

M.S. IN PHARMACOLOGY AND TOXICOLOGY

The Master of Science in pharmaceutical sciences degree is designed to prepare an individual for responsibilities in professional practice, the pharmaceutical industry and scientific research beyond those possible with a baccalaureate.

Although a single degree is conferred, specialization is possible in that the curriculum is organized into three distinct disciplines, referred to here as "options". Applicants must select the program of study (option) they wish to pursue. The options available to graduate students are:

- pharmacology/toxicology,
- health outcomes and socioeconomic sciences, and
- industrial pharmacy.

The requirements for the Master of Science in pharmaceutical sciences degree differ according to the option. The minimum course work for the industrial pharmacy major is 24 semester hours, for the pharmacology/toxicology major 28 semester hours and for the health outcomes and socioeconomic sciences major 27 semester hours. In addition, each major requires a minimum of 6 semester hours of thesis research.

In general, a baccalaureate in the sciences is required for admission, although applicants possessing other bachelor's degrees will be considered if the latter represent adequate preparation. Certain options and graduate courses require undergraduate preparation as prerequisites, and this preparation should be completed as soon as possible upon admission. The total time required for completion of the graduate program leading to the Master of Science in pharmaceutical sciences degree will depend upon the preparation of the student entering the program. Normally two years of study and research are required.

The admission requirements of the College of Graduate Studies of the University apply. The basic requirement is a 2.7 (on a 4.0 scale) GPA on all undergraduate work leading to the bachelor's degree. Applicants having less than a 2.7 GPA on all undergraduate work will be considered for admission if other criteria for estimation of potential success in graduate studies are positive.

Each student must submit three copies of transcripts, one of which must be official and show all post-secondary academic work and degrees granted, three letters of recommendation from college faculty members acquainted with the applicant's character and ability. The Graduate Record Exam (GRE) is not required for admission, but is highly recommended for International students.

International students are required to take an English language test (<https://www.utoledo.edu/graduate/prospectivestudents/admission/guidelines.html>), which will be given in their own country by the Educational Testing Service.

Normally, acceptance will be decided by April 1 for admission during the following fall semester. The priority deadline for completed applications is January 15th. Complete applications received by this deadline will be considered for admission. Applications received after the January 15th deadline may also be considered, if positions are available in a

program. International students are encouraged to submit applications one month prior to the stated deadline to allow for delays in international correspondence.

A minimum of 28 semester hours of courses plus a minimum of 6 thesis credit hours are required for the degree.

Code	Title	Hours
Undergraduate Courses Required (or their equivalents)		
CHEM 3710	Physical Chemistry For The Biosciences I	3
CHEM 3720	Physical Chemistry For The Biosciences II	3
MATH 1750	Calculus For The Life Sciences With Applications I	4
MATH 1760	Calculus For The Life Sciences With Applications II	3
MBC 3310	Medicinal Chemistry I: Drug Action And Design	2
MBC 3320	Medicinal Chemistry II: Drug Design and Drug Action	3
PHCL 2610	Introductory Physiology	3
Graduate Courses Required		
PHCL 5140	Interpretation Of Pharmaceutical Data	2
PHCL 5700	Pharmacology I: Principles of Pharmacology, Autonomic Pharmacology and Related Pharmacology	3
PHCL 5720	Pharmacology II: Endocrine And Cns Pharmacology	3
PHCL 5730	Toxicology I	3
PHCL 5760	Toxicokinetics	3
PHCL 6600	Seminar In Pharmacology ¹	1
PHCL 6700	Pharmacology III: Cns And Cardiovascular/Renal Pharmacology	3
PHCL 6720	Pharmacology IV; Chemotherapeutics	3
PHCL 6900	M.s. Thesis Research In Pharmacology ²	1-6
PHCL 6920	M.s. Thesis Research In Pharmacology ²	1-6
Elective Course Work		
Select up to six credits of the following: ³		
PHCL 5750	Toxicology II	
PHCL 5990	Problems In Pharmacology ⁴	
MBC 6100	Advanced Immunology	
MBC 6550	Biochemistry	
MBC 5620	Biochemical Techniques	

¹ 1 credit hour can only be taken for BSPS/MSPS combined degree.

² 6 credit hours are the required minimum; more than 6 credit hours can be taken.

³ Other electives may be recommended by the department graduate committee.

⁴ May replace PHCL 5700, PHCL 5720, PHCL 5730, PHCL 6700, PHCL 6720, and PHCL 5760 if these were taken at UT at the undergraduate level as PHCL 3700, PHCL 3730, PHCL 4730, PHCL 4810, PHCL 4820 and PHCL 4760, respectively, and a grade of B- or above was received for the course.

BSPS-MSPS in Pharmaceutical Sciences – PTox

The combination of BSPS and MSPS degrees in PTox gives students the ability and choice to elect to get two degrees in five years. Currently, BSPS students will take 3.5-4 years to graduate and MSPS students will take 2 years. This will take up to 1 year off of the combined BS-MSPS degree.

All BSPS degree requirements remain intact. The student electing this program will need to achieve two things. First, the student taking classes that are required courses in the BSPS curriculum are also taking most of what is required in the MSPS curriculum in PTox. Classes that are required in BSPS that may be waived for the Master's curriculum with an achieved grade of B- or better will be:

Code	Title	Hours
PHCL 5700	Pharmacology I: Principles of Pharmacology, Autonomic Pharmacology and Related Pharmacology	3
PHCL 5720	Pharmacology II: Endocrine And Cns Pharmacology	3
PHCL 5730	Toxicology I	3
PHCL 6700	Pharmacology III: Cns And Cardiovascular/Renal Pharmacology	3
Total Hours		12

This will leave the internship which must then be done in the summer between P1 and P2. To fulfill both the internship and degree credit requirements, this must be 9-12 credits during this summer. The student must do the internship and the Master's degree program thesis with the same PI. This allows ideas and training done in the internship phase to be carried forward in the Master's degree program.

Master's degree program students in this combined degree curriculum will be starting in the spring after graduation in December (9 credits). The Master's program will go through the summer (4-6 credits), following fall (9 credits) and spring (9 credits), and a possible 3 credit summer where the students would defend.

BSPS –MS Law (available with BSPS in Pharmacology/Toxicology, Medicinal Chemistry, and Cosmetic Science)

This is a 4+1 combined degree program between the BSPS and the MS in Law. Students accepted into this program will carry out the requirements for their BSPS degree, take their internship in the summer between Junior and Senior years, and be eligible to take up to 9 credit hours of graduate level courses in the MS in Law program. Application is made in the summer between Junior and Senior years, to be eligible to take graduate courses in the senior year. The rest of the masters is taken in the year following graduation with the BSPS and fulfills the requirements of the Master's in Law program (30 total credits, etc.).

- PLO 1. Interpret and critically evaluate the literature in the respective discipline and identify gaps in current knowledge.

- PLO 2. Design, implement, and analyze the results of an independent research project in the respective discipline.
- PLO 3. Effectively communicate and defend research findings orally and in writing.
- PLO 4. Describe and comply with standards of ethical conduct of research.
- PLO 5. Effectively work in a team of colleagues within the discipline.