

2022-23

PRECISION MEDICINE

Degree Offered: Certificate



Program Description

The Precision Medicine Education program based in the Medical College of Wisconsin Institute for Health & Equity offers a hybrid of online and in-person coursework toward a 12-credit Graduate Certificate in Precision Medicine (PM). Clinician participants in the program will advance their knowledge, skills, practices, and competencies in PM. Learners may also enroll in courses as non-degree seeking students.

Admission Requirements

In addition to the general [Graduate School admission requirements](#), this program has additional specific requirements.

All applicants will be required to submit their clinical or medical license as part of the application process.

Credits Required to Graduate

12 credits

Required Courses

42100 Introduction to Precision Medicine. 3 credits.

Introduction to Precision Medicine offers 10 applied learning sessions led by directors of PM Education courses. Students initiate a professional development plan and write and present reports explaining PM concepts, demonstrating research in practice, and judging the validity of PM information.

Elective Courses

Students must pick three of these courses.

42110 Bioethics in Precision Medicine. 3 credits.

Prerequisite: 42100 Introduction to Precision Medicine

This course will explore the historical, philosophical, rhetorical, and ethical foundations of precision medicine and analyze the bioethical issues raised by this new medical paradigm as they manifest in a variety of clinical, biomedical, and health policy contexts.

42150 Biomedical and Clinical Informatics and Data Science. 3 credits.

Prerequisite: 42100 Introduction to Precision Medicine

This course provides an overview of the many types of informatics approaches and data science techniques that are used in the realm of medicine and clinical practice. The course is a general introduction to the fields of clinical informatics and data science. It aims at supplying practical skills for answering topical bioinformatics and clinical informatics research questions. We will additionally discuss the use of these tools, systems, and approaches for supporting a Learning Health System and the ethical and potential implications of such data-driven methods on the clinical setting. This course will expose students to the field of

informatics, including the history of the field, core principles, and future career paths. The course aims to advance the personal development of all students across a spectrum of prior experiences with electronic health records and computer science.

42155 Epigenomics for Precision Medicine. 3 credits.

Prerequisite: 42100 Introduction to Precision Medicine

This course is designed to introduce students to Epigenetics and Epigenomics, an important foundation of modern medicine, in particular as an advanced discipline of Precision Medicine. Epigenomics refers to the inheritance of traits independent of the coding capacity of the DNA and is highly influenced by the environment. Fortunately, epigenomic dysregulations that cause diseases are often amenable to therapeutic intervention, thereby auguring the birth of novel therapeutics. Additionally, like genomics, epigenomics is providing promising biomarkers for diagnosis, prognosis, and real-time surveillance of disease progression. In this course, students will discuss molecular mechanisms underlying epigenetic events, the tools for the design and execution of research in this discipline, how to generate and analyze epigenomic data, and the application of Epigenomics to diagnostics, prognostics, and treatments. Entry level visualization of bioinformatics will be covered as it relates to Epigenomics. No prior bioinformatic knowledge is necessary to enroll for course.

42165 Laboratory Genetics and Genomics. 3 credits.

Prerequisite: 42100 Introduction to Precision Medicine

This course discusses the principles of laboratory genetics and genomics and its application in identifying genetic causations for disease.

42170 Medical Genetics, Undiagnosed, and Rare Diseases. 3 credits.

Prerequisite: 42100 Introduction to Precision Medicine

Medical Genetics, Undiagnosed and Rare Diseases allows students examine the application of genomics to core clinical systems and applying that knowledge to personalized management of patients. Experts in their respective fields will guest lecture in several sessions.

42175 Pharmacogenomics for Precision Medicine. 3 credits.

Prerequisite: 42100 Introduction to Precision Medicine

This elective course is essential and important to Precision Medicine Education of interested enrolled clinician learners. The topic is a session in the Introduction to PM course and harmonizes with the other courses. The topic is also included in a therapeutics chapter in the 8th edition of the classic textbook Thompson & Thompson Genetics in Medicine.

42180 Precision Public Health. 3 credits.

Prerequisite: 42100 Introduction to Precision Medicine

Precision Public Health uses readings, 16 lectures and discussions, 2 essays and presentations, and an individual develop plan for learners to explain and connect concepts, understand publications, justify positions, and formulate ideas about the new field. PPH is delivering the right intervention at the right time every time to the right population.

42185 Cancer Precision Medicine. 3 credits.

Prerequisite: 42100 Introduction to Precision Medicine

This course provides an overview of the molecular basis of cancer, the role of germline and somatic alterations in the development/progression of cancer and the various precision assay methodologies utilized in cancer diagnosis, prognostication, and treatment.

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