

The purpose of this course is to provide a mechanism for understanding and predicting the properties of drugs: absorption, distribution, interaction with receptors and enzymes, metabolism, and excretion. The mechanism involves identification of individual functional groups in drugs, prediction of the physicochemical/biochemical properties of those individual functional groups and prediction of how the collective individual functional groups can contribute to the properties of the drugs. As a pharmacist, these concepts are essential when developing a prioritized problem list and care plan for a patient. Future coursework will require application of concepts taught in this course as the student pharmacist learns to develop a prioritized problem list and care plan.

Course Prerequisites: -- Admission to the Doctor of Pharmacy program.

Course Corequisites: -- There are no co-requisites for this course.

Course Faculty and Staff	
Course Director	Instructional Designer
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[Faculty and Staff: Who to Contact and Questions to Ask](#)

Faculty Locations:

Office Hours: Please see the Canvas course site for posted office hours.

Gainesville	PTR: MSB 0445, PG-22 MC: MSB P3-12
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Course Objectives and Educational Outcomes

Course Objectives	Linked Educational Outcome
1. Develop and integrate knowledge about principles of medicinal chemistry and pharmacology.	Learner
2. Understand the primary stages of the modern drug discovery and development process.	Learner
3. Identify the unique role and challenges for natural products in drug discovery.	Problem-Solver
4. Recognize sources of drugs that increasingly impact healthcare.	Problem-Solver Steward
5. Determine how to discover new therapeutic targets and hit compounds.	Learner Problem-Solver
6. Predict the effects of functional groups in drugs on pKa, solubility, and interactions.	Learner
7. Predict interactions between functional groups in macromolecules and in ligands that are responsible for binding of ligands to receptors/enzymes based on biochemical/physicochemical principles.	Learner
8. Predict the effect of binding to receptors on activity versus potency.	Learner
9. Predict the following based on analysis of functional groups: a) metabolism, b) drug interactions.	Learner
10. Predict drug-drug, drug-food, and related interactions based on alterations of drug metabolism.	Learner
11. Consider the role of genetics as a determinant of the rate of metabolism of drugs	Learner
12. Predict efflux transport for different classes of drugs.	Learner
13. Predict drug-drug, drug-food, and related interactions based on alterations of drug transport	Learner Provider
14. Predict degree of ionization of acids and bases from the Henderson Hasselbalch equation.	Learner
15. Estimate the pH of solutions of weak acids and bases.	Learner
16. Explain how prodrugs and soft drugs result in drug action.	Learner

Course Resources and Fees

Course Outline
See Appendix A. Please routinely check your Google campus calendar and the Canvas course site for any messages about changes in the schedule including meeting dates/times, deadlines, and room changes.
Required Textbooks/Readings
<ol style="list-style-type: none"> Roche VF, Zito, SW, Lemke TL, Williams DA. Foye's Principles of Medicinal Chemistry, Wolters Kluwer Health/Lippincott Williams & Wilkins, Philadelphia, PA, 8th Edition, 2020. ISBN-13:978-1-4963-8502-4 Not available in Access Pharmacy Brunton L. Goodman and Gilman's The Pharmacological Basis of Therapeutics, McGraw-Hill Professional, New York, NY, 14th Edition, 2022. ISBN-13: 978-1264258079; ISBN- 10: 1264258070. Available in Access Pharmacy <p>Use UF VPN to access UF Libraries Resources when off-campus. The UF HSC library staff can assist you with questions or issues related to accessing online library materials. For assistance contact your College of Pharmacy librarian or visit the HSC Library Website at this URL:http://www.library.health.ufl.edu/</p>
Suggested Textbooks/Readings
Suggested reading materials will be posted in the Canvas site.
Other Required Learning Resources
N/A
Materials & Supplies Fees
None

Evaluation and Grading

Student Evaluation & Grading

The Canvas© gradebook will be set-up using the percentages below to compute the grade.

Assessment Item	Grade Percentage
Individual Readiness Assurance Tests [5 @ 3% ea.]	15%
Team Readiness Assurance Tests [5 @ 2% ea.]	10%
Exam 1 (material from modules 1 to 3)	37%
Exam 2 [material from modules 1 to 6, 33%; material from modules 1 to 3, 5%]	38%
Total	100%

Grading Scale

Percentage	Letter Grade	Percentage	Letter Grade	Percentage	Letter Grade
92.50-100%	A	79.50-82.49%	B-	66.50-69.49%	D+
89.50-92.49%	A-	76.50-79.49%	C+	62.50-66.49%	D
86.50-89.49%	B+	72.50-76.49%	C	59.50-62.49%	D-
82.50-86.49%	B	69.50-72.49%	C-	< 59.50%	E

Rounding of grades:

Final grades in Canvas will be rounded to the 2nd decimal place. If the decimal is X.495 or higher, Canvas will round the grade to X.50. The above scale depicts this policy and grades are determined accordingly. Grade assignment is made using this policy and NO EXCEPTIONS will be made in situations where a student's grade is "close."

