

Syllabus
PHCY 425
Medicinal Chemistry in Infectious Diseases and Cancers
Fall Semester 2013

UNC ESHELMAN SCHOOL OF PHARMACY

section numbers: Asheville = 961A, Chapel Hill = 001, Elizabeth City = 961E

COURSE COORDINATORS

INFECTIOUS DISEASE Jian Liu, Ph.D.
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INSTRUCTORS (Office hours by appointment if not posted on Sakai):

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TEACHING ASSISTANT: Christine Lee, cmlee19@email.unc.edu

CLASS MEETING TIMES AND LOCATIONS

Before Oct. 14, varied
From Oct 14 to the end: M and W 9:00 am – 9:50 am
UNC Location: Kerr Hall RM 2001
ECSU Location: Pharmacy Building 204
Asheville Location: Karpen 106

The PHCY 425 course schedule is posed on Sakai: <https://www.unc.edu/sakai>

CREDIT HOURS: 2 PRE-REQUISITES: [PHCY 421 and 422](#)

COURSE DESCRIPTION

PHCY 425, the third module of the medicinal chemistry series, provides an introduction to the antibiotics and antiviral drugs, and the drugs for cancers. The course is designed to integrate the information from drug targets, molecular mechanism of action, organic synthesis and drug resistance for pharmacists. The course emphasizes on the drugs that are being clinically used and potential new drug targets. The overall goals of this course are to:

1. Understand the drug targets and molecular mechanism of action.
2. Encourage the development of problem-solving skills and knowledge related to chemotherapy which are necessary to provide pharmaceutical care.
3. Build a knowledge base of chemotherapy principles for various disease states.

COURSE OBJECTIVES:

By the end of the medicinal chemistry series, based on principles and concepts presented in class discussion, recitation, and in reading assignments, students should be able to complete the following objectives, when presented with a drug therapy problem:

1. Describe, and apply to the solution of therapeutic problems, the relationship between the chemical and physicochemical properties of medicinal agents and their biological action, absorption, distribution, excretion, and metabolism.
2. Recognize medical problems, symptoms, and/or abnormal laboratory values that may require pharmacotherapy, that may alter the selection and/or dosing regimen of drugs, or that may be caused or worsened by pharmacotherapy.
3. Evaluate the risks vs. benefits of therapy for a particular medical problem by recognizing the prognosis if the problem is left untreated and the efficacy and toxicity of various pharmacotherapy strategies based upon the respective principles of pathophysiology, medicinal chemistry, and applied pharmacology.
4. Determine an overall therapeutic goal when a particular problem is to be treated; establish a therapeutic goal for each form of therapy; and list parameters that must be monitored to determine whether or not each goal is met.
5. List the class of drugs and other non-drug modes of therapy, such as diet, that may be used in the treatment of a problem; discuss efficacy and toxicity and/or advantages and disadvantages of each class of drug considering the severity of the disease; and select the most efficacious, least toxic and most appropriate agent within the class of drugs based on differences in pharmacokinetics and cost.
6. Recognize whether the choice or dose of drug will be affected by other patient diseases or problems. The student should list drugs which are contraindicated in a particular case, and predict the influence of the drug selected on the patients' other medical problems.

7. Determine whether any clinically significant drug interactions are likely to occur during therapy for multiple problems. If an interaction is likely, the student should select the next best alternative for the interacting drug(s).
8. Summarize a safe, effective dosing regimen for each of the drugs selected for therapy based on age, weight, liver and kidney function.
9. Alter drug administration regimens (increase dose, give on empty stomach, etc.) or select the next best alternative if therapy fails based on the therapeutic goal.
10. Describe the common and/or significant adverse reactions for each drug selected and identify the parameters necessary to monitor for drug toxicity.
11. Evaluate outcomes of an implemented pharmacotherapeutic plan. Assess effectiveness, adverse effects, and benefits of drug therapy. Decide to conclude, continue, or revise the pharmacotherapeutic plan.

DESCRIPTION OF TEACHING / LEARNING METHODS

The basic class format for the PHCY 425 is a combination of lecture overview of the scheduled topics and active participation of learners in classroom discussions and out of classroom exercises. In most cases, the introductory overview will be accomplished by pre-class reading assignments and other learning methods outside of the classroom. The class format is weighted towards lecturing with didactic information disseminated in the class room fused with active learning exercises both in and out of the classroom. Further information regarding specific assignments can be found on the course Sakai™ site.

