

**PHARMACEUTICS REQUIRED COURSE OUTLINES
MIDWESTERN UNIVERSITY CHICAGO COLLEGE OF PHARMACY
ACADEMIC YEAR 2007-8**



**MIDWESTERN UNIVERSITY
CHICAGO COLLEGE OF PHARMACY
Pharmaceutical Calculations
PSCI 0360
Fall 2007**

Credit Hours: 3

Course Description

This is the first of the four required courses in the Pharmaceutics series. It focuses on the pharmaceutical and clinical calculations that are critical to the safe and effective delivery of medications. Pharmacists must calculate patient-specific doses and prepare extemporaneously compounded prescriptions with a high degree of accuracy. The Pharmaceutical Calculations course prepares students to use these calculations in pharmacy practice. The course covers calculations performed by pharmacists for compounding and dispensing of medications in a variety of practice settings. Such calculations involve applications of concepts from arithmetic and algebra.

Course Objectives:

Upon successful completion of this course the student should be able to:

1. Correctly identify and interpret the various parts of a prescription.
2. Calculate the quantity of medication to be compounded or dispensed; reduce and enlarge formulation quantities and calculate the quantity or ingredients needed to compound the proper amount of the preparation
3. Calculate the rate of drug administration
4. Calculate and / or convert drug concentrations.

Study Material 

Required Book: Pharmaceutical Calculations, 4th Edition. Zatz, Joel; Teixeira, Maria. Wiley Interscience, 2005.

LECTURE/WORKSHOP SCHEDULE :

Week	Day/Date	Topic	Chapter
1	Wednesday 9/5/07 TWO HOUR LECTURE	Introduction to the Course, Ground Rules, Systems of Measurement, Unit Conversions, Problem Solving Techniques	1, 2
2	Monday 9/10/07	Density and Specific Gravity; Prescriptions written in terms of total dispensed or in terms of dose	2, 3
	<i>Wednesday 9/ 12/07</i>	<i>WORKSHOP #1</i>	<i>1, 2</i>
3	Monday 9/17/07	Prescriptions and Medication Orders; Dosing Directions and Abbreviations; Reducing and Enlarging Formulas	3
	Wednesday 9/19/07	Formulas Written in Parts; Dosing	3, 4
4	Monday 9/24/07	Dosing; Percent Strength	4, 5
	<i>Wednesday 9/26/07</i>	<i>WORKSHOP #2</i>	<i>3, 4</i>
5	Monday 10/1/07	Percent Strength; Parts per Million/Billion; Ratio Strength; Stock Solutions; Solvent based on Weight	5, 6
	Wednesday 10/3/07	Moles and mmol	9
6	Monday 10/8/07	Mmol and mEq	9
	<i>Wednesday 10/10/07</i>	<i>WORKSHOP #3</i>	<i>5, 6, 9</i>
7	Monday, 10/15/07	Osmolarity Midterm Review	
	<i>Tuesday, 10/16/07</i> <i>LITTLEJOHN DE</i>	<i>MIDTERM EXAM</i>	<i>1-6; 9</i>
	Wednesday, 10/17/07	Dilution/Concentration	7
8	Monday 10/22/07	Dilution/Concentration	7
	<i>Wednesday 10/24/07</i> <i>LITTLEJOHN DE</i>	<i>WORKSHOP #4</i>	<i>7</i>
9	Monday 10/29/07	Isotonicity	8
	<i>Wednesday 10/31/07</i>	<i>WORKSHOP #5</i>	<i>8</i>
10	Monday 11/5/07	Reconstitution and Parenteral Therapy	10
	Wednesday 11/7/07 TWO HOUR LECTURE	Review	
	<i>Thursday 11/8/07</i> <i>LITTLEJOHN ABC</i>	<i>Comprehensive Final Exam 1</i>	<i>1-10</i>
11	<i>Friday 11/16/07</i> <i>CENTENNIAL EAST</i>	<i>Comprehensive Final Exam 2</i>	

PSCI 362: Dosage Form Design

(3 credits, Winter Quarter, 2007)

Course Description:

This course is centered on imparting an understanding of the types and characteristics of pharmaceutical dosage forms, and the physico-chemical principles involved in design, development, formulation, preparation, and dispensing of dosage forms.

Course Format:

This course is taught primarily in a lecture format. In-class problem solving and the use of hands-on examples will be included when possible.

Textbook:

Gibaldi's Drug Delivery Systems in Pharmaceutical Care, A Desai and M Lee.
American Society of Health-System Pharmacists. 2007.

Course Objectives:

After taking this course, students should be able to:

- 1) Understand the differences between different types of pharmaceutical dosage forms and the advantages and disadvantages of each.
- 2) Understand the method of preparation of various pharmaceutical dosage forms.
- 3) Identify the function of different components present in a pharmaceutical product, and understand why some excipients are preferred to others in certain dosage forms.
- 4) Discuss preformulation, solubility, stability, preservation and sterilization issues relating to manufactured and extemporaneously compounded pharmaceutical products.
- 5) Make use of critical thinking skills to better understand drug dosage forms currently available, as well as those that may be developed in the future.

