CARLETON UNIVERSITY
SCHOOL OF COMPUTER SCIENCE

COMP 4900F & 5900C Knowledge Representation for Artificial Intelligence

Instructor: Prof. Leopoldo Bertossi

Contact: (`bertossi@scs.carleton.ca`)

Instructor's Web Page: https://people.scs.carleton.ca/ bertossi

Brightspace Course Website (graduate students): `https://brightspace.carleton.ca/d2l/home`
Brightspace access for University of Ottawa Students; please see information here.

Course Web Page: https://people.scs.carleton.ca/ bertossi/kr4ai/new.htm. **This is where News and Slides will regularly be posted.**

Important Note: The midterm and the exam will be in person. The two-hour Midterm test will be on October 16th at the beginning of the lecture time. The Final Exam will be scheduled by Carleton University, and will take place during the official examination period.

Office Hour: By appointment anytime, online, contacting the instructor by email

Lectures: Mondays 18:05-20:55. Online via Zoom. No tutorials are planned for this course.

Prerequisites: COMP 3005.

Assessment: 3 Assignments (30%). Midterm test (30%). Final Exam (40%).

Description: The course is about representation of knowledge in a computer and its use for reasoning. Knowledge can be certain or uncertain. Different logical and probabilistic representation languages and models will be introduced, and reasoning mechanisms will be presented and used.

Course Contents:

1. Brief Review of Relational Databases (RDBs). Personal reading right at the course start. Material (Chapter 0) available on course web page.
2. Predicate Logic in RDBs and Datalog Extensions.
3. Metadata, Semantic Web Languages, Ontologies, Knowledge Graphs.
4. Answer-Set Programs.
5. Probabilistic Extensions of RDBs.

6. Markov Logic Networks
7. Probabilistic Graphical Models.
8. Probabilistic Logic Programming.

Reading Material (mandatory):

1. Lecture notes posted after every lecture on the course web page.
2. Relevant survey and research papers will be occasionally posted for mandatory reading.

Academic Integrity: If you are unsure of the expectations regarding academic integrity (how to use and cite references, if unauthorized collaboration with lab- or classmates is permitted (and, if so, to what degree), then you must ASK your instructor. Sharing assignment or quiz specifications or posting them online (to sites like Chegg, CourseHero, OneClass, etc.) is ALWAYS considered academic misconduct. You are NEVER permitted to post, share, or upload course materials without explicit permission from your instructor. Academic integrity offences are reported to the office of the Dean of Science. Information, process and penalties for such offences can be found on the ODS webpage: ODS webpage.

The assignments should are expected to reflect individual and personal work. Solutions should not be shared with other students. Clearly and explicitly indicate references to resources used for the problem solutions, e.g. references, material found on internet, etc. The use of artificial intelligence-based LLM systems (e.g., ChatGPT, Copilot, Elicit, etc.) to solve your assignments is prohibited, except when their use is explicitly allowed or requested as part of the assignment.

Academic Accommodation: Carleton is committed to providing academic accessibility for all individuals. Please review the academic accommodation available to students here: here.