PREPARATION FOR CLASSROOM SESSIONS AND EXAMINATIONS:

The required textbooks for the medicinal chemistry (pharmacochemistry) component of PHCY 425 is *Principals of Medicinal Chemistry 5th Ed* and *Goodman and Gilman, The Pharmacological Basics of Therapeutics, 10th Edition*. The student also should review the appropriate material in a medicine textbook such as *Harrison's Principles of Internal Medicine* or *Cecil's Textbook of Medicine*. Reading materials are on reserve at the Health Science Library. The course study guide supplements class lectures and is not intended as a textbook substitute.

ACADEMIC POLICIES:

Academic policies in PHCY 425 generally follow those in the Division of Medicinal Chemistry Professional Curricula and the Medicinal Chemistry Series. Students are expected to complete all reading assignments *prior to the class period*. Structures, diagrams, and other information in the course study guide are meant to serve as a guide only. Students are responsible for a thorough understanding of related material in the required text and will be examined for their comprehension of this material. Photocopying may not reproduce accurately chemical structural formulas and diagrams; students should refer to the required text to verify these.

ACADEMIC HONOR CODE:

The principles of academic honesty, integrity, and responsible citizenship govern the performance of all academic work and student conduct at the University as they have during the long life of this institution. Your acceptance of enrollment in the University

presupposes a commitment to the principles embodied in the Code of Student Conduct and a respect for this most significant Carolina tradition. Your participation in this course comes with the expectation that your work will be completed in full observance of the Honor Code. Academic dishonesty in any form is unacceptable. If a violation is suspected, it may be reported to the Student Attorney General's Office. If you have any questions about your responsibility or the responsibility of faculty members under the Honor Code, please visit the Office of Student Conduct web site (<http://studentconduct.unc.edu>), consult the Graduate and Professional Student Attorney General (gpsag@unc.edu), or contact a representative within the UNC Eshelman School of Pharmacy.

STUDENTS WITH DISABILITIES:

The UNC Eshelman School of Pharmacy is committed to providing reasonable accommodations for all persons with documented disabilities or accessibility concerns in accordance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990. If you have a medical condition, disability, or accessibility concern that may impact your ability to meet the academic demands or requirements of the course, please contact the appropriate office on your campus. Students are required to self identify for disability/accessibility support.

Chapel Hill based students, contact Accessibility Resources and Services in person at the Student and Academic Services Building (SASB) Suite 2126, by email at accessibility@unc.edu or via the web site at <http://accessibility.unc.edu>.

Elizabeth City based students, please contact the Disability Services Office in person at 121 Ridley Student Center or by phone at (252) 335-3273.

Asheville based students, please contact Disability Services in person at 258 Brown Hall, by phone at (828) 232-5050, or by email at disabilityservices@unca.edu.

STUDENT EVALUATION:

Students should expect to be examined for comprehension of material related to lectures and textbook reading assignments. There are three scheduled one-hour examinations in PHCY 425. Each exam will be weighted as the following: Exam I = 40%, Exam II = 25%, and Exam III = 30%. The remaining 5% (5 points) will be a question writing exercise in the Cancer section. Students will prepare multiple choice questions for their peers. Selected questions will be used in class as "clicker questions". Students will be graded on the quality of their questions. Questions that are selected for in class use will automatically be awarded 5 points. Quality questions that reflect core concepts and expected outcomes from the course will receive 5 points. Superficial questions will receive 2 points, and failure to complete the assignment will result in 0 points. The final numerical score will be converted to a final letter grade of A, B, C, or F, according to the chart. *Reexaminations will not be given.*

Final Grading Scale for PHCY 425:

| | |
|--------------------------|----------------------|
| A = $\geq 89.5\%$ | (270 - 300 points) |
| B = 80.0 - 89.5% | (240 - 269.9 points) |
| C = 67.0 - 79.9% | (201 - 239.9 points) |
| F = $< 67.0\%$ | (< 200.4 points) |

MISSED EXAM POLICY:

Exams may be taken later than the scheduled time in extreme cases (e.g. severe health issues or death in the family, travel to a scholarly conference associated with the professional program) and will be considered on an individual basis. Holiday travel is not a valid excuse for missing an exam. Contact Drs. J. Liu or Jarstfer regarding circumstances that may make it difficult to be present for any exam.

POLICY REGARDING RE-TESTING OF LEARNERS WITH NON-PASSING COURSE GRADES

There is no remediation for the course and no re-testing will be available.

OFFICE HOURS:

You should seek help from the course professors and other students. Professors will be available upon request or will post their open office hours on Sakai. Some office hours will be conducted using the blogging function on Sakai.

CLASS POLICY ON RECORDINGS:

Recorded lectures will be made available to all students.

SAKAI:

The contents of this course will be available through Sakai. Students are expected to obtain additional information via Sakai.

