Master of Science in Pharmacogenomics

Overview

A 38 credit Master of Science in Pharmacogenomics ("MSPGx") degree is being offered by the Department of Pharmaceutical and Administrative Sciences in the College of Pharmacy and Health Sciences as both an in person MSPGx and Hybrid Pathway ("MSPGx-HP"). This degree program can be completed in three in person full-time semesters (fall, spring, summer) or with the fall and spring semesters being offered via online coursework (with an in person immersive session after the fall semester), and the summer semester taking place in person for the MSPGx-HP. The MSPGx/MSPGx-HP is designed to enhance students' knowledge and academic credentials for entry into subsequent programs, including medical doctor, genetic counselor, pharmacist, geneticist, cancer biologist, or other professional or research-based healthcare related programs, as well as opportunities to directly enter career paths in basic academic or industrial research, clinical or industrial genetic testing, and clinical implementation or research in the field of PGx.

Pharmacogenomics is a fast-growing field that explores a patient's DNA sequence to determine how they are most likely to respond to medications. Pharmacogenomics supports personalized or precision medicine, which connects a patient's genetics, epigenetics, environment, and lifestyle to design a treatment plan that will best suit the patient. The goal of this modern approach to medication therapy is to optimize response and beneficial outcomes while limiting adverse effects and toxicities. The WNE Master of Science in Pharmacogenomics has purposely integrated all major aspects of this field, from basic genetics to clinical implementation, to provide a strong foundation and well-rounded education to graduates. The in person MSPGx degree takes place on the WNE campus in the Center for Sciences and Pharmacy, which houses state of the art scientific instrumentation. Courses include lecture and discussion based didactic and laboratory courses in the fall and spring semesters, and two 3 week long laboratory and clinical experiential courses in the summer.

The Hybrid offering of this program allows those at any location across the US to develop expertise and skills in this growing field. This curriculum requires students to spend only a short immersive session following the fall semester and 6 weeks during the summer (the last semester of the curriculum) on campus, where they will apply the knowledge they have learned throughout the year in didactic courses to laboratory and clinical experiences. Didactic courses may each require live sessions (typically 1 to 1.5hrs each per week) of hybrid learning with in person and/or HP students at specified times. Class schedules will be provided in advance of the start of each semester and the dates for the experiential courses will be provided at the start of the program. Campus housing can be utilized for a fee during the in-person components of the program, if needed.

The curriculum for the in person MSPGx and MSPGx-HP are identical, with the only difference being the mode of completion of non-experiential courses.

Program Outcomes

Students will be expected to fulfill the following primary goals and objectives prior to graduation, which will demonstrate competency in core knowledge areas and relevant skill sets:

1. Demonstrate knowledge of fundamental biological systems, processes, and core principles that are critical to proficiency in the field of pharmacogenomics, including knowledge of basic cell biology, biochemistry, genetics, and other biological systems.
2. Demonstrate knowledge of pharmacogenomics and other areas critical to developing proficiency in this field, including pathophysiology, pharmacology, pharmacokinetics, healthcare outcomes, and medical genetics.
3. Demonstrate proficiency in basic pharmaceutical and molecular genetic techniques.
4. Demonstrate proficiency in applying biologically relevant statistical analysis to research methodology.
5. Interpret and analyze data from genetic test results and sequencing.
6. Critically evaluate current scientific advances in the fields of pharmaceutical sciences and pharmacogenomics.
7. Demonstrate skills required for the implementation of pharmacogenomics in a clinical setting.
8. Demonstrate proficiency in oral and written communication related to dissemination of pharmacogenomics concepts and interprofessional collaboration.

Total Credit Hours: 38

Degree Requirements

A total of 38 credits is required for graduation.

Course Sequence

Fall Semester

PHRSC 513	Biochemistry	3 cr.	
PHRSC 529	Responsible Conduct of Research	3 cr.	
PHRSC 515	Principles of Pharmacology	3 cr.	
PHRSC 510	Seminar & Journal Club 1	1 cr.	
PHRSC 527	Data Analysis & Biostatistics	3 cr.	
PHRSC 551	Introduction to Genetics and Genetic Counseling	3 cr.	
PHRSC 526	Analytical Techniques Lab	1 cr.	
			Subtotal: 17

Spring Semester

PHRSC 522	Pathophysiology	3 cr.	
PHRSC 530	Pharmacy Outcomes	2 cr.	
PHRSC 523	Medical Genetics and Pharmacogenomics	2 cr.	
PHRSC 552	Applied Genetics, Pharmacokinetics, and PGx	2 cr.	
PHRSC 560	Genetic Research and Bioinformatics	3 cr.	
PHRSC 557	Mechanisms of Drug Action	3 cr.	
			Subtotal: 15

Summer Semester

PHRSC 558	Pharmacogenomics Laboratory Experience	3 cr.	Two full time 3-week blocks offered during 1st summer session*
PHRSC 559	Pharmacogenomics Clinical Experience	3 cr.	Two full time 3-week blocks offered during 2nd summer session*

* Blocks will be filled on a first come first served basis. **Subtotal: 6**

Total Credit Hours: 38

Degree completion requirements:

1) All courses passed ("C" or better), with no more than two courses with a grade of "C" or "C+'" and

2) Attain an overall grade point average of 3.0 or higher.