

# MASTER OF SCIENCE IN BIOMEDICAL DATA SCIENCE AND MODELING

The overall objective of the Master of Science in Biomedical Data Science and Modeling is to provide education and training relevant to professional employment in computational biomedical engineering. Special emphasis is placed on principles of mathematical modeling, machine learning, biostatistics, and bioinformatics. The student must have a minimum 3.0/4.0 GPA in an engineering or science bachelor's program to be admitted. Candidates should have prior coursework that demonstrates proficiency in math and computer science.

## Curriculum

Requirement	Credits
Requirement	
Minimum Credits Required	32
Maximum 400-Level Credit	12
Minimum 500-Level Credit	20
Maximum Transfer Credit	9

Code	Title	Credit Hours
<b>Required Courses (20)</b>		
BIOL 550	Bioinformatics	3
BME 500	Introduction to Biomedical Engineering (In Fall 2021, we will change credit hours of BME 500 from 3 to 2)	2
BME 522	Mathematical Methods in Biomedical Engineering	3
or BME 422	Mathematical Methods for Biomedical Engineers	
or CHE 439	Numerical and Data Analysis	
or CHE 535	Applications of Mathematics to Chemical Engineering	
BME 533	Biostatistics	3
or BME 433	Biomedical Engineering Applications of Statistics	
or CHE 426	Statistical Tools for Engineers	
or MATH 425	Statistical Methods	
or MATH 476	Statistics	
BME 553	Advanced Quantitative Physiology	3
or BME 453	Quantitative Physiology	
BME 560	Methods in Biomedical Data Science	3
ECE 566	Machine and Deep Learning	3
<b>Elective Courses (12)</b>		
Select 2 courses from the following list (6 credits) plus an additional 6 credits of Math/Life Science/Eng courses recommended from this list. Other courses may be selected with adviser approval prior to course registration.		12
BIOL 414	Genetics for Engineering Scientists	3
BIOL 521	Population Genetics	3
BME 537	Introduction to Molecular Imaging	3

BME 538	Neuroimaging	3
BME 518	Reaction Kinetics for Biomedical Engineering	3
BME 545	Quantitative Neural Function	3
BME 582	Advanced Mass Transport for Biomedical Engineers	3
BME 597	Special Problems	1-6
CS 522	Advanced Data Mining	3
CS 577	Deep Learning	3
CS 578	Interactive and Transparent Machine Learning	3
CS 584	Machine Learning	3
ECE 505	Applied Optimization for Engineers	3
ECE 567	Statistical Signal Processing	3
MATH 522	Mathematical Modeling (or)	3
MATH 569	Statistical Learning (or)	3
MATH 571	Data Preparation and Analysis (or)	3
MATH 577	Computational Mathematics I (or)	3
MMAE 451	Finite Element Methods in Engineering	3
MMAE 501	Engineering Analysis I	3
MMAE 502	Engineering Analysis II	3
MMAE 517	Computational Fluid Dynamics	3
STAT 514	Applied Computational Statistics for Analytics	3
<b>Total Credit Hours</b>		<b>32</b>