

BIOMEDICAL INFORMATICS (BIMI)

BIMI 6100 Elements in Biomedical Informatics (4)

Goals/Mission: To develop an understanding of biomedical informatics, the biomedical data, the practice modern medicine, conduct modern biological research, and health sciences education with information technology. Prerequisites: Students should have a basic understanding of intermediate mathematics. Designation: This course is for graduate students and advanced undergraduate students

BIMI 6200 Introduction to Data Science for Biomedical Informatics (3)

Goals/Mission: The goal is to provide a comprehensive orientation to data science using SQL, R, Python, and programs with application to biomedical informatics Prerequisites: The course does not require prior programming knowledge. Designation: This course is for graduate students and advanced undergraduates

BIMI 6300 Fundamentals of Data Analytics (3)

Goals/Mission: To develop an understanding of the integrated behavior of random variables multivariate data sets using R/ Python with application to complex biomedical data. Prerequisites: Students should have a basic understanding of statistics, multivariable calculus, and linear/matrix algebra. Designation: This course is for graduate students and advanced undergraduate students.

BIMI 6400 Health Informatics (3)

Goals/Mission: To develop an understanding of the advanced approaches of bioinformatics and its application. Prerequisites: Students should have a basic understanding of biomedical informatics and statistics. Designation: This course is for graduate students.

BIMI 7100 Statistical Machine and Deep Learning in Biomedical Practice (3)

Goals/Mission: To develop a comprehensive understanding of modeling for pattern recognition in data and utilizing these models to predict future data. This course is for graduate students and advanced undergraduate students with permission of instructor.

Prerequisite(s): BIMI 6200 and 6300.

BIMI 7210 Biomedical Informatics Workshop I - IV (1)

The Biomedical Informatics Workshop is designed to promote reading, writing, oral presentation skills, and critical analysis of biomedical data, and research related to are a key tool for critically appraising articles and keeping up to date with the current literature. BIMI 7210 Workshop I - IV (1 credit hour) allows credit for participation in these journal clubs.

Maximum Hours: 4

BIMI 7220 Biomedical Informatics Research Methods (4)

The first two years are generally devoted to coursework and research. In conjunction with the course work in the first year, students rotate in 6-8 week blocks through three of the division's participating research laboratories of the student's choice. BIMI 7220 Research Methods allows 2 credit hours per rotation. Subsequent years focus on independent research that culminates in a dissertation. Students accepted into the BMS BMI track are required to join faculty in the Division of Biomedical Informatics and Genomics, but may consider one of other faculty outside of the Division for committee members or co-mentors (with approval of the Division Chief).

Maximum Hours: 99

BIMI 7230 Biomedical Informatics Research Methods (2)

The first two years are generally devoted to coursework and research. In conjunction with the course work in the first year, students rotate in 6-8 week blocks through three of the division's participating research laboratories of the student's choice. BIMI 7230 Research Methods allows 2 credit hours per rotation. Subsequent years focus on independent research that culminates in a dissertation. Students accepted into the BMS BMI track are required to join faculty in the Division of Biomedical Informatics and Genomics, but may consider one of other faculty outside of the Division for committee members or co-mentors (with approval of the Division Chief).

Maximum Hours: 99

BIMI 7300 Biomedical Data Science with Cloud Computing (3)

Goals/Mission: To develop an understanding of programming and high-performance computing techniques in data science with cloud computing. This course is for graduate students and advanced undergraduate students with permission of instructor.

Prerequisite(s): BIMI 6100 and 6200.

BIMI 7500 Genomic Sequence and Omics Data Analysis (3)

Goals/Mission: To understand how to use and analyze high-throughput genomics and omics data in biomedical informatics. The course covers various high-throughput omics data, including genomics, transcriptomics, and proteomics data, as well as their data analysis methods and applications in biological and disease studies. Designation: This course is for graduate students and advanced undergraduate students.

Prerequisite(s): BIMI 6100 and 6200.

BIMI 7700 Algorithms in Biomedical Informatics (3)

To develop an understanding of various algorithm design techniques, such as exhaustive search, greedy search, divide-and conquer, dynamic programming, graph-based algorithms, and randomized algorithms, as well as various computational problems in biomedical informatics, such as sequence alignment, genome arrangement, motif finding, and peptide identifications. These problems are used as examples to demonstrate how to solve biomedical problems by mathematical modeling and algorithm design. Designation: This course is for graduate students and advanced undergraduates.

Prerequisite(s): BIMI 6200.

BIMI 7990 Biomedical Informatics Directed Independent Study (3)

The first two years are generally devoted to coursework and research. Subsequent years focus on independent research that culminates in a dissertation. Students accepted into the BMS BMI track are required to join faculty in the Division of Biomedical Informatics and Genomics, but may consider one of other faculty outside of the Division for committee members or co-mentors (with approval of the Division Chief). BIMI 7990 Directed Independent Study (3 credit hours) allows credit for independent research under the direction of a mentor or co-mentor in the Division of Biomedical Informatics and Genomics.

Maximum Hours: 99

BIMI 8500 Research Methodology of Biomedical Informatics (2)

Goals/Mission: Journal clubs are a key tool for critically appraising articles and keeping up to date with the current literature. Designation: This course is for graduate students only.

Prerequisite(s): BIMI 7500.

Maximum Hours: 99

BIMI 8550 Computational Biology: Structure and Organization (3)

Goals/Mission: To develop an understanding of the advanced approaches of computational biology, and their application. Designation: This course is for graduate students and advanced undergraduate students.

Prerequisite(s): BIMI 6100 and 6200.

BIMI 8600 Advanc Data Sci Ana Tech (3)

Goals/Mission: To develop an understanding of the advanced approaches with algorithms in representation learning, generative adversarial networks, and their application to imaging multi-omics data. Designation: This course is for graduate students and advance undergraduate students.

Prerequisite(s): BIMI 6100, 6200 and 6300.

BIMI 9980 Master's Thesis Research (0)

Goals/Mission: The goal is to develop a deeper understanding of a research field in biomedical informatics and gain capability to design a conceptual framework, conduct data analysis, and write a dissertation proposal. Designation: This course is for graduate students

Prerequisite(s): BIMI 6100, 6200 and 6300.