The VIU community acknowledges and thanks the Snuneymuxw, Quw'utsun, Tla'amin, Snaw-naw-as and Qualicum First Nation on whose traditional lands we teach, learn, research, live and share knowledge.

Course Outline

CSCI 479 (3 credits) Advanced Topics in Artificial Intelligence
S26N01

Calendar Description

This course examines selected emerging and advanced topics in Machine Learning. Topics may include: predictive model classification (using techniques such as decision tree, Bayesian networks, deep learning, etc.), data association analysis, and clustering/outlier analysis. (3:0:2)

Delivery Mode

Face-to-Face

Prerequisites and Corequisites

Minimum "C" in both CSCI 260 and CSCI 265; Minimum "C" in CSCI 370 is preferrable.

Instructor Info

Instructor name:	Huizhu Liu
Instructor VIU email address:	Huizhu.Liu@VIU.CA
Office Hours:	11:30 – 1:30, Tuesdays and Thursdays
	By appointment

Contact hours

Lectures: 8:30 – 10:00, Tuesdays and Thursdays, B200/R106
Labs: S26N01: 14:30 – 16:30, Thursdays, B315/R115

Schedule

Dates	Topics	Labs	Assignments/Quizzes	Exams
Week 1	Introduction Data	-	-	-
Week 2	Information based learning I Information based learning II	Lab 1 - Data preprocessing	A1 - Decision tree application	-
Week 3	Information based learning III Similarity based learning I	Lab 2 - Information based binning algorithm	-	-
Week 4	Similarity based learning II Probability based learning I	Lab 3 - data transformation and distance function	A2 - Similarity application	-
Week 5	Probability based learning II Probability based learning III	Lab 4 - Probability algorithms	-	-
Week 6	Error based learning I Midterm review	Lab 5 - Bayesian Belief Network	A3 - Probability applications	-
Week 7	Midterm Error based learning II	-	-	Midterm
Week 8	Error based learning III Deep Learning	Lab 6 - Neural network algorithm	A4 - Regression model	-
Week 9	Predictive Model Evaluation Association I	Lab 7 - Model evaluation	-	-
Week 10	Association II Association III	Lab 8 - Association analysis algorithm	A5 - Clustering application	-
Week 11	Association IV Cluster Analysis I	Lab 9 - Association analysis algorithm	-	-
Week 12	Cluster Analysis II Cluster Analysis III	Lab A - Association Analysis algorithm	-	-
Week 13	Outliers Summary/Final Review	Presentation	-	-

Learning Outcomes

Upon completing this course, students should be able to:

- determine the characteristics of a given problem that machine learning techniques can be applied;
- apply pre-processing techniques to prepare the data to be used by machine learning algorithms;
- select and implement the appropriate machine learning algorithms to build predictive models, or perform data pattern analysis;
- select and apply appropriate machine learning techniques to solve problems;
- evaluate, maintain and evolve predictive models and data patterns learned from the data set.

Course Learning Materials

- (Optional Textbook) Fundamentals of Machine Learning for Predictive Data Analytics, by John Kelleher, Brian Mac Namee, and Aoife D'Arcy
- (Optional Textbook) Data Mining, Concepts and Techniques, by Jiawei Han and Micheline Kamber

Evaluation and Assessment

- Assignments -- 30%
- Application Project -- 10%
- Midterm Exam -- 20%
- Final Exam -- 40%

All the course works must be done by students individually and independently.
In order to pass the course, your weighted exam average must be a passing mark.

Labs/Tutorials
You must be enrolled in, and *fully participate in*, the weekly tutorial/lab sessions.

Appeals of Grades:
Any exercise or examination grade may be appealed. However, the appeal must be made to the instructor, in writing and attached to the work in question, and within 7 days of the grade being made available to the class. The instructor reserves the right to re-grade the entire piece of work submitted on appeal, not necessarily just the component that the student believes is in error.

Grade Conversion:
The following grade scale will be used:

Percentage (%)	Letter Grade	Grade Point
90-100	A+	4.33
85-89	A	4.00
80-84	A-	3.67
76-79	B+	3.33
72-75	B	3.00
68-71	B-	2.67
64-67	C+	2.33
60-63	C	2.00
55-59	C-	1.67
50-54	D	1.00
0-49	F	0.00

Resources

- Instructor's Website
- VIU Learn
- Library
- Academic Advising
- Writing Centre
- CSCI Help Centre
- Math Learning Centre
- Services for Aboriginal Students
- Counseling Services
- Accessibility
- Registration
- VIU Students' Union

Accessibility

Vancouver Island University recognizes its legal duty to provide educational opportunities that enable students with a documented disability to access courses, programs, facilities, and services.

The Policy and Procedural Guidelines apply to all students who have identified themselves to the institution as having a documented disability who are inquiring about, applying to, or registered in credit or non-credit courses in both on and off-campus programs.

- Policy 32.02 - Services Available to Students with a Documented Disability

Academic Integrity

Integrity in academic work is a central element of learning and is the basis of intellectual pursuits in any academic community. It is also your responsibility to abide by the Student Conduct Code and Student Academic Code of Conduct.

- Academic Integrity

Links University Policies, Standards, and Guidelines

- University Policies
- Freedom of Information and Protection of Privacy
- Student Conduct and Care (SCC)
- Student Academic Code of Conduct
- Student Affairs
- Academic Regulations
- Equity, Diversity, and Inclusion (EDI)