COURSE EVALUATION:

Students are required to complete the course evaluation. Those not completing the evaluation will receive an “incomplete” grade for the course, and the “incomplete” grade must be resolved directly with the Executive Associate Dean for Professional Education. This is a course requirement and a responsibility of all students completing a course. Student feedback is essential and highly valued in the School’s efforts to continually improve the quality of courses and the effectiveness of our faculty as educators. As a faculty, we can assure you that your feedback is reviewed in detail. The evaluations are taken very seriously by course directors, individual instructors, and the School. In 2011, the School implemented new policies and procedures for course evaluations, which include specific guidance on how the findings are used by the School as a means of continued quality improvement. More information about the policy and insight into how we use your feedback, can be found here:<http://pharmacy.unc.edu/about-us/school-organization/office-of-strategic-planning-and-assessment/course-evaluations>.

Online course evaluations will be available for students beginning the last week of the course. Students will receive an email message directing them to a website where they can complete their course evaluations. The course evaluation must be completed by midnight December 11, 2013 to receive a final grade in a course. Those not completing the evaluation will receive an “incomplete” grade for the course. All course evaluations are confidential and anonymous.

SYLLABUS CHANGES :

The course directors reserve the right to make changes to the syllabus, including project due dates and test dates, when unforeseen circumstances occur. These changes will be announced as early as possible so that students can adjust their schedules.

**Pharmacotherapy Module 2 (PHCY 443):
Dermatology and Endocrinology
Fall Semester 2013**

Infectious Disease Topics (Dr. Jian Liu coordinator)

| Date/Time | Topic | Instructor |
|---|--|---|
| Wed, Aug 14 9:00 to 9:50 11:00 to 11:50 | Challenges in infectious diseases Bacterial infection and sulfonamides | J.Liu/Williams J Liu |
| Fri, Aug 16 9:00 to 9:50 10:00 to 10:50 11:00 to 11:50 | β -Lactam antibiotics I β -Lactam antibiotics II Quinolones | Morris-Natschke Morris-Natschke J Liu |
| Wed, Aug 21 9:00 to 9:50 | Aminoglycosides, vancomycin, daptomycin and linezolid and macrolides | J. Liu |
| 10:00 to 10:50 | Tetracycline (Tigecycline) and antifungal agents | J Liu |
| Fri, Aug 23 11:00 to 11:50 | Virus life cycle and infection mechanism | J. Liu |
| Mon, Aug 26 9:00 to 9:50 10:00 to 10:50 | Antiviral drugs I, drugs to block viral entry and nucleoside analog drugs Antiviral drugs II, interferons and retro viral protease inhibitors | J. Liu J. Liu |
| Thur, Aug 29 5:00 to 6:00 pm Rm 116 | Exam review (Drs Morris-Natschke and Liu) | |
| Fri, Aug 30 9:00 to 10:00 | Exam I , infectious disease topics | |

**Pharmacotherapy Module 2 (PHCY 443):
Dermatology and Endocrinology
Fall Semester 2013
Cancer Topics (Dr. Michael Jarstfer coordinator)**

| Date/Time | Topic | Instructor |
|--|---|-------------------|
| Mon, Oct 14 9:00 to 9:50 | Steroid hormone oncology agents | Jarstfer |
| Wed, Oct 16 9:00 to 9:50 | Immunomodulator oncology agents | Jarstfer |
| Mon, Oct 21 9:00 to 9:50 | Nucleic acid-based anticancer drugs | Jarstfer |
| Wed, Oct 23 9:00 to 9:50 | Inhibitors of mitosis and DNA topoisomerase I | Lee |
| Mon, Oct 28 9:00 to 9:50 | Inhibitors of mitosis and DNA topoisomerase II | Lee |
| Wed, Oct 30 9:00 to 9:50 | Oncology drug discovery and introduction to kinase targeted therapeutics | Frye |
| Mon, Nov. 4 9:00 to 10:00 Rm 2001 | Exam II, covering Jarsfer's and Lee's lectures | |
| Wed, Nov. 6 9:00 to 9:50 | Kinase targeted therapeutics – case study | Frye |
| Mon, Nov. 11 9:00 to 9:50 platinum | Antibiotic oncology agents and cis- | Frye |
| Wed, Nov. 13 9:00 to 9:50 | Antimetabolites I | Singleton |
| Mon, Nov. 18 9:00 to 9:50 | Antimetabolites II | Singleton |
| Wed, Nov 20 9:00 to 9:50 | Metastasis and angiogenesis | R. Liu |

| Date/Time | Topic | Instructor |
|-----------------------------|--|-------------------|
| Mon, Nov 25 9:00 to 9:50 | Anticancer drugs that target angiogenesis | R. Liu |
| Wed, Nov 27 | Thanksgiving holiday, no class | |
| Mon, Dec 2 9:00 to 10:00 | Exam III, covering Liu's, Singleton's and Frye's lectures | |