

# PHARMACEUTICS AND PHARMACEUTICAL CHEMISTRY GRADUATE CURRICULUM

## 1. Prerequisites

- Organic chemistry with laboratories – one year
- Physical chemistry – one year
- Calculus – one year
- Anatomy, cell biology, developmental biology, classical genetics, or physiology – one semester

## 2. Required Coursework (didactic: 26 hours; total hours: 30)

- Introductory course in pharmaceutical sciences (PHARM 7113) – 3 cr
- Core Pharmaceutics sequence (PHCEU 7010, 7011, 7020, 7030, 7040) – 15 cr<sup>1</sup>
- Electives – at least 4 elective courses that total to a minimum of 8 credit hours
- Journal Club (PHCEU 7975) – 1 cr per semester for 4 semesters<sup>2</sup>

## 3. Department Seminar

All graduate students are expected to attend department seminar each week. In addition, they are required to present at least three seminars prior to their Ph.D. defense. Two of these must be presented to the Department. Students may, however, substitute a podium or poster presentation at a national meeting for the third seminar; alternatively, students may substitute two podium or poster presentations at a local or regional meeting for the third seminar.

## 4. Highly Recommended Electives

- Biocompatibility (PHCEU 7210)
- Biostatistics [FPMD 6100 (3 cr with lab) or PH TX 6680 (2 cr with lab)]
- Case Studies and Research Ethics (MBIOL 7570)

## 5. Recommended Class Schedules for Students Entering Fall 2009

Fall Semester 2009	Spring Semester 2010	Fall Semester 2010 & Spring Semester 2011
PHARM 7113 (3 cr) Pharmaceutical Science	PHCEU 7030 (4 cr) Drug Delivery Systems	PHCEU 7975 (1 cr) Journal Club
PHCEU 7010 (1.5 cr) Molecular Biology (8 weeks)	PHCEU 7040 (4 cr) Biotechnology	Electives or Ph.D. Thesis Research (PHCEU 7970) (8-10 cr)
PHCEU 7020 (4 cr) Physical Pharmacy & Dosage Forms	PHCEU 7011 (1.5 cr) Pharmacokinetics (8 weeks)	
PHCEU 7031 (0.5 cr) Lipid-Based Drug Delivery Systems (meets mid Nov.)	PHCEU 7975 (1 cr) Journal Club	
PHCEU 7975 (1 cr) Journal Club	Electives or Ph.D. Thesis Research (PHCEU 7970) (0-0.5 cr)	
Electives or Ph.D. Thesis Research (PHCEU 7970) (0-1 cr)		

<sup>1</sup> Core sequence (PHCEU 7010 – 7040) is taught annually. Comprehensive exam must be taken within six months of completing the core sequence. The comprehensive exam is offered autumn and spring semesters annually.

<sup>2</sup> Students must take 4 journal club courses starting their first semester after matriculation. The sequence should be taken without interruption.

## 6. Recommended Elective Courses for Students Specializing in the Following Research Areas

### A. Advanced Pharmaceutical Chemistry

PHCEU 6612	Clinical Research & Drug Development: From Molecule to Market – 1 cr
PHCEU 7055	Integrated Drug Development Process in the Pharmaceutical Industry – 1.5 cr
PHCEU 7095	Molecular Modeling and Biomolecular Simulation from a Pharmaceutical Perspective – 2 cr
BIOEN 6065	Biotransport – 3 cr
CHEM 7000	Introduction to Quantum Mechanics I – 2 cr
CHEM 7010	Introduction to Quantum Mechanics II – 2 cr
CHEM 7020	Introduction to Spectroscopy I – 2 cr
CHEM 7030	Introduction to Spectroscopy II – 2 cr
CHEM 7040	Statistical Thermodynamics – 2 cr
CHEM 7050	Classical Thermodynamics – 2 cr
CHEM 7240	Physical Organic Chemistry I – 2 cr
CHEM 7250	Physical Organic Chemistry II – 2 cr
CHEM 7260	Physical Organic Chemistry III – 2 cr
FPMD 6100	Biostatistics – 3 cr
PH TX 6680	Statistical Methods for Pharmacological Research – 2 cr