University of Florida Honor Pledge and Academic Dishonesty

UF students are bound by The Honor Pledge which states "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment."

The Conduct Code specifies a number of behaviors that are in violation of this code and the possible sanctions. Expectations for Artificial Intelligence and when use constitutes academic dishonesty is outlined below.

Tendering information (giving your work to another to be copied, giving someone answers to assessment questions, informing another person in a later section about the questions that appear on an assessment that you have taken, or giving or selling a paper to another student), is considered academic dishonesty.

Students are required to report any condition that facilitates academic misconduct to appropriate personnel. Failure to report is also considered academic dishonesty. If you have any questions or concerns, please consult the course's Teaching Partnership Leader/Course Director or Assistant Dean for Curricular Affairs.

See the [UF Conduct Code website](#) for more information. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Course-Related Policies

UF Resources and Policies

University of Florida resources and policies can be found at this URL: <https://go.ufl.edu/syllabuspolicies>

PharmD Course Policies

The Policies in the following link apply to this course. Review the General [Pharm.D. Course Policies](#) carefully, at this URL: <http://curriculum.pharmacy.ufl.edu/current-students/course-policies/>

Attendance Policy

Attendance is mandatory for active learning sessions such as team-based learning sessions, case discussions, laboratory sessions, and other activities that the instructor designates as required. This course has 5 required sessions. A student who misses greater than 1 session(s) for this course will receive an incomplete in the course and will retake the course during the next offering, resulting in delayed graduation.

Makeup Assignments

Make-up assignments may be given for excused ALS absences. Students shall be permitted a reasonable amount of time to make-up any excused absence(s). Due to the block curriculum model, students must complete the make-up assignment by the deadline set by the course director. The time period for this make-up will be consistent with the UF attendance policies. If a student misses multiple class sessions and make-up by the end of the course becomes difficult, the student and Teaching Partnership Leader/Course Director will meet with the Associate Dean of Student Affairs to develop options such as a makeup/remediation plan or withdrawal from the course.

Late Assignments

Late assignments will not be accepted.

Educational Technology Use

The following technology below will be used during the course and the student must have the appropriate technology and software.

1. ExamSoft™ Testing Platform
2. Canvas™ Learning Management System

For technical support, navigate to [Educational Technology and IT Support Contact Information](http://curriculum.pharmacy.ufl.edu/current-students/technical-help/) at this URL: <http://curriculum.pharmacy.ufl.edu/current-students/technical-help/>

Artificial Intelligence (AI) Use for Assessments

The use of generative AI in assessments is prohibited, unless explicitly allowed by the course instructor. Assessments include any submitted work, graded or ungraded, that will be evaluated. These include, but are not limited to, quizzes, exams, assignments, writing projects, etc. If a student is uncertain about the use of AI technology, it is the student's responsibility to ask the instructor prior to beginning the assignment or assessment.

When authorized by the course director/course instructors, students may use AI technologies in the completion of an assessment if they acknowledge all use by naming the technology, describing how it was employed, and adhering to any other requirement stipulated in the assessment's instructions. Failure to acknowledge the use of AI technology or disregarding instructions related to the use of AI for assessments is considered academic misconduct. Students must disclose the use of AI and AI-assisted technologies by following the instructions below.

Application of AI technology must be done with human oversight and control, and students should carefully review and edit the result, as AI can generate outputs that can be incorrect, incomplete, or biased. **Students assume full responsibility for all content, including errors and omissions, if AI is employed.** Additionally, privacy is a concern with AI-generated content. Most commercially available AI systems are not compliant with [HIPAA](#) or FERPA protections, inputting patient or student information is prohibited by federal law.

Instructions to acknowledge the use of AI:

Statement: During the preparation of this assignment I/we, [INSERT NAME/S], used [INSERT TOOL / SERVICE] in order to [INSERT REASON OR PURPOSE]. After using this tool/service, I/we reviewed and edited the content as needed and take full responsibility for the content of the submission.

Penalties for unauthorized use:

Unauthorized use of AI text generators for assessments is considered evidence of academic dishonesty (see [policy on academic dishonesty](#)).

