

BSPS IN MEDICINAL CHEMISTRY (MBC)

Medicinal and biological chemistry is an interdisciplinary applied science. This major focuses on organic chemistry and biochemistry underlying the design, synthesis, and development of drugs.

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) Pharmaceutics, 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.

Medicinal and Biological Chemistry Major & Master of Science (M.S.) in Medicinal Chemistry Option

The combination of BSPS degree with a major in Medicinal and Biological Chemistry (MBC) 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 P2 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.

Below is a sample plan of study. Consult your degree audit for your program requirements.

BSPS MEDICINAL AND BIOLOGICAL CHEMISTRY MAJOR CURRICULUM (FOR P1 STUDENTS ENTERING IN FALL 2018 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		
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 accepted into the College of Pharmacy and Pharmaceutical Sciences should be academically prepared to be placed into MATH 1850 and CHEM 1230. Students placing into a lower math level -

MATH 1200, MATH1320 or MATH1750 and/or placing into a lower level chemistry - CHEM 1090 (based on students' testing scores) will require additional hours for graduation.

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

PROFESSIONAL

Fifth Term		Hours
MBC 3310	Medicinal Chemistry I: Drug Action And Design	2
MBC 3330	Techniques in Pharmaceutical and Medicinal Chemistry	2
MBC 3340	Techniques in Pharmaceutical and Medicinal Chemistry Laboratory	1
PHCL 3700	Pharmacology I: Principles of Pharmacology, Autonomic Pharmacology and Related Pharmacology	3
MBC 3550	Physiological Chemistry I: Structure And Function Of Biological Macromolecules	3
PHM 3700	Career Planning Strategies	1
MBC 3880	Medicinal And Biological Chemistry Laboratory	3
Major Elective ²		2
Hours		17
Sixth Term		Hours
MBC 3100	Practices in Pharmaceutical Research	1
MBC 3320	Medicinal Chemistry II: Drug Design and Drug Action	3
MBC 3560	Physiological Chemistry II: Chemical Regulation Of Cells And Organisms	3
PHCL 3730	BSPS Pharmacology II: Endocrine and CNS Pharmacology	3
MBC 3860	Microbiology for Pharmaceutical Professionals	2
MBC Laboratory (Recommend MBC 4870) ¹		6
Hours		18
Seventh Term		Hours
MBC 4710	Targeted Drug Design ³	3
MBC Laboratory (Footnote 1) or Major Elective (Footnote 2) ¹ ₂		12
Free electives, if necessary		2
Hours		17
Eighth Term		Hours
MBC 4780	Internship in Medicinal Chemistry ⁴	3-6
Hours		3-6
Total Hours		55-58

¹ The MBC major requires that 3 semester hours of laboratory instruction be taken at the 3000 level or higher in a course taught by the MBC Department. Completion of 3 semester hours of any of the following courses will satisfy this requirement: MBC 3880, MBC 4850, MBC 4870, MBC 4880, MBC 4900, MBC 4950, or MBC 4960.

² A total of 20 hours of course work to be chosen from the MBC electives list.

³ MBC 4720, Advances in Drug Design, when offered, will also fulfill the requirement.

⁴ Internship can be taken in summer before P2 year.

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

MBC Electives

A total of 20 hours of course work must be selected from the list of elective courses below. Other electives require approval of the MBC adviser.

Code	Title	Hours
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 3610	Inorganic Chemistry I	3
CHEM 3720	Physical Chemistry For The Biosciences II	3
CHEM 3730	Physical Chemistry I	3
CHEM 3740	Physical Chemistry II	3
CHEM 3860	Advanced Laboratory I	2
CHEM 3870	Advanced Laboratory II	2
CHEM 4300	Instrumental Analysis	2
CHEM 4620	Inorganic Chemistry II	3
CHEM 4880	Advanced Laboratory III	2
CHEM 4980	Special Topics In Chemistry	2
EEES 4150	Evolution	3
EEES 4300	Field Botany	3
EEES 4450	Hazardous Waste Management	3
EEES 4510	Environmental Microbiology	3
MBC 3860	Microbiology for Pharmaceutical Professionals	2
MBC 4470	Advanced Immuno-Therapeutics	2
MBC 4720	Advances In Drug Design	3
MBC 4850	Advanced Immunology And Tissue Culture Laboratory	1-10
MBC 4870	Biomedical Chemistry Laboratory	1-10
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 4950	Research In Medicinal Chemistry (Honors)	3-8

MBC 4960	Honors Thesis In Medicinal And Biological Chemistry	2-5
MBC 4980	Special Topics In Drug Design	1-4
PHCL 4810	BSPS Pharmacology III: CNS and Cardiovascular Pharmacology	3
PHCL 4820	BSPS Pharmacology IV: Chemotherapeutic Agents	3
PHCL 4730	Toxicology I	3
PHCL 4750	Toxicology II	3
PHCL 4760	Toxicokinetics	3

- PLO 1. Perform calculations to correctly make standard solutions, control pH, and for conduction of reactions, bioassays, and formulations.
- PLO 2. Utilize basic laboratory techniques common to medicinal and/or biological chemistry for the purpose of accomplishing set goals.
- PLO 3. Define the structures and functions of the major classes of both low and high molecular weight biomolecules in a living organism.
- PLO 4. Describe the fundamentals of a drug receptor interaction including specific binding between a ligand to a macromolecule, a description of the intermolecular binding forces, and the thermodynamics of binding.
- PLO 5. Describe the process of drug design and describe cases in which a design process has resulted in a successful new drug.
- PLO 6. Explain the scientific basis and application of analytical techniques utilized in medicinal chemistry and in biochemistry.
- PLO 7. Communicate effectively and work cooperatively as a team member.