

DAWSON COLLEGE
COMPUTER SCIENCE DEPARTMENT
COURSE OUTLINE

INTRODUCTION TO ARTIFICIAL INTELLIGENCE:

420-BWC-03

Ponderation: 1.5-1.5-3

Prerequisite: None

Domain: Language of Mathematics and Computer Science

Ensemble: 1

Semester: Fall 2023

Revised: 2023-05-22

Teacher:	Section	Office	Email
TBA			
TBA			

Teachers' schedules will be posted on Lea or Moodle.
Teachers will respond to students' inquiries in a timely manner.

Course Objectives

Upon Completion of this course the student will:

1. Have achieved a basic level of AI literacy.
2. Identify risks in AI applications
3. Be able to use google colab to run and edit basic code
4. Be able to produce graphs using python libraries
5. Understand the technology and concepts that applies to Information Technology

Course Methodology

This course consists of 1 lecture period and 1 lab period each of 1½ hours per week over a period of 15 weeks. The lecture periods will cover topics in each of the six objective areas stated above. Specific topics are outlined in following pages, and the lectures may include additional material chosen by the instructor.

The lab periods will be devoted to students doing either the assigned training or exercises at their respective workstations. In addition, students are expected to spend 3 hours per week on homework.

Required Materials

Media suitable for backups and assignment submission.

Evaluation

Note: Submission dates, etc. in this course outline are approximate. Students are expected to demonstrate both computer and English language literacy in all submitted work.

Failure in the essay will result in the failure of the course with a maximum mark of 50% or the essay grade.

In-Class Worksheets.....	20%
Lab work and assignments.....	20%
2 take home Writing assignments (10% each)	20%
Final Assignment and Presentation (summative).....	40%

Weekly Topics

1. Introduction -> AI vs ML, History of AI
 - a. Review course outline
 - b. What is Artificial Intelligence and Machine Learning?
 - c. History of AI
2. Stats/ML Primer
 - a. Accuracy, Recall and Measurements
 - b. Training, Verification and Testing
 - c. Features and Labels
3. Forecasting and Prediction
 - a. Understand Regression and Classification and how past data can model future
 - b. Identify Proxy Variables: features which encode another trait (race, gender, ability,...)

Applications: Diagnostics, Financial Forecasting / Loan Acceptance

4. Intro to Natural Language Processing – Sentiment Analysis
 - a. View different types of data present within language and writing.
 - b. Classify text with descriptive labels: positive, negative

Applications: Movie Reviews, Hate/Aggressive Speech Detection,

5. NLP: Language Models and Translation
 - a. Use models of existing text to generate new passages
 - b. Discuss copyright, and whether generated text is novel

Applications: ChatGPT, Translation

Written Assignment #1 Due

6. NLP: Summarizing and Understanding
 - a. Understand how Language Models can summarize
 - b. Describe what Machine Understanding means, and if it is human understanding.

Applications: Article Summarization, Research Assistance

7. Intro to Computer Vision – Classification
 - a. Introduce the ImageNet challenge
 - b. Explore Convolutional Neural Networks and how patterns are found in pictures
 - c. Discuss adversarial attacks and how they expose dissonance between AI and Human processing

Applications: Robotics, Data Labelling, Security

8. CV: Facial Recognition
 - a. Describe the Detect, Align, Extract, Match pipeline.
 - b. Analyze how FRT models are trained, and how they are prone to bias.
 - c. Understand how misidentification can cause harm

Applications: Police Surveillance, Personal Security, E-Proctoring

9. CV: Object Tracking

- a. Use previously discussed technology to track objects

Applications: Satellite Tracking / Astronomy, Robotics, Military Use

10. Recommender Systems

- a. Exploit user browsing history to recommend new media, purchases, ads.
- b. Demonstrate how data can be manipulated to harmfully target vulnerable individuals

Applications: Social Media, E-Commerce, Streaming Services

Written Assignment #2 Due

11. Essay Brainstorming Session

12. Topics 1 – TBD- Possible Topic: Generative AI/ Generative Art

Essay Proposal Due

13. Topics 2 – TBD – Possible Topic: Looking Forward: What can we do as citizens of a post-AI society

14. Presentations 1

Essay Due

15. Presentations 2

Ministerial Objectives and Standards: Computer Literacy, Set 1

Ministerial Objectives:

The objective of this is course is to enable students to recognize the role of computers in contemporary society. To this end, they should acquire certain general, basic knowledge in the field of computers, and learn something of the evolution of computers. They should then be able to recognize the contribution of computers to the development of other fields of knowledge, illustrate the diversity of applications of computers, and assess the impact of computers on individuals and organizations.

Ministerial Standards:

By the conclusion of the course, each student will be able to produce a 750-word paper based on several concrete examples chosen by the students. In this paper, using appropriate terminology, the student would make the necessary distinctions of basic notions and concepts of computers, identify the main branches of computer science, describe some of the milestones in the evolution of computers, and give examples of major contributions of computers to the development of other fields of knowledge. The student would also, with the aid of concrete examples, give a variety of uses of computers in various spheres of human activity, and explain how computers have altered certain human and organizational realities, while recognizing the advantages and disadvantages of these changes.