Disability Resource Center
Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center. See the Get Started with the DRC webpage on the Disability Resource Center site. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.
Course Evaluation Process
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online. Students can complete evaluations in three ways: <ol style="list-style-type: none"> 1. The email they receive from GatorEvals, 2. Their Canvas course menu under GatorEvals, or 3. The central portal at https://my-ufl.bluera.com <p>Guidance on how to provide constructive feedback is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/</p>

Appendix A: Course Outline

Date / Time	Mod#	Activity	Activity Title	Contact Time (min)	Faculty
09/22/25	00	Lecture Video	Intro Video	12	Lina Cui
	00	Quiz (Online)	Course Introduction Quiz		Lina Cui
09/22/25	1	Module	Module 1: Relationships of Functional Groups to Pharmacological Activity – Part 1 (Objectives 1, 5-6, 13-15)		Guangrong Zheng, Mohamed Radwan
09/22/25	1.1	Lecture Video	Watch: Relationships of Functional Groups to Pharmacological Activity – Lecture 1.1	57	Mohamed Radwan
09/22/25	1.2	Lecture Video	Watch: Relationships of Functional Groups to Pharmacological Activity – Lecture 1.2	47	Mohamed Radwan
09/22/25	1.3	Lecture Video	Watch: Relationships of Functional Groups to Pharmacological Activity – Lecture 1.3	47	Mohamed Radwan
09/23/25	1.4	Lecture Video	Watch: Relationships of Functional Groups to Pharmacological Activity – Lecture 1.4	42	Mohamed Radwan
09/23/25	1.5	Lecture Video	Watch: Relationships of Functional Groups to Pharmacological Activity – Lecture 1.5	44	Mohamed Radwan
09/23/25	1.6	Lecture Video	Watch: Relationships of Functional Groups to Pharmacological Activity – Lecture 1.6	40	Mohamed Radwan
09/24/25	1.7	Lecture Video	Watch: Relationships of Functional Groups to Pharmacological Activity – Lecture 1.7	37	Guangrong Zheng

09/24/25	1.8	Lecture Video	Watch: Relationships of Functional Groups to Pharmacological Activity – Lecture 1.8	32	Guangrong Zheng
09/24/25	1.9	Lecture Video	Watch: Relationships of Functional Groups to Pharmacological Activity – Lecture 1.9	32	Guangrong Zheng
		Quiz (Self-Assessment)	Module 1 - Self Assessments		Guangrong Zheng, Mohamed Radwan
09/25/2025 at 1:00pm - 2:50pm	1	Active Learning Session	Active Learning Session 1: Relationships of Functional Groups to Pharmacological Activity	110	Guangrong Zheng, Mohamed Radwan
	1	Quiz (iRAT/tRAT)	iRAT/tRAT 1		Guangrong Zheng, Mohamed Radwan
	2	Module	Module 2: Relationships of Functional Groups to Pharmacological Activity –Part 2 (Objectives 1, 5-6, 17)		Mohamed Radwan, Yousong Ding
09/26/25	2.1	Lecture Video	Watch: Relationships of Functional Groups to Pharmacological Activity –Lecture 2.1	54	Mohamed Radwan
09/26/25	2.2	Lecture Video	Watch: Relationships of Functional Groups to Pharmacological Activity –Lecture 2.2	52	Mohamed Radwan
09/29/25	2.3	Lecture Video	Watch: Relationships of Functional Groups to Pharmacological Activity –Lecture 2.3	53	Mohamed Radwan
09/29/25		Optional/ Supplemental	Read: Chapter 2, pages 25-32 in Foye's Principles of Medicinal Chemistry (8th edition).		Mohamed Radwan
09/29/25		Optional/ Supplemental	Read: (Supplementary) The Organic Chemistry of Medicinal Agents, Chapter 1 (1.1 to 1.3), Chapter 2, Chapter 3 and Chapter 4		Mohamed Radwan
09/30/25	2.4	Lecture Video	Watch: Relationships of Functional Groups to Pharmacological Activity –Lecture 2.4	32	Yousong Ding
10/01/25	2.5	Lecture Video	Watch: Relationships of Functional Groups to Pharmacological Activity –Lecture 2.5	53	Yousong Ding
10/02/25	2.6	Lecture Video	Watch: Relationships of Functional Groups to Pharmacological Activity –Lecture 2.6	51	Yousong Ding
10/09/25 1:00pm - 2:50pm	2	Active Learning Session	Active Learning Session 2: Drug Discovery and Natural Products; Relationships of Functional Groups to Pharmacological Activity, Part 2	110	Mohamed Radwan Yousong Ding
	2	Quiz (iRAT/tRAT)	iRAT/tRAT 2		Mohamed Radwan Yousong Ding
	3	Module	Module 3: How New Drugs are Developed: Natural Products and Drug Discovery (Objectives 1-4)		Yanjun Li
10/10/25	3.1	Lecture Video	Watch: Introduction to Drug Discovery and Development	44	Yanjun Li
10/10/25	3.2	Lecture Video	Watch: Natural Product-Based Drug Discovery Process and Structural Features	58	Yanjun Li

