

Medicinal Chemistry (MCH) 311: *Chemistry of Drug Action*

Schedule: Tuesdays and Thursdays 11:00 AM - 12:20 PM
112 Norton Hall, North Campus

Instructor: Thomas Kalman, Ph.D., Professor
433 Hochstetter Hall; Phone: 645-6368
E-mail: tkalman@buffalo.edu

Office hours: Wednesdays 10:30 AM – 12:30 AM (433 Hochstetter Hall)

Teaching Assistant: TBA

Text: *NOTES (required): course packs* are available from Great Lakes Graphics & Printing at the UB Commons (636-8440); copies of last year's exams are included, with keys.

Grading Policy: The final grade is based on two 80-minute examinations (30% each) and a 3-hr final examination (40%) on the new material (not covered by the 1st 2 exams), *as well as* all principles and concepts discussed during the entire course. In addition, 2 take-home exercises on drug structures (functional groups, stereochemistry, etc) will be given in Q & A format, and the results (a maximum 10 bonus points) will be added to the overall score of the 3 exams. Take-home exercises will have 2-weeks deadlines. After the final exam, plus/minus grades are given for scores calculated as percentage points, approximating the following ranges (subject to change depending on the overall class performance):

<u>Scores</u>	<u>Grade</u>	<u>Scores</u>	<u>Grade</u>
>=90	A- to A	50-64	D to D+
75-89	B- to B+	<50	F
60-74	C- to C+		

Examination Policy: Students must take examinations when scheduled, except when excused for acceptable cause, such as a documented illness (doctor's certificate needed). A student must notify the instructor by e-mail *before* an examination, and **obtain approval to be excused**, if (s)he is unable to take a scheduled examination. Any student who is not excused from a scheduled examination will receive a zero for the missed examination. **No make-up exams are given**, except for those officially excused.

Student's Responsibilities: Learning is the student's responsibility. Students are responsible for *studying the course pack (NOTES)* and should read *relevant material before class*. The slide materials accompanying the lectures will be available on UBlearns. Not all illustrations will be reproduced. *Attendance is required*. The examination questions will be based on the material in the *NOTES, material on UBlearns, and everything else discussed in class*.

Course Goals and Organization: Designed for pharmacy students, **MCH 311** provides a chemically oriented introduction to pharmacology and therapeutics. It emphasizes familiarity with drug structures and properties, and an understanding of how the chemical structures and physicochemical properties of representative drugs determine their molecular mechanisms of action and the body's response to them. In class, important concepts will be discussed with selected examples. The emphasis is on the understanding of the material and the integration of knowledge. In this course the chemistry is integrated with relevant topics in biochemistry, physiology and pharmacology.

Library Reserve (Reference Textbooks and Resources):

Wilson and Gisvold's Textbook of Organic Medicinal & Pharmaceutical Chemistry, Block & Beale, Eds., 11th Ed. **2004**.

Foye's Principles of Medicinal Chemistry, Williams & Lemke, Eds., 5th Ed. **2002**.

Burger's Medicinal Chemistry and Drug Discovery, Abraham, Ed., 6th Ed., **2003**. Available online for UB students and faculty: <http://www.mrw.interscience.wiley.com/bmcdd/>

Outline

History of Drug Discovery and Development

Historical Outline

Pharmacodynamic vs. Chemotherapeutic Drugs

Accomplishments and Challenges in Drug Development

Sources of Drugs

Natural Products

Drugs from Organic Synthesis

Drug Discovery and Development

Drug Structure and Biological Activity

Pharmaceutically Important Functional Groups

Physicochemical Properties of Drugs

Electronic Effects

Spatial Properties of Drugs

Fate of Drugs in the Body

Absorption, Distribution, Metabolism, and Elimination (ADME)

Chemistry of Drug Metabolism

Modifications to Decrease Metabolism

Prodrugs

Molecular Mechanism of Drug Action

Drug Targets

Receptors

Enzymes

Nucleic Acids

Non-receptor targets

Chemistry of Selected Drug Classes

Pharmacodynamic Drugs

Chemotherapeutic Drugs

Antibacterial Drugs

Antiviral Drugs

Antineoplastic Drugs

Drug Interactions

Introduction

Drug Interactions at Absorption

Drug-Food Interactions

Serum Protein Binding

Effects on Drug Metabolism

Drug interactions at Excretion

Therapeutic Drug Interactions

Drug Incompatibilities

Introduction

Chemical Reactivity