

*Rutgers 16:125:590**
Drug Delivery Fundamentals and Applications
*Rutgers 16:155:544**
Pharmaceutical Organic Nanotechnology
Fall 2016

**CBE MS/ME/PhD students and MBS PharmE/ChemE students should register for 155:544. BME and all other students should register for 125:590.*

Course Instructor: Professor Charlie Roth, cmroth@rutgers.edu

Time and Location: Tues. 5:00-6:20, SEC-205; Online modules on Ecollege.

Textbook: Saltzman, W. Mark. Drug Delivery: Engineering Principles for Drug Therapy, ISBN 0-19-508589-2

Synopsis: This course will discuss the engineering of novel pharmaceutical delivery systems with enhanced efficacy and safety profiles, with an emphasis on the design and application of materials that overcome drug delivery barriers or challenges. Topics will include drug delivery fundamentals and transport mechanisms, materials and formulations for drug delivery, and applications.

Modes of instruction and assessment: This is a hybrid course. Most of the basic material will be presented online, via a mix of video lecture, voice over Power Point, and readings for presentation of core material. In addition, we will meet each week for 80 minutes. During this time, we will focus on highlighting key or difficult conceptual points, holding discussions and student “journal club presentations, and going over example problems for quantitative material. You will be expected to complete the online lectures, attempt example problems and in some cases engage in online discussions **before each class meeting**.

Assessment will be based on short assignments, class journal club presentations and associated discussions, two exams, and a term project where you will individually write a white paper recommending a drug delivery formulation and design plan for a new drug. The primary objectives of the course are to make students knowledgeable about the design, formulation and evaluation of drug delivery systems; to provide them with sufficient background to be able to read and understand the scientific literature in this area; and to foster creative, yet scientifically based, thinking regarding novel approaches or fundamental advances to be made in drug delivery.

Grading: Homework assignments - 20%, Journal club presentation and discussion - 20%, Exams - 2x20% each, Term project - 20%.

Academic Integrity: This course requires students to summarize the work of others and to create original work. It is critical that work submitted is the student’s own work and that due credit is given to others whose work is cited or otherwise utilized. Please review the Academy Integrity policy of the Graduate School at http://gsnb.rutgers.edu/publications/academic_integrity.pdf.

Note: I reserve the right to amend course policies, including the grading rubric, due to changing circumstances at my discretion.

Syllabus (subject to slight alterations)

<i>Week</i>	<i>Topic</i>
	Drug Delivery Barriers
1	Introduction and Overview
2	Pharmacokinetics
3	Pharmacodynamics
4	Transport in Tissues
5	Cellular and Intracellular Transport of Drugs
6	Review and Exam 1
	Materials and Formulations
7	Materials for Nanoparticle Drug Delivery Systems
8	Pharmaceutical Dosage Forms
9	Controlled Release Drug Delivery Systems
10	Nanoparticles and Passive Targeted Delivery
11	Nanoparticles and Active Targeted Delivery
12	Review and Exam 2
	Applications
13	GI Delivery
14	Gene and Oligonucleotide Delivery
15	Term Projects