

Pharmaceutics (PhD Program Requirements)

PCEUT 531 Pharmaceutical Formulation: Principles and Dosage Forms (4 credits)	Physiochemical principles involved in formulating stable dosage forms suitable for human administration. Hands-on laboratory experience with formulating extemporaneous preparations routinely encountered in community and hospital pharmacies. Routes of drug administration.
PCEUT 532 Clinical Pharmacokinetics (4 credits)	Covers basic principles of pharmacokinetics and their application to the clinical setting, including: single-dose intravenous and oral kinetics, multiple dosing, nonlinear pharmacokinetics, metabolite kinetics, pharmacogenetics, and the role of disease in drug clearance and dose requirements, and kinetics of drug-drug interactions.
PCEUT 533 Biopharmaceutics, Drug Delivery and Therapeutic Response (3 credits)	Provides basic principles of biopharmaceutics, drug delivery and therapeutic response, and their application to traditional and biotherapeutics, including oral and non-oral routes of drug administration. Discussion include fundamental principles related to assessment of bioavailability, bioequivalence, and genetic basis for drugs.
PCEUT 505 Concepts in Pharmaceutical Sciences I (2 credits)	Provides the student with foundational knowledge of drug properties and interaction with physiology upon administration in vivo, and an understanding of pharmaceutical formulation which is a key disciplinary area within the pharmaceutical sciences and its application to small molecules and protein-based therapeutics.
PCEUT 506 Concepts in Pharmaceutical Sciences II (4 credits)	Covers the fundamentals of pharmacokinetics. Includes lectures and laboratory exercises on the key concepts in pharmacokinetics, including compartmental kinetics, clearance, protein binding, bioavailability, pharmacodynamics, clinical pharmacokinetics, and Michaelis-Menten kinetics.
PCEUT 501 * Advanced Pharmacokinetics I (5 credits)	Advanced study of the kinetics of drug absorption, distribution, excretion, metabolism, and effects in mammalian systems. Compartmental model and model-independent approaches examined. Drug disposition studied in a physiologically realistic context taking nonlinear events into account. Aimed at development of innovative methods for data analysis and evaluation in biological systems.
PCEUT 502 * Pharmacokinetics of Drug Metabolism (4 credits)	Advanced study of drug metabolism pharmacokinetics. Topics emphasize linear and nonlinear metabolic clearance kinetics, metabolite kinetics, in vitro-in vivo predictions, drug-drug interaction kinetics and pharmacogenetics.
PCEUT 503 * Drug Transport and Delivery (5 credits)	Provides advanced knowledge of the physico-chemical and biological concepts underlying the transport and delivery of drugs. Emphasizes the cell uptake and efflux functions as well as the interplay between transport and intracellular biotransformation and drug effect.
PHCOL 510 * Drug Discovery and Emerging Therapeutics (2 credits)	Consideration of the general principles and current approaches involved in modern drug discovery and development, with an emphasis on basic concepts in drug action, delivery, and metabolism. Discussion of novel drug discovery techniques and emerging non-standard therapeutics.
PHCOL 511 * Autonomic/Cardiovascular Pharmacology (2.5 credits)	Consideration of the pharmacology of the cardiovascular and autonomic nervous systems. Emphasizes the mechanisms of neurotransmitter, hormone, drug action at autonomic synapses, and the molecular basis for physiology and pathophysiology of the cardiovascular system. Lectures, group discussion, and analysis of recent research. Prerequisite: organic chemistry, biochemistry, introductory anatomy, and physiology.
PHCOL 512 * Neuropharmacology (2 credits)	Consideration of the neurobiological basis of drug action on the central nervous system, including mechanism of action and therapeutic use in psychiatric disorders; neurodegeneration/neuroinflammation; control of neuronal excitability and pain; and drug abuse and addiction. Lecture, group discussion, and analysis of recent research. Recommended: organic chemistry, biochemistry, introductory anatomy, and physiology.
PHCOL 513 * Endocrine Pharmacology and Chemotherapeutics (2 credits)	Consideration of the pharmacology of endocrine systems including the hypothalamic/pituitary regulatory peptides, glycoprotein hormones/growth factors, peptide and steroid hormones. Basic principles of chemotherapy of endocrine and other cancers, as well as viral and microbial diseases. Lecture, group discussion, and analysis of recent research.
BIOST 511 Medical Biometry I (4 credits)	Presentation of the principles and methods of data description and elementary parametric and nonparametric statistical analysis. Examples are drawn from the biomedical literature, and real data sets are analyzed by the students after a brief introduction to the use of standard statistical computer packages. Statistical techniques covered include description of samples, comparison of two sample means and proportions, simple linear regression and correlation.
PCEUT 520 Seminar (1 credit)	Graduate students attend seminars and make one formal presentation per year while in residence; maximum of three presentations. Offered: jointly with MEDCH 520.
PCEUT 583 Topics in Pharmaceutics (1 credit)	Discussion of pertinent articles from current literature and recent laboratory results.

* Students choose 3 of 4 graduate-level PHCOL courses and 2 of 3 of the advanced Pceut courses.

Ph.D. Program in Pharmaceutics - Typical Schedule of Core Requirements[‡]

YEAR 01

Autumn	Winter	Spring	Summer
BIOST 511 (4 cr)			
PCEUT 531 (4 cr)	PCEUT 532 (4 cr)	PCEUT 533 (3 cr)	PCEUT 584 (2 cr)
PCEUT 505 (2 cr)	PCEUT 506 (4 cr)	Advanced Pceut Course [†]	
PCEUT 600: Lab Rotation (2 cr)	PCEUT 600: Lab Rotation (2 cr)	PCEUT 600: Pre-thesis Research	PCEUT 600: Pre-thesis Research

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Select advisor

YEAR 02

Autumn	Winter	Spring	Summer
	PCHOL 510, 511 (4 cr)	PCHOL 512, 513 (4 cr)	
(Elective)*	(Elective)*	Advanced Pceut Course [†]	
PCEUT 599: CUM Exam (1 cr)	PCEUT 599: CUM Exam (1 cr)	PCEUT 599: CUM Exam (1 cr)	
PCEUT 600: Pre-thesis Research	PCEUT 600: Pre-thesis Research	PCEUT 600: Pre-thesis Research	PCEUT 600: Pre-thesis Research

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Complete Cum exams

YEAR 03 to Graduation

Autumn	Winter	Spring	Summer
(Elective)*	(Elective)*	(Elective)*	
PCEUT 800: Thesis Research [‡]	PCEUT 800: Thesis Research	PCEUT 800: Thesis Research	PCEUT 800: Thesis Research
			<i>End of YEAR 03: Bypass Exam</i>
			<i>End of YEAR 04: General Exam</i>
			<i>End of YEAR 05: Defense Exam</i>

[†] Advanced Pceut course includes: PCEUT 501, PCEUT 502, PCEUT 503 (and PCEUT 504)

* Electives are not required, but students are encouraged to take classes that will enhance their thesis research or career.

[‡] PCEUT 520 (Seminar) and PCEUT 583 (Topics in Pharmaceutics) every quarter except summer until graduation