

BIOL-4520/-5520 Biochemical Pharmacology

Spring 2021

Instructor: Dr. Yuqi Wang, MW241, 314-977-4178, yuqi.wang@slu.edu

Class Times: Tuesday and Thursday, 9:30 – 10:45 AM
Zoom

Office Hours: Thursday 1:00 – 3:00 PM or by appointment
Zoom.

Course Description

This course is designed to give students a good understanding of fundamental principles of pharmacology. The course will utilize the knowledge that students gained in organic chemistry, biochemistry, molecular biology and physiology to learn about how drugs interact with various targets in the body and how our body affects these compounds. The course begins with basic principles of pharmacology, pharmacokinetics and pharmacodynamics such as sites of drug action, agonists and antagonists, receptor theories and dose response relationships, drug absorption, distribution, metabolism, and elimination. It also covers GPCR, NO, eicosanoid mediators and related drugs, intermediate metabolism and related drugs, chemotherapy of infectious diseases and tumor, RNA as new drug targets, and vaccine development.

Course Learning Objectives

1. Understand basic general principles of pharmacokinetics and pharmacodynamics.
2. Understand the major categories of drug targets.
3. Understand mechanism of actions of major drugs related to cardiovascular diseases, diabetes, infectious diseases, cancer, and neurological disorders.
4. Use problem solving skills to learn basic pharmacological concepts.
5. Be familiar with the techniques and approaches used for the study of pharmacology.
6. Be able to read, analyze, and present pharmacology-related literature.

Course Prerequisites: BIOL3040

Course Materials

1. Biochemical Pharmacology, by Michael Palmer (*free online book is available*)
2. Basic and Clinical Pharmacology, by Bertram G. Katzung (*free online book is available*)
3. Primary Literature

Course Expectations

1. Understand materials presented in lectures and read the relevant content in the textbook.
2. Read and study the assigned research papers thoroughly and critically.
3. Give well-prepared and well-organized presentation.
4. Write clearly and logically on pharmacology-related topics.
5. Complete all assignments on time.

BIOL 4520 Grading Procedures

1. **Exams (70%):** throughout the semester, there will be a total of four exams. The first three of which will be given during regular class periods and the fourth one (not cumulative) will be given during the final week. Each exam on its own is worth 100 points. To diminish the stress, the lowest exam will only be counted half, thus the total exam points possible will be 350 instead of 400. If one scores 90, 82, 80, and 60 on the four exams, his/her scores will be $(90 + 82 + 80 + 60/2) = 282$. Exams constitute 70% of the final grade.
2. **Critique of a research paper (10%):** each student is required to write a critique on one of the four research papers to be discussed in class. The critique will be due the date the paper being discussed. It will be graded on the clarity of writing, the quality of the points presented, the skill with which the arguments are made, and the quality of the writing. A critique that reflects critical thinking about the research paper is valued much more than a mere summary of the paper. The critique is worth 50 points and constitutes 10% of the final grade.
3. **Drug Report and Presentation (20%):** a pair of students will study one of the assigned drugs, write on his/her own a short summary (about 2 pages) about the drug, and give an 8-minutes in-class presentation together. The summary is worth 50 points, and the presentation is also worth 50 points. Together, they constitute 20% of the final grade.

BIOL 5520 Grading Procedures

1. **Exams (70%):** throughout the semester, there will be a total of four exams. The first three of which will be given during regular class periods and the fourth one (not cumulative) will be given during the final week. Each exam on its own is worth 100 points. To diminish the stress, the lowest exam will only be counted half, thus the total exam points possible will be 350 instead of 400. If one scores 90, 82, 80, and 60 on the four exams, his/her scores will be $(90 + 82 + 80 + 60/2) = 282$. Exams constitute 70% of the final grade.
2. **Critique of a research paper (10%):** each student is required to write a critique on one of the four research papers to be discussed in class. The critique will be due the date the paper being discussed. It will be graded on the clarity of writing, the quality of the points presented, the skill with which the arguments are made, and the quality of the writing. A critique that reflects critical thinking about the research paper is valued much more than a mere summary of the paper. The critique is worth 50 points and constitutes 10% of the final grade.
3. **Presentation of a research paper (10%):** each student will work with two or three others to give a team presentation on a research paper selected by the instructor. The presentation is worth 50 points and constitutes 10% of the final grade. The evaluation will be based on important aspects for scientific presentation as detailed in the guideline.
4. **Research Report or Research Proposal (10%):** each student will conduct literature research on an assigned topic relevant in pharmacology and write a report (4 to 5 pages). Alternatively, you can substitute the research report with a research proposal (4 to 5 pages) on any topic of your interests that fall within the umbrella of biology or pharmacology. The research proposal should consist one page of "Specific Aims", followed by three pages of background, hypothesis, and research design.

