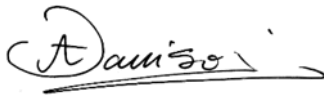


Approved By Associate Dean:



Jan 2, 2025

Signature

COURSE SECTION INFORMATION

Applied Mathematical Concepts for Machine Learning Applied A.I. Solutions Development
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Note: All academic inquiries will be replied to within three business days.

COURSE DESCRIPTION:

This course will provide an introduction to mathematical foundations of Machine Learning algorithms. The main focus of this course will be exploring and implementing Machine Learning algorithms for text, audio and image analysis. Students will gain experience with current industry standard mathematical tools, techniques, and libraries.

COURSE OUTCOMES:

Upon successful completion of this course the students will have reliably demonstrated the ability to:

1. Interpret the mathematics of Machine Learning algorithms.
2. Implement natural language processing, signal and image processing algorithms.
3. Utilise mathematical libraries for building Machine Learning models.
4. Implement Machine Learning algorithms.
5. Understand Linear Algebra in the context of Machine Learning models.

LIST OF TEXTBOOKS AND OTHER TEACHING AIDS:

Required:

Recommended Resources:

Course Delivery Mode

Refer to the table below for the delivery mode.

Important Note on the Use of Generative AI:

Students must review the "Generative AI Usage Guidelines" document, available on D2L, or consult with the instructor for details on how generative AI tools may be used in this course.

Generally, use of AI is allowed and encouraged in most of the courses of this program, this include projects and assignments. However use of AI are not allowed in exams and quizzes unless specified otherwise by the instructor. Students must consult their instructor when unsure.

Misuse of AI in assessments where it is not permitted or failure to adequately disclose its use will be treated as a violation of academic integrity. According to college policy, consequences may include failing the assignment or the course or more severe disciplinary actions. **Students must also download the AI Usage Declaration form from D2L, complete it, and submit it with their assignments where AI use is permitted.** Adherence to these guidelines is mandatory to maintain academic integrity.

Detailed Evaluation System

Assessment Tool:	Description:	Outcome(s) assessed:	EES assessed:	Date / Week:	% of Final Grade:
Participation	Attendance and in-class participation in various activities	1, 2, 3, 4, 5	1,2,3,4,5,6,7,8,9,10,11	1 - 4	10
Lab Exercises	Hands-on exercises	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1 - 4	30
Project	Assignments	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	4	30
Final Exam/Project	This is a short answer exam that will evaluate the knowledge of the student	1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	4	30
TOTAL:					100%

GRADING SYSTEM the passing grade for this course is: D (50%)

A+	90-100	4.0	B+	77-79	3.3	C+	67-69	2.3	D+	57-59	1.3	Below 50	F	0.0
A	86-89	4.0	B	73-76	3.0	C	63-66	2.0	D	50-56	1.0			
A-	80-85	3.7	B-	70-72	2.7	C-	60-62	1.7						

Excerpt from the College Policy on Academic Dishonesty:

The *minimal* consequence for submitting a plagiarized, purchased, contracted, or in any manner inappropriately negotiated or falsified assignment, test, essay, project, or any evaluated material will be a grade of zero on that material.

To view George Brown College policies please go to www.georgebrown.ca/policies

Learning Schedule / Topical Outline (subject to change with notification)

TOPICAL OUTLINE:

Week	Topic Task	In-person/ Online	Outcome(s)	Content / Activities	Resources
1	1	Tuesday Online	1, 2, 3	<ul style="list-style-type: none"> Introduction to NumPy Vector Space Analysis and Linear Algebra 	Resource material available on D2L
1	2	Thursday In-person	1, 2, 3	<ul style="list-style-type: none"> Mathematics of Natural Language Processing algorithms Regression algorithms 	Resource material available on D2L
					Tasks: Lab Exercises 1, 2, 3, 4
2	3	Tuesday Online	1, 2, 3, 4	<ul style="list-style-type: none"> Decision Tree algorithms Gradient Descent algorithm Support Vector Machines Clustering algorithms 	Resource material available on D2L
2	4	Thursday In-person	1, 2, 3, 4	<ul style="list-style-type: none"> Matrix Factorization Mathematics of Digital Signal Processing 	Resource material available on D2L
					Tasks: Lab Exercises 5, 6, 7, 8
3	5	Tuesday Online	1, 2, 3, 4, 5	<ul style="list-style-type: none"> Fourier transform in signal and image processing 	Resource material available on D2L
3	6	Thursday In-person	1, 2, 3, 4, 5	<ul style="list-style-type: none"> Image processing techniques 	Resource material available on D2L
					Tasks: Lab Exercises 9, 10, 11, 12
4	7	Tuesday Online	1, 2, 3, 4, 5	<ul style="list-style-type: none"> Term project 	Resource material available on D2L
4	8	Thursday In-person	1, 2, 3, 4, 5	<ul style="list-style-type: none"> Final Exam 	Resource material available on D2L
					Tasks: Project Due

Please note: this schedule may change as resources and circumstances require.

For information on withdrawing from this course without academic penalty, please refer to the College Academic Calendar: <http://www.georgebrown.ca/Admin/Registr/PSCal.aspx>