### B. Drug Delivery Systems

PHCEU 6612	Clinical Research & Drug Development: From Molecule to Market – 1 cr
PHCEU 7031	Lipid-based Drug Delivery Systems – 0.5 cr
PHCEU 7055	Integrated Drug Development Process in the Pharmaceutical Industry – 1.5 cr
PHCEU 7095	Molecular Modeling and Biomolecular Simulation from a Pharmaceutical Perspective – 2 cr
PHCEU 7110	Molecular Imaging – 2 cr
PHCEU 7210	Biocompatibility – 2 cr
BIOEN 6140	Tissue Engineering – 3 cr
BIOEN 6302	Biomaterials – 3 cr
BIOEN 7140	Advanced Topics in Tissue Engineering – 2 cr
BIOEN 7160	Physical Nature of Surfaces – 3 cr
BIOEN 7168	Proteins at Interfaces and in Membranes – 3 cr
BIOEN 7170	Biomolecular Engineering – 3 cr
BLCHM 6410	Protein and Nucleic Acid Biochemistry – 3 cr
BLCHM 6460	Protein Chemistry – 2 cr
FPMD 6100	Biostatistics I – 3 cr
MDCH 6550	Site-Specific Drug Targeting – 1-2 cr
MSE 5473	Polymer Synthesis/Characterization – 3 cr
MSE 6480	Polymer Science – 3 cr
PH TX 6680	Statistical Methods for Pharmacological Research – 2 cr

### C. Biotechnology

PHCEU 6612	Clinical Research & Drug Development: From Molecule to Market – 1 cr
PHCEU 7055	Integrated Drug Development Process in the Pharmaceutical Industry – 1.5 cr

PHCEU 7095	Molecular Modeling and Biomolecular Simulation from a Pharmaceutical Perspective – 2 cr
BIOEN 7140	Advanced Topics in Tissue Engineering – 2 cr
BIOEN 7160	Physical Nature of Surfaces – 3 cr
BIOEN 7168	Proteins at Interfaces and in Membranes – 3 cr
BIOEN 7170	Biomolecular Engineering – 3 cr
BLCHM 6410	Protein and Nucleic Acid Biochemistry – 3 cr
BLCHM 6430	Structural Methods – 3 cr
BLCHM 6450	Biophysical Chemistry – 2 cr
BLCHM 6460	Protein Chemistry – 2 cr
FPMD 6100	Biostatistics I – 3 cr
MDCH 6550	Site-Specific Drug Targeting – 2 cr
MDCH 6560	Biomedical Applications of Mass Spectrometry – 2 cr
PH TX 6680	Statistical Methods for Pharmacological Research – 2 cr
PH TX 7500	Biochemical Mechanisms of Signal Transduction – 2 cr

D. Pharmacokinetics and Pharmacodynamics

PHCEU 6612	Clinical Research & Drug Development: From Molecule to Market – 1 cr
PHCEU 7055	Integrated Drug Development Process in the Pharmaceutical Industry – 1.5 cr
PHCEU 7095	Molecular Modeling and Biomolecular Simulation from a Pharmaceutical Perspective – 2 cr
PHCEU 7110	Molecular Imaging – 2 cr
PHCEU 7315	Biopharmaceutics and Pharmacokinetics – 2 cr
PHCEU 7316	Clinical Pharmacokinetics and Pharmacodynamics – 2 cr
FPMD 6100	Biostatistics I – 3 cr
MDCH 6550	Site-Specific Drug Targeting – 1-2 cr
MDCH 6560	Biomedical Applications of Mass Spectrometry – 2 cr
ONCSC 6150	Biostatistics – 2 cr