

COURSE: Fundamentals of Drug Action II (14760 & 31239)

COURSE NUMBER: PHAR 332, Spring 2016 (Revised 9 Dec. 2015)

CREDITS: 4

MEETING DAYS AND TIMES: Tue, Thur, 8:30 - 10:20 AM

MEETING LOCATIONS: Room 32 (Chicago) and Room E230 (Rockford)

INSTRUCTORS (All offices are in Chicago, in the College of Pharmacy building [COP] or the Molecular Biology Research Building [MBRB])

Dr. Bolton Rm 325 COP, ph. 996-5280, email judyb@uic.edu
Dr. Burdette Rm 3202 MBRB, ph. 996-6153, email joannab@uic.edu
Dr. Murphy Rm 3120 MBRB, ph. 413-9057, email btmurphy@uic.edu
Dr. Woodbury* Rm 118B COP, ph. 996-6793, email woodbury@uic.edu

* Course Coordinator

The P1 Class Coordinator in Rockford is Mr. Jeremy Ebersole (jebersle@uic.edu).

Course instructors will make reasonable efforts to respond to email from student pertaining to course content or administration. We suggest that questions regarding course content be directed to the instructor responsible for that portion of the course; administrative questions should be directed to the Course Coordinator, Dr. Woodbury.

COURSE TOPICS

This course covers biochemical topics of interest in medicinal chemistry. These include basic enzyme kinetics, the biochemical basis for energy production and use in the cell, and basic drug metabolism. See the course schedule of lectures for further details.

TEXTS

The textbook by Woodbury, "Biochemistry for the Pharmaceutical Sciences" (pub. Jones & Bartlett Learning), is the most pertinent to this course. This is a required text.

ISBN-13:978-0-7637-6384-8

ISBN-10:0-7637-6384-5

BLACKBOARD SITE NOTICES

We have set up a BlackBoard site for this course, which can be accessed using your own password. We will post lecture recordings, powerpoint presentations, exam results, notices, etc. on the BlackBoard site. Please consult the BlackBoard site regularly. It may have information not given in the lecture, such as schedule changes, exam score histograms, etc. Also, you can check your exam scores on the BlackBoard site. You should notify us promptly if you discover any errors. These are the scores we will use in computing your grade, and if you do not appeal

any errors (we allow two weeks after posting scores), those scores will stand.

COURSE OBJECTIVES

Upon completion of this course, the student should have an understanding of:

1. The different types of enzymes and the types of reactions they catalyze.
2. Common enzyme reaction mechanisms, how enzymes may be inhibited, and how this pertains to the development of therapeutic agents.
3. How enzyme kinetics may be analyzed.
4. The metabolic processes involved in the production and storage of energy from foodstuffs.
5. The metabolic processes involved in the biosynthesis of common biochemicals, including amino acids, fatty acids, carbohydrates, purines, and pyrimidines, and common derivatives of these biochemicals.
6. The relationships between aberrant biochemical processes and diseases.
7. The biochemical basis for vitamin and mineral requirements in the diet, and for distinguishing as “essential” certain amino acids and fatty acids.
8. Phase I and phase II metabolism of drugs.
9. Enzyme induction, redox recycling, and sites of drug metabolism.

Detailed learning objectives for each chapter are given in the textbook.

COMPETENCIES FOR PHAR 332

Excerpted from UIC College of Pharmacy Professional Competencies and Outcome Expectations

Graduates will be able to:

I. Integrate critical and scientific thinking

A. Demonstrate and apply the scientific method.

1. Describe the scientific method.
2. Apply the scientific method to pharmacy-based problems and critique its application by others.
3. Distinguish among fact, concept, rule and opinion, as they apply to pharmacy-based problems.
4. Explain the process of drug discovery and development as it applies to the scientific method.

B. Use mathematics and logic to solve problems.

1. Make basic calculations applicable to contemporary pharmacy practice.
2. Create and interpret scientific graphs and plots that arise in the practice of pharmacy.
. . . .
4. Apply advanced mathematical tools to interpret scientific data: elementary calculus, elementary differential equations, and the associated concepts of rates of change, slopes of curves, and areas under a curve, relate and apply these concepts to kinetics of drug action.

C. Apply problem-solving strategies.

1. Analyze a scientific problem.
 - a. Separate parts of the problem
 - b. Collect data
 - c. Identify conditions and constraints
 - d. Set apart any unknowns quantities
2. Connect the problem to related problems and use appropriate problem solving techniques to work on the problem at hand.
3. Estimate reliability of results using known methods.

STUDENT BEHAVIOR AND ACADEMIC INTEGRITY

We have high expectations for the conduct and behavior of our students. Students are expected to conduct themselves at all times in accordance with accepted principles of responsible citizenship and with scrupulous regard for the rights of others. Students are expected to behave in a civil fashion towards instructors, staff, and fellow students. Please attend to the business of the class while in the classroom. It is rude to engage in casual conversation, read a newspaper, or take up other non-class activities during the class period.

