

# COMPUTATIONAL DATA SCIENCE, CERTIFICATE

The Computational Data Science certificate program provides students/professionals with the skills and training to tackle real-world data analysis challenges. Students obtain in-depth knowledge of data science through lectures and hands-on studies of motivating real-world cases.

The curriculum consists of a total of five courses, including two required core courses and three electives. The core courses cover fundamental big data programming skills, statistical and mathematical concepts, essential data analysis techniques including data wrangling, data organization, and data visualization, as well as application and implementation of machine learning algorithms. The electives allow students to dive further into data analytics and address data challenges in their desired direction of study.

The program is designed for motivated graduate students and professionals holding a bachelor's degree who have an interest in data science, especially in the computational aspect of data science. Students must have a strong foundation in programming and experience with computational data handling.

## Admission Requirements

Students must hold a bachelor's degree, and have a strong foundation in programming and experience with computational data handling.

## Summary

Code	Title	Hours
	Data Science Core	6
	Data Science Electives	9
	<b>Total Hours</b>	<b>15</b>

## Data Science Core

Code	Title	Hours
CPSC:515	Big Data Programming	3
CPSC:536	Applied Machine Learning	3
	<b>Total Hours</b>	<b>6</b>

## Data Science Electives

Code	Title	Hours
	<i>Complete nine credits from the following:</i>	9
CPSC:535	Algorithms	3
CPSC:545	Introduction to Bioinformatics	3
CPSC:560	Artificial Intelligence & Heuristic Programming	3
CPSC:575	Database Management	3
CPSC:576	Introduction to NoSQL Data Management	3
CPSC:577	Introduction to Parallel Processing	3
CPSC:635	Advanced Algorithms	3
CPSC:636	Graph Analytics	3
CPSC:658	Visualization	3
CPSC:676	Data Mining	3
CPSC:677	Parallel Processing	3
CPSC:678	Data Integration	3

CPSC:680	Software Engineering Methodologies	3
CPSC:689	Advanced Topics in Computer Science	1-3
	Graduate course outside the CS department <sup>1</sup>	3

<sup>1</sup> For a graduate course outside the Department of Computer Science to be used towards the certificate, it must be on a topic related to Computational Data Science, and must be approved by the Department. At most three credits of Data Science Elective may be from outside Computer Science.