DATA SCIENCE (SECOND MAJOR ONLY)

Requirements

Data Science Core (56 hours)

Fundamentals (36 hours) These classes can be used to satisfy any requirements for any major. They can also be used to satisfy degree requirements for any minor, with the exception of the Mathematics Minor; for the Mathematics Minor at most two of these courses can also be used to satisfy those requirements.

Code	Title	Hours
CSSE 120	Introduction to Software Development	4
CSSE 220	Object-Oriented Software Development	4
CSSE 230	Data Structures and Algorithm Analysis	4
CSSE 333	Intro to Database Systems	4
MA 371	Linear Algebra I	4
or MA 373	Applied Linear Algebra for Engineers	
MA 382	Introduction to Statistics with Probability [1]	4
CSSE 286	Introduction to Machine Learning	4
or MA 386	Statistical Programming	
PHIL H202	Business & Engineering Ethics	4

[1] Note: If the primary major requires MA 223 Engineering Statistics, this would be accepted as a standard course substitution.

Advanced (20 hours)

These classes can only be used to satisfy technical or free electives within the primary major, and cannot be used to satisfy any other requirements for other majors or minors.

Code	Title	Hours
CSSE 313	Artificial Intelligence	4
CSSE 433	Advanced Database Systems	4
or CSSE 434	Introduction to the Hadoop Ecosystem	
MA 384	Data Mining	4
MA 415	Machine Learning	4
MA 485	Applied Linear Regression	4

Data Science Electives (16 hours)

At most 8 of these credit hours can be used to satisfy degree requirements for any major or minor sought by the student. The remaining credit hours can only be used to satisfy technical or free electives within the primary major. The student can choose any courses from the following list of approved Data Science Elective courses (or another upper-level course approved by the Director of the Data Science program). The courses below noted by [1] cannot also be used to satisfy the requirements above.

Code	Title	Hours
BMTH 312	Bioinformatics	4
CSSE 314	Bio-Inspired Artificial Intelligence	4
CSSE 315	Natural Language Processing	4
CSSE/MA 416	Deep Learning	4
CSSE 433	Advanced Database Systems [1]	4
CSSE 434	Introduction to the Hadoop Ecosystem [1]	4
CSSE 453	Topics in Artificial Intelligence	4
CSSE 463	Image Recognition	4
ECE 582	Advanced Image Processing	4
MA 332	Introduction to Computational Science	4
MA/CSSE 335	Introduction to Parallel Computing	4
MA 342	Computational Modeling	4
MA 439	Mathematical Methods of Image Processing	4
MA 482	Biostatistics	4
MA 483	Bayesian Data Analysis	4
OE 537	Advanced Image Processing	4
PH 327	Thermodynamics & Statistical Mechanics	4
PH 538	Introduction to Neural Networks	4
ECON S451	Econometrics	4

Senior Capstone

Students should complete a senior project or senior thesis that includes a data science component. In order to use the senior capstone experience of another major as part of the Data Science second major, it must be approved by the Director of Data Science. Furthermore, the student may need to either include within the capstone report a description of the data science work done or submit a separate report to the Director of Data Science describing the data science component of the capstone.