In all work, students must adhere to the guidelines regarding academic integrity as described in the Student Handbook and in the UIC Undergraduate Catalog. Academic dishonesty is just cause for strong disciplinary measures. A first instance of cheating will result in a score of zero for that exam or exercise; a second instance will result in a failing grade for the course. Be warned that penalties beyond this may also apply; depending on the degree or level of the infraction, penalties may extend up to and include dismissal from the University.

DISABILITY SERVICES STATEMENT

If you are a student who requires accommodations for examinations, we will make all reasonable efforts to accommodate you in accordance with the written instructions provided to the course coordinator by the Office of Disability Services. It is your responsibility to consult that Office and to obtain written instructions for appropriate accommodations, which should be given to the course coordinator at least one week prior to the first examination in the course.

RELIGIOUS HOLIDAYS

Students will be allowed observance of religious holidays, as defined by the UIC Senate and the UIC College of Pharmacy Student Handbook. Students who wish to observe their religious holidays must notify the course coordinator by the deadlines specified in the current campus policy statement regarding religious holiday observances. We will then make a reasonable effort to accommodate the student.

RECORDINGS

This course will be using the Echo360 video capture system. Lectures will be recorded that include audio and video of the instructor, sequences with lecture slides and annotations. A few hours following the lecture, students can access the video capture using BlackBoard. These recordings are a supplement to the class, and are not a substitute for class attendance. There may be times that a class is not recorded (due to issues with equipment, with sensitive medical records or subjects, etc).

You should be aware that, although the video capture system is designed to record the lecture, student questions and responses made in class may also be recorded and captured. Also, conversations before or after the lecture may also be unintentionally recorded. Please exercise due caution in conversing with others in the classroom.

USE OF RECORDINGS, IMAGES, WRITTEN MATERIALS, AND OTHER MEDIA

Written materials, images, recordings, and other media used in PHAR 332 are restricted to your personal educational use. Copying, distributing, or placing them on the internet, or using them for purposes other than your own educational use, is prohibited. Violations will be dealt with severely, up to and including recommendation of dismissal from the College.

EXAMINATIONS

1. Two-hour examinations are scheduled at intervals of about 4 weeks.

<u>Exam Number</u>	<u>Professor</u>	<u>Course Points</u>	<u>Time & Date</u>
1	Woodbury	250	8:30-10:20 AM, Thur 04 Feb.
2	Burdette/Murphy/ Woodbury	250	8:30-10:20 AM, Thur 03 Mar.
3	Woodbury	250	8:30-10:20 AM, Thur 07 Apr.
4 (Final Exam)	Woodbury/Bolton	250	2:00-4:00 PM, Mon 02 May

1. We have scheduled 4 exams (including the Final Exam). They are closed-book exams; additionally, you will not be permitted to use a calculator or other electronic aid. Generally you will be asked to place your hats, bags, coats, etc. off to one side during the exam. **Please turn off cell phones, beepers, etc.** Upon entering the exam room you will receive your copy of the exam. On the front page of the exam will be your seat number for that exam (this will change randomly from exam to exam). If we observe suspicious activity during the exam, we may ask you to change seats. Please do not be offended if you are asked to move; we may be trying to reduce some offensive activity we observed with another student.

2. As a matter of basic policy, we do not generally answer questions during an examination. Interpretation of the questions by the student is a part of the examination. We will, however, respond to typographic errors, missing pages, etc., in the exam, and if such arise, we will make general announcements to correct these.

3. If you are late for an exam, contact Dr. Woodbury (in Chicago) or Mr. Ebersole (in Rockford) as soon as possible. You may be permitted to start the exam, and to continue it past the usual deadline, but circumstances may not allow this. Please make allowances for bad weather, heavy traffic, etc. on the days that exams are scheduled; we will accept reasonable excuses for lateness, but it is basically your responsibility to be there on time.

4. If you miss an exam, please telephone the Department at (312)996-7255 or (312)996-7245 PROMPTLY. We accept reasonable and timely excuses. ***We do not give make-up exams.*** With an acceptable excuse for missing an hour exam, we will instead give you the weighted average of your scores on the other hour exams. This policy applies to missing one and only one exam. If you miss a second exam, depending on circumstances, you may have to take a zero for that exam or we may offer some other accommodation. In any case where you miss an exam, you must have an acceptable excuse which can be verified, and you must present this excuse to the Course Coordinator as soon as possible. Please don't abuse our willingness to accommodate people with real trouble by giving us trivial excuses.

5. The weighting (in course points) assigned for each of the exams roughly reflects the number of lectures the exams cover, respectively. There will be a total of 1000 course points. See the exam schedule above.

