

Master of Science in Pharmacogenomics

Curriculum

MS in Pharmacogenomics Curriculum (Degree Requirements)

A total of 41 credits is required for graduation.

First Year - Fall Semester

PHRSC 510	Student Seminar	1
PHRSC 551	Introduction to Genetics and Genetic Counseling	3
PHAR 513	Biochemistry	3
PHAR 516	Pharmacy Ethics	3
PHAR 611	Principles of Pharmacology	3
PHRSC 527	Data Analysis and Biostatistics	3

Subtotal: 16

First Year - Spring Semester

PHRSC 520	Student Seminar	1
PHAR 522	Pathophysiology	3
PHAR 526	Pharmacy Outcomes	2
PHRSC 552	Advanced Genetics and Pharmacogenomics	3
PHRSC 553	Genetic Data Analysis - Bioinformatics	3
PHRSC 526	Analytical Techniques	1

Subtotal: 13

First Year - Summer Semester

PHRSC 554	Applied Pharmacogenomics Experience	6
PHRSC 555	Clinical Pharmacogenomics Experience	6

Subtotal: 12

Degree completion requirements:

- 1) All courses passed ("C" or better), and
- 2) Cumulative degree GPA \geq 3.0.

General Information

Innovations in biotechnology and major advances in fields such as genetics and molecular pharmacology have led to the development of a new approach to medication therapy in recent

years. Personalized or precision medicine, which explores a patient's genetics, environment, and lifestyle as a way to craft a treatment plan that will best suit the patient, has the goal of limiting adverse effects, while optimizing response and beneficial outcomes. Our Master of Science in Pharmacogenomics (MSPGx) program at Western New England University is designed to allow students to gain first-hand knowledge of these concepts by learning from faculty with expertise in this field and completing experiences in the laboratory and clinical sites. This program will prepare graduates for careers in various aspects of pharmacogenomics, including in academic, industry, and clinical research settings, as well as medical centers implementing pharmacogenomic testing into their patient services.

Program Goals and Objectives

The design of the WNE Master of Science in Pharmacogenomics has purposely integrated all major aspects of this field, from basic genetics to clinical implementation, including introductory and advanced medical genetics and pharmacogenomics, pharmacology and pathophysiology, genetic data analysis and laboratory techniques, healthcare outcomes and statistical analysis, research design and application, genetic counseling, and clinician and patient interactions at medical sites. Having experience in all of these areas and settings will not only provide graduates with insight into how a genetic variant can affect patient response and approaches to study that, but also how to implement the constantly advancing knowledge of pharmacogenomics into clinical practice through collaboration with clinicians and patients, as well as gain financial support for these services based on improved healthcare outcomes data.

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. To comprehend and have a thorough understanding 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. This will be achieved through taking core courses in the program and study of the scientific literature.
2. To comprehend and have a thorough understanding of pharmacogenomics and other areas critical to developing proficiency in this field, including pathophysiology, pharmacology, healthcare outcomes, and medical genetics. This will be achieved through taking core courses in the program and study of the scientific literature.
3. To gain an understanding and proficiency in basic pharmaceutical and molecular genetic techniques. This will be achieved through taking the Analytical Techniques and the Applied Pharmacogenomics Experience courses.
4. To achieve proficiency in understanding and applying biologically relevant statistical analysis to research methodology, and interpretation and analysis of data from genetic sequencing. This will be achieved through taking the Data Analysis and Biostatistics and Genetic Data Analysis – Bioinformatics courses and study of the scientific literature.

5. To be abreast of current scientific advances in the fields of pharmaceutical sciences and pharmacogenomics. This will be achieved through study of the scientific literature, attending journal clubs and seminars, and presentation of research articles and research data.

6. To achieve proficiency in skills such as hypothesis development and experimental design. This will be achieved through developing a hypothesis that tests a specific research question in the field of pharmacogenomics and designing hypothetical experiments, which would test that hypothesis under the supervision of the applied pharmacogenomics experiential faculty.

7. To acquire skills needed for the implementation of pharmacogenomics in a clinical setting. This will be achieved through the Introduction to Genetics and Genetic Counseling course, and the Applied Clinical Experience where students will interact with clinicians and patients in a healthcare setting.

8. To develop proficiency in oral and written communication related to dissemination of Pharmacogenomics concepts and interprofessional collaboration. This will be achieved through presentations and interactions in seminar and experiential courses.

Program Structure

Students in the MS for Pharmacogenomics program will complete three semesters, fall, spring, and summer, culminating in both an applied and clinical experience, for a total of 41 credits.