

BSPS IN DRUG DISCOVERY AND DESIGN

Drug Discovery and Design prepares students to research and design pharmaceutical drugs for a variety of patient needs and health objectives.

The program's lab-based curriculum blends courses in pharmacology and toxicology, medicinal and biological chemistry, pharmaceuticals, and healthcare delivery. Aside from the robust career prospects, the Drug Discovery and Design Program also serves as a great pre-med major for entering medical school, physician assistant (PA) school, veterinary school or dental school.

BSPS Internship Description

A 400-hour internship experience is required to be completed for all five majors within the Bachelor of Science in Pharmaceutical Sciences Program: 1) Cosmetic Science & Formulation Design, 2) Medicinal & Biological Chemistry, 3) Pharmaceuticals, 4) Pharmacology & Toxicology, and 5) Pharmacy Administration. Internships must be related to the pharmaceutical sciences industry and may take place within a variety of local, regional, national, and international sites. Students are not guaranteed or placed into internship experiences; however, robust career development resources are provided to help ensure students' success (i.e., job search assistance, networking contacts, resume writing assistance, interview preparation, etc.). Internships typically occur during the summer after P1 year. The internship experience typically occurs during the summer after P1 year, and the course grade is determined through a combination of supervisor evaluations and course assignments.

drug discovery and design MAJOR & MASTER OF SCIENCE (M.S.) IN MEDICINAL CHEMISTRY OPTION

The combination of BSPS degree with a major in Drug Discovery and Design (DDAD) and M.S. in Medicinal Chemistry gives students the ability to obtain two degrees in five years. Students in this program complete the BSPS portion in 3.5 years by graduating in December of the 4th year.

Once the BSPS degree is awarded the student can move from provisional to accepted in the graduate program. Information on and requirements for the M.S. portion of the program is in the CPPS Graduate Catalog in the section entitled: Master of Science in Medicinal Chemistry.

The student begins the Master's portion in the spring semester following the BSPS MBC graduation at the end of the Fall term, and could complete the M.S. degree by the end of the spring semester of the following year. Therefore, the two degrees, BSPS MBC and M.S. Medicinal Chemistry, could be completed in 5 calendar years.

Drug Discovery and Design

Completion of the requirements of the Pre-Pharmacy Curriculum, 62 semester hours without a double-dip

Code	Title	Hours
MBC 3310	Medicinal Chemistry I: Drug Action And Design	2
MBC 3550	Physiological Chemistry I: Structure And Function Of Biological Macromolecules	3
PHCL 3700	Pharmacology I: Principles of Pharmacology, Autonomic Pharmacology and Related Pharmacology	3
PHPR 3010	Pharmaceutical Calculations	2
PHPR 3020	Pharmaceutics I	3
PHM 3700	Career Planning Strategies	1
MBC 3100	Ethical Practice in Research	1
MBC 3320	Medicinal Chemistry II: Drug Design and Drug Action	3
MBC 3552	Physiological Chemistry II Cellular Metabolism and Homeostasis	2
PHCL 3730	BSPS Pharmacology II: Endocrine and CNS Pharmacology	3
PHCL 3810	Pharmacology And Toxicology Laboratory	1
PHPR 3030	Pharmaceutics II	3
PHPR 3150	Essentials of U.S. Healthcare Delivery and Pharmacoeconomic Evaluation	2
PHM 4780	Internship in Drug Discovery and Design	3
MBC 3330	Techniques in Pharmaceutical and Medicinal Chemistry	2
MBC 3340	Techniques in Pharmaceutical and Medicinal Chemistry Laboratory	1
MBC 4710	Targeted Drug Design	3
PHCL 4730	Toxicology I	3
PHCL 4810	BSPS Pharmacology III: CNS and Cardiovascular Pharmacology	3

BSPS Drug Discovery and Design Curriculum (FOR P1 STUDENTS ENTERING IN FALL 2025 AND AFTER)

