

Bioinformatics (BIIN)

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Mathematical and Statistical Sciences Chairperson: Anne Clough, Ph.D.

Program Director: Mehdi Maadooliat, Ph.D.

Bioinformatics website (<https://www.marquette.edu/grad/programs-bioinformatics.php>)

Degree Offered

Master of Science, students are admitted under Plan B (non-thesis option) but Plan A (thesis option) is also offered.

Program Description

This interdisciplinary program is jointly offered by Marquette University and 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: Computer Science; Mathematical and Statistical Sciences; Biology; Biomedical Engineering; and Electrical and Computer Engineering. In addition, courses are offered by the Department of Physiology and the Division of Biostatistics at 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 evenings.

Prerequisites for Admission

Applicants must have completed or are 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 are considered. These areas include: biological and medical science, computer science, mathematics, statistics, engineering and physical sciences. Students may be admitted on a probationary basis if they are not fully prepared to take courses carrying graduate credit in both computer science and biology.

Application Deadline

To be considered for fall admission, all application requirements must be completed and received in the Graduate School. The priority deadline for review of applications is **Jan. 15** for both the master's and doctoral programs. After the priority admission deadline, applications are reviewed on a rolling basis.

Application Requirements

Applicants must submit, directly to the Marquette University Graduate School:

1. A completed online (http://marquette.edu/grad/future_apply.shtml/) application form and fee.
2. Copies of all college/university transcripts except Marquette.¹
3. An essay outlining relevant work experience or education, career goals, possible areas of interest, and reasons for seeking admission to this program.
4. Three letters of reference from professors or professionals familiar with the applicant's abilities, academic work, and/or professional background.
5. (For international applicants only) a TOEFL score or other acceptable proof of English proficiency. A recent GRE score is strongly recommended.

¹ Upon admission, final official transcripts from all previously attended colleges/universities, with certified English translations if original language is not English, must be submitted to the Graduate School within the first five weeks of the term of admission or a hold preventing registration for future terms are placed on the student record.

General Information

Students interested in applying to the program should consult the program website (<https://www.marquette.edu/grad/programs-bioinformatics.php>) for a list of currently approved courses and scheduled course offerings for the next term.

Special registration for this program is required, as courses are taken at both institutions. Students must register for BIIN 6947 Medical College of Wisconsin/BIIN-Joint Degree through Marquette University and for the matching MCW course through Medical College of Wisconsin.

Bioinformatics Master of Science

Students are admitted to the program under Plan B (non-thesis option), although with the co-directors' approval, students may elect to transfer to Plan A (thesis option). In both options below, courses taken for credit in this program must be from the list of courses approved by the Steering Committee. Exceptions must be approved by the Steering Committee.

PLAN B OPTION (33 CREDITS)

Students must complete 33 credit hours of course work, of which at least 18 hours must be earned in 6000-level courses and above. Plan B Option students must take at least 18 credits at Marquette University.

Code	Title	Hours
BIOL 5201	Genomics and Bioinformatics	3
BIIN 6000	Introduction to Bioinformatics	3
COSC 6050	Elements of Software Development	3
BIIN 6980	Practicum in Bioinformatics	3
3 credits of approved computer science courses		3
3 credits of approved biological science courses		3
3 credits of approved statistical science courses		3
12 credits of approved electives		12
Total Credit Hours:		33

PLAN A OPTION (30 CREDITS)

Students must complete 24 credit hours of course work, of which at least 18 credit hours must be earned in 6000-level courses and above. Plan A Option students must take at least 15 credits at Marquette University. Students must also complete a master's thesis for 6 credit hours and pass an oral examination concentrated on the thesis.

Code	Title	Hours
BIOL 5201	Genomics and Bioinformatics	3
BIIN 6000	Introduction to Bioinformatics	3
COSC 6050	Elements of Software Development	3
BIIN 6980	Practicum in Bioinformatics	3
3 credits of approved computer science courses		3
3 credits of approved biological science courses		3
3 credits of approved statistical science courses		3
3 credits of approved electives		3
BIIN 6999	Master's Thesis	6
Total Credit Hours:		30

Courses

BIIN 6000. Introduction to Bioinformatics. 3 cr. hrs.

The application of knowledge gained through previous course work in informatics, information systems, mathematics, medical and/or biological research to the design, development, implementation and evaluation of information systems and analysis methods applied to biomedical data. Prereq: BIOL 1004 and CHEM 2112 which may be taken concurrently; and COSC 2100; and cons. of dept. ch.

BIIN 6931. Topics in Bioinformatics. 3 cr. hrs.

Topics vary. Students may enroll more than once as the subject matter changes. Prereq: Cons. of dept. ch.

BIIN 6947. Medical College of Wisconsin/BIIN-Joint Degree. 1-8 cr. hrs.

Graduate-level course in selected areas of the life sciences offered at Medical College of Wisconsin. Prereq: Cons. of dept. ch.

BIIN 6960. Seminar in Bioinformatics. 1-3 cr. hrs.

Seminars in research and development tools and applications designed for M.S. in bioinformatics program.

BIIN 6980. Practicum in Bioinformatics. 3 cr. hrs.

An opportunity to participate in the practice of research and/or development in the area of bioinformatics. Prereq: Admitted to BIIN program; BIIN 6000; and cons. of dept. ch.

BIIN 6995. Independent Study in Bioinformatics. 1-3 cr. hrs.

An in-depth study on a topic or subject matter usually not offered in the established curriculum with faculty and independent of the classroom setting. Prereq: Admitted to BIIN program; cons. of dept. ch.

BIIN 6999. Master's Thesis. 1-6 cr. hrs.
S/U grade assessment. Prereq: Cons. of dept. ch.