CIS*3700 Introduction to Intelligent Systems

Winter 2021

School of Computer Science
Credit Weight 0.50

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1 Course Details

1.1 Calendar Description

This course covers the core topics of artificial intelligence, namely: agents and environment, search, knowledge representation, reasoning, and learning. The last three topics are covered using logic as the common formalism for coherence. The course introduces a broad range of basic concepts, terminology, and applications, in addition to providing some specific, widely applicable methodologies.

Pre-Requisites: (CIS*3750 or CIS*3760), (CIS*2460 or STAT*2040)

1.2 Course Description

This is an introductory course on Artificial Intelligence. The following topics are covered:

A. Intelligent agents
B. Properties of agent environment
C. Solving problems by uninformed search and heuristic search
D. Knowledge representation with logic
E. Inference with model checking, resolution, and chaining
F. Inductive learning and decision trees
G. Regression, classification by linear models, gradient descent, & neural networks

Course assignments require programming in Java.

All components of this course are delivered online. Some components involve real-time communication. Hence, a reliable computer and an internet connection are necessary to participate in online learning. Assignment and exam submissions involve scanning or photocopying hand-written answers into PDF files, and a scanner or photo-taking cell phone is needed.

1.3 Timetable

The following time slots has been scheduled for this course in WebAdvisor, with the starting date of Jan 11, 2021 and the ending date of Apr 27, 2021:

LEC Tues, Thur
02:30PM - 03:50PM
LAB Tues
11:30AM - 12:20PM
EXAM Sat
08:30AM - 10:30AM (2021/04/24)

To ensure no time conflict for synchronous (live) activities, all live activities occur within the 3 scheduled time slots (2 on Tues and 1 on Thur) as follows:

1. Virtual lectures (video-recorded) are delivered to CourseLink on Tues and Thur by 2:30PM.
2. Weekly Instructor office hour is on Thur from 2:30 to 3:30 PM by Teams. The Instructor will answer student questions. Participation is voluntary.
3. Virtual labs (video-recorded) are delivered to CourseLink on Mon by 11:30AM (24 hours before the scheduled lab time).
4. Weekly TA office hour is on Tues from 11:30AM to 12:20PM (at scheduled Lab time) by Teams. The TA office hour is best utilized when students study the lab video delivered on Mon in advance, and bring questions to TA office hour.
5. Time slots on Tues are NOT used live in each week. They will be used as needed, e.g., extra office hour by the Instructor or TA, with advance notice.

The 1st CIS*3700 lecture is on Jan 12. Refer to that week as Week 1, and subsequent weeks as Week 2, 3, and so on. The last lecture is on Apr 8 of Week 13. Lecture weeks are summarized below, where Week 6 (Feb 15) is Winter Break (no lecture):

Lectures: Week 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13

There are a total of 9 labs, scheduled below (no lab on Week 1, 6, 10, and 13):

Labs: Week 2, 3, 4, 5, 7, 8, 9, 11, 12

Instructor and TA office hours are scheduled below (no office hour on Week 1 and 6):

Office Hours: Week 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13

1.4 Final Exam

The Final Exam on Apr. 24, 2021 is open-book and online. It includes both multiple-choice and short answer questions. The expected time to answer all questions by an average student is 2-hour. Counting additional time for online file processing, the Final Exam will have 2.5-hour duration.

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2 Instructional Support

2.1 Instructional Support Team

Instructor: Yang Xiang, Professor, yxiang@uoguelph.ca

Teaching Assistant: Hillary Dawkins, hdawkins@uoguelph.ca

2.2 Consultation of Instructor

You may ask the Instructor questions on any aspect of the course, and questions about lectures and assignments are preferably directed to the Instructor. Requests to regrade assignments should only be directed to the Instructor. Consultation with the Instructor is available in the following ways:

1. Instructor office hours (Thur, 2:30 - 3:30 PM) as Teams meetings: Student participation is voluntary. Meetings are driven by questions from students, typically one student at a time, with other students present. The 3:30 PM end time will extend if some student remains with unanswered questions.

   Additional office hours may be arranged on Tues, 2:30 - 3:30 PM, as needed and with advance notice.
2. By CourseLink Discussions forum: A Discussions forum, "Ask the Instructor", can be used by students to raise questions on course materials, and they will be answered by the Instructor. Both the question and the answer are visible to all students.
3. By email to Instructor: If you prefer to keep your question private, email to **yxiang@uoguelph.ca**, and it will normally be answered within 24 hours. Do not send to other addresses (see below). If your question is not answered within 24 hours, most likely it was sent to wrong address, and never reached the Instructor.
4. By individual Teams meeting: As email is not interactive, if a student prefers interactive discussion with the Instructor, they can request one-on-one Teams meeting. Please request by email and suggest 2 optional time slots.

