MASTER OF SCIENCE IN CHEMICAL ENGINEERING, PLAN B

Requirements Effective Fall 2025

Code	Title	Credits
Core Courses:		
CBE 693	Research Conduct and Practices	1
Select one option from the following:		7-12
Option (1): chemical engineering principles and mathematical modeling (12 credits)		
CBE 501	Chemical Engineering Thermodynamics	
CBE 502	Advanced Reactor Design	
CBE 503	Transport Phenomena Fundamentals	
CBE 521	Mathematical Modeling for Chemical Engineers	
Option (2): chemical and biological engineering principles (7 credits) [1]		
CBE 500	Chem & Biological Engineering Fundamentals	
CBE 504/ BIOM 504	Fundamentals of Biochemical Engineering	
Advanced Statistics and Data Science [1]		**0-3**
BIOM 422	Quantitative Systems and Synthetic Biology	
BIOM 526/ ECE 526	Biological Physics	
BIOM 537/ ECE 537	Biomedical Signal Processing	
BIOM 570/ MECH 570	Bioengineering	
BIOM 576/ MECH 576	Quantitative Systems Physiology	
BZ 548	Theory of Population and Evolutionary Ecology	
BZ 562	Computational Approaches in Molecular Ecology	
CS 528/ECE 528	Embedded Systems and Machine Learning	
CS 535	Big Data	
CS 540	Artificial Intelligence	
CS 545	Machine Learning	
DSCI 445	Statistical Machine Learning	
DSCI 511	Genomics Data Analysis in Python	
DSCI 512	RNA-Sequencing Data Analysis	
ENGR 478	Applied Engineering Data Analytics	
ERHS 535	R Programming for Research	
HORT 579	Mass Spectrometry Omics-Methods and Analysis	
MIP 545	Microbial Metagenomics/Genomics Data Analysis	
MIP 570	Functional Genomics	
SOCR 545	Current Methods in Microbial Genomics	
STAR 511	Design and Data Analysis for Researchers I	
STAR 512	Design and Data Analysis for Researchers II	
STAT 520	Introduction to Probability Theory	
STAT 540	Data Analysis and Regression	
STAT 544/ ERHS 544	Biostatistical Methods for Quantitative Data	
STAT 547/ CIVE 547	Statistics for Environmental Monitoring	
STAT 560	Applied Multivariate Analysis	
SYSE 541	Engineering Data Design and Visualization	
Biomolecular Engineering Electives [1]		**0-6**
CBE 522/ BIOM 522	Bioseparation Processes	
CBE 524	Bioremediation	
CBE 540/CIVE 540	Advanced Biological Wastewater Processing	
CBE 560	Engineering of Protein Expression Systems	
CBE 570	Biomolecular Engineering/Synthetic Biology	
Biomolecular Engineering Laboratory [1]		**0-1**
CBE 505	Biochemical Engineering Laboratory	
Electives [2]		**11-19**
5XX - 7XX courses with the course following prefixes: CBE, BIOM, MSE, CIVE, ECE, MECH, SYSE, ENGR, AB, AHS, ANEQ, BC, BMS, BTEC, BZ, CM, CHEM, CS, DSCI, ECOL, ESS, ERHS, FSHN, FTEC, GEOL, GES, GRAD, HORT, LIFE, MATH, MIP, NB, PH, SOCR, STAR, STAA, STAT		
Independent Study for use towards the scholarly paper requirement [3]		**0-3**
CBE 695	Independent Study	
Program Total Credits		**32**

A minimum of 32 credits are required to complete this program.

1. Students who choose option (2) in the core courses must take 3 credits in Advanced Statistics and Data Science, 6 credits in Biomolecular Engineering Electives, and 1 credit in Biomolecular Engineering Laboratory
2. For students who choose option (1) in the core courses, take a minimum of 16 credits of electives, including any additional courses in the categories listed above.
   For students who choose option (2) in the core courses, take a minimum of 11 credits of electives, including any additional courses in the categories listed above
3. The M.S. degree, Plan B, is completed with a scholarly paper. The M.S. degree with a scholarly paper requires 32 graduate course credit hours. A maximum of 3 credits of independent study (CBE 695) for use towards the scholarly paper requirement may be counted toward the 32-credit degree requirements.

Department Seminar Attendance

Master of Science Students are also required to attend the department seminars whenever they are held as a condition of making satisfactory

progress towards their degree, except when regular coursework conflicts with the time.

Examinations and Scholarly Paper Requirement
An acceptable scholarly paper must be submitted to and approved by the student's graduate committee. Satisfactory performance on a final comprehensive examination administered by the student's graduate committee is required. **The final comprehensive examination includes an oral presentation of the scholarly paper that is open to the public.**