CGSC 3601 – Artificial Intelligence for Cognitive Scientists
DEPARTMENT OF COGNITIVE SCIENCE, CARLETON UNIVERSITY

Lecture time and dates:	Fridays Sept 11 – Dec 11, 11:35am – 2:25 pm, all times are Eastern Time (ET)
Lecture location:	Online, TBA
Tutorials:	A1 (Sean): Fridays, 2:35 – 3:55, Online, TBA A2 (Michael): Tuesday, 4:05 – 5:25, Online, TBA
Instructor:	Hamidreza Chinaei, PhD
Office:	Online, TBA
E-mail:	HamidrezaChinaei@cunet.carleton.ca (best way to reach me)
Office Hours:	Wednesdays, 9:30am-10:30am or by appointment
TAs:	Michael Caughey (michaeljcaughey@cmail.carleton.ca) Sean Riley (Sean.Riley@carleton.ca)
TA Office Hours:	TBA

Course Description and Learning Objectives

This course provides an overview of Artificial Intelligence (AI) techniques and applications, such as problem solving by search, machine learning and its applications, probabilistic reasoning, natural language processing, and robotics. By the end of this class, you will be able to:

- Describe various AI algorithms, including rationale for their design
- Explain how to evaluate AI algorithms
- Compare and contrast various AI approaches
- Apply AI algorithms and techniques to solve various AI problems and synthesize the results

Prerequisites: Third year standing and CGSC 2002 and (CGSC 1005 or COMP 1005). Restricted to students enrolled in B. COG. SC. Honours**.**

Text book required

There is no textbook required for the course. There may be required readings or supplementary readings and these will be provided through the course web site.

Supplementary texts

There are several excellent, albeit highly technical, AI textbooks that provide supplementary information. The two tests will not contain content from these sources UNLESS otherwise stated during class.

Artificial Intelligence: Foundations of Computational Agents, David Poole, Alan Mackworth; Cambridge University Press (April 19, 2010).

Available freely online under a Creative Commons Attribution-Noncommercial-No Derivative Works 2.5 Canada License: **http://artint.info/html/ArtInt.html**

AI: A Modern Approach, Artificial intelligence : a modern approach, Stuart Russell, Peter Norvig, Prentice Hall, 2010. Available under course reserves in the library.

Course modality: Online blended mode: mostly synchronous, short videos will be available for difficult subjects. **Students are responsible to ensure they have proper internet connection before the term starts.**

Course Web Page (cuLearn)

On this site you will find the course syllabus, slides, and any supplementary materials. Please note that the course slides are there for you to use and you are welcome and encouraged to do so, **but you are prohibited from sharing the slides.** The slides are the intellectual property of the author(s), are Copyrighted and may not be shared or repurposed outside of this class. Sharing the slides either by electronic or non-electronic means is a violation of Copyright and author(s) reserve the right to take action if you do so. For more information on Carleton's policy on Copyright infringement see:
https://calendar.carleton.ca/copyrightcompliance/

Evaluation

Midterm and final exam: The midterm will cover content from the first portion of the course (up to and including week 5). The final exam will focus on the part of the class not covered by the midterm (week 6 onwards) but will also include some selected topics prior to the midterm – details will be provided in class.

The midterm and the final will be based on (1) the course slides, which will be made available on cuLearn, (2) selected tutorial topics, (3) any additional content provided during the class and/or readings as specified before the test/exam. Class attendance is strongly encouraged because information will be provided during class beyond that in the slides or readings, including explanations of course themes, perspectives that are not in the slides, hints for tests, etc. Thus, if you miss a class, please obtain a fellow student's notes from that class.

Reading quizzes: there will be 4 brief online quizzes on the assigned readings which will be research papers illustrating the application of AI techniques – **you are only required to write any 3 of the 4 scheduled quizzes and each is worth 2%** (see schedule for dates). If you write all 4 quizzes, that grade will be added to the quiz total (if you obtain over 6%, that additional score up to 2% will count as bonus points added to the course total). **What happens if I miss a quiz?** Because there are 6-7 days to write a quiz, one quiz can be dropped as well because they are designed to mirror class content, make-up quizzes will not be available – if you miss a quiz because of a documented reason, its weight will be added to the final. More details will be provided in the first day of class.

Tutorials. The tutorials are designed to provide hands on practice with concepts discussed in class – please see schedule below for exact dates. Attendance is mandatory, and the TA will give you a mark for the tutorial at the end of the session: **0 if did not show up, 0.5 if you came late, and 1 if came on time and worked on the tutorial materials the whole period. Tutorials have a grace period similar to assignments until Monday 9:30am -see below- but with no penalty. However, it is not recommended to use grace-period. It is only for unseen circumstances such as illness, etc.**

Some of tutorials provide "*assignment time*". If you finish the corresponding assignment before the tutorial and submit the final version before the tutorial start time, you don't have to attend the tutorial and you will get credit – but you must let your TA know before the tutorial starts.

