Bioinformatics

Degree Offered

Master of Science*

*Joint-Degree Program with Marquette University

Program Description

This interdisciplinary program is jointly offered by Marquette University and the Medical College of Wisconsin. The program prepares students for a multidisciplinary career in the biomedical sciences using mathematics, statistics, and computer science. It is designed to provide students quantitative tools for analyzing data and problems associated with molecular, cellular, physiological, and particularly, genetic systems. Students may select courses from a list of approved courses offered by the following departments at Marquette: Mathematics, Statistics and Computer Science; Biology; Biomedical Engineering; and Electrical and Computer Engineering. In addition, courses are offered by the Department of Physiology and the Division of Biostatistics at the Medical College of Wisconsin. The program meets the needs of recent undergraduates seeking an advanced degree as well as employed professionals interested in opportunities for career advancement. Students may pursue the degree on a full-time or part-time basis. Many courses are offered in the evening.

Program Admissions Requirements

Application is made through Marquette University

*In addition to the general **Graduate School admission requirements**, this program has additional specific requirements.*

Applicants must have completed or be in the process of completing a bachelor's degree from an accredited college or university. Applicants with degrees in a wide range of scientific areas will be considered. These areas include: biological and medical science, computer science, mathematics, statistics, engineering and physical sciences. Applicants must also have the following:

- Basic understanding of one of the life sciences and/or computer science, mathematics or engineering.
- Basic biology or chemistry: sufficient preparation in biology and chemistry for a biochemistry or biochemical course carrying graduate credit. It is suggested that students have 1) at least two semesters of biology and two semesters of organic chemistry or 2) one semester of biology and the second semester of organic chemistry and the first semester of

biochemistry.
- Data structures and programming: sufficient preparation in computer science for a computer science course carrying graduate credit. This would generally be one semester of Structured Programming and one semester of Data Structures.
- One semester of calculus

Program Degree Requirements

Thesis option: Students must complete 30 credit hours of coursework, of which at least 18 credit hours (six courses) must be earned in graduate (6000-level or above MU) courses and six credits earned as thesis credits. The thesis will follow the standards set at the host department, Mathematics, Statistics, and Computer Science (MSCS) at Marquette University. The MSCS department assigns a thesis advisor and requires a thesis committee of three. The thesis advisors may be from any of the participating departments (MU: MSCS, EECE, BIEN, BIOL), or Medical College Graduate Faculty members. Students will be asked to consult with their advisor, practicum mentor, and the listed faculty to determine who might act as thesis advisor. The student may use the same advisor for both practicum and thesis.

Non-Thesis Option: Students must complete 36 credit hours of course work of which at least 18 credit hours (six courses) must be earned in graduate (6000-level or above) courses.

For each option: The minimal requirements consist of 21 credits:

- Six credits for Bioinformatics I (17201 – MCW) and Bioinformatics II (17202-MCW)
- Three credits for Bioinformatics Research Practicum (17294 – MCW)
- Three credits of approved computer science courses at the 6000-level MU.
- Three credits of approved biological sciences courses at the 6000-level MU.
- Three credits of approved computer science or biological sciences courses at the 6000-level MU.
- Three credits of approved biological sciences or computer science courses at the 5000-level MU.
- Students will also attend the Bioinformatics Seminar for at least three semesters. Remaining courses may be taken from either computer science or biological science approved courses.

Medical College Course Registration for Joint-Degree Program

Joint-Degree Program students will register at the Medical College of

Wisconsin for any Medical College courses. For Medical College registration procedure see information for **Joint-Degree Programs**.

Required Courses

17294 Practicum for Research and Development in Bioinformatics I. *3 credits.*

This course will provide students who are enrolled in the MS in Bioinformatics Program the opportunity to participate in bioinformatics research within a biomedical laboratory. Three credits may be counted toward graduation.

17294 Practicum for Research and Development in Bioinformatics II. *3 credits.*

This course will provide students who are enrolled in the MS in Bioinformatics Program the opportunity to participate in bioinformatics research within a biomedical laboratory. Three credits may be counted toward graduation.

Elective Courses

Lists of approved computing and bio courses are available on the **Bioinformatics Program Web site**.