UNIVERSITY OF THE FRASER VALLEY

ORIGINAL COURSE IMPLEMENTATION DATE: **May 2014**
REVISED COURSE IMPLEMENTATION DATE: **September 2015**
COURSE TO BE REVIEWED: (six years after UEC approval) **March 2021**
Course outline form version: 11/22/13

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: COMP 381 **Number of Credits:** 3 Course credit policy (105)

Course Full Title: Introduction to Machine Learning
Course Short Title: Machine Learning

Faculty: Faculty of Science **Department (or program if no department):** Computer Information Systems

Calendar Description:
Programming computers to learn from experience and from data, resulting in flexible, customized software. Applications range from simple spam detection to complex speech recognition. Emphasis on programming techniques for implementing machine learning algorithms.

Prerequisites (or NONE): COMP 251 with a C or better, STAT 106 recommended. Note: As of January 2016, prerequisites will change to the following: (COMP 251 and one of the following: [STAT 106 or STAT 270]) or admission to the Data Analysis Post-degree certificate. Note: Students who do not have the required courses but have been admitted to the Data Analysis Post-degree certificate will need to contact the department assistant for permission to register.

Corequisites (if applicable, or NONE):

Pre/corequisites (if applicable, or NONE):

Equivalent Courses (cannot be taken for additional credit)
Former course code/number:
Cross-listed with:
Equivalent course(s):
Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.

Transfer Credit
Transfer credit already exists: ☐ Yes ☒ No
Transfer credit requested (OReg to submit to BCCAT):
☐ Yes ☒ No (Note: If yes, fill in transfer credit form)
Resubmit revised outline for articulation: ☐ Yes ☒ No
To find out how this course transfers, see **bctransferguide.ca**.

Total Hours: 45
Typical structure of instructional hours:

Lecture hours	39
Seminars/tutorials/workshops	
Laboratory hours	
Field experience hours	
Experiential (practicum, internship, etc.)	
Online learning activities	6
Other contact hours:	
Total	**45**

Special Topics
Will the course be offered with different topics?
☐ Yes ☒ No
If yes,
Different lettered courses may be taken for credit:
☐ No ☐ Yes, repeat(s) ☐ Yes, no limit
Note: The specific topic will be recorded when offered.

Maximum enrolment (for information only): 35

Expected frequency of course offerings
(every semester, annually, etc.): every other year

Department / Program Head or Director:		**Date approved:**	January 16, 2015
Campus-Wide Consultation (CWC)		**Date of posting:**	March 6, 2015
Faculty Council approval		**Date approved:**	February 6, 2015
Dean/Associate VP:	Dr. Lucy Lee	**Date approved:**	January 23, 2015

Learning Outcomes

Upon successful completion of this course, students will be able to:

- Systematically explore large amounts of data.
- Implement classification, regression and clustering models.
- Implement a simple recommendation system.
- Evaluate machine learning performance.
- Use existing machine learning toolkits.

Prior Learning Assessment and Recognition (PLAR)

☒ Yes ☐ No, PLAR cannot be awarded for this course because

Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)

Lectures

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Text(s) and Resource Materials (if more space is required, download supplemental Texts and Resource Materials form)

	Author Surname, Initials	Title (article, book, journal, etc.)	Current Edition	Publisher	Year Published
1.	James, G.	Introduction to Statistical Learning	☒	Springer	2013
2.	Flach, P.	Machine Learning	☒	Cambridge	2012
3.	Barber, D.	Bayesian Reasoning and Machine Learning	☒	Cambridge	2012
4.	Murphy, K.	Machine Learning	☒	MIT	2012
5.	Bishop, C.	Pattern Recognition and Machine Learning	☒	Springer	2006

Required Additional Supplies and Materials (Eg. Software, hardware, tools, specialized clothing)

None.

Typical Evaluation Methods and Weighting

Final exam:	30%	Assignments:	20%	Midterm exam:	30%	Practicum:	%
Quizzes/tests:	%	Lab work:	20%	Field experience:	%	Shop work:	%
Other:	%	Other:	%	Other:	%	Total:	100%

Details (if necessary):

Grading system: Letter Grades: ☒ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☐ No ☒

Typical Course Content and Topics

- Linear Regression
- The Perceptron
- Logistic Regression
- K-Nearest Neighbours
- Regularization
- Neural Networks
- Support Vector Machines
- Non-Parametric Models
- Clustering