

# PHA5012: Clinical Applications of Personalized Medicine

Spring 2021

*2 Credit Hours – A-E Grading*

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Personalized medicine involves the use of an individual's genetic profile to guide decisions about the prevention, diagnosis, and treatment of disease. This course will focus on how pharmacogenomic and genomic data can be used in patient care to provide students with the knowledge and skills to use a personalized medicine approach in their future clinical practice. Students can opt to participate in personal genotyping and use their own genetic data for class assignments or work with a de-identified genotype dataset. This course will use a combination of lectures, patient cases, assignments, and case-based discussions of clinical pharmacogenetic guidelines and primary literature.

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## Teaching Partnership Leader

Julio Duarte, Pharm.D., Ph.D.

- Email: [juliod@cop.ufl.edu](mailto:juliod@cop.ufl.edu)
- Office: PG-21
- Phone: 352-273-8132
- Office Hours: Please see the Canvas course site for posted office hours.

*See Appendix A. for Course Directory of Faculty and Staff Contact Information.*

## Entrustable Professional Activities

This course will prepare you to perform the following activities which the public entrusts a Pharmacist to perform:

- Collect information to identify a patient's medication-related problems and health-related needs.
- Analyze information to determine the effects of medication therapy, identify medication-related problems, and prioritize health-related needs.
- Establish patient-centered goals and create a care plan for a patient in collaboration with the patient, caregiver(s), and other health professionals that is evidence-based and cost-effective.

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- Follow-up and monitor a care plan.
- Identify patients at risk for prevalent diseases in a population.
- Minimize adverse drug events and medication errors.
- Maximize the appropriate use of medications in a population.
- Use evidence-based information to advance patient care.

## Course-Level Objectives

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

1. Explain potential risks and benefits of pharmacogenetic testing.
2. Interpret and apply evidence for clinical pharmacogenetics and genomic medicine to patient care.
3. Apply genetic information to patient cases for clinically actionable gene-drug pairs.
4. Demonstrate best practices for returning pharmacogenetic test results to patients, including legal and ethical concerns and communication strategies.
5. Apply family history and pedigree information to clinical decision-making and disease risk prediction.
6. Apply theoretical genetic information to clinical decision-making and disease risk prediction for the following types of diseases:
  - Complex Diseases: Cardiovascular Disease Risk
  - Somatic Genomics: Genomic Medicine in Breast Cancer
7. Demonstrate the contributions and roles of other health care professionals in the clinical application of pharmacogenetic information to patient care.
8. Summarize challenges and opportunities in integrating pharmacogenetic data into the clinical process of patient care, including informatics and clinical laboratory considerations.

## Course Pre-requisites

1. Completion of all Year 1 Pharm.D. program coursework including milestones.
2. Satisfactory completion of blocks 5 through 11

## Course Co-requisites

1. Completion of all Year 2 Pharm.D. program coursework including milestones.
2. Satisfactory completion of blocks 5 through 11

## Course Outline

Please routinely check your campus calendar and Canvas for any messages about changes in the schedule including meeting dates/times, deadlines, and room changes.

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Date and Time	Mod#	Unit Topic	Contact Time [hr.]	Responsible	Syllabus Learning Objectives
4/21/2021	1	Module 1: Intro and PGx review		Julio Duarte	
4/21/2021	1.1	Watch: Course Introduction	0.25	Julio Duarte	
4/21/2021	1.2	Watch: Understanding and Applying Your Genotype Results	0.75	Caitrin McDonough	2, 6
4/22/2021	2	Module 2: Evidence Evaluation		Julio Duarte	
4/22/2021	2.1	Watch: Evidence Evaluation in Clinical Pharmacogenetics	1	Julio Duarte	2, 4
4/22/2021	2.3	Watch: Drug-Drug-Gene Interactions/Phenoconversion	0.5	Emily Cicali	1, 3-4
4/22/2021 at 2:00-4:00pm	1-2	Active Learning Session 1: Evidence Evaluation Activity *In-class Quiz 1* *Case worksheet due at ALS start*	2	Julio Duarte	1-4, 6
4/23/2021	3	Module 3: Population Genetics, Genomic Medicine, and Testing		Caitrin McDonough	
4/23/2021	3.1	Watch: Clinical Relevance of Population Genetics/Ancestry	0.5	Caitrin McDonough	2, 5-6
4/23/2021	3.2	Watch: Monogenic and Complex Disease Genomic Medicine	0.75	Caitrin McDonough	6
4/26/2021	3.2	Watch: Consumer-Based Genetic Testing	0.5	Cameron Thomas	3-4
4/26/2021	3.3	Watch: Clinical Laboratory Testing	0.5	Emily Cicali	3-4
DUE 4/26/2021 at 11:59pm	3	Assess: Genomic Medicine Assignment	1	Julio Duarte	2, 5-7
4/27/2021	4	Module 4: Cardiology		Julio Duarte	
4/27/2021	4.1	Watch: Cardiology: CYP2C19-clopidogrel	0.75	Larisa Cavallari	1-3, 7-8
4/27/2021	4.2	Watch: Cardiology: CYP2C9/VKORC1-warfarin; SLCO1B1-simvastatin	0.30	Julio Duarte	1-3, 7-8
4/27/2021 at 2:00-4:00pm	1-4	Active Learning Session 2: Cardiology Pharmacogenetics *In-class Quiz 2* *Case worksheet due at ALS start*	2	Julio Duarte Cameron Thomas	1-4, 6
4/28/2021	5	Module 5: Adverse Drug Reactions		Julio Duarte	
4/28/2021	5.1	Watch: Adverse Drug Reactions/Hypersensitivity: abacavir, allopurinol, carbamazepine, phenytoin	0.75	Julio Duarte	1-3, 7-8
4/28/2021	6	Module 6: Pain Management		Emily Cicali	
4/28/2021	6.1	Watch: Pain Management: CYP2D6-opiates; CYP2C9-NSAIDs	1	Emily Cicali	1-3, 7-8

