Introduction to Drug Discovery

CHM 4279
3 Credits

Fall Semester 2014

Tuesdays and Thursdays, 5:00 pm – 6:15 pm
ISA 3050

Course Director: Professor James Leahy, PhD – Department of Chemistry, College of Arts & Sciences and Center for Drug Discovery and Innovation
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Office Hours: Tuesdays and Thursdays 11:00 am – 12:00 pm or by appointment

Course Description: “Introduction to Drug Discovery” is a course for advanced undergraduates who are interested in pursuing research aimed at identifying and optimizing new medicinal agents. It will introduce the fundamentals required to understand and evaluate assays for activity, pharmacokinetics and pharmacodynamics as well as strategies for the simultaneous optimization of all of these parameters. Case studies will be used to illustrate various methods for the discovery of a number of drugs, including challenges faced in taking potential drug candidates from discovery through the FDA approval process. Students enrolled in this course should have a solid foundation in organic chemistry and introductory biology.

Textbook: No textbook is officially required. “An Introduction to Medicinal Chemistry,” Graham L. Patrick, Oxford University Press, 2009 is recommended as an excellent reference text. In addition, relevant journal articles will be suggested to supplement the text.

Grading Policy and Evaluation Items: Grades will be assigned on an A, B, C, D or F scale. The grading will be based on performance on a midterm examination (worth 40%), a case study project (approximately 5 pages) about an approved drug that illustrates an understanding of the principles discussed throughout the class (20%) and a cumulative final examination (40%).

Course Objectives and Student Learning Outcomes: The course will detail the process of drug discovery and the role of chemistry from target discovery through clinical trials. Upon completion of this class:

1) students will have a thorough understanding of the entire drug discovery process;

2) students will be able to assess what is necessary to progress a drug candidate past all of the preclinical and clinical hurdles as well as to comprehend the time and cost that is typically required to perform these tasks;
3) students will fully understand the legal constraints of patents and how to be able to create new drugs without violating intellectual property laws; and

4) students will understand the difference between the classes of drugs (small molecules vs. biologics) and the unique challenges associated with the discovery, development and manufacturing of each of these classes.

**Attendance Policy:** Students are expected to be in attendance on time for lectures. For the official USF policy on attendance, see the link below.

**Tentative Schedule:**

**Weeks 1 and 2 (August 26 – September 4)** – Introduction and target discovery

**Weeks 3 and 4 (September 9 – 18)** – Pharmacokinetics, pharmacodynamics and ADME/Tox

**Week 5 (September 23 – September 25)** – Intellectual property and patent law

**Weeks 6 and 7 (September 30 – October 9)** – Lead discovery and lead optimization

**Week 8 (October 14)** – **Tentative date for Midterm Examination**

**Week 8 (October 16)** – Physicochemical properties

**Weeks 9, 10 and 11 (October 21 – November 6)** – FDA and drug development

**Weeks 12 through 15 (November 11 – December 4)** – Case studies

**Final Project due December 8 at 5 pm**

**Final Exam (Date to be determined by the University's exam schedule)**

**University Policies:**

1. Final Examinations Policy - all final examinations are to be scheduled in accordance with the University's final examination policy.
   - [http://www.ugs.usf.edu/policy/FinalExams.pdf](http://www.ugs.usf.edu/policy/FinalExams.pdf)
2. General Attendance Policy
   - [http://www.ugs.usf.edu/policy/GeneralAttendance.pdf](http://www.ugs.usf.edu/policy/GeneralAttendance.pdf)
3. Early Notification Requirement for Observed Religious Days - Students who anticipate the necessity of being absent from class due to the observation of a major religious observance must provide notice of the date(s) to the instructor, in writing, at the beginning of the term.
4. Academic Integrity of Students
5. Disruption of the Academic Process
6. Student Academic Grievance Procedures
   o http://www.ugs.usf.edu/policy/StudentAcademicGrievanceProcedures.pdf
7. Students with Disabilities - Students with disabilities are responsible for registering with Students with Disabilities Services (SDS) in order to receive academic accommodations. SDS encourages students to notify instructors of accommodation needs at least 5 business days prior to needing the accommodation. A letter from SDS must accompany this request.
   o See student responsibilities: http://www.asasd.usf.edu/Students.asp
   o See instructor responsibilities: http://www.asasd.usf.edu/faculty.asp
8. SafeAssign Privacy policy
   o In order to comply with privacy laws, students are not required to include personal identifying information, such as your name, in the body of the document. Submitting to the SafeAssign Global Reference Database allows papers from other institutions to be checked against your paper to protect the originality of your work across institutions. Please follow your instructor's instructions carefully regarding what identifying information to include.
   o Blackboard Quick Reference Guide - Submitting SafeAssignments
9. University Emergency Policy
   o In the event of an emergency, it may be necessary for USF to suspend normal operations. During this time, USF may opt to continue delivery of instruction through methods that include but are not limited to: Blackboard, Elluminate, Skype, and email messaging and/or an alternate schedule. It's the responsibility of the student to monitor Blackboard site for each class for course specific communication, and the main USF, College, and department websites, emails, and MoBull messages for important general information.