MACHINE LEARNING AND DATA SCIENCE MINOR

The minor in Machine Learning and Data Science requires 8 courses: 2 core courses, 2 elective courses, and 4 courses from a specialization track.

At least 4 units of coursework must be unique to this minor program. These units cannot be applied to any other minor or certificate program, or the major requirements of any degree program. Such coursework may fulfill McCormick Social Sciences/Humanities (Theme), WCAS distribution requirements, or other unrestricted electives.

Course with a grade lower than "C-" cannot be applied to the minor.

Core courses (2 units):

Course	Title
Programming Foundations	
COMP_SCI 150-0	Fundamentals of Computer Programming 1.5

Course	Title
Statistics Foundations (choose one)	
BMD_ENG 220-0	Introduction to Biomedical Statistics
CHEM_ENG 312-0	Probability and Statistics for Chemical Engineering
CIV_ENV 306-0	Uncertainty Analysis
IEMS 201-0	Introduction to Statistics
IEMS 303-0	Statistics
MATH 314-0	Probability and Statistics for Econometrics
STAT 320-2	Statistical Theory & Methods 2

Specialization (4 units):

Course	Title
Data Engineering Track	
COMP_SCI 217-0	Data Management & Information Processing
or COMP_SCI 214-0	Data Structures & Algorithms
IEMS 304-0	Statistical Learning for Data Analysis
DATA_ENG 200-0	Foundations of Data Science
DATA_ENG 300-0	Data Engineering Studio

Course	Title
Machine Learning Track (not open to computer science majors/minors)	
COMP_SCI 111-0	Fundamentals of Computer Programming
COMP_SCI 214-0	Data Structures & Algorithms
COMP_SCI 348-0	Introduction to Artificial Intelligence
COMP_SCI 349-0	Machine Learning

Course	Title
Hybrid Track	
COMP_SCI 214-0	Data Structures & Algorithms
COMP_SCI 349-0	Machine Learning
DATA_ENG 200-0	Foundations of Data Science
DATA_ENG 300-0	Data Engineering Studio

Elective Courses (2 units):

Course	Title
BMD_ENG 311-0	Computational Genomics
BMD_ENG 312-0	Biomedical Applications in Machine Learning
BMD_ENG 313-0	Wearable Devices: From Sensing to Biomedical Inference
CHEM_ENG 379-0	Computational Biology: Analysis and Design of Living Systems
CIV_ENV 304-0	Civil and Environmental Engineering Systems Analysis
CIV_ENV 377-0	Choice Modelling in Engineering
CIV_ENV 395-0	Special Topics in Civil and Environmental Engrg (Data Science for Urban Systems)
CIV_ENV 480-1	Travel Demand Analysis & Forecasting 1
CIV_ENV 480-2	Advances in Travel Demand Analysis and Forecasting
CIV_ENV 495-0	Selected Topics in Civil Engineering (Data Analytics for Transportation and Urban Infrastructure Applications)
COMP_SCI 312-0	Data Privacy
COMP_SCI 332-0	Online Markets
COMP_SCI 333-0	Interactive Information Visualization
COMP_SCI 394-0	Agile Software Development
COMP_SCI 396-0	Special Topics in Computer Science (Computing, Ethics, and Society) or (Visualization for Scientific Communication) or (Modeling Relationships with Causal Inference) or (Natural and Artificial Vision)
COMP_SCI 397-0	Special Projects in Computer Science (Rapid Prototyping for Software Innovation) or (Seminar in Statistical Language Modeling)
COMP_SCI 449-0	Deep Learning
ELEC_ENG 328-0	Information Theory & Learning
ELEC_ENG 335-0	Deep Learning Foundations from Scratch
ELEC_ENG 373-0	Deep Reinforcement Learning
ELEC_ENG 395-0	Special Topics in Electrical Engineering (Optimization Techniques for Machine Learning and Deep Learning)
ELEC_ENG 424-0	Distributed Optimization
ELEC_ENG 433-0	Statistical Pattern Recognition
ES_APPM 345-0	Applied Linear Algebra
ES_APPM 375-1	Quantitative Biology I: Experiments, Data, Models, and Analysis
ES_APPM 375-2	Quantitative Biology II: Experiments, Data, Models, and Analysis
ES_APPM 472-0	Introduction to the Analysis of RNA Sequencing Data
ES_APPM 479-0	Data Driven Methods for Dynamical Systems
IEMS 307-0	Quality Improvement by Experimental Design
IEMS 308-0	Data Science and Analytics
IEMS 313-0	Foundations of Optimization
IEMS 340-0	Qualitative Methods in Engineering Systems
IEMS 341-0	Social Networks Analysis
IEMS 351-0	Optimization Methods in Data Science
MAT_SCI 358-0	Modeling and Simulation in Materials Science and Engineering
MAT_SCI 391-0	
MECH_ENG 301-0	Introduction to Robotics Laboratory
MECH_ENG 329-0	Mechanistic Data Science for Engineering
MECH_ENG 341-0	Computational Methods for Engineering Design
MECH_ENG 441-0	Engineering Optimization for Product Design and Manufacturing
MECH_ENG 455-0	Active Learning in Robotics
MECH_ENG 469-0	Machine Learning and Artificial Intelligence for Robotics
MECH_ENG 495-0	Selected Topics in Mechanical Engg (Sensory Navigation and Machine Learning for Robotics)