Week	Lecture	Lecture Topic Schedule (dates subject to change)	Reading Assignment	Date	Exam
1	1	Course Introduction / Syllabus Introduction to dosage form design	Chapters 1 and 2	11/26	1
	2	Introduction to dosage form design Preformulation studies: <ul style="list-style-type: none"> Physical characteristics Particle size and surface area Crystal properties and polymorphism 	Page 26	11/27	1
	3				
2	4	Preformulation studies: <ul style="list-style-type: none"> Solubility Dissolution Diffusion and partition coefficient 	Page 25-27	12/3	1
	5	Preformulation studies: <ul style="list-style-type: none"> Stability kinetics Acid-base theory Prodrugs	Page 27 Chapter 9	12/4	1
	6	Excipients			
3	7	Packaging Quiz (10 points)		12/10	1
	8	Solid dosage forms	Pages 23-34	12/11	1
	9				
4	10	Solid dosage forms	Pages 23-34	12/17	2
	11	Liquid dosage forms – single phase	Chapter 3	12/18	2
	12				
		Exam 1 (Note: exam is at 7:30 AM)		12/21	
5	13	Liquid dosage forms - multiphase	Chapter 3	1/7	2
	14	Semisolids	Pages 43-50	1/8	2
	15				
6		Suppositories	Chapter 7 Pages 348-350	1/14	2
	16	Nasal and pulmonary dosage forms	Chapter 6 Chapter 15 Pages 65-73	1/15	2
	17				
7	18	No Class – MLK birthday		1/21	
	19	Parenterals	Chapter 8	1/22	2
	20				

		Exam 2 (Note: exam is at 7:30 AM)		1/25	
8	21	Biologics Ophthalmics	Page 70 Pages 59-65	1/28	3
	22	Biotechnology	Chapter 10	1/29	3
	23				
9	24	Controlled Release Products: Oral	Pages 34-40	2/4	3
	25	Controlled Release Products: Oral and injectable	Pages 34-40	2/5	3
	26				
10	27	Controlled Release Products: Transdermal	Pages 50-55	2/11	3
	28	Clinical Decision Making	Chapter 11	2/12	3
	29	Special Populations: Pediatrics and Geriatrics	Chapter 12 Chapter 13		
11		Exam 3		2/22	

PHARMACY 392: Dosage Form Design Laboratory

(1 credit, Winter Quarter, 2007)

Course Description:

This course is centered focused on discussing and learning to prepare various extemporaneously compounded dosage forms, understanding and adhering to while fulfilling all legal requirements.

Course Objectives:

- 1) Recognize the legal requirements for prescription order forms and prescription labels, as well as information that should be included based on good pharmacy practice.
- 2) Understand the method of preparation of various pharmaceutical dosage forms, and be able to extemporaneously compound those forms that may need to be prepared by a pharmacist.
- 3) Formulate an appropriate recipe for an extemporaneously compounded prescription by consulting commonly used reference texts.
- 4) Calculate amounts of ingredients needed for extemporaneously compounded prescriptions based on a written prescription order.
- 5) Identify the function of different components present in a compounded pharmaceutical preparation.
- 6) Discuss stability and preservation issues relating to extemporaneously compounded prescriptions and be able to determine reasonable beyond-use dates for compounded prescriptions.

Required Textbook:

Applied Pharmaceutics in Contemporary Compounding, 2nd Ed., R Shrewsbury. Morton Publishing Company, 2008.

PSCI 0392 Lab Calendar 2007-08

		Groups 16-29	Groups 1-15		
Nov 26 Lab Lecture/Intro to course policies	Nov 27	Nov 28 Workshop: Rx document / label / info sources	Nov 29 Workshop: Rx document / label / info sources	Nov 30	
Dec 03 Lab Lecture: RX Balance; Gels	Dec 04	Dec 05 Lab check in; topical gel; Prescription balance	Dec 06 Lab check in; topical gel; Prescription balance	Dec 07	
Dec 10 Lab Lecture: Powders & Capsules	Dec 11	Dec 12 Mixing powders; CCP topical powder; single component capsule	Dec 13 Mixing powders; CCP topical powder; single component capsule	Dec 14	
Dec 17 Lab Lecture: Multi- component capsules; Liquids and flavorings	Dec 18	Dec 19 Multi- component capsules; oral solution	Dec 20 Multi- component capsules; oral solution	Dec 21 (PSCI 0362: Exam 1)	
Dec 24	Dec 25	Dec 26	Dec 27	Dec 28	
Dec 31	Jan 01	Jan 02	Jan 03	Jan 04	
Jan 07 Lab lecture: Liquids & flavorings cont.	Jan 08	Jan 09 Oral syrup, gel	Jan 10 Oral syrup, gel	Jan 11	
Jan 14	Jan 15 Lab Lecture: emulsions	Jan 16 Oral suspension; topical emulsion	Jan 17 Oral suspension; topical emulsion	Jan 18	
Jan 21 Lab Lecture: Semi-solids - ointments	Jan 22 Lab Midterm 8:30-9:50 AM; Littlejohn DE	Jan 23 Oral emulsion; ointment base; topical ointment	Jan 24 Oral emulsion; ointment base; topical ointment	Jan 25 (PSCI 0362: Exam 2)	
Jan 28 Lab Lecture: Semi-solids -	Jan 29	Jan 30 Topical paste; thermoplastic	Jan 31 Topical paste; thermoplastic	Feb 01	

