University of Arkansas – Fort Smith
5210 Grand Avenue
P. O. Box 3649
Fort Smith, AR 72913–3649
479–788–7000

General Syllabus

CHEM 3303 Medicinal Chemistry

Credit Hours: 3 Lecture Hours: 3 Laboratory Hours: 0

Prerequisite: CHEM 2713 Organic Chemistry II

Effective: 2018~2019

I. Course Information

A. Catalog Description

Focuses on the discovery, invention, and/or design of biologically active compounds. Focuses on the metabolism, mode of action at the molecular level, and structure-activity relationship (SAR), and pharmacological activity of a wide-array of current medicinal compounds.

B. Additional Information - None

II. Student Learning Outcomes

A. Subject Matter

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

1. Analyze the historic significance of natural products used as medical treatments and how those compounds have developed into modern medicines.
2. Evaluate the importance of Structure-Activity Relationship (SAR) as it pertains to modern drug discovery
3. Evaluate the importance of metabolism and its effects drug degradation.

B. University Learning Outcomes

Medicinal Chemistry enhances student abilities in the following areas:

Analytical Skills
Critical Thinking Skills: Students will identify a problem or issue and will research, evaluate, and compare information from varying sources in order to evaluate authority, accuracy, recency, and bias relevant to the problems/issues. Students will generate solutions/analysis of problems/issues evaluated and will

assess and justify the solutions and/or analysis.

Communication Skills (written and oral)
Students will communicate proficiently. Students will compose coherent documents appropriate to the intended audience and effectively communicate orally in a public setting.

Ethical Decision Making
Students will model ethical decision-making processes. Students will identify ethical dilemmas and affected parties and will apply ethical frameworks to resolve a variety of ethical dilemmas.

Global & Cultural Perspectives
Students will reflect upon cultural differences and their implications for interacting with people from cultures other than their own. Students will demonstrate understanding or application of their discipline in a global environment and will demonstrate how their discipline impacts or is impacted by different cultures.

III. Major Course Topics

A. Drug Discovery from Natural Products
B. Drug Discovery from a Lead
C. Lead Modification
    1. The Pharmacophore
    2. Functional-Group Modification
    3. Structure-Activity Relationship
D. Structural Modifications to Increase Oral Bioavailability
E. Drug-Receptor Interactions
    1. Types of Interactions
    2. Spatial Arrangement of Atoms
    3. Drug and Receptor Chirality
F. Enzymes and Enzyme Inhibition
G. Drug Resistance
H. Drug Synergism
I. Drug Metabolism
J. Prodrugs
K. Drug Delivery Systems
L. US Drug Regulation