in teaching and research activities.

Students who enter the Ph.D. program with a concentration in Pharmaceutical Outcomes Sciences with a post-baccalaureate degree (B.S. or Pharm.D.) must successfully complete at least 60 hours of graduate coursework. Students who enter the Ph.D. program with a master's degree in a related field must successfully complete at least 34 hours of graduate coursework.

After enrolling in the program, the student must choose a research advisor by the end of the first year of enrollment. Admission to candidacy must occur by the end of the second year after passing a qualifying examination based on all courses completed during the first year of the program. A comprehensive written and oral examination must be completed by the end of the third year of the program. A written dissertation, along with an oral presentation and defense is required for the completion of the Ph.D. degree

Ph.D. Pharmaceutical Outcomes Sciences (POS) Concentration (60 Hours Minimum Post-Baccalaureate)

Pharmacy Core (22 hours)

Course	Title	Credits
PHAR 711A	Seminar in Pharmaceutical Outcomes Research ¹	1
PHAR 711B	Seminar in Pharmaceutical Outcomes Research ¹	1
PHAR 711C	Seminar in Pharmaceutical Outcomes Research ¹	1
PHAR 711D	Seminar in Pharmaceutical Outcomes Research ¹	1
PHAR 740	Socio-Economics of Pharmacy Practice	3
PHAR 741	Pharmaceutical Outcomes Database Development	3
PHAR 742	Research Methods in Pharmaceutical and Health Outcomes Sciences	3
PHAR 743	Grant Writing for the Pharmaceutical Sciences	2
PHAR 748	Principles of Pharmacoeconomics	3
PHAR 749	Introduction to Implementation Science	2
PHAR 750	Introduction to Pharmacoepidemiology	2
Total Credit Hours		22

¹ A maximum of 4 hours credit can be earned for PHAR 711.

Analytic Requirements (12 hours)

All doctoral students must also complete at least 12 credit hours in graduate level statistical and analytical coursework. Depending on the student's needs, additional courses may be required as identified and approved by the major advisor and Graduate Program Director in consultation with the student.

Analytical Core (12 hours)

Course	Title	Credits
BIOS 700	Introduction to Biostatistics	3
BIOS 757	Intermediate Biostatistics	3
BIOS 754	Discrete Data Analysis	3
EPID 701	Concepts and Methods of Epidemiology	3
Total Credit Hours		12

Dissertation Preparation (12 hours)

Course	Title	Credits
PHAR 899	Dissertation Preparation	1-12
Total Credit Hours		1-12

Minor/Cognate (Specialization) (14 Hours Minimum)

Students in the Ph.D. in Pharmaceutical Outcomes Sciences concentration must also take at least 14 hours of elective graduate level courses in one of the following areas: pharmacoeconomics, pharmacoepidemiology, or implementation science and health policy. Elective courses will be identified and approved by the major advisor and Graduate Program Director in consultation with the student.

Specialization Areas:

- *Pharmacoeconomics* identifies, measures, and compares the costs (resources used) and consequences (clinical, economic, and humanistic outcomes) of the use of pharmaceutical products and services. Cost-consequence, cost-minimization, cost-effectiveness, cost-utility and quality of life methodologies are applied to answer questions about the value of therapy to the patient, payer, health care system and society. Decision makers can use these methods to

evaluate and compare the total costs of treatment options and the outcomes associated with these options.

- *Pharmacoepidemiology* is the study of the utilization and effects of drugs in large numbers of people. Pharmacoepidemiology focuses on patient outcomes from medical interventions and therapeutics by applying the methods of clinical epidemiology to understanding the determinants of beneficial and adverse drug effects.
- *Implementation Science and Health Policy* is an emerging field focused on improving the uptake of evidence-based research and practice in real-world settings. Graduates will understand and apply a range of theories and methods to identify determinants, develop implementation strategies, and evaluate outcomes of evidence-based health-related programs, interventions, and policies to ensure effective, safe, equitable, and quality care.

Concurrent Pharm.D. and Ph.D. (60 Hours minimum Post-Baccalaureate)

All students must successfully complete at least 60 hours of graduate coursework. In addition to the general requirements listed for the Ph.D. degree, students pursuing the Pharm.D. and Ph.D. concurrently will take elective courses that are approved for graduate credit and fulfill requirements for the Ph.D. program. Up to twelve (12) credit hours from the Pharm.D. curriculum may count toward both degrees, with the following stipulations.

- The student must have completed at least 90 hours of undergraduate coursework, have a minimum GPA of 3.40, and have the Accelerated Bachelor's/Graduate Study Plan Authorization (G-ABGSP) form approved and on file in the Graduate School.
- Grades of B or higher must be earned for the course to count for graduate credit.
- At least half of the electives must be numbered 700 or above. Courses numbered 500-699 are acceptable only if they have been approved for graduate credit.
- Graduate courses taught in units other than the College of Pharmacy must be approved by the graduate faculty of the College of Pharmacy as appropriate for a Ph.D. degree in pharmaceutical sciences.
- Registration for each course requires approval of the student's advisor, the chair of the student's department, the Graduate Program Director of the Ph.D. program, and the dean of the UofSC Graduate School.
- Form G-ABGSP must be processed for each graduate credit course at the time of registration to permit the registrar's office and the UofSC Graduate School to properly enroll and code the student for enrollment in a course for graduate credit.

A written dissertation based upon original research, along with an oral presentation and defense, is required for the completion of the Ph.D. degree.