Course and program rules and regulations:

A minimum grade of 60% is required to pass the course.

Assignments are due at the due date specified by the instructor. Assignments received after this time are late. Assignments will not be accepted after due date set by instructor. In exceptional circumstances, such as illness, etc. assignments submitted late will be graded provided that the student has received an extension from the instructor in advance.

Each student must submit their own individual answers to assignments, and shared solutions are not acceptable. Students must protect their work from being easily copied by others by introducing uniqueness into their work in the choice of images used, the display styles used in the presentation of documents, the originality of the written descriptive passages, and by placing digital signatures on their original images.

Students are reminded that they are responsible for all material presented in the lecture and during the lab, and are expected to obtain material they have missed. In certain cases, specific learning activities conducted in class time are essential to measure the achievement of a competency. Absence may result in a penalty up to a grade of 0 for the activity.

Students must follow exactly the instructions in the lab exercises about how and where to store all computer files in order for their work to be accepted and properly evaluated.

DAWSON COLLEGE

COMPUTER SCIENCE DEPARTMENT

POLICIES

1. ACADEMIC INTEGRITY

The Computer Science Department adheres to the Dawson College Academic Conduct policy. Students have an obligation to inform themselves of all aspects of this policy. Every instance of cheating or plagiarism leading to a resolution that impacts a student's grade must be reported, with explanation, in writing, to the appropriate Dean. (ISEP Section V-A). The penalty for cheating or plagiarism may range from a penalty to zero on the work to a failure in the course.

2. ATTENDANCE AND LATENESS

Students are responsible for all material covered in classes and labs, whether or not they are present. Students have an obligation to arrive on time and to remain for the duration of scheduled classes, labs and activities. Students who disregard this obligation may be asked to leave the class, lab or activity. Students should refer to the Institutional Student Evaluation Policy (ISEP Section IV-C) regarding attendance.

3. RELIGIOUS HOLIDAY OBSERVANCE

Class period(s) may be cancelled in order that the teacher can observe religious holidays. Any material missed as a result, will be made up during labs, class periods and alternate tutorial sessions.

Students observing religious holidays must inform their teachers, in writing, as prescribed in the ISEP Policy on Religious Observances, no later than the end of the second week of the impacted semester or term. This applies both to the semester or term, as well as to any final examination period. (ISEP Section IV-D). Students absent from classes because of observance of religious holidays will not be penalized. It must be emphasized, however, that this College policy should not be interpreted to mean that a student can receive credit for work not performed. It is the student's responsibility to fulfill the requirements of the alternative arrangement.

4. SOFTWARE

The Computer Science Department forbids the use of the computer labs it uses to make any copies of any software without the explicit authorization of the Department. Apart from any legal action that might arise from such unauthorized copying, the Computer Science Department reserves the right to discipline any student involved in such activity.

Students who borrow software from the College and fail to return it will be placed on the defaulter list and be subject to the appropriate penalties.

Viruses are programs that attach themselves to a computer system without the permission of those to whom the system belongs. They are deliberately written to be, at worst, harmful (e.g. destroying the contents of disks) and, at best, bothersome (e.g. disturbing the image shown on the screen). They can cause serious losses of time and effort for students, staff and faculty. Any student involved in the deliberate spreading of viruses is subject to the most severe penalties prescribed by College regulations, apart from any legal action that might arise from such acts.

5. LITERACY

The Computer Science Department recognizes that literacy in all its forms (read, written, spoken) is essential to students in their careers.

Teachers may choose to incorporate a literacy component into the marking scheme for any piece of work. Teachers may use their discretion to insist that any piece of work submitted for credit is revised by the student if it is unsatisfactory with regard to literacy.

Teachers will inform all students in their courses of this policy at the beginning of each semester either by including it in the course description or otherwise.

6. CELL PHONES

The use of cell phones in all Computer Science lectures, labs and exams is prohibited.

7. PORTABLE COMPUTERS

The use of portable computers in all Computer Science lectures for purposes other than note-taking is prohibited.

8. STUDENT CONDUCT

Everyone has the right to a safe and non-violent environment. Students are obliged to conduct themselves as stated in the Student Code of Conduct and in the ISEP section on the roles and responsibilities of students. (ISEP Section II-D)

9. PROFESSIONAL CONDUCT POLICY

Students who are enrolled in the Computer Science Technology careers program must conduct themselves according to the Professional Conduct Policy as described in the Program Handbook (ISEP Section IV-N.2). This professional conduct policy includes online conduct.

10. INTENSIVE COURSE CONFLICTS

If a student is attending an intensive course, the student must inform the teacher, within the first two weeks of class, of the specific dates of any anticipated absences.

11. ISEP

The Institutional Student Evaluation Policy (ISEP) is designed to promote equitable and effective evaluation of student learning and is therefore a crucial policy to read and understand. The policy describes the rights and obligations of students, faculty, departments, programs, and the College administration with regard to evaluation in all your courses, including grade reviews and resolution of academic grievance. ISEP is available on the Dawson website. ([Link](#))