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Date and Time	Mod#	Unit Topic	Contact Time [hr.]	Responsible	Syllabus Learning Objectives
DUE 4/28/2021 at 11:59pm	6	Assess: Pain Management Assignment	1	Julio Duarte	1-3, 7-8
4/29/2021	7	Module 7: Oncology		Nathan Seligson	
4/29/2021	7.1	Watch: Introduction to Cancer Biology	0.5	Nathan Seligson	
4/29/2021	7.2	Watch: Germline and Somatic Genomic Testing in Cancer	1	Nathan Seligson	1-3, 5-8
4/29/2021	7.3	Watch: Tissue Agnostic Therapy	0.25	Nathan Seligson	1-3, 7-8
4/29/2021	7.4	Watch: Molecular Tumor Boards	0.25	Nathan Seligson	
4/29/2021 at 2:00-4:00pm	1-7	Active Learning Session 3: Oncology Pharmacogenetics *In-class Quiz 3* *Case worksheet due at ALS start*	2	Nathan Seligson Julio Duarte	1-3, 5-8
4/30/2021	8	Module 8: Gastroenterology and Transplant		Emily Cicali	
4/30/2021	8.1	Watch: Gastroenterology: TPMT-thiopurines; CYP2C19- PPIs; CYP2D6-ondansetron	0.5	Emily Cicali	1-3, 7-8
4/30/2021	8.2	Watch: Transplant: CYP3A5-tacrolimus; CYP2C19-voriconazole;	0.5	Emily Cicali	1-3, 7-8
5/3/2021	9	Module 9: Psychiatry		Emily Cicali	
5/3/2021	9.1	Watch: Psychiatry Review	0.25	Amanda Elchynski	2, 8
5/3/2021	9.2	Watch: Psychiatry: CYP2D6/CYP2C19-TCAs and SSRIs	0.75	Amanda Elchynski	1-3, 7-8
5/3/2021 at 2:00-4:00pm	1-9	Active Learning Session 4: Psychiatry Pharmacogenetics *In-class Quiz 4* *Case worksheet due at ALS start*	2	Amanda Elchynski Emily Cicali	1-3, 7-8
5/4/2021	10	Module 10: Clinical Implementation of Pharmacogenomics		Julio Duarte	
5/4/2021	10.1	Watch: Clinical Informatics in Pharmacogenetics	0.5	Amanda Elchynski	1-4, 8
5/4/2021	10.3	Watch: Beyond the CPIC Guidelines: Emerging Gene-Drug Pairs and Clinical Implementation	0.5	Christelle Lteif	8
5/4/2021	10.2	Required Reading – Online learning: Implementing pharmacogenomics at your institution: establishment and overcoming implementation challenges	2	Julio Duarte	4, 7-8
5/6/2021 at 8:30-10:30am	1-10	Final Exam		Julio Duarte	All
		Contact Hours	24.75		

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## Submission of Course Materials and Late Assignments

All quizzes and assignment submissions will be completed in Canvas. Quizzes may include questions on any materials covered since the previous active learning session. Case questions for ALS are also due in Canvas before the session begins. Technology such as Lock-down browser and Turn-it-in may be used to encourage the individual completion of these materials.

All course materials are due by the deadlines posted in Canvas and the course outline. Late submissions will be accepted in Canvas (with a 50% grade reduction) up to 2 days after the deadline. Once the submission link closes in Canvas, submissions will no longer be accepted.

## Required Textbooks/Readings

Arwood MJ, Chumnumwat S, Cavallari LH, Nutescu EA, Duarte JD. Implementing pharmacogenomics at your institution: establishment and overcoming implementation challenges. Clin Tranl Sci (2016) 00, 1-14. Available via Canvas.

