

Phar 6162
Principles of Drug Delivery II
3 Credits, Spring 2008

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	Ronald A. Siegel, Sc.D. Office: WDH 9-127E, (612) 624-6164 e-mail: siege017@umn.edu Office hours: by appointment
UMD Course Faculty	Gregory Rutkowski, Ph.D. Office: (218) 726-7828, FAX (218) 726-6907 e-mail: grutkows@umn.edu Office hours: 12:15-1:15 PM Th 162 LSci Cube A
UMTC Teaching Assistants	Sunny Bhardwaj WDH 9-125, 612-624-7968 email: bhard005@umn.edu Office hours: 3.30 – 4.30 PM Friday
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UMD Teaching Assistant	Matthew Pruitt, Pharm.D.II e-mail: pruit020@d.umn.edu Office hours: By appointment
Lectures	MWF, 2.30 – 3.20 PM; MT-1450; LSci 165
Tutorial (optional)	Monday 9.00 – 10.00 AM; 7-193/195 WDH; 385 Kirby Thursday 4.00 – 5.00 PM; 7-193/195 WDH; 165 LSci (on selected days) While the tutorials will be regularly scheduled on Mondays, the tutorials on Thursdays will be specially scheduled and will be announced during the semester.
Midterm Exams	February 20, March 28, May 9
Course Objectives	To introduce the student to physicochemical principles that are relevant to the design, preparation, use and evaluation of pharmaceutical dosage forms

Learning Objectives: After successfully completing this course, the student will be able to:

1. Identify the different rates of decomposition reactions and calculate the shelf-life of pharmaceutical formulations.
2. Explain the role of interfacial phenomena in the design of dosage forms.
3. Select surfactants for use in the preparation of formulations.
4. Design suspension formulations by taking into consideration the electric properties of the suspended drug particles.
5. Understand the scientific principles in the design, preparation and evaluation of a variety of dosage forms
6. Understand the different types of colloids used in pharmaceutical dosage forms. Explain the unique properties of colloidal systems.
7. Recognize the different types of flow behavior of fluids.
8. State Fick's laws of diffusion and apply them to selected pharmaceutical systems.
9. Recognize the role of particle size and pore distribution on the performance of dosage forms.
10. Explain liquid-liquid equilibria relevant to pharmaceutical systems using partition coefficients
11. Understand and identify some physicochemical phenomena that can reduce drug efficacy.
12. Identify and relate the properties of polymers to their potential use in pharmaceutical systems.
13. Explain how the primary, secondary and tertiary structure of proteins affects their physical and chemical stability.
14. Explain the most basic properties of absorption, distribution, metabolism, and excretion of drugs.

Textbooks

Required

1. Patrick J Sinko, *Martin's Physical Pharmacy and Pharmaceutical Sciences*, 5th edition, Lippincott Williams and Wilkins, Baltimore, MD, 2006.
2. Course notes, written by each instructor.

Supplementary (all of these are in the Biomedical Library, TC Campus)

3. L. V. Allen, Jr., N. G. Popovich, H.C. Ansel, *Ansel's Pharmaceutical Dosage Forms*, 8th edition, Lippincott Williams and Wilkins, Philadelphia, PA, 2005 (also available at UMD).
4. *Remington: The Science and Practice of Pharmacy*, Ed. A.R. Gennaro, 19th Edition, Mack Pub. Co., Easton, PA, 1995.
5. A.T. Florence and D. Attwood, *Physicochemical Principles of Pharmacy*, 2nd edition, Chapman and Hall, NY, 1988.

Course Structure:

The course will be made up of lectures, and in-class assignments. There will be a weekly optional tutorial session. Although attendance at the tutorials is optional, you are strongly encouraged to attend.

Prerequisites:

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Course Requirements: Students are expected to attend all lectures. There will be three examinations. The examinations will include questions in one or more of the following formats: multiple choice, short answer, derivation, problem solving and true/false. Six assignments will be given during the semester. The assignments **must** be submitted by the due date. Each assignment carries 5% of the total grade.

The assignments as well as the midsemester examinations should be written in ink. If you use a pencil, then the assignment/examination will NOT be regraded. Regrading request must be submitted, in writing, within a week from the day the graded exam/assignment is returned.

Exams and Quizzes: There will be six assignments, and 3 midsemester exams.

A *comprehensive* final exam will be given during the Final Exams Week. This is a required exam.

Grading Policy:	Assignments	30%
	Midsemester I	15%
	Midsemester II	15%
	Midsemester III	15%
	Final Exam (comprehensive)	25%
	93% and above	A
	88 - 92	A-
	83 - 87	B+
	79 - 82	B
	74 - 78	B-
	70 - 73	C+
	66 - 69	C
	62 - 65	C-
	56 - 61	D
	Less than 56%	F

Honor Code: Each student is bound by the following specific provisions as part of the Code: Academic misconduct is any unauthorized act which may give a student an unfair advantage over other students, including but not limited to: falsification, plagiarism, misuse of test materials, receiving unauthorized assistance and giving unauthorized assistance. Specifically, each student will be required to do their own work on all assignments, midsemester and final examination.

Make-up Policy: There will be no make-up exams given for the mid-term and final exams except under the following circumstances:

- illness, verified by a note from a doctor;
- a family emergency, verified by a note from the professional person in attendance; or
- a University-sponsored event, verified by a note from the leader of the sponsoring organization.

The course director must be notified IN ADVANCE of the originally scheduled time of the examination.

Disability Policy: Any student with a documented disability (e.g. physical learning, psychiatric, vision, hearing etc.) who needs to arrange reasonable accommodations must contact the Course Director (612 624-9626) and Disability Services (612 626-1333 – Twin Cities; 218 726 7966 Duluth) at the beginning of the semester. All discussions will remain confidential. Any student with a documented disability (e.g. physical learning, psychiatric, vision, hearing, etc.) who needs to arrange reasonable accommodations must contact the Course Director (624-4611) and Disability Services (626-1333) at the beginning of the semester. All discussions will remain confidential.

Course Evaluation: Available on-line towards the end of the semester.

SCHEDULE OF LECTURES

January 23	Introduction to the course; Chemical Kinetics and Drug Stability (Sury)
January 25 – February 1	Chemical Kinetics and Drug Stability (4 lectures; Sury)
February 4 - February 13	Interfacial Phenomena (5 lectures; Panyam)
February 15 - February 18	Colloidal Systems (2 lectures; Panyam)
February 20	Midsemester Exam I
February 22 - February 27	Mass Transport/Diffusion (3 lectures; Rutkowski)
February 29 - March 3	Powders (2 lectures; Siegel)
March 5 – March 7	Semisolid and Transdermal Dosage forms (2 lectures; Sury)
March 10 - March 14	Disperse dosage forms (3 lectures; Sury)
Mar 17 – Mar 21	Spring Break
March 24 – March 26	Rheology (2 lectures; Siegel)
March 28	Midsemester Exam II
Mar 31 – April 4	Partitioning (3 lectures; Rutkowski)
April 7 – April 11	Physical Incompatibilities, Complexation, Protein binding (3 lectures; Rutkowski)
April 14 – April 21	Polymers (4 lectures; Siegel)
April 23 - April 28	Proteins (3 lectures; Siegel)
April 30 – May 5	Introduction to ADME (3 lectures; Siegel)
May 7	Review
May 9	Midsemester Exam III
Between May 12-14	FINALS (Comprehensive – Panyam, Rutkowski, Siegel, Sury) Final exam date, time, and place will be posted after Spring Break.