

BIOMEDICAL INFORMATICS, MS

Overview

The program is a two-year (four-semester) thesis program leading to a Master of Science in Biomedical Informatics. The major goal of the program curriculum is to train new Biomedical Informatics (BMI) specialists. The program is primarily designed to enrich and improve the academic credentials of graduates. Our distinctive program emphasizes student development in four areas (coursework, experiential learning, presentation skills, and personal growth), and allows students to broaden and strengthen their academic foundation for further intellectual development and medical research. Each graduate will be able to use their preparation to investigate and apply information and communication technologies to advance research, practice, and solve problems in the related Biomedical fields in a comprehensive, competitive, and effective way.

The program is designed to include the following high-level competency areas:

- Biomedically-related courses: principal of public health informatics, biomedical imaging and process, advanced bioinformatics.
- Data science related courses: introduction to data science, data science with cloud computing, advanced data science analytic techniques, and big data related courses.
- The program has reciprocal relationships with specific courses in the graduate programs in Biomedical Engineering, and Biochemistry/ Molecular Biology.

The program will provide graduates with marketable skills for informatics careers in biology, medicine, public health, IT trainers, project managers, chief nursing officers, chief medical officers, or research scientists focused on the development of prescriptive analytics from big data sources. These uniquely trained master's graduates will be critical to existing efforts to improve health outcomes. Building a stronger presence in biomedical data sciences and informatics in clinical practice, research, and education, is a high priority for the institutions. This program also prepares students to participate in research programs in academia, healthcare, public health, and industry, as well as to apply the knowledge in clinical, government, and industry settings.

Requirements

The core curriculum emphasizes biomedical applications of data science and big data knowledge. Students must complete a minimum of 32 credit hours from the courses listed below (23 core and at least 9 elective credit hours).

Year 1		Credit Hours
Fall		
BIMI 6100	Elements in Biomedical Informatics	4
BIMI 6200	Introduction to Data Science for Biomedical Informatics	3
BIMI 6300	Fundamentals of Data Analytics	3
Credit Hours		10
Spring		
BIMI 7100	Statistical Machine and Deep Learning in Biomedical Practice	3
BIMI 7300	Biomedical Data Science with Cloud Computing	3
BIMI 7500	Genomic Sequence and Omics Data Analysis	3
Credit Hours		9
Summer Session 1		
BIMI 9980	Master's Thesis Research	0
Credit Hours		0
Year 2		
Fall		
BIMI 8500	Research Methodology of Biomedical Informatics	2
BIMI 9980	Master's Thesis Research	0
Credit Hours		2
Spring		
BIMI 8500	Research Methodology of Biomedical Informatics	2
BIMI 9980	Master's Thesis Research	0
Credit Hours		2

Summer Session 1

BIMI 9980	Master's Thesis Research	0
Credit Hours		0
Total Credit Hours		23

ELECTIVES

Electives courses (Year 1 or Year 2): All students are required to take at least one of the following biologically relevant courses (excluding GBCH 7250 Biomedical Statistics and Data Analysis (2 c.h.)) as an elective: BMSP 6070 Advanced Cell Biology (3 c.h.); GBCH 6010 Graduate Biochemistry (4 c.h.); EPID 7810 Human Molecular Genetics (3 c.h.). Other elective courses may be substituted with permission of the Program Director.

Course ID	Title	Credits
Fall		
BIMI 6400	Health Informatics	3
BIMI 8550	Computational Biology: Structure and Organization	3
BMEN 6830	Intro Biomed Imaging & Process	3
GBCH 6010	Graduate Biochemistry	4
GBCH 7230	Introduction to Bioinformatics	3
PATH 7600	Cancer Biology and Pathology	3
Spring		
GBCH 7170	Principles of Genetics	4
GBCH 7250	Biomedical Statistics and Data Analysis	2
EPID 7810	Human Molecular Genetics	3
GPSO 7320	Renal Physiology	3
MIIM 7065	Scientific Writing	2