PREPROFESSIONAL

First Term		Hours
PHPR 1000	Orientation *	1
MATH 1850	Single Variable Calculus I *	4
CHEM 1230	General Chemistry I *	4
CHEM 1280	General Chemistry Lab I	1
BIOL 2170	Fundamentals of Life Science: Biomolecules, Cells, and Inheritance	4
BIOL 2180	Fundamentals of Life Science Laboratory: Biomolecules, Cells, and Inheritance	1
		Hours
		15
Second Term		Hours
PHCL 2610	Introductory Physiology	3
MATH 2640	Statistics for Applied Science *2	3
CHEM 1240	General Chemistry II	4
CHEM 1290	General Chemistry Lab II	1

ENGL 1110	College Composition I *	3
Diversity of US ³		3
Hours		17
Third Term		
CHEM 2410	Organic Chemistry I	3
CHEM 2460	Organic Chemistry Laboratory I for Non-Majors	1
PHYS 1750	Introduction To Physics ¹	4
ENGL 1130	College Composition II: Academic Disciplines And Discourse *	3
Social Sciences Core ³		3
Hours		14
Fourth Term		
CHEM 2420	Organic Chemistry II	3
CHEM 2470	Organic Chemistry Laboratory II for Non-Majors	1
Social Sciences Core ³		3
Arts/Humanities Core ³		3
Arts/Humanities Core ³		3
Non#US Diversity ³		3
Hours		16
Total Hours		62

¹ Only offered during fall semesters

² Not required prior to P1 for BSPS-only applicants

³ If double-dip, PREP courseload reduced by 3 hours. Only one double dip is allowed for the UT Core requirements.

* Students should be academically prepared to be placed into MATH 1850 and CHEM 1230. Students placing into a lower math level - MATH 1200, MATH 1320 or MATH 1750 and/or placing into a lower level chemistry - CHEM 1090 (based on students' testing scores) will require additional hours for graduation.

*Equivalent courses:

o ENGL 1110 or ENGL 1010

o ENGL 1130 or ENGL 2950

o MATH 1850 = MATH 1750+1760

o MATH 2640 = MATH 2600

o PHYS 1750 = PHYS 2070 (please note that PHYS 2070 AND 2080 is recommended for pre-med/pre-vet/pre-dental degrees)

o PHCL 2610 = EXSC 2560+2570

Students should consult their Degree Audit for coursework that fulfills elective course requirements in the General Education/Core area.

PROFESSIONAL

		Hours
Fifth Term		
MBC 3310	Medicinal Chemistry I: Drug Action And Design	2
MBC 3550	Physiological Chemistry I: Structure And Function Of Biological Macromolecules	3
PHCL 3700	Pharmacology I: Principles of Pharmacology, Autonomic Pharmacology and Related Pharmacology	3

PHPR 3010	Pharmaceutical Calculations	2
PHPR 3020	Pharmaceutics I	3
PHM 3700	Career Planning Strategies	1
Professional Electives		0-3

Hours 14-17

Sixth Term		
MBC 3100	Ethical Practice in Research	1
MBC 3320	Medicinal Chemistry II: Drug Design and Drug Action	3
MBC 3552	Physiological Chemistry II Cellular Metabolism and Homeostasis	2
PHCL 3730	BSPS Pharmacology II: Endocrine and CNS Pharmacology	3
PHCL 3810	Pharmacology And Toxicology Laboratory	1
PHPR 3030	Pharmaceutics II	3
PHPR 3150	Essentials of U.S. Healthcare Delivery and Pharmacoeconomic Evaluation	2
Professional Electives ¹		0-2

Professional elective (MBC 3860, Microbiology for Pharmaceutical Professionals, recommended)

Hours 15-17

Seventh Term		
PHM 4780	Internship in Drug Discovery and Design ¹	3

Students taking an internship at a site which is outside of the College of Pharmacy and Pharmaceutical Sciences will register for PHM 4780.

The internship requirement can alternately be satisfied with 3 semester hours of MBC 4780, PHCL 4780, PHPR 4780 or PHPR 4880 if the internship site is within the College of Pharmacy and Pharmaceutical Sciences and under the supervision of a CPPS faculty member. Internship credit beyond the required 3 semester hours is counted for graduation as free elective hours and not as professional elective hours.