REGRADE POLICY FOR EXAMINATIONS

You are responsible for picking up your own exams. If you want an exam regraded, follow the policy outlined below. We reserve the right to duplicate graded exams prior to returning them to the class. Examinations and assignments will be regraded if properly requested.

1. Regrade requests must be typed/keyboarded, and attached firmly as a cover sheet to the exam sheets (use staples, please; no “dog ears” or “sticky notes”, etc.). The full examination must be included. Requests for regrades are to be clearly marked at the top of the cover page "Regrade-Examination # __", along with the student's name.

2. Requests for a regrade must be submitted within five working days after the examination or assignment has been available for the student to pick up. All regrade requests must be submitted to Dr. Woodbury (mailbox in room 539) or to the Rockford Class Coordinator, not to a teaching assistant. The deadline for submission of requests for regrades will be 4:30 PM on the fifth working day after the return of exams. This deadline will be strictly enforced.

3. Requests for regrades must include completely explained and documented reasons supporting the contested answer to the question. Undocumented and handwritten requests will be returned without being considered.

A. Check the key to see where your answer matched and did not match ours.

B. If your answer says substantially the same thing(s) as the key, but perhaps in a different way, write out as clearly as you can how your answer matches our key. **Requests such as “Please check question 4” will not receive consideration**; you must be specific as to exactly where and why you should receive extra consideration.

LETTER GRADE AND BONUS POINTS POLICY

1. There are 1000 course points possible through 4 exams, at 250 points per exam. Letter grades will be based on a 92% - 83% - 75% - 60% scale, using the average of the five top students' total course points as 100%.

Example: Suppose that the average of the five top-scoring students is 950 points on four exams. Then the "cutline" for a letter grade of "A" will be 92% of 950 points, or 874 course points. The cutlines for a "B" would be at 788.5 points, "C" at 712.5, and "D" at 570. Less than 570 points would be a failing score.

2. "Bonus Points" may be used to augment the accumulated points from exams. This may help in raising a letter grade, for students who are just below the "cutline".

Example: Suppose the cutline for an "A" is 870, and you have accumulated 865 points through four exams. Suppose you have also accumulated 5 bonus points (see below). This would then bring your aggregate score to 870, sufficient for a letter grade of "A".

Note: Bonus points will not be added to the five top students' scores, so they won't "raise the bar" for the cutlines.

3. There are two ways to get a bonus point. First, you must be the first student to respond with a correct and full answer to a TA's question, as posted by the TA (and answered by you) on the Blackboard system. Questions will be posted as starting threads on the Discussion Board in the appropriate Forum; you respond directly on that thread. The TAs will notify "winners". Timestamps on the Blackboard system will determine issues of priority. Second, you can answer the "Bonus Point" questions on the exams; we generally include two or three such bonus point questions on each exam.

4. We have used the above grading scheme (or one very similar to it) for the last several years. Recent grade distributions in this course were

<u>Year</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>
2013	91	72	41	7	2
2014	40	78	50	21	0
2015	51	75	60	4	3

How to get the most out of reading a book:

(Adapted from *The Psychology of Learning*, by J.E. Deese)

1. Skim through the assigned reading so that you will know what it is you are to read.
2. Next, read the text carefully. Do not forget that many important ideas are presented in graphs, diagrams, or maps.
3. As you read, stop now and then and recite to yourself, in your own words, the important ideas in what you have just read.
4. Make brief notes in the margin. These will serve as cues for subsequent self-recitation.
5. Mark important or key passages for later review. (But if you mark too many passages or phrases, it becomes harder to remember which stuff is more important, so be sparing in the use of your highlighter!)
6. Cross-index your lecture notes with the textbook.

Some general rules for preparing for tests:

1. Prepare for the lecture by reading ahead in the text, according to the course syllabus.
2. Make lots of notes during the lecture. Stay alert and receptive. Try to think ahead of the lecturer.
3. Review the lecture within 24 hours. You tend to forget material, with a "decay half-life" of about one day.
4. Do a weekly cumulative review. Start *now* on the review for the next test.
5. Work problems. If you really want the grade, find textbooks with lots of problems, work through them, then look for other problems in other textbooks.
6. Join a study group. The other people will help reinforce your own learning. Trade notes with your study-mates; another person's perspective on the lecture can help you.
7. See the tutor, the TA, the professor. When in doubt, ask!
8. Make up a "rehearsal" test, maybe with your study group. Take it, and see how you do.

See the course Blackboard site for more hints on how to prepare for exams, why we use "free-response" questions, and more.

Feeling stressed out? For study aids, stress reduction, and so on, check with the campus counseling center.

A key to some of the phrasing in the learning objectives

“RECALL”

To produce facts, lists, names labels, tables, definitions, descriptions, reproductions.

