

Course Syllabus – Fall 2023
Pharmacogenetics of Drug Metabolism and Transport
PHA 6427

Department of Pharmacotherapy and Translational Research

COURSE FACULTIES:

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Location: Gainesville- MSP PG-19; Lake Nona- Conference room 462

Time: 12:00-1:30pm Monday and 12:00-1:30 pm Wednesday

COURSE DESCRIPTION: Pharmacogenetics/pharmacogenomics is the study of how an individual's genetic inheritance affects the body's response to drugs. This course will examine factors that affect drug response including genetics, as well as, additional factors such as environment, diet, age, concurrent drug therapy, and health status. Methods important to pharmacogenomics research will be presented. The course will use a combination of lectures, assignments (readings and discussions), and presentations on pharmacogenetics. The goal of this course is to provide students with an understanding of pharmacogenetics/pharmacogenomics in the context of variability in drug response and its application in improving treatment approaches as well as in new drug development.

Course Learning Objectives

Upon completion of this course, the student will be able to:

1. Discuss basic principles of genetic medicine, pharmacogenomics, and personalized medicine.
2. Describe the mechanisms by which genetic variation affects drug metabolism and transport. Also, describe how this may impact clinical response and outcomes.
3. Describe the methodology used for standard genotyping assays.
4. Discuss the role of pharmacogenomics in drug discovery and development.

Course Structure

1. This is primarily a lecture-based course wherein lectures will be delivered each week in the classroom (Orlando Campus via zoom).
2. Student Paper: Each student will independently research and write a term paper on a self-selected issue related to the pharmacogenetics of drug metabolism or transport.
3. Student Presentations: Each student will independently develop a PowerPoint presentation based on the Student Paper, and deliver the presentation in one of the final sessions of the semester.
4. Reading Assignments: Supplemental reading assignments may be required to increase the comprehensiveness and clarity of course topics. These assignments are chosen in consideration of their concision and clarity. Material from required reading assignments will be material for exams. There may also be recommended supplemental reading assignments that will not be required for exams.

DESCRIPTION OF COURSE CONTENT

Course Schedule (based on 2023 calendar)

Module	Date	Topic	Instructor
Foundation of Pharmacogenetics and Pharmacogenomics	8/23/2023	Pharmacogenetics: a historical perspective	Wang
	8/28/2023	Applied molecular and cellular biology	Langaee
	8/30/2023	Principles of genetic Medicine	Langaee
	9/4/2023	Holiday-Labor Day, No class	
	9/6/2023	Introduction to Pharmacogenetic and Pharmacogenomic	Wang
Pharmacogenomics Methodology, Web-based tools, and application of AI	9/11/2023	Methods in Pharmacogenomics-1	Langaee
	9/13/2023	Methods in Pharmacogenomics-2	Langaee
	9/18/2023	Methods in Pharmacogenomics-3	Langaee
	9/20/2023	Web-based tools	Wang
	9/25/2023	Artificial intelligence in Pharmacogenomics	Rouhizadeh
Pharmacogenetics of drug metabolism and transport	9/27/2023	Drug Metabolizing enzymes-phase I	Wang
	10/2/2023	Drug Metabolizing enzymes-phase I	Wang
	10/4/2023	Drug Metabolizing enzymes -phase II	Wang
	10/9/2023	Other Drug Metabolizing Enzymes and Drug Transporters	Lamba
	10/11/2023	Gene expression regulation and regulatory variants	Wang
		Topic selection by 10/13/2023	
Applied Clinical Pharmacogenomics	10/16/2023	PGx in pain and CNS disease management	Cavallari
	10/18/2023	PGx in cardiovascular diseases	Cavallari
	10/23/2023	PGx in infectious diseases	Langaee
	10/25/2023	PGx in Oncology: Solid tumors	Lamba
	10/30/2023	PGx in Oncology: Hematological Malignancies	Lamba
	11/1/2023	Applications of Genomics/Pharmacogenomics to Drug Discovery and Development	Lamba
	11/6/2023	Ethical, Legal, and Social Challenges	Wang
Student Presentation and exam	11/8/2023	Student Presentations (schedule to be determined)	Lamba, Wang, Langaee
	11/13/2023	Student Presentations (schedule to be determined)	Lamba, Wang, Langaee
	11/15/2023	Student Presentations (schedule to be determined)	Lamba, Wang, Langaee
	11/20/2023	Student Presentations (schedule to be determined)	Lamba, Wang, Langaee
	11/23/2023	Student Presentations (schedule to be determined)	Lamba, Wang, Langaee
	11/27/2023	Student Presentations (schedule to be determined)	Lamba, Wang, Langaee
	11/29/2023	Reading Days, Q&A	Lamba, Langaee, Wang
	12/6/2023	Take-home exam due	Wang

TEXT: There is no required text. The instructor will provide any required readings.

STUDENT PAPER AND PRESENTATION REQUIREMENTS

Paper:

Students will write a paper (no more than 5-pages long with 1-page references) and prepare a PowerPoint presentation on a self-chosen topic related to pharmacogenomics of drug metabolism or transport (pre-approval of topics is required).

Examples of topics include (but are not limited to):

- Effect of genetic variation on pharmacokinetics and pharmacodynamics
- Effect of genetic variation on drug therapy/toxicity
- Application of pharmacogenetics in drug discovery and development

If the topic is covered in lecture, then the material should be covered in more detail (typically more depth on a specific topic is preferable to a broad topic with shallow coverage).

Presentations:

The presentations should be approximately 15 minutes long, with 5 additional minutes for discussion. Students must use PowerPoint.

Deadlines:

Topic selection by October 11th – pre-approval of topic is required. Talks will be scheduled during week 12- week 15 (individual dates to be assigned).

GRADING AND EXAMS: An exam will be given following completion of the lectures. The exam will be given as a take home exam and will account for 40% of the final grade. The assignments and participation in class discussion, the student paper and the student presentation will account for 10%, 20% and 30%, respectively of the final grade.

GRADING:

A	93.0 - 100
A-	90.0 – 92.9
B+:	85.6 – 89.9
B:	80.0 – 85.5
C+:	76.6 – 79.9
C:	73.3-76.5
C-:	70.0-73.2
D+:	66.6-69.9
D:	63.3-66.5
E:	<63.3

More information on UF grading policy may be found at:

[UF Graduate Catalog](#)

[Grades and Grading Policies](#)

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES: Students requesting classroom accommodation must first register with the Dean of Students Office. This office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

ACADEMIC HONESTY: As a result of completing the registration form at the University of Florida, every student has signed the following statement: "I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University."

COURSE EVALUATION

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

ATTENDANCE

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. [Click here to read the university attendance policies.](#)