

This syllabus is not to be construed as a contract with the student and is subject to change.

The School of Pharmacy reserves the right to change the course syllabus. *The School should notify the students through the course notification system or by an email preferably through the Blackboard system.*

Course meeting days and time	Tuesday Monday, Tuesday, Wednesday	9:45 AM - 12:00 PM 8:00-9:30 AM	(Weeks 1-5) (Weeks 6-15)
Location	L04		
Team Leader / Instructor	Dr. Hasan Koc		
Office	MEB 217A		
Phone	(304) 696-7368		
Email	kocha@marshall.edu (Use Bb's internal email for course correspondence)		
Office hours	Mon, Wed Thu	8:00-9:00 AM 8:00-9:30 AM	(Weeks 1-5) (Weeks 6-15) or by appointment

Student: If the instructor accepts appointments, then please email the instructor for availability. The student can expect the instructor to respond to E-mails and phone messages within 72 hours.

Course Description: This course contains both medicinal chemistry and biochemistry and touches on most of the chemical principals that will be needed in our pharmacy curriculum. Topics covered include the diversity of functional groups found in the molecules of life and pharmaceutical substances; the language used to describe these chemical substances; the acid-base properties of functional groups; the redox properties of functional groups; naturally occurring organic acids, alcohols, simple sugars, carbohydrates, amino acids, peptides, proteins, lipids, glycoproteins, lipoproteins, and basic biological processes, such as: membrane structure and function, biosignaling, essential nutrients and cofactors, enzyme structure and function, metabolic pathways and the regulation of metabolism, drug metabolism, drug-receptor interactions, drug-enzyme interactions, and the interaction of drugs and xenobiotics with natural systems. Examples of basic chemical principles will be illustrated by use of the top 200 drugs. A solid foundation on the general principles underlying the relationship between drug structure and function will be provided along with strategies for discovery of new chemical entities (NCEs) and prediction of their pharmaceutical, pharmacokinetic, and pharmacodynamics properties

Prerequisites: P-1 status

Text Books:

Recommended:

Harper's Illustrated Biochemistry (29th Ed.) by Robert Murray, David Bender, Kathleen M. Botham, Peter J. Kennelly, Victor Rodwell. ISBN-13: 9780071765763

Review of Organic Functional Groups, 5th Edition Editor: T.L. Lemke, Ed.; Lippincott, Williams & Wilkins, Philadelphia, 2012. ISBN 978-1-60831-016-6

Lehninger **Principles of Biochemistry**, 5th Edition Authors: David L. Nelson and Michael M. Cox W. H. Freeman and Company, New York, N.Y. ISBN-13: 978-0-7167-7108-1; ISBN-10: 0-7167-7108-X

Required: N/A

Course Objectives:

Number	Objective	MUSOP abilities	How assessed
1	Identify, define and describe the properties of various functional groups of drugs and biomolecules and how they determine the chemical and physical properties of those molecules.	10	RATs, ICAs and exams
2	Describe the basic structure and properties of amino acids, proteins, carbohydrates, nucleic acids, and lipids and describe the basic structure and function of biological membranes, transport mechanisms, ion transport, and signaling.	10	RATs, ICAs and exams
3	Define and describe the chemical and physical properties of drug molecules and how they determine or influence their biopharmaceutical properties.	10	RATs, ICAs and exams
4	Define and describe the molecular interactions of drug substances with enzymes or receptors and the methods used to characterize those interactions.	10	RATs, ICAs and exams
5	Describe basic enzyme structure, function and kinetics and the methodologies used to determine the structure and function of drugs or biomolecules.	10	RATs, ICAs and exams
6	Describe metabolic pathways for naturally occurring substances and their interrelationships and identify potential metabolic products for a given substance.	10	RATs, ICAs and exams
7	Describe the importance of major metabolic pathways and the important intermediates as it applies to a drugs mechanism of action or side effects.	10	RATs, ICAs and exams
8	Describe metabolic regulation by hormones and neurotransmitters as it applies to disease states or the mechanism of action of drugs.	10	RATs, ICAs and exams

Tentative Schedule of Activities:

Legend: IRAT = Individual Readiness Assurance Test, GRAT = Group Readiness Assurance Test, ICA= In-Class Activity, ILD=Instructor-Lead Discussion