Assignments: There are three written assignments that involve the application of AI techniques (see table below for due dates and weights). **All assignments are due by 9:30am on the specified date**. Please avoid putting the assignment off until the last minute – this does not work well with AI assignments as they require exploration of the concepts, use of AI software, etc.

Assignment	Due Date, tentative	Weight
A1	Friday, Oct. 16, 9:30am	6%
A2	Friday, Nov 13, 9:30am	6%
A3	Friday, Dec 4, 9:30am	6%

Late policy: Assignments should be passed in on time – during the online semester periods there is a grace period of 3 days for each day 5% of the grade is deducted. After the 3-day grace period no assignment is accepted. This policy is to ensure that we can provide some flexibility if a situation such as sickness happens. All due dates are on Fridays and the grace period is until 9:30 Monday after. It is not recommended to use the grace period as you also may need to work on the weekend. The grace period is for unseen situations. After the 3-day grace period, the assignment will be given a grade of 0. Please do not wait till the last minute to submit as technical problems such as connectivity may occur. Some advice:

1. upload partially completed submissions as you work on them (you can submit multiple times)
2. submit the correct type of file (if the assignment requires a python file, submit a file that ends in .py, not a word file)
3. aim to submit your final submission at least 30 minutes in advance of the due date and time
4. download your submission and verify the contents after submitting

Issues with uploaded files. It is your responsibility to ensure that the file you uploaded is correct (see point 3 above, i.e., after uploading, download to ensure the correct file(s) was uploaded).

Plagiarism and collaboration policy: You may collaborate on the assignments with **one** other person – if you do, you must clearly indicate the name of the person you worked with on the assignment you pass in (and in that case, your assignments can be the same). **Group collaboration on the assignments with more than 2 people is not permitted – this will be strictly enforced. If you use any external sources, like papers or stackexchange, please cite them. In general, if you are not sure, please check with us.** Please see the notice on academic integrity towards the end of the syllabus (e.g., "A student found in violation of academic integrity standards may be awarded penalties which range from a reprimand to receiving a grade of F in the course or even being expelled from the program or University").

Midterm and Tutorial Deferral Policy

If, for extraordinary reasons you miss any of the mandatory evaluation items, you must notify the instructor as soon as possible, **before** the date of the item, unless extraordinary circumstances prevent doing so. A deferred item will be permitted under only two conditions: illness or bereavement. Documentation is required in order to schedule a deferral. If no documentation is provided, you will receive a grade of zero for that item. This policy will be strictly enforced. Deferral of the final exam is only possible if the registrar office is notified and their protocol is followed.

Weighting of the Final Grade

Readings quizzes:	6%	[see schedule for quiz dates]
Midterm:	28%	[October 23]
Assignments:	18%	[see schedule for due dates]
Tutorials:	10%	[see schedule]
Final:	38%	[regular exam period]

E-mail Protocol and Guidelines

I will respond to e-mails within 24-48 hours (excluding weekends and holidays). E-mail is best reserved for simple questions - if you have questions that require more than a yes/no type answer, the best forum for answering them is during class or in person during group or individual office hours.

Communication guidelines: Please write e-mails clearly using complete words, sentences and punctuation. Address your emails appropriately by using the names and titles you have asked to use when addressing your TA and professor.

Lecture and Schedule (tentative)

Please note that the dates for topics may change. Any supplementary or required readings will be made available on cuLearn. Assignment dues are in red; Assignment posting is in green. Reading quiz schedule is in purple (details will be provided in class).

	Lecture	Tutorial
Week 1 Sept 11	Welcome and introduction Symbolic approaches: problem solving (PS) as search	**PS as search**
Week 2 Sept 18	Symbolic approaches cont'd	**Expert Systems**
Week 3 Sept 25	Bayesian networks (BN) and probabilistic reasoning **Reading Quiz 1 (online, open Tuesday, Sept. 29 – Monday, Oct. 5)**	**BN**
Week 4 Oct 2	Bayesian networks cont'd **A1 posted (Monday)**	A1 *assignment time, see rules about attendance*
Week 5 Oct 9	Supervised machine learning (I) **Reading Quiz 2 (online, open Tuesday, Oct. 13 – Monday, Oct. 19)**	**Weka**
Week 6 Oct 16	Supervised machine learning (II) **A2 posted (Tuesday)**	**ID3** **A1 due**
Week 7 Oct 23	Midterm (coverage: Week 1 – Week 5)	*A2 assignment time, see rules about attendance*
Reading Week (Oct 26-30)		
Week 8 Nov 6	Neural networks (NN) **Reading Quiz 3 (online, open Tuesday, Nov. 10 – Monday, Nov. 16)**	**NN - basics**
Week 9 Nov 13	Neural networks cont'd **A3 posted (Monday)**	*A3 assignment time, see rules about attendance* **A2 due**
Week 10 Nov 20	Natural language processing (NLP) **Bonus Reading Quiz 4 - TBA**	**NLP & Weka**
Week 11 Nov 27	Unsupervised machine learning, Reinforcement learning	**Unsupervised learning** **A3 due**
Week 12 Dec 04	Reinforcement learning cont'd, brief review	No tutorials