Hours 3

Eighth Term		
MBC 3330	Techniques in Pharmaceutical and Medicinal Chemistry	2
MBC 3340	Techniques in Pharmaceutical and Medicinal Chemistry Laboratory	1
MBC 4710	Targeted Drug Design	3
PHCL 4730	Toxicology I	3
PHCL 4810	BSPS Pharmacology III: CNS and Cardiovascular Pharmacology	3
Professional Elective		3-5

Hours 15-17

Ninth Term		
Professional Elective - to complete 13 hours		0-4
Free Elective (if necessary to complete 120 hours)		0-4

Hours 0-8

Total Hours 47-62

¹ Need a total of 13 credit hours as major electives.

All requirements listed above must be fulfilled with a minimum of 120 semester hours required for graduation.

Drug Discovery and Design Electives

Other electives require the approval of the Drug Discovery and Design major coordinator.

Code	Title	Hours
BIOL 2150	Fundamentals Of Life Science: Diversity Of Life, Evolution And Adaptation	4
BIOL 2160	Fundamentals Of Life Science Laboratory: Diversity Of Life, Evolution And Adaptation	1
BIOL 3010	Molecular Genetics	3
BIOL 3020	Molecular Genetics Laboratory	2
BIOL 3030	Cell Biology	3
BIOL 3040	Cell Biology Laboratory	2
BIOL 4010	Molecular Biology	3
BIOL 4030	Microbiology	3
BIOL 4050	Immunology	3
BIOL 4110	Human Genetics and Genomics	3
BIOL 4330	Parasitology	3
CHEM 3310	Analytical Chemistry	2
CHEM 3360	Analytical Chemistry Laboratory	2
CHEM 3560	Biochemistry Laboratory	2
CHEM 3730	Physical Chemistry I	3
CHEM 3710	Physical Chemistry For The Biosciences I	3
CHEM 3720	Physical Chemistry For The Biosciences II	3
CHEM 4200	Green Chemistry	3
CHEM 4400	Advanced Organic Chemistry	4
CHEM 4920	Readings In Chemistry III	1-2
ECON 4750	Health Economics	3
EEES 4450	Hazardous Waste Management	3
MBC 3860	Microbiology for Pharmaceutical Professionals	2
MBC 3880	Medicinal And Biological Chemistry Laboratory	3
MBC 4380	Medicinal Plants	3
MBC 4400	Cannabis Science: Plants and Products	3
MBC 4900	Honors Seminar In Medicinal And Biological Chemistry	1-3
MBC 4910	Problems In Biomedical Chemistry	1-3
MBC 4950	Research In Medicinal Chemistry	3-8
MBC 4960	Honors Thesis In Medicinal And Biological Chemistry	1-5
PHCL 4160	Biopharmaceutics & Pharmacokinetics	3
PHCL 4400	Cannabis Science – Risks & Benefits	3
PHCL 4750	Toxicology II	3
PHPR 4770	Advanced Drug Delivery Systems – I	3
PHCL 4900	Honors Seminar In Pharmacology	1-3
PHCL 4910	Problems In Pharmacology	1-3

PHCL 4960	Honors Thesis In Pharmacology	2-5
PHPR 4900	Honors Seminar In Pharmacy Practice	1-3
PHPR 3110	Pharmaceutics Lab I	1
PHPR 3120	Pharmaceutics Lab II	1
PHPR 4910	Pharmacy Practice Problems	1-5
PHPR 4960	Honors Thesis In Pharmacy Practice	2-5
HEAL 1800	Medical Terminology	3
HEAL 2800	Principles Of Nutrition	3
PHIL 3370	Medical Ethics	3
PHYS 2080	General Physics II	4

- Describe the drug development process, the role of pharmaceutical sciences in different stages of drug development, and provide examples of contemporary successful drug development cases and unmet needs.
- Apply pharmaceutical laboratory techniques for material identification, bioassays, experimental design, and quality assurance, while also explaining the scientific principles and practical applications of analytical techniques.
- Perform calculations and correctly make solutions for chemical reactions and bioassays, to control pH, and to prepare formulations.
- Apply principles of physical, biological, and administrative sciences to solve problems successfully and ethically in the pharmaceutical sciences.
- Predict chemical, biological, and pharmaceutical properties of compounds relevant to drug action and dosage form.
- Analyze scientific literature on a given topic in the pharmaceutical sciences to draw overall conclusions based on the data.
- Communicate effectively and work successfully as an individual or cooperatively as a team member.