Key words: recall, identify, describe, define, list, name memorize, match, tell who, tell what, fill in the blank

“COMPREHEND”

To produce a summary, interpretation, translation, extrapolation.

Key words: summarize, paraphrase, translate, explain, interpret, write a short answer

“APPLY”

To produce an application, performance, product, illustration, demonstration, lesson, model, map, diary.

Key words: apply, show, make, illustrate, demonstrate, teach, use, tell how to

“ANALYZE”

To produce a comparison, contrast, outline, chart, graph, plan, causal analysis.

Key words: compare, contrast, classify, categorize, dissect, distinguish, determine, tell why, deduce, investigate

“SYNTHESIZE”

To produce a design, prediction, hypothesis, invention, formula, solution, synthesis, project.

Key words: design, predict, hypothesize, invent, create, solve, compose, combine, infer

“EVALUATE”

To produce an evaluation, opinion, verdict, judgment, editorial, critique, recommendation, decision, or diagnosis.

Key words: evaluate, rate, assess, judge, editorialize, choose, critique, grade, decide, diagnose, determine value

PHAR 332 Course Schedule
Spring 2013

Updated 31 Aug. 2012

<u>Class Period</u>	<u>Date</u>	<u>Instructor</u>	<u>Topic</u>
1, 2 Tue	12 Jan.	Dr. Woodbury	Course Orientation; Introduction to Enzymes
3, 4 Thu	14 Jan.	Dr. Woodbury	Enzyme Mechanisms; Review & Discussion
5, 6 Tue	19 Jan.	Dr. Woodbury	Enzyme Mechanisms
7, 8 Thu	21 Jan.	Dr. Woodbury	Enzyme Mechanisms; Review & Discussion
9, 10 Tue	26 Jan.	Dr. Woodbury	Enzyme Kinetics
11, 12 Thu	28 Jan.	Dr. Woodbury	Enzyme Kinetics
13, 14 Tue	02 Feb.	Dr. Woodbury	Enzyme Kinetics; Review & Discussion
15, 16 Thu *****	04 Feb	EXAM THURSDAY (2 hours)	Exam 1 8:30 - 10:20 AM (250 points)
17, 18 Tue	09 Feb.	Dr. Burdette	Introduction to Primary Metabolism, Glycolysis
19, 20 Thu	11 Feb.	Dr. Burdette	Gluconeogenesis; Review & Discussion
21, 22 Tue	16 Feb.	Dr. Murphy	Glycogen, Mitochondrial Role in Metabolism
23, 24 Thu	18 Feb.	Dr. Murphy	TCA Cycle, Aerobic Metabolism; Review & Discussion
25, 26 Tue	23 Feb.	Dr. Woodbury	Respiratory Complexes and Oxidative Phosphorylation
27, 28 Thu	25 Feb.	Dr. Woodbury	Oxidative Phosphorylation, Pentose Phosphate Pathway
29, 30 Tue	01 Mar.	Drs. Woodbury, Burdette, & Murphy	Complex Carbohydrates; Review & Discussion
31, 32 Thu *****	03 Mar.	EXAM THURSDAY (2 hours)	Exam 2 8:30 - 10:20 AM (250 points)
33, 34 Tue	08 Mar.	Dr. Woodbury	Survey of Biolipids, Lipid Catabolism
35, 36 Thu	10 Mar.	Dr. Woodbury	Lipid Catabolism; Lipid Biosynthesis
37, 38 Tue	15 Mar.	Dr. Woodbury	Membrane Lipids; Review and Discussion
39, 40 Thu	17 Mar.	Dr. Woodbury	Amino Acid Biosynthesis
***** *	21 - 25 Mar.	SPRING BREAK	*****
41, 42 Tue	29 Mar.	Dr. Woodbury	Amino Acid Catabolism; Urea Cycle
43, 44 Thu	31 Mar.	Dr. Woodbury	Nucleotide Biosynthesis
45, 46 Tue	05 Apr.	Dr. Woodbury	Nucleotide Catabolism; Review & Discussion
47, 48 Thu *****	07 Apr.	EXAM THURSDAY (2 hours)	Exam 3 8:30 - 10:20 AM (250 Points)

49, 50 Tue	12 Apr.	Dr. Bolton	Drug Metabolism
51, 52 Thu	14 Apr.	Dr. Bolton	Drug Metabolism; Review & Discussion
53, 54 Tue	19 Apr.	Dr. Bolton	Drug Metabolism
55, 56 Thu	21 Apr.	Dr. Bolton	Drug Metabolism; Review & Discussion
57, 58 Tue	26 Apr.	Dr. Bolton	Chemical Toxicology
59, 60 Thu	28 Apr.	Dr. Bolton	Chemical Toxicology; Review & Discussion
*****	02 May (Mon)	FINAL EXAM	FINAL EXAM 2:00 - 4:00 PM (250 points)