Colorado State University Data Science Degree Program

- Bachelor of Science with concentrations in Statistics, Computer Science, Mathematics, or Economics
- 10 required credits in Statistics, 12 in Computer Science, 13 in Mathematics
- 21 required credits in cross-disciplinary Data Science courses:
  - DSCI 100: First Year Seminar in Data Science Introduction to problems and techniques in data science.
  - DSCI 150: Introduction to Python programming An introduction to programming and object-oriented design using Python.
  - DSCI 235: Data Wrangling Introduce tools and techniques for handling, cleaning, extracting, and organizing data.
  - DSCI 335: Inferential Reasoning in Data Analysis Sources of data collection errors and uncertainties, type of studies, interaction versus confounding, fair use of data, confidentiality and disclosure.
  - DSCI 336: Data Graphics and Visualization Data graphics and visualization techniques for data science.
  - DSCI 445: Statistical Machine Learning Algorithms and statistical methods for regression, classification, and clustering; hands-on experience in analyzing data and running machine learning experiments.
  - DSCI 478: Capstone Group Project in Data Science Group-project-based capstone, in which small groups of students from each Data Science degree concentration work collectively on a problem in data science.

- Additional elective courses in Statistics, Computer Science, Mathematics, or Data Science:
  - DSCI 346: Dynamical Systems in Data Science Numerous physical phenomena and processes ranging from molecular to geophysical scales may be successfully modeled as dynamical systems. Data collected from observing such phenomena reflect their underlying dynamical structure. This course examines the modeling of phenomena using dynamical systems approaches including formulation, parameter estimation, numerical solution and investigates the qualitative properties of these solutions.
  - DSCI 473: Introduction to Geometric Data Analysis Geometric techniques for analyzing high-dimensional and complex data. Techniques for data reduction and analysis.
  - DSCI 475: Topological Data Analysis Topological techniques for analyzing high-dimensional or complex data. Topics include clustering, dendrograms, a visual introduction to topology, data modeling and visualization, and selected topics from nonlinear dimensionality reduction, graph-based models of data, Reeb graphs, multi-scale approaches to data, and persistent homology.