Exam Policy:

Exams must be taken during your regularly scheduled lecture time. If you must miss an exam you must contact the instructor for that exam and submit a written request for a makeup exam at least one week **prior** to that exam date. You will need to provide in the request what your conflict is and provide documentation of the conflict and contact information. Legitimate conflicts

and excuses require written documentation, and are limited to death or near-death instances in the immediate family, a student's illness that requires immediate doctor's care, and participation in an out-of-town university-scheduled athletic event (not club sports). Excuses that will NOT be considered include personal travel arrangements, non-University sponsored events, a conflicting appointment, a previous illness or situation that interfered with your study time or an illness that does not prevent you from coming to the exam. **Unexcused exam absences will be counted as zero in the calculation of your final grade.** If granted, the format of the make-up test will be at the discretion of the instructor, and may consist of an oral or written examination of the material. Make-ups must be taken within 72 hours of the originally scheduled date.

Presentation and Critique Policy

Student presentation must be made for the assigned paper on the scheduled day to receive the consideration for full credit. If you must miss your assigned presentation due to legitimate conflicts, you must contact the instructor and submit a written request at least one week prior to that presentation date. Legitimate conflicts are limited to death or near-death instances in the immediate family and a student's illness that requires immediate doctor's care. Excuses that will NOT be considered include personal travel arrangements, non-University sponsored events, a conflicting appointment, or an illness that does not prevent you from coming to the class. **Unexcused presentation absences will be counted as zero in the calculation of your final grade.** If granted, the format of the make-up presentation will be at the discretion of the instructor. Make-up presentation must be made within a week of the originally scheduled date and the maximum points you can receive for the presentation will be 40 (instead of 50). In other words, you will automatically lose 10 points for your make-up presentation. Likewise, the critique must be received in hard copy prior to the discussion of the paper. Any later submission will lead to a loss of 5 points per day.

Re-grades:

If you have any concerns about an exam question, you must submit a written request within one week of the return of the exam to the class. After one week, you can no longer request a re-grade of any exam. You may request a re-grade if you can demonstrate that your exam was scored incorrectly. You may also request a re-grade if you can sufficiently demonstrate **from course material** that your answer is better than the official answer. This request must carefully document any and all pertinent information regarding the question material. If your request is granted, the change of score may be applied to all students who have answered as you did.

Grading Scale:

A	=	93 - 100% of the total points (i.e., 500)
A-	=	90 - 93% of the total points
B+	=	87 - 90% of the total points
B	=	83 - 87% of the total points
B-	=	77 - 83% of the total points
C+	=	73 - 77% of the total points
C	=	70 - 73% of the total points
C-	=	65 - 70% of the total points
D	=	55 - 65% of the total points
F	=	less than 55% of the total points

Course Evaluation:

According to the University Policy, all students must complete the online course evaluation and

assessment survey during the posted period at the end of the semester to receive a grade.

Academic Integrity and Honesty

The University is a community of learning, whose effectiveness requires an environment of mutual trust and integrity. Academic integrity is violated by any dishonesty such as soliciting, receiving, or providing any unauthorized assistance in the completion of work submitted toward academic credit. While not all forms of academic dishonesty can be listed here, examples include copying from another student, copying from a book or class notes during a closed book exam, submitting materials authored by or revised by another person as the student's own work, copying a passage or text directly from a published source without appropriately citing or recognizing that source, taking a test or doing an assignment or other academic work for another student, securing or supplying in advance a copy of an examination without the knowledge or consent of the instructor, and colluding with another student or students to engage in academic dishonesty.

