

# DATA SCIENCE - GRADUATE CERTIFICATE

The on-campus Master of Science in Data Science program focuses on developing knowledge and skills in interdisciplinary and collaborative data science competencies including statistical analysis, data structures and algorithms, data mining, machine learning, big data architecture and data visualization. The on-campus program offers a stackable graduate certificate that can be earned on its own or applied toward the full master's degree.

Graduates of the certificate and/or full master's degree program will be well-prepared to apply data science skills to a specific domain area. Graduates will also be able to clearly communicate the results of data science analysis to a non-technical audience; structure effective meetings and projects using collaboration skills; and act ethically in the role of professional data scientist.

## Admission Requirements

Initially, the proposed Residential Data Science Graduate Certificate will be primarily for students who meet either of the following criteria:

- Currently matriculated CU Boulder residential or online (Canvas) graduate student in a participating department on Main Campus.
- Graduate or non-degree seeking students in other disciplines with an interest in data science.

Students are required to have an awarded bachelor's degree to be admitted into the residential Data Science or Online (Canvas) Graduate Certificate and will be subject to graduate main campus graduate certificate policies for admission/award. Further admission requirements and processes will be refined by the Data Science Faculty Director and oversight committee.

## Required Courses and Credits

The residential Data Science Graduate Certificate requires 12 credit hours of coursework. Students must complete the required courses listed below.

In order to earn a certificate, students must receive a minimum grade of a C or higher in each course. The cumulative GPA for certificate courses must be 3.0 or higher.

Code	Title	Credit Hours
<b>Required Courses</b>		
CSCI 5502	Data Mining	3
STAT 5000	Statistical Methods and Application I	3
Choose two:		6
STAT 5600	Methods in Statistical Learning	
CSCI 5622	Machine Learning	
STAT 5010	Statistical Methods and Applications II	
<b>Total Credit Hours</b>		<b>12</b>

## Learning Outcomes

By the completion of the program, students will be able to:

- Acquire, clean, wrangle, and manage data
- Correctly perform exploratory data analysis in order to assist with the generation of scientific hypotheses
- Apply principles and methods of probability theory and statistics to draw rational conclusions from data
- Construct an appropriate statistical model in order to answer important scientific or business-related questions
- Assess the validity of a statistical model when applied to a particular dataset
- Use statistical techniques to design an experiment
- Understand and be able to apply the main computational techniques used to analyze large data sets, including a variety of data mining and machine learning approaches
- Understand the principles of computer representation, storage and access of large data sets and be able to determine the appropriate approaches for specific problem
- Clearly communicate the results of a data science analysis to a non-technical audience