

MEDICINAL CHEMISTRY I

(30:715:409)

FALL 2018

Course Description: The mission of the Medicinal Chemistry courses is to help students gain a comprehensive understanding of the fundamental concepts related to the actions and clinical uses of major classes of drugs. The major topics and classes of drugs covered in Medicinal Chemistry I include 1) nomenclature of polycyclic and heterocyclic rings, 2) cholinergic & adrenergic drugs, 3) cardiovascular drugs, 4) antithrombotics & antihistamines, and 5) CNS stimulants. In this class, students are expected to relate the physico-chemical properties, pharmacological activities, mechanisms of action, ADME (adsorption, distribution, metabolism, and excretion), pharmacokinetic properties of drugs to their chemical structures.

Course Objectives: Students completing the Medicinal Chemistry I course will be expected to demonstrate the following abilities-based outcomes (ABOs)

1. Develop and demonstrate depth and breadth of knowledge in biomedical, pharmaceutical, social/administrative/behavioral, and clinical sciences. (1.1.1)
2. Integrate knowledge from foundational sciences to explain how specific drugs or drug classes work and evaluate their potential value in individuals and populations. (1.1.2)
3. Apply knowledge in foundational sciences to solve therapeutic problems. (1.1.3)
4. Critically analyze scientific literature related to drugs and disease to enhance clinical decision making. (1.1.4)
5. Identify and critically analyze emerging theories, information, and technologies that may impact patient-centered and population based care. (1.1.5)

Course Instructors: Edmond LaVoie, Ph.D. (Coordinator)
Professor of Medicinal Chemistry
Longqin Hu, Ph.D.
Professor of Medicinal Chemistry
Samuel Chackalamannil, Ph.D.
Adjunct Professor, Medicinal Chemistry

Times and Location: Monday, Wednesday, Friday, 1:20-2:15 PM, PH-131

Required Textbooks:

- *Foye's Principles of Medicinal Chemistry, Seventh Edition*, By Thomas L. Lemke, David A. Williams, Victoria F. Roche, and S. William Zito, Lippincott Williams & Wilkins, 2013
- *Organic Chemistry Concepts and Applications for Medicinal Chemistry*, By Joseph E. Rice, Academic Press, 2014

Optional Resource: ChemDraw Ultra 15.0

(<http://sitelicense.cambridgesoft.com/sitelicense.cfm?sid=113>)

Course Home Page: <http://medchem.rutgers.edu/MedChemI/index.shtml>

Examinations: Four exams (three mid-terms and one optional comprehensive final that counts as two mid-terms if taken) and several in-class quizzes.

Grading: Numerical grades are calculated as: grade = [0.9(exam average) + 0.1(quiz average)].
Grades: A, 100-90; B+, 89-85; B, 84-80; C+, 79-75; C, 74-70; D, 69-60; F, <60.

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Tentative Course Outline

I. Nomenclature of Polycyclic and Heterocyclic Rings (Sept. 5 - Sept. 14)

TBA, Office Hours: *By Appointment*; email: TBA

Reading:

Rice, Chapter 6 – The Nomenclature of Cyclic and Polycyclic Compounds (*Students are encouraged to read Chapters 1-5 to review basic concepts*)

II. Cholinergic and Adrenergic Drugs (Sept. 17 – Oct. 3)

Dr. LaVoie, Rm 326 Office Hours: *By Appointment*; email: elavoie@pharmacy.rutgers.edu

Reading:

Rice, Chapter 7 – Drug Metabolism

Foye, Chapter 9 – Drugs Affecting Cholinergic Neurotransmission

Foye, Chapter 10 – Adrenergic Receptors and Drugs Affecting Adrenergic Neurotransmission

EXAM # 1 - Friday, October 5, 2018, 1:30pm - 3:00pm PH-130/131

III. Cardiovascular Drugs

Dr. LaVoie (Oct. 8 – Oct. 31)

Dr. Chackalamannil (Nov. 2 – Nov. 9) email: samuel.chackalamannil@rutgers.edu

Reading:

Foye, Chapter 21 – Cardiac Agents: Cardiac Glycosides, Antianginal, and Antiarrhythmic Drugs Foye, Chapter 22 – Diuretics

Foye, Chapter 23 – Agents Affecting the Renin-Angiotensin Pathway and Calcium Blockers

Foye, Chapter 24 – Central and Peripheral Sympatholytics and Vasodilators

Foye, Chapter 25 – Antihyperlipoproteinemics and Inhibitors of Cholesterol Biosynthesis

EXAM # 2 – Monday, November 12, 2018, 8:00-9:30AM, PH-130/131

IV. Antithrombotics and Antihistamines

Dr. Chackalamannil (Nov. 12 – Nov. 21)

Reading:

Foye, Chapter 26 – Antithrombotics, Thrombolytics, Antiplatelets, and Coagulants

Foye, Chapter 32 – Antihistamines and Related Antiallergic and Antiulcer Agents

V. CNS Stimulants (Nov. 26 – Dec. 10)

Dr. Hu, Rm 314, Office Hours: *By Appointment*; email: longhu@rutgers.edu

Reading:

Foye, Chapter 19 – Hallucinogens, Stimulants, and Related Drugs of Abuse and Their Therapeutic Potential

Foye, Chapter 18 – Antidepressants

Foye, Chapter 11 – Serotonin Receptors and Drugs Affecting Serotonin Neurotransmission

EXAM # 3 – Wednesday, December 12, 2018, TBA

FINAL EXAM - Optional for all students; Cumulative for the semester (Counts as two hourly exams)

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Course Policies

Grading: In addition to the examinations, there may be **ANNOUNCED OR UNANNOUNCED QUIZZES** throughout the semester, worth up to 10% of your semester grade. Quizzes will be based on concepts discussed in class as well as on the reading assignments from the handouts posted on Sakai and the textbook. **Make up quizzes are not given.** Attendance is mandatory! Students are expected to be in class and ready for lecture at the scheduled time. Grades in medicinal chemistry are based solely on the numerical average of your tests and quizzes and are not curved.

Numerical grades are calculated as: $\text{grade} = [0.9(\text{exam average}) + 0.1(\text{quiz average})]$.

Grades: A, 100-90; B+, 89-85; B, 84-80; C+, 79-75; C, 74-70; D, 69-60; F, <60.

Absence From Class: Students are expected to attend all classes; if you expect to miss one or two classes, please use the University absence reporting website <https://sims.rutgers.edu/ssra/> to indicate the date and reason for your absence. An email is automatically sent to the faculty coordinator.

Exams: Have student ID or photo driver's license face up on desk during exams. Calculators, PDAs, cell phones, pagers, portable radios, etc. may not be used during exams. When you enter the exam room, you are to **TURN OFF** all cell phones and pagers and you may not have them on your person during the exam. Textbooks, notes, and handouts are to be closed once you enter the exam room. **Come prepared with 2 or 3 pens or pencils** – but regrading of any answers written in pencil will not be allowed. *You may not ask any questions during the exam.* If you wish to dispute something on the exam write a note in the margin. When the announcement to “put your pencils or pens down” is made you must **immediately stop writing**. If you continue to write, your exam may not be accepted or you might lose points. When it is announced in class that your exams may be picked up, you will have 5 calendar days to submit it for regrading.

No regrading of any exam for any reason will be done after 5 days.