pastes		gel; evaluate emulsion	gel; evaluate emulsion	
Feb 04 Lab Lecture: Suppositories	Feb 05	Feb 06 MBK & PEG suppositories	Feb 07 MBK & PEG suppositories	Feb 08
Feb 11 Review session for final	Feb 12	Feb 13 Makeup lab	Feb 14 Makeup lab	Feb 15 Lab Final exam 7:30-8:50 AM; Littlejohn ABC
Feb 18	Feb 19	Feb 20	Feb 21	Feb 22
Final Exams				



Midwestern University
Chicago College of Pharmacy
PSCI 0363 - Pharmaceutics II (3 Credit Hours)
Biopharmaceutics and Pharmacokinetics
Spring 2008

Course Description

The course covers biopharmaceutics and basic pharmacokinetic parameters, which include mathematical descriptions of the time course of drug absorption, distribution, and elimination; the important physicochemical properties of drugs and the relevant physiologic factors that affect drug absorption, distribution, and elimination; the relationship between drug concentration and clinical responses, the pharmacokinetic variability caused by differences in body weight, age, sex, genetic factors, diseases, and drug interactions; and applications of pharmacokinetics in clinical situations.

Course Objectives

After completing this course the students should be able to:

- Discuss the relevance of the terms biopharmaceutics, pharmacokinetics, and pharmacodynamics
- Understand the time course of drug absorption, distribution, and elimination
- Discuss the physicochemical properties of drugs and the relevant physiologic factors that affect drug absorption, distribution, and elimination
- Describe the factors that influence the bioavailability of a drug.
- Explain the pharmacokinetic variability caused by differences in body weight, age, sex, genetic factors, diseases, and drug interactions

Recommended Texts 

There is no required text for this course. However, if you wish to have further information on any of the lecture topics, please consult the following books:

- ♦ Shargel, L. Wu-Pong, S., Yu, A.B.C., Applied Biopharmaceutics and Pharmacokinetics, 5th Edition. Appleton and Lange. 2004. (50 copies arrived)
- ♦ Gibaldi, M. Biopharmaceutics and Clinical Pharmacokinetics, 4th Edition. Lea & Febiger. 1991.
- ♦ DiPiro JT, Spruill WJ, Blouin RA, Pruemmer JM, Concepts in Clinical Pharmacokinetics: A Self-Instructional Course, 3rd Edition. American Society of Health-System Pharmacists. 2002. (50 copies arrived)

SPRING 2008 SCHEDULE

Week	Date	Topic	Lecturer
1	March 5 W	Course Introduction, Brief Introduction to PK and Biopharmaceutics	Bhalla
	March 6 Th	Plasma drug concentration profiles	Bhalla
2	March 12 W	PK Modeling (Compartmental), plasma drug concentration versus time.	Bhalla
	March 13 Th	Basic Pharmacokinetic Parameters	Bhalla
3	March 19 W	Drug Distribution	Bhalla
	March 20 Th	Drug Distribution /Elimination	Bhalla
4	March 26 W	Drug Elimination	Bhalla
	March 27 Th	Drug Elimination /Additional Practice Problems	Bhalla
5	April 2 W	Multiple drug dosing	Bhalla
	April 3 Th	Multiple drug dosing and Steady State concentrations	Bhalla
5	April 4 Fri	Exam 1	Bhalla
6	April 9 W	Different routes of drug delivery	Gulati
	April 10 Th	Pharmacokinetics of oral administration/ Physiologic factors and drug absorption	Gulati
7	April 16 W	Physiologic factors and drug absorption	Gulati
	<i>April 17 Th</i>	Bioavailability and Bioequivalence	Gulati
8	April 23 W	Non Linear Pharmacokinetics	Bhalla
	April 24 Th	Non Linear Pharmacokinetics	Bhalla/Gulati
8	April 25 Fri	Exam 2	Bhalla/Gulati
9	April 30 W	Pharmacokinetics and drug delivery	Gulati
	May 1 Th	Pharmacokinetics and drug delivery	Gulati
10	May 7 W	Sources of pharmacokinetic variability	Gulati
	May 8 Th	Sources of pharmacokinetic variability/ Wrap Up	Gulati
10	May 9 Fri	EXAM REVIEW SESSION	Bhalla/Gulati
11	May 13 Tues	Comprehensive Final Exam 10:30 am – 12:20 pm	Bhalla/Gulati
	May 13 Tues	Make-up exams 2:10 pm – 4:00 pm	Bhalla/Gulati