

# DATA - DATA SCIENCE

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## **DATA 1501 Introduction to Data Science (3-0-3)**

This course is intended to provide an introduction into the field of Data Science. Students will develop skills in appropriate technology and basic statistical methods by completing hands-on projects focused on real-world data and address the social consequences of data analysis and application.

## **DATA 3111 Data Mining I (3-0-3)**

This course identifies the importance of adequately preparing data for data modeling and predictive analytics. Topics include data retrieval, merging and organization, data cleaning and data visualization.

**Prerequisite(s):** STAT 3127 with a minimum grade of C

## **DATA 3112 Data Mining II (3-0-3)**

This course investigates the methods for selecting among multiple data models and for evaluating model selection. Topics include logistic regression, model evaluation techniques, cost-benefit analysis using mis-classification costs, graphical evaluation of classification models, association rules and CART models.

**Prerequisite(s):** DSCI 3111 with a minimum grade of C or DATA 3111 with a minimum grade of C

## **DATA 3116 Ethics and Data Analytics (3-0-3)**

This course investigates characteristics of ethical design of algorithms for predictive models. Topics include opacity, scale and potential damage of data mining algorithms, data accuracy, stereotyping, and proxy variables; data privacy and security.

**Prerequisite(s):** DSCI 3112 (may be taken concurrently) with a minimum grade of C

## **DATA 3215 Data Analytics Project (1-4-3)**

This course provides the student with an opportunity to conduct a full data analytics project approved by a faculty mentor in the student's home department or one recommended by the course instructor.

**Prerequisite(s):** DSCI 3112 with a minimum grade of C or DATA 3112 with a minimum grade of C

## **DATA 4111 Predictive Models and Analytics I (3-0-3)**

An introductory experience in utilizing statistical models to solve real-world scenario-defined problems. Topics include: statistical learning, review of multivariate linear regression models, classification models, resampling methods and shrinkage approaches.

**Prerequisite(s):** (DSCI 3112 with a minimum grade of C or DATA 3112 with a minimum grade of C) and (DSCI 4127 with a minimum grade of C or DATA 4127 with a minimum grade of C)

## **DATA 4112 Predictive Models and Analytics II (3-0-3)**

A continuation of the study of statistical models and statistical learning. Topics include: polynomial regression, regression splines, smoothing splines, regression trees, classification trees, bagging, random forests, boosting, and support vector machines.

**Prerequisite(s):** DSCI 4111 with a minimum grade of C or DATA 4111 with a minimum grade of C

## **DATA 4119 Machine Learning (3-0-3)**

A study of the practice and theory of machine learning from a variety of perspectives. Topics covered include decision tree learning, entropy, Bayes rule, maximum likelihood estimation, maximum a posteriori estimation, conditional independence, multinomial naïve Bayes classifiers, Gaussian Bayes classifiers, decision surfaces, logistic regression, gradient descent, computational learning theory, PAC learning, supervised learning, dataset shift, concept shift and context shift.

**Prerequisite(s):** MATH 2115 with a minimum grade of C and MATH 3175 with a minimum grade of C and (DSCI 4127 with a minimum grade of C or DATA 4127 with a minimum grade of C)

## **DATA 4127 Advanced Statistical Programming (3-0-3)**

A leveling experience in the use of one of the advance statistical programming languages. Topics include: manipulations of numbers and vectors, objects, arrays and matrices, lists and data frames, loops and conditional execution, reading data from files, probability distributions, statistical models, and graphical procedures.

**Prerequisite(s):** STAT 3127 with a minimum grade of C and CPSC 1301K with a minimum grade of C

## **DATA 4698 Data Analytics Internship (0-0-(3-6))**

Practical, supervised experience in the field with an approved company or organization. Students will take on projects that require data cleaning, data organization, data modeling, and/or predictive analytics.

**Prerequisite(s):** DSCI 3112 with a minimum grade of C or DATA 3112 with a minimum grade of C

**Repeatability:** Repeatable for credit up to 1 times or 6 hours.