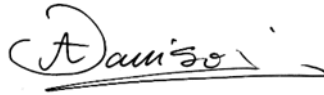**Approved by Associate Dean :**

Aug 31, 2024

Signature

COURSE SECTION INFORMATION
Machine Learning I
Applied A.I. Solutions Development

Note: All academic inquiries will be replied to within three business days.

COURSE DESCRIPTION:

This course will provide an introduction to Machine Learning. The main focus of this course will be on building Machine Learning models for tabular data. Students will gain experience with professional tools and techniques such as Git, Docker, and Python libraries like Scikit-learn, NLTK.

COURSE OUTCOMES:

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

1. Explain Machine Learning concepts of an AI ecosystem
2. Utilise developer tools like Git, Docker, and the Command Line Interface (CLI)
3. Assess, transform, and select the appropriate data attributes for building Machine Learning models.
4. Apply Machine Learning techniques like Data Acquisition, Data Cleaning, Data Pre-processing, Data Transformation, Model Building and Model Deployment.
5. Build Tabular data models using a variety of Python libraries

Evaluate, and finetune appropriate ML algoithms

LIST OF TEXTBOOKS AND OTHER TEACHING AIDS:

Required:
Data Science Handbook - Jake Van der Plas
Python for Data Analysis - Wes McKinney

Recommended Resources:
1. **Python Essential Reference - David Beazley**
2. **Learn Python the Hard Way - Zed Shaw**

COURSE DELIVERY MODE:
Refer to the topical outline table for the delivery mode.

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	1,2,3,4,5,6,7	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1 - 4	10
Lab Exercises 15 @ 2% (best 15 out of 20)	Hands-on exercises	1,2,3,4,5,6,7	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1 - 4	30
Project	Individual Assignments	1,2,3,4,5,6,7	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1 - 4	30
Final Exam	This is a short answer exam that will evaluate the knowledge of the student	1,2,3,4,5,6,7	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						

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

TOPICAL OUTLINE:

Week	Topic Task	Delivery mode	Outcome(s)	Content / Activities	Resources
1	1	Monday Online	1, 2, 3	● Tools for Machine Learning development and environment setup ● Introduction to Git, Command Line Interface (CLI), Jupyter Notebook ● Introduction to Python	**Resource material available on Blackboard**
1	2	Wednesday Online	1, 2, 3	● Introduction to Pandas	**Resource material available on Blackboard**
1	3	Friday In-person	1, 2, 3	● Introduction to Machine Learning	**Resource material available on Blackboard**
					Tasks: **Lab Exercises 1, 2, 3, 4**
2	4	Monday In-person	1, 2, 3, 4	● Scikit-learn	**Resource material available on Blackboard**
2	5	Wednesday Online	1, 2, 3, 4	● Fundamentals of feature selection	**Resource material available on Blackboard**
2	6	Friday In-person	1, 2, 3, 4	● Pre-processing of data (data cleaning)	**Resource material available on Blackboard**
					Tasks: **Lab Exercises 5, 6, 7, 8, 9, 10**
3	7	Monday In-person	1, 2, 3, 4, 5, 6	● ML Algorithms - I	**Resource material available on Blackboard**
3	8	Wednesday Online	1, 2, 3, 4, 5, 6	● ML Algorithms – II	**Resource material available on Blackboard**

3	9	Friday Online	1, 2, 3, 4, 5, 6	● ML Algorithms – III	Resource material available on Blackboard
				Tasks: **Lab Exercises 11, 12, 13, 14, 15, 16**	
4	10	Monday In-person	1, 2, 3, 4, 5, 6, 7	● Benchmarking Algorithms ● Cross Validation ● Fine-tuning a model ● Evaluation of models	Resource material available on Blackboard
4	11	Wednesday Online	1, 2, 3, 4, 5, 6, 7	● Ensemble Learning	Resource material available on Blackboard
4	12	Friday In-person	1, 2, 3, 4, 5, 6, 7	● Project Due ● Final Exam	Resource material available on Blackboard
				Tasks: **Lab Exercises 17, 18, 19, 20** **Project Due** **Final Exam**	
		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**			