Regulations and Information Common to all Cognitive Science Courses

REQUESTS FOR ACADEMIC ACCOMMODATION

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

Pregnancy obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details see the Student Guide

Religious obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details see the Student Guide

Academic Accommodations for Students with Disabilities: The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam (if applicable).

PETITIONS TO DEFER

Students unable to complete a final term paper or write a final examination because of illness or other circumstances beyond their control or whose performance on an examination has been impaired by such circumstances may apply within five working days to the Registrar's Office for permission to extend a term paper deadline or to write a deferred examination. The request must be fully and specifically supported by a medical certificate or other relevant documentation. Only deferral petitions submitted to the Registrar's Office will be considered.

WITHDRAWALS

The last day to withdraw from a Fall 2019 course, without academic penalty, is December 6, 2019.

The last day to withdraw from a Fall course with a full fee adjustment (financial withdrawal) is September 30. Withdrawals after this date will create no financial change to term fees but will result in a grade(s) of WDN appearing on your official transcript.

OFFICIAL FINAL EXAMINATION PERIOD

Fall 2020 courses: December 12-23, 2020 (may include evenings & Saturdays or Sundays). **For more information on the important dates and deadlines of the academic year, consult the Carleton 2019-2020 Calendar.**

PLAGIARISM

The University Senate defines plagiarism as "*presenting, whether intentional or not, the ideas, expression of ideas or work of others as one's own.*" This can include:

- reproducing or paraphrasing portions of someone else's published or unpublished material, regardless of the source, and presenting these as one's own without proper citation or reference to the original source;
- submitting a take-home examination, essay, laboratory report or other assignment written, in whole or in part, by someone else;
- using ideas or direct, verbatim quotations, or paraphrased material, concepts, or ideas without appropriate acknowledgment in any academic assignment;
- using another's data or research findings;
- failing to acknowledge sources through the use of proper citations when using another's works and/or failing to use quotation marks;
- handing in "*substantially the same piece of work for academic credit more than once without prior written permission of the course instructor in which the submission occurs.*"

Plagiarism is a serious offence, which cannot be resolved directly with the course's instructor. The Associate Deans of the Faculty conduct a rigorous investigation, including an interview with the student, when an instructor suspects a piece of work has been plagiarized. Penalties are not trivial. They range from a mark of zero for the plagiarized work to a final grade of "F" for the course, and even suspension from all studies or expulsion from the University.

GRADING SYSTEM

Letter grades assigned in this course will have the following percentage equivalents:

A+ = 90-100	B = 73-76	C - = 60-62
A = 85-89	B - = 70-72	D+ = 57-59
A - = 80-84	C+ = 67-69	D = 53-56
B+ = 77-79	C = 63-66	D - = 50-52

F Failure. No academic credit

ABS Absent from the final examination

DEF Official deferral (see "Petitions to Defer")

FND "Failed, no Deferral" – assigned when the student is absent from the final exam and has failed the course on the basis of inadequate term work as specified in the course outline.

Standing in a course is determined by the course instructor, subject to the approval of the Chair and Faculty Dean.

ICS RESOURCES (613-520-2600, phone ext. 2522)

Department of Cognitive Science (2522)	2221 DT (Dunton Tower)
Registrar's Office (3500)	300 Tory
Student Academic and Career Development Services (7850)	302 Tory
Paul Menton Centre (6608)	501 University Centre
Writing Tutorial Service (1125)	4th fl Library
Learning Support Services (1125)	4th fl Library

Academic Advising

Visit the Cognitive Science Undergraduate Office, DT 2221 to discuss your program. Advisors can answer questions concerning:

- Course selection and meeting program requirements
- Your audit and transfer credits
- Gaining access to courses that are closed
- Information concerning prerequisites and preclusions
- Course equivalencies and substitutions
- Information about whether to pursue the (Honours Project Course) or the Thesis stream and CGPA requirements
- Community Practicum Course
- Concentrations
- Exchanges and course selection

DEPARTMENTAL DROP BOX POLICY – Located outside 2202A DT

Mail received prior to 8:30am will be date stamped with yesterday's date. Mail received before 8:30am on Monday's will be date stamped with the previous Friday's date.Please include your name, student number, course code and instructor's name. If any of this information is missing it may delay getting your paper to your instructor.