DATA SCIENCE - GRADUATE CERTIFICATE (ONLINE)

The Master of Science in Data Science program hosted online through the Coursera platform offers stackable graduate-level courses, a graduate certificate, and a fully accredited master's degree in data science. Students earn the same credentials as on-campus students. There are no online or Coursera designations on official CU transcripts or diplomas.

Program Policies

This specialized program does not align with standard campus policies. Please refer to the Special Online Programs (https://catalog.colorado.edu/specialized-programs/) section of the catalog for more information.

Program Requirements

Admission Requirements

There are no admission processes for learners seeking to earn the Data Science Graduate Certificate.

All courses attempted and/or completed for credit will appear on an official CU Boulder transcript (unless dropped by the drop deadline) and will count toward the cumulative GPA.

Prerequisite Knowledge

There are no formal prerequisites for the Data Science Graduate Certificate, but we recommend that prospective students be knowledgeable in Python, R Programming, Calculus including derivatives and integrals, and Linear Algebra including matrix multiplication, matrix inversion, and solving linear systems using matrices. If they are not, we encourage them to try out non-credit coursework before attempting for-credit courses.

Required Courses and Credits

To earn the Data Science Graduate Certificate (12 credits), students must complete the following required specializations:

- Data Mining Foundations and Practice (3 credits)
- Data Science Foundations: Statistical Inference (3 credits)

As well as two specializations from the following:

- Introduction to Statistical Learning for Data Science (3 credits)
- Machine Learning (3 credits)
- Statistical Modeling for Data Science (3 credits)

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.

The Data Science Graduate Certificate requires 12 credit hours of coursework. Students must complete the follow required courses:

Code	Title	Credit Hours
Required Courses		
DTSA 5504	Data Mining Pipeline	1
DTSA 5505	Data Mining Methods	1
DTSA 5506	Data Mining Project	1
DTSA 5001	Probability Theory: Foundation for Data Science	1
DTSA 5002	Statistical Inference for Estimation in Data Science	1
DTSA 5003	Hypothesis Testing for Data Science	1
Additional Requirements		
Students must complete an additional 6 credits and can choose to complete any 2 of the following 3 specializations		6
DTSA 5020	Statistical Learning for Data Science: Regression and Classification	
DTSA 5021	Statistical Learning for Data Science: Resampling, Selection and Splines	
DTSA 5022	Statistical Learning for Data Science: Trees, SVM and Unsupervised Learning	
DTSA 5509	Introduction to Machine Learning - Supervised Learning	
DTSA 5510	Unsupervised Algorithms in Machine Learning	
DTSA 5511	Introduction to Deep Learning	
DTSA 5011	Modern Regression Analysis in R	
DTSA 5012	ANOVA and Experimental Design	
DTSA 5013	Generalized Linear Models and Nonparametric Regression	
Total Credit Hours		**12**

Learning Outcomes

- 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