10/13/25	3.3	Lecture Video	Watch: Drug Target Identification	54	Yanjun Li
10/13/25	3.4	Lecture Video	Watch: Drug Screening and De Novo Design	53	Yanjun Li
10/13/25		Optional/ Supplemental	Foye's Principles of Medicinal Chemistry, Wolters Kluwer Health/Lippincott Williams & Wilkins, Philadelphia, PA, 7th Edition, 2013. Chapter 1: Drug Discovery from Natural Products		Yanjun Li
10/16/25 8:00am – 9:50am	3	Active Learning Session	Active Learning Session 3: How New Drugs are Developed: Natural Products and Drug Discovery	110	Yanjun Li
	3	Quiz (iRAT/tRAT)	iRAT/tRAT 3		Yanjun Li
	4	Module	Module 4: Drug Biotransformation (also known as Drug Metabolism) (Objectives 8-10, 12)		Lina Cui Wenjun Xie
10/17/25	4.1	Lecture Video	Watch: Drug Biotransformation– Lecture 4.1	26	Lina Cui
10/17/25	4.2	Lecture Video	Watch: Drug Biotransformation– Lecture 4.2	16	Lina Cui
10/17/25		Reading	Read: Foye's (text 1) Chapter 3, pg. 48-52	30	Lina Cui
10/17/25		Optional/ Supplemental	Read: Foye's (text 1) Chapter 3, pages 55-128		Lina Cui
10/17/25		Optional/ Supplemental	Read: Goodman and Gillman, Chapters 6 and 7		Lina Cui
10/20/25	4.3	Lecture Video	Watch: Drug Biotransformation – Lecture 4.3	40	Lina Cui
10/20/25	4.4	Lecture Video	Watch: Drug Biotransformation – Lecture 4.4	22	Lina Cui
10/21/25	4.5	Lecture Video	Watch: Drug Biotransformation – Lecture 4.5	50	Wenjun Xie
10/21/25	4.6	Lecture Video	Watch: Drug Biotransformation – Lecture 4.6	30	Wenjun Xie
10/22/25	4.7	Lecture Video	Watch: Drug Biotransformation – Lecture 4.7	45	Wenjun Xie
10/22/25	4.8	Lecture Video	Watch: Drug Biotransformation – Lecture 4.8	30	Wenjun Xie
10/30/25 8:00am - 9:50 am	4	Active Learning Session	Active Learning Session 4: Drug Biotransformation	110	John S Markowitz Lina Cui Wenjun Xie
	4	Quiz (iRAT/tRAT)	iRAT/tRAT 4		Lina Cui Wenjun Xie
10/24/20 25 at 9:00am - 11:00am	1-3	Exam	Exam 1 (Modules 1-3)	120	Lina Cui

	5	Module	Module 5: Prodrugs and Soft Drugs (Examples that are sold) (Objective 16)		Guangrong Zheng
10/31/25	5.1	Lecture Video	Watch: ProDrugs and Soft Drugs – Lecture 5.1	36	Guangrong Zheng
10/31/25	5.2	Lecture Video	Watch: ProDrugs and Soft Drugs – Lecture 5.2	37	Guangrong Zheng
11/03/25	5.3	Lecture Video	Watch: ProDrugs and Soft Drugs – Lecture 5.3	52	Guangrong Zheng
11/03/25		Reading	Read: Foye's (Text 1), Chapter 2, pg. 25	10	Guangrong Zheng
	6	Module	Module 6: Physicochemical and Biopharmaceutical Properties of Drug Substances: Drug Absorption (Objective 11)		Lina Cui
11/04/25	6.1	Lecture Video	Watch: Physicochemical and Biopharmaceutical Properties of Drug Substances: Drug Absorption-Lecture 6.1	30	Lina Cui
11/04/25	6.2	Lecture Video	Watch: Physicochemical and Biopharmaceutical Properties of Drug Substances: Drug Absorption- Lecture 6.2	15	Lina Cui
11/04/25	6.3	Lecture Video	Watch: Physicochemical and Biopharmaceutical Properties of Drug Substances: Drug Absorption- Lecture 6.3	19	Lina Cui
11/04/25		Reading	Read: Foye's (Text 1), Chapter 4, Membrane Drug Transporters, p131-150	120	Lina Cui
11/14/25 11:50am - 12:15pm		Course Evaluation	Course Evaluation		
11/19/25 9:00am - 10:50am	5-6	Active Learning Session	Active Learning Session 5: ProDrugs and Drug Absorption	110	Guangrong Zheng Lina Cui
		Quiz (iRAT/tRAT)	iRAT/tRAT 5		Guangrong Zheng Lina Cui
11/25/25 9:00am - 11:00am	1-6	Exam	Exam 2 (Modules 1-6) Comprehensive		Lina Cui
			Total Min	2172	
			Total Contact Time	43.44	