- 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/>

## Suggested Textbooks/Readings

There is no suggested textbook. Suggested readings will be available via Canvas.

## Other Required Learning Resources

None

## Materials & Supplies Fees

None

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## Student Evaluation & Grading

### Evaluation Methods and How Grades are calculated:

[If course is pass fail, include the following: This course is pass/fail. In order to pass the course, you must receive an overall course grade of **69.50%**]

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

<i>Assessment Item</i>	<i>Grade Percentage</i>
<i>Assignments – 2 @ 7.5% each</i>	15%
<i>Active Learning Session Attendance/Participation: In-class quiz (individual assessment) – 4 @ 5% each Completed case worksheets (individual submission) – 4 @ 7.5% each (Rubric - Appendix B)</i>	50%
<i>Final Exam</i>	35%
<i>Total</i>	100%

Table 1. Grading Scale

### Rounding of grades:

Final grades in Canvas will be rounded to the 2<sup>nd</sup> 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."

## 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/>

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

## Pharm.D. Course Policies

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

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## Appendix A. Course Directory

### Teaching Partnership Leader/Course Director:

Julio Duarte, Pharm.D., Ph.D

Email: [juliod@cop.ufl.edu](mailto:juliod@cop.ufl.edu)

Office: PG-21

Phone: 352-273-8132

#### Questions to Ask:

- Concerns about performance
- Guidance when there are performance problems (failing grades)
- General questions about content

### Instructional Designer:

Holly Fremen

Email: [holly.fremen@ufl.edu](mailto:holly.fremen@ufl.edu)

Office: HPNP 4309

### Academic Coordinator:

Misti Merrill

Office: HPNP 4312

Phone: 352-273-5617

Absence/Tardy Email: [absent2pd@cop.ufl.edu](mailto:absent2pd@cop.ufl.edu)  
or [absent3pd@cop.ufl.edu](mailto:absent3pd@cop.ufl.edu) (course policy site)

### Educational Coordinators:

Name: McKenzie Wallen

Email: [mwallen@cop.ufl.edu](mailto:mwallen@cop.ufl.edu)

Office: Jacksonville Campus

Name: Iverta Allen

Email: [iallen1@cop.ufl.edu](mailto:iallen1@cop.ufl.edu)

Office: Orlando Campus

#### Questions to Ask:

- Issues related to course policies (absences, make up exams, missed attendance)
- Absence/tardy requests (Only the Academic Coordinator handles absence requests)
- Questions about dates, deadlines, meeting place
- Availability of handouts and other course materials
- Assignment directions
- Questions about grade entries in gradebook (missing grades, incorrect grade)
- Assistance with ExamSoft® (Distance campus students may contact the Educational Coordinator for use of Exemplify and assistance during exams. The Academic Coordinator is the contact person for issues related to grading and posting of ExamSoft grades.)

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## Other Teaching Partnership Faculty Members:

Caitrin McDonough, Ph.D.	Email: <a href="mailto:cmcdonough@cop.ufl.edu">cmcdonough@cop.ufl.edu</a>
Larisa Cavallari, Pharm.D.	Email: <a href="mailto:lcavallari@cop.ufl.edu">lcavallari@cop.ufl.edu</a>
Emily Cicali, Pharm.D.	Email: <a href="mailto:emily.cicali@cop.ufl.edu">emily.cicali@cop.ufl.edu</a>
Amanda Elchynski, Pharm.D.	Email: <a href="mailto:aelchynski@cop.ufl.edu">aelchynski@cop.ufl.edu</a>
Christelle Lteif, Pharm.D.	Email: <a href="mailto:christelle.lteif@ufl.edu">christelle.lteif@ufl.edu</a>
Nathan Seligson, Pharm.D.	Email: <a href="mailto:NSeligson@cop.ufl.edu">NSeligson@cop.ufl.edu</a>



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# Appendix B. Rubric for Assessing Active Learning Session Cases and Assignments

**Grade Determination (each question is worth a total of 6 points):**

<b><i>Proficiency Level</i></b>	<b>Accomplished (2 Points)</b>	<b>Meets Expectations (1 Point)</b>	<b>Deficits Exist (0 Points)</b>
Quality of Information	Interprets information in accurate and highly insightful ways. Cites data sources and explains how these references extend and refine insights.	Information is summarized and not a reiteration of information provided by the instructor or in readings. References are sometimes made. Interpretations of information are mostly precise and clear.	Responses are descriptive: a reiteration of what was presented by instructor or read. Serious misinterpretations or no interpretation of the information is evident.
Organization	Information is very well organized with well-organized complete sentences and paragraph form.	Information is logically organized and most sentences/paragraphs are well organized.	Information is disorganized.
Mechanics	No grammatical, spelling or punctual errors.	1-2 grammatical, spelling or punctual errors.	Three or more grammatical, spelling or punctual errors.