MACHINE LEARNING I

School of Comp. Technology

Course Code: AASD4000	**Co-Requisites:** Please see Course Related Information	**Pre-Requisites:** Please see Course Related Information
Applicable Program(s): T431 - Applied A.I. Solutions Development	**Core/Elective:** Core	
Prepared by:	Vejey Gandyer, Professor	
Approved by:	Chair Computer Technology, Chair, School of Comp. Technology	
Approval Date:	Tuesday, August 23, 2022	
Approved for Academic Year:	2022-2023	
Contact Hours:	48.00	
Credit Hours:	3.00	

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 text and audio analysis. Students will gain experience with professional tools and techniques such as Git, Docker, and Python libraries like Scikit-learn, Spacy, Librosa, and PyAudioAnalysis.

Essential Employability Skills

This course contributes to your program by helping you achieve the following Essential Employability Skills:

EES 1   COMMUNICATION: Communicate clearly, concisely and correctly in the written, spoken and visual form that fulfills the purpose and meets the needs of the audience. (P, E,)

EES 2   COMMUNICATION: Respond to written, spoken or visual messages in a manner that ensures effective communication. (P, E,)

EES 3   NUMERACY: Execute mathematical operations accurately. (P, E,)

EES 4   CRITICAL THINKING & PROBLEM SOLVING: Apply a systematic approach to solve problems. (T, P, E,)

EES 5   CRITICAL THINKING & PROBLEM SOLVING: Use a variety of thinking skills to anticipate and solve problems. (T, P, E,)

EES 6   INFORMATION MANAGEMENT: Analyze, evaluate and apply relevant information from a variety of sources. (T, P, E,)

EES 7   INFORMATION MANAGEMENT: Locate, select, organize and document information using appropriate technology and information systems. (T, P, E,)

EES 8	INTERPERSONAL: Show respect for diverse opinions, values, belief systems and contributions of others. (P, E,)
EES 9	INTERPERSONAL: Interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals. (T, P, E,)
EES 10	PERSONAL: Manage the use of time and other resources to complete projects. (T, P, E,)
EES 11	PERSONAL: Take responsibility for one's own actions, decisions and consequences. (P, E,)

Note: "T" means elements of the skill are taught; "P" means elements of the skill are practiced; "E" means elements of the skill are evaluated; "C" means the skill culminates.

Course Learning Outcomes

When you have earned credit for this course, you will have demonstrated the ability to:

CLO 1	AASD4000 CLO1 - Explain Machine Learning concepts of an AI ecosystem
CLO 2	AASD4000 CLO2 - Utilise developer tools like Git, Docker, and the Command Line Interface (CLI)
CLO 3	AASD4000 CLO3 - Assess, transform, and select the appropriate data attributes for building Machine Learning models.
CLO 4	AASD4000 CLO4 - Apply Natural Language Processing techniques like Sentiment Analysis, Entity Recognition, Text classification
CLO 5	AASD4000 CLO5 - Apply audio analysis techniques such as Speaker identification, Audio Classification, Speech-to-Text conversion
CLO 6	AASD4000 CLO6 - Build NLP & audio models using a variety of Python libraries
CLO 7	AASD4000 CLO7 - Evaluate, and finetune appropriate text and audio models

Delivery Methods/Learning Activities

The instructional methods of this course are comprised of a combination of lectures, demonstrations, hands-on exercises and take-home assignments.

Learning Resources

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

Recommended Resources:
Python Essential Reference - David Beazley
Learn Python the Hard Way - Zed Shaw

Course Related Information

Prerequisites: None
Corequisites: None

TESTING POLICY:
- Students must complete tests and the final exam on the assigned day. If unable to complete the test/exam as scheduled, students are required to notify the professor at least three days prior to the date, so alternative arrangements can be made. Failure to comply with this policy may result in a zero grade.
- Lab tests must be completed based on given instructions and must be completed during the lab hours. There will be no partial marks awarded for any of the lab tests if they are not complete.
- There will be no makeup quiz and lab exercises, for medical or other reasons. If you anticipate missing more than 2 quizzes or lab exercises for serious, major reasons, see your professor beforehand.

