Data Science Courses		**12 Cr.**
DATA 151	Introduction to Data Science	2+3, 3 Cr.
DATA 299	Data Science Colloquium I	1 Cr.
DATA 399	Data Science Colloquium II	1 Cr.
DATA 433	Data Mining and Applications	2+3, 3 Cr.
DATA 499	Data Science Capstone	1 Cr.
One course from the following options:		
DATA 373	Computational Linear Algebra	2+2, 3 Cr.
DATA 375	Scientific Visualization	3 Cr.
DATA 490	Advanced Topics in Data Science	3 Cr.
ECON 473	Applied Data Science	3 Cr.
Application Area		**1-3 Cr.**
One course from the following options:		
BIO/MATH 321	Mathematical Models of Infectious Diseases	3 Cr.
GEO/MET 460	Data Analysis	3 Cr.
ECON 473	Applied Data Science (if not taken above)	3 Cr.
PHYS 246	Data Reduction and Error Analysis	1 Cr.
POLS 210	Research Methods in Political Science	3 Cr.
PSY 370	Laboratory in Experimental Design and Analysis	3 Cr.
Additional courses may be approved by the program director.		

Data Science Courses

DATA 151   **Introduction to Data Science**   2+3, 3 Cr.

Introduction to the use of computer based tools for the analysis of large data sets for the purpose of knowledge discovery. Students will learn to understand the Data Science process and the difference between deductive hypothesis-driven and inductive data-driven modelling. Students will have hands-on experience with appropriate on-line analytical processing and data mining software platforms, and will complete a project using real data. Pre-requisite: MATH 115, or placement higher than MATH 115 in the Math Placement process, or one of STAT 140, STAT 240, IDS 205, or CE 202.

DATA 299   **Data Science Colloquium I**   1 Cr.

Students read current media or journal articles involving data science, and present written and/or oral analyses. Students evaluate senior presentations given by students in DATA 499, and provide written feedback on project proposals from DATA 399. Guest speakers may be arranged to present on a variety of topics. Meets jointly with DATA 399 and DATA 499. Usually offered every spring semester. Pre/corequisite: DATA 151.

DATA 373/   **Computational Linear Algebra**

AMOD 573   2+2, 3 Cr.

(Also offered as MATH 373 or CS 373.) A survey of computational applications of linear algebra for solving science and engineering problems. Topics include linear systems in both equation and matrix form, row operations, inverses and determinants, eigenvalues, Gaussian elimination, matrix decomposition (including singular value and QR decompositions), sparse vs. dense matrices, and approximation. Topics are explored through applications to large data sets, with programming in both Python and MATLAB environments. Other advanced topics related to data mining may be covered. Usually offered in the Fall Semester of even numbered years. Prerequisites: One of CS 157 or DATA 151, one of MATH 260 or MATH 264.

DATA 375   **Scientific Visualization**   3 Cr.

Students are introduced to a variety of techniques for visualizing scientific data, with an emphasis on representing large datasets in informative ways. Data from a variety of disciplines is studied and taxonomies for viewing this data are developed. The interfaces used to manipulate views of such datasets in a virtual environment are also studied. Prerequisites: DATA 151 and CS 158.

DATA 381   **Cooperative Education in Data Science**   0.5-3 Cr.
The application of data science concepts in a professional setting. Grade based on employer's evaluation and student's written and oral reports. S/U grade only. May be repeated for additional credit. Prerequisite: Data Science major and approval of the director of the Data Science program.

DATA 386   **Internship in Data Science**   1-3 Cr.
Opportunities for students to have direct, supervised experience in public agencies or private industry, such as scientific, technical, or financial firms. S/U grade. Prerequisites: Data Science major and approval of the director of the Data Science program.

DATA 399   **Data Science Colloquium II**   1 Cr.
Students will present an ethical case study on an analytical or statistical data topic. Students will propose and design a capstone project integrating their mathematical, statistical, computational and applied knowledge. Guest speakers may be arranged to present on a variety of topics. Meets jointly with DATA 299 and DATA 499. Usually offered every spring semester. Prerequisite: DATA 299 and junior standing.

DATA 433   **Data Mining and Applications**   2+2, 3 Cr.
Data mining is a broad area that integrates techniques from several fields, including machine learning, statistics, pattern recognition, artificial intelligence, and database systems, for the analysis of large volumes of data. This course gives a wide exposition of these techniques and their software tools. Prerequisite: DATA 151 or CS 157 and one of STAT 140, STAT 240, IDS 205, PSY 201, or CE 202. Students may not receive credit for both DATA 433 and BUS 440.

DATA 490/590 **Advanced Topics in Data Science**   3 Cr.
An intensive study of selected topics, methods, techniques, and problems in Data Science. Only offered when there is sufficient demand. Prerequisites will depend on the content.

DATA 495   **Independent Study in Data Science**   1-3 Cr.
Students study advanced topics in data science under the supervision of a faculty member. Written work is required. Prerequisite: consent of the chair of the department.

DATA 496   **Research in Data Science**   0-3 Cr.
Students undertake a research problem in data science under the direction of a faculty member. Written and oral reports are required. S/U grade only. Prerequisite: Consent of the instructor or chair of the department.

DATA 497   **Honors Work in Data Science**   3 Cr.
See Honors Work, page 64.

DATA 498   **Honors Candidacy in Data Science**   3 Cr.
See Honors Work, page 64.

DATA 499   **Data Science Capstone**   1 Cr.
Students will undertake a capstone project integrating their applied domain knowledge and general data-science coursework. The project will culminate in a final paper and presentation. Guest speakers may be arranged to present on a variety of topics. Meets jointly with DATA 299 and DATA 399. Usually offered every spring semester. Prerequisite: DATA 399.