Please do not send questions or requests to the Instructor by Teams Chat or by replying to mark report. These channels are NOT monitored. As the result, your question will NOT reach the Instructor and cannot be responded.

2.3 TA Office Hour

TA office hour occurs on Tues from 11:30AM to 12:20PM. Lab related questions are preferably directed to the TA. No request to regrade assignments should be directed to TA.

3 Learning Resources

3.1 Textbook

S. Russell and P. Norvig, Artificial Intelligence: A Modern Approach, (4th Ed.), Pearson, 2021.

3.2 Course Website at CourseLink

The website contains the following resources:

1. Course outline
2. News for the course
3. Virtual lectures
4. Lecture notes
5. Assignment descriptions
6. Assignment Submission Instruction
7. Droboxes for submission of assignments
8. Resources for assignments
9. Assignment solutions distributed after marking
10. Questions and Answers (Q & A)
11. Discussions forum "Ask the Instructor"
12. Discussions forum "Discuss with Peers" for students to share thoughts on course materials

4 Learning Outcomes

After completing this course, students will be able to

1. identify key properties of environment for intelligent system applications
2. implement uninformed search and A* search
3. encode domain knowledge in propositional logic
4. understand inference by resolution, forward and backward chaining
5. understand inductive learning and information measure
6. implement decision tree learning
7. understand regression, classification by linear models, and simple artificial neural networks

5 Teaching and Learning Activities

The course includes the following teaching and learning activities:

1. Fundamental concepts, theories, methodologies, and algorithms are described and analyzed through virtual lectures.
2. The theories, methodologies, and algorithms are practiced through lecture examples lead by the Instructor.
3. The theories, methodologies, and algorithms are practiced independently by students through short-answer questions in labs and assignments.
4. Hands-on experience on solving AI problems is gained through labs and algorithm implementation problems in assignments.
5. Learning from peers is facilitated by Discussions Forum "Discuss with Peers".

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6 Assessments

6.1 Marking Schemes & Distributions

Student performance will be evaluated by 3 assignments (A1, A2, A3) and the Final Exam.

Course Work	Due Date	Weight
A1:	Feb. 11 (Week 5)	20%
A2:	Mar. 16 (Week 10)	18%
A3:	Apr. 6 (Week 13)	18%
Final Exam:	Apr. 24: 8:30 - 11:00AM	44%
		A student passes the course if the weighted sum of all components $\geq$ 50%.

6.2 Assignment Submission

Assignment Submission Instruction in the course Website should be followed. Assignments should be submitted to CourseLink Dropbox by 11:30PM on specified due dates. Late submissions are subject to reduction of 20% of the full mark per day, up to 2 *calendar* days (graceful period). For instance, the latest time to submit an assignment due on Thursday is 11:30PM on Saturday, with the highest possible mark of 60%.

6.3 Re-Grading Policy

For each assignment, a mark report will be emailed to each student. Problems in marking should be reported to the Instructor at yxiang@uoguelph.ca within 48 hours after receiving the mark report. After 48 hours, the reported mark will be finalized. Please do not request re-grading by replying to mark report, as it will NOT reach the Instructor.

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7 University Statements

7.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

7.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars. Undergraduate Calendar - Academic Consideration and Appeals
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml Graduate Calendar - Grounds for Academic Consideration
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml Associate Diploma Calendar - Academic Consideration, Appeals and Petitions
https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml

7.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.
Undergraduate Calendar - Dropping Courses
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml Graduate Calendar - Registration Changes
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml Associate Diploma Calendar - Dropping Courses
https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml

7.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

7.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student. When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway. Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability. Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day. For Guelph students, information can be found on the SAS website https://www.uoguelph.ca/sas For Ridgetown students, information can be found on the Ridgetown SAS website
https://www.ridgetownc.com/services/accessibilityservices.cfm

7.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community-faculty, staff, and students-to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.
Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor. Undergraduate Calendar - Academic Misconduct https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml Graduate Calendar - Academic Misconduct https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml

7.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

7.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs. Academic Calendars https://www.uoguelph.ca/academics/calendars

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8 Policy Regarding Online Course Delivery

Do not redistribute recorded interactive discussions that involve your classmates. This includes virtual office hours with the instructor.

Online activities such as virtual office hours may be recorded by the instructor and posted to Courselink. By taking this course you are agreeing that your participation in these activities can be used in this manner. If you do not wish to have your image or voice recorded as part of these activities, then either do not take this course or do not ask verbal questions during these activities.

A reliable internet connection that is sufficient for online learning is necessary for this course. If you do not have a sufficiently fast and reliable internet connection, then you may not be able to view or download lectures or other course material. It may also not be possible to attend virtual office hours or have individual Teams meetings with the instructor.

This course is offered in the eastern standard time zone (EST). While taking this course, you may be required to attend online activities such as virtual office hours or individual Teams meetings with the instructor between 9:00 and 4:30 EST.