ASSIGNMENT POLICY:
- All assignments must be submitted on the due date based on an instruction given by the professor. Late assignment, will be penalized 20% per day to maximum of 5 days, weekend included unless the student has notified the professor (via e-mail, phone or in person) ahead of the due date that he/she has a valid reason for late submission.
- Students are responsible for making sure their marks are up to date on the blackboard. No mark will change after two weeks from the time marks were posted on Blackboard.

Student Evaluation System

Below is a list of evaluation methods included in this course along with the course learning outcomes (CLO) and essential employability skills (EES) assessed by each. In some cases, program learning outcomes (PLO) assessed may also be indicated.

Participation (10%)

Attendance and in-class participation in various activities

> Validates Outcomes: CLO 1, CLO 2, CLO 3, CLO 4, CLO 5, CLO 6, CLO 7, EES 1, EES 2, EES 3, EES 4, EES 5, EES 6, EES 7, EES 8, EES 9, EES 10, EES 11

Lab Activity(ies) (30%)

Hands-on exercises. 15 @ 2% (best 15 out of 20)

> Validates Outcomes: CLO 1, CLO 2, CLO 3, CLO 4, CLO 5, CLO 6, CLO 7, EES 1, EES 2, EES 3, EES 4, EES 5, EES 6, EES 7, EES 8, EES 9, EES 10, EES 11

Project(s) (30%)

Individual Assignments

> Validates Outcomes: CLO 1, CLO 2, CLO 3, CLO 4, CLO 5, CLO 6, CLO 7, EES 1, EES 2, EES 3, EES 4, EES 5, EES 6, EES 7, EES 8, EES 9, EES 10, EES 11

Final Exam (30%)

This is a short answer exam that will evaluate the knowledge of the student

> Validates Outcomes: CLO 1, CLO 2, CLO 3, CLO 4, CLO 5, CLO 6, CLO 7, EES 1, EES 2, EES 3, EES 4, EES 5, EES 6, EES 7, EES 8, EES 9, EES 10, EES 11

Prior Learning Assessment and Recognition

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Prior learning assessment and recognition (PLAR) is a process that gives students the opportunity to obtain academic credit for one or more courses in a certificate, diploma or degree based on demonstrated prior learning acquired through life experiences before enrollment in a program. More information regarding PLAR can be found on the GBC website at: http://www.georgebrown.ca/plar/

• This course is PLAR eligible, please see Program Coordinator/Chair for more information.

Grading System

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The passing grade for this course is 50% / "D"

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

Refer to the Evaluation System on this outline for information on how marks are distributed. More detailed information on assessments may also be found in your Course Section document.

As per Office of the Registrar Policies:

"A" Range = GPA 4.0-Consistently exceeds (course) requirements; shows evidence of being well-organized; shows original and creative thinking and a superior grasp of subject matter.

"B" Range = GPA 3.0-Shows consistent performance and evidence of being well-organized, shows elements of original and creative thinking; has a strong grasp of subject matter

"C" Range = GPA 2.0-Applies the subject matter appropriately; comprehends the subject matter."

"D" Range = GPA 1.0-The student inconsistently applies and communicates knowledge of the subject matter

"F" Range = GPA 0.0-The student fails to apply and communicate an understanding of the subject matter.

Additional information regarding grading for this course may also be found in the "Course Related Information" section of this course outline.

Legend

Terms
- ILO: Indigenous Learning Outcome
- Apprenticeship LO: Apprenticeship Learning Outcome
- CLO: Course Learning Outcome
- DPLO: Degree Program Learning Outcome
- EES: Essential Employability Skill
- EOP: Element of Performance
- GELO: General Education Learning Outcome
- LO: Learning Outcome
- APO: Additional Program Outcome
- PLA: Prior Learning Assessment
- PLAR: Prior Learning Assessment and Recognition
- PLO: Program Learning Outcome