Any clear violation of academic integrity will be met with appropriate sanctions. Possible sanctions for violation of academic integrity may include, but are not limited to, assignment of a failing grade in a course, disciplinary probation, suspension, and dismissal from the University. Students should review the College of Arts and Sciences policy on Academic Honesty, which can be accessed on-line at <http://www.slu.edu/colleges/AS/> under "Quicklinks for Students" or in hard copy form in the Arts and Sciences Policy Binder in each departmental or College office.

The Department of Biology recognizes that nearly all of our students are extremely honest individuals who work very hard to obtain the best grades that they can in their course work. In an effort to protect these students from the very small group of students that may engage in dishonest practices, the Department has adopted a zero tolerance policy with regard to cheating on exams, plagiarism in the preparation of assignments and/or collusion to carry out any of the above. During exams, quizzes or any other activities in which a grade is being assigned or points toward the course are being assessed, if the instructor or an exam proctor observes you cheating your exam, quiz, or paper will be collected and you will receive a grade of zero for that exam (or activity) that cannot be dropped from the calculation of your final grade for the course. During exams, quizzes or any other activities in which a grade is being assigned or points toward the course are being assessed, if the instructor or an exam proctor observes behavior that is indicative of cheating you will be given a warning to modify your behavior. If you fail to heed the instructors advice or persist in your efforts, your exam (or paper) will be collected and you will receive a grade of zero for that exam (or activity) that cannot be dropped from the calculation of your final grade for the course. If, in the preparation of written assignments for the course, you engage in any plagiarism or in any manner falsely represent the work of others as your own, you will be given a grade of zero for the assignment that cannot be dropped from the calculation of your final grade for the course. Your actions with regard to any of the above matters will be documented in writing and reported to the Chairman of Biology and the appropriate Associate Dean of Arts and Sciences. The Chairman and Dean reserve the right to report the matter to the Committee on Academic Honesty. In the case of collusion however, the matter will without question be reported to the committee on Academic Honesty as this represents a "Class B" violation (see College of Arts and Sciences Policy on Academic Honesty, <http://www.slu.edu/x12657.xml>).

Students with Special Needs - Disability Services

Any student who feels that he/she may need academic accommodations in order to meet the requirements of this course -- as outlined in the syllabus -- due to presence of a disability, should

contact the Office of Diversity and Affirmative Action. Please telephone the office at 314-977-8885, or visit DuBourg Hall Room 36. Confidentiality will be observed in all inquiries.

The instructor reserves the right to change the syllabus if necessary.

CLASS SCHEDULE

The following is a tentative schedule of the course, and it may be subject to change.

Date		Topic
Jan 28	Th	Introduction and Course Overview
Feb 2	Tu	Drug and Drug Targets
Feb 4	Th	Pharmacodynamics
Feb 9	Tu	Drug Development and Proposal Basics
Feb 11	Th	G protein-coupled Receptors
Feb 16	Tu	<i>Paper Discussion</i>
Feb 18	Th	Exam I
Feb 23	Tu	Pharmacokinetics
Feb 25	Th	Drug Elimination and Dosing
Mar 2	Tu	Drug Metabolism
Mar 4	Th	Pharmacology of Nitric Oxide
Mar 9	Tu	Eicosanoids and Related Drugs
Mar 11	Th	<i>March Break</i>
Mar 16	Tu	<i>Paper Discussion</i>
Mar 18	Th	Exam II
Mar 23	Tu	Intermediate metabolism Related Diseases and Drugs
Mar 25	Th	Heart Failure and Antianginal Drugs
Mar 30	Tu	Hypertension and Arrhythmia Drugs
Apr 1	Th	Antimicrobial Agents
Apr 6	Tu	Antifungal and Antiviral Agents
Apr 8	Th	Vaccine Development
Apr 13	Tu	<i>Paper Discussion</i>
Apr 15	Th	Exam III
Apr 20	Tu	Cancer Chemotherapy
Apr 22	Th	Drugs in CNS
Apr 27	Tu	RNA as Drug and Drug Targets
Apr 29	Th	<i>Paper Discussion</i>
May 4	Tu	<i>4520 Student Presentations on New FDA approved Drugs</i>
May 6	Th	<i>4520 Student Presentations on New FDA approved Drugs</i>
May 13	Th	Final Exam (8:00 – 9:50 AM)