Date	#	Meeting Format	Meeting Topic	Instructor
8/26	1	ILD, ICA	Water and pH	HK
9/2	2	ILD, ICA	Water and pH	HK
9/09	3	IRAT, GRAT, ILD, ICA	Functional Groups	HK
9/16	4	IRAT, GRAT, ILD, ICA	Pharmaceutical Properties	HK
9/23	5	IRAT, GRAT, ILD, ICA	Drug Metabolism	HK
9/23	Exam I (1-4) (6:00-8:00 PM)*			
9/29	6	IRAT, GRAT, ILD, ICA	Proteins	HK
9/30	7	ILD, ICA	Proteins	HK
10/1	8	ILD, ICA	Proteins	HK
10/6	9	ILD, ICA	Proteins	HK
10/7	10	IRAT, GRAT, ILD, ICA	Carbohydrates	HK
10/8	11	ILD, ICA	Carbohydrates	HK
10/13	12	IRAT, GRAT, ILD, ICA	Nucleic acids	HK
10/14	13	ILD, ICA	Nucleic acids	HK
10/15	14	IRAT, GRAT, ILD, ICA	Lipids and Membranes	HK
10/17	Exam II (5-11) (2:00-4:00 PM)*			
10/20	15	ILD, ICA	Lipids and Membranes	HK
10/21	16	IRAT, GRAT, ILD, ICA	Biosignaling	HK
10/22	17	ILD, ICA	Biosignaling	HK
10/27	18	IRAT, GRAT, ILD, ICA	Nutrients	HK
10/28	19	IRAT, GRAT, ILD, ICA	Enzymes	HK
10/29	20	ILD, ICA	Enzymes	HK
10/31	Exam III (12-18) (2:00-4:00 PM)*			
11/3	21	IRAT, GRAT, ILD, ICA	Carbohydrate metabolism	HK
11/4	22	ILD, ICA	Carbohydrate metabolism	HK
11/5	23	ILD, ICA	Carbohydrate metabolism	HK
11/10	24	IRAT, GRAT, ILD, ICA	Nitrogen metabolism	HK
11/11	25	ILD, ICA	Nitrogen metabolism	HK
11/12	26	ILD, ICA	Nitrogen metabolism	HK
11/17	27	IRAT, GRAT, ILD, ICA	Lipid metabolism	HK
11/18	28	ILD, ICA	Lipid metabolism	HK
11/19	29	ILD, ICA	Lipid metabolism	HK
11/21	Exam IV (19-26) (2:00-4:00 PM)*			
12/1	30	IRAT, GRAT, ILD, ICA	Hormones and Metabolic Regulation	HK
12/2	31	ILD, ICA	Hormones and Metabolic Regulation	HK
12/3	32	ILD, ICA	Hormones and Metabolic Regulation	HK
12/8	Final Exam (1-32) (2:00-4:00 PM)* -- Comprehensive --			

* -Indicates major assessment

Course Evaluation (grading):

Exams: 50%
 Final Exam: 20%
 IRATs: 5%
 GRATs: 10%
 Other In-Class Activities (ICAs): 15%

Letter grades distribution:

A = 89.50 to 100% = A
 B = 79.50 to less than 89.50%
 C = 69.50 to less than 79.50%
 F = Less than 69.50%

Course Evaluation (assessment): At or near the end of the course, students are expected to complete an evaluation of the course content, learning approaches, student assessment and instructors according to School of Pharmacy procedures.

Assignment and examination grades will be posted in Blackboard within 7 days unless otherwise stated.

Attendance policy: Each student is expected to attend class. Attendance at graded events is mandatory. Only excused absences accepted – see university and school policies. The instructor must be contacted prior to the exam, unless circumstances are prohibitory. Please note – the student is solely responsible for any materials missed.

UNIVERSITY POLICIES

University policies regarding **Academic Dishonesty, Students with Disabilities, University Computing Services' Acceptable Use, Affirmative Action, and Sexual Harassment** can be found at <http://www.marshall.edu/wpmu/academic-affairs/policies/>.

School of Pharmacy Policies

SOCIAL JUSTICE POLICY STATEMENT

Marshall University is committed to bringing about mutual understanding and respect among all individuals and groups at the University. As part of Marshall University, School of Pharmacy has made a commitment to social justice. Therefore, no one will be discriminated against on the basis of race, gender, ethnicity, age, sexual orientation, religion, social class, or differing viewpoints. Each student will be viewed as a valuable member of this class and as the faculty for the course, I will strive to facilitate an atmosphere/learning environment where mutual understanding and respect are actualized.

ACADEMIC, ETHICAL, AND PROFESSIONAL CONDUCT

Student expections for academic, ethical, and professional conduct are defined within the school's [Ethical and Professional Conduct Policy](#) and the university's [Academic Dishonesty Policy](#).

Second Chance and Remediation Policy

Second chance and remediation are mechanisms designed to assist students who have struggled within the classroom environment in demonstrating achievement of classroom and curricular learning outcomes. These processes are described in sections 200.001.003 (Second Chance) and 200.001.004 (Remediation) of the [Academic Standards for Grading, Progressions, Dismissal, and Re-admission Policy](#).

Test Security Policy

In order to ensure the security of all examinations, the School of Pharmacy has adopted the following policies:

1. Test Administration

- A. Non-electronic testing
 - a. Students may not access any electronic equipment during the exam that has not been provided by the faculty, including but not limited to calculators, cell phones, laptops and PDAs.
- B. Electronic testing
 - a. Only those resources (electronic or otherwise) approved by the instructor may be used or accessed during the testing session.

- b. Students enrolled within courses using electronic testing must download and install the [Respondus Lockdown Browser](#). The installation will require an installation code that must be acquired from Computing Services.

2. Test Review

- A. Students will not be allowed to view any exam without direct supervision of course faculty or site facilitator
- B. Students must review tests within time specified by the course faculty.
- C. Limited numbers of students may be allowed to view the exam at one time depending on office size, space, and faculty preference.
- D. Students will be allowed to review the exam only one time, and time limits may be placed on review as specified by course faculty.
- E. NO notes can be taken by the student while reviewing the test, and students are not allowed to access any electronics while reviewing the tests. NO copies electronic or written!
- F. Individual student printouts for exams are to be retained by the faculty.
- G. Faculty have the right to